Proceedings of 3rd National Conference on

SCIENCE, TECHNOLOGY AND COMMUNICATION SKILLS

(NCSTCS 2K20)

26-27th September, 2020

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PROCEEDINGS OF 3rd NATIONAL CONFERENCE
ON
SCIENCE, TECHNOLOGY AND COMMUNICATION SKILLS
(NCSTCS 2K20)

26-27 SEPTEMBER, 2020

Organized by

Department of Basic Science &Humanities
Narula Institute of Technology
(An Autonomous Institute under MAKAUT)
81, Nilgunj Road, Agarpara,

Kolkata –700 109

PROCEEDINGS OF 3rd NATIONAL CONFERENCE
on
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(NCSTCS 2K20)

27th-28th September, 2020

Chief Editor
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ABOUT JIS GROUP

JIS Group Educational initiative is the endeavour of Late Sardar Jodh Singhji, Chairman, JIS Group. Through the years, with this enterprising zeal and vision the empire of JIS Group spanned in the fields of Education, Dairy business, Telecommunication, Transportation, Infrastructure, Logistics, Healthcare and Social service. His aspiration to serve society by imparting knowledge, education and employment culminated into JIS Group Educational Initiatives. This is one of the majestic entrepreneurial endeavours in Eastern India, creating facilities for higher education, Research, industry and creating jobs for thousands of people.

JIS Group Educational Initiatives has heralded new age education in West Bengal by imparting futuristic undergraduate and post graduate programmes. Spread across several sprawling campuses, JIS Group Educational Initiatives has colleges in Engineering, Dental, Pharmaceutical Sciences, Management Science and Polytechnic. The objective was to create an opportunity for students from Eastern India by providing a high standard Education and Research platform in Engineering, Dental Science, Pharmacy, Hospitality management etc.

The journey commenced with a mission

"Igniting Minds, Empowering Lives"

"Learning is the beginning of wealth.
Learning is the beginning of health.
Learning is the beginning of spirituality,
searching and learning is
where the miracle process all begins"

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ABOUT THE INSTITUTE

Narula Institute of Technology is a leading Engineering & Management college, located at Agarpara in West Bengal. Approved by All India Council for Technical Education (AICTE) and affiliated to MAULANA ABUL KALAM AZAD University of Technology (MAKAUT). The college offers NBA accredited degree programmes in engineering. The four year B. Tech course is imparted in the streams like CSE, ECE, EE, CE, IT, EIE & ME. The institute provides a brilliant platform for pursuing higher studies through PG courses like M. Tech (CSE, ECE-Communication, EE-Power System, CE-Structural engineering), MBA and MCA. It has expanded to include diploma programs in EE, CE and ETC under the affiliation of West Bengal State Council of Technical Education. The Institute is eligible for receiving Central assistance under the recognition of 2(f) & 12(B) under UGC Act. The institute is also accredited by National Assessment and Accreditation Council (NAAC). The college has also received the notable World Bank Assisted and MHRD approved TEQIP (Phase II) grant for the advancement of Technical Education and is a one-stop venue for promoting a vibrant and sustainable. Moreover, it is a proud moment for the institute that presently it has acquired its position (among the top most 150 private colleges in India) in NIRF Ranking and also achieved QS-Star rankimg.

Academic success is the key for laying the foundation for the students and therefore the College emphasizes on quality academic delivery in their stride towards excellence. The College has also significantly reinforced their outreach initiatives by facilitating faculty development programme, knowledge exchange sessions, and procuring funded projects from Government to foster synergy between academia, business, industry and the community.

The institute boasts of a powerful R & D cell with immense contribution from the scholarly faculty members. There is an enormous repository of International and National Journal publications which have drawn nationwide attention. The college is in collaboration with Oracle, INFOSYS, TCS, NIT Sikkim, IIT-KGP, AIT Bangkok and other organizations of repute. The students get an opportunity to interact with foreign experts all across the globe through Conferences, conferences and special teaching-learning sessions. The student chapter plays a crucial role in organizing informative technical events within the campus. At present there are five student chapters in our college: IETE student forum of Electronics & Communication Engineering Department, ICE & ASCE of Civil Engineering Department, CSI of Computer Science Engineering, Information Technology & MCA Department and Institute of Engineers of Electrical Engineering Department. NIT is a one-stop venue for promoting a vibrant and sustainable atmosphere for teaching-learning. Besides academics, the students get an exposure to the world of co-curricular activities which help them in shaping their personality. Thus, the cornerstone of the successful evolution of Narula Institute of Technology lies in its meticulous tutoring and mentoring of the future professionals of the industry as well as of academia and citizens of the society where the Institute's success has always been directly proportional to the success of the students.

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PREFACE

The Department of Basic Science and Humanities of Narula Institute of Technology digitally organised two day the **3rdNational Conference on Science, Technology and Communication Skills (NCSTCS 2K20)**. This conference is specially designed to bring together an interdisciplinary team of researchers to share their information and research experience on recent trends in Science, Technology and Professional communication. There were invited lectures by eminent resource persons from reputed University and Institutions, paper presentation, and interactive sessions. The faculties from different colleges, research scholars and students had given opportunity to demonstrate their own works and get valuable suggestions from experts. It also aimed to create a teaching-learning environment and encourage academicians, researchers and students to develop various competencies and enhance their self–efficacy in different techniques.We had the pleasure to welcome the eminent speakers and several outstanding researchers from different universities and Institutions of repute.

We would like to take the proud privilege to thank our Managing Director, Principal, Registrar, the organizing committee members, the reviewers, all colleagues and friends, the entire cast and crew who helped us to organize this Conference.

October 2020, Kolkata
Dr. Sumit Nandi
Associate Professor
HOD, Department of BS & HU

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MESSAGE FROM CHAIRMAN, BOG, JIS GROUP

I am happy to observe that the Department of Basic Science and Humanities Department of NiT has digitally organised the "3rdNational Conference on Science, Technology and Communication Skills (NCSTCS 2K20)" on26-27th September, 2020. This Conference in terms of its areas and tracks is a comprehensive one providing a platform from multiple disciplines of engineering and technology to participate and contribute. This Conference will definitely be a significant attempt to assemble the leading experts and learners in the field. Understanding the differences between invention and innovation is the keynote to success in today's globalised market driven economy. It is not only important to invent ideas but also to be able to convert them into productive outcomes in consumer's society. Innovation and invention are quite different things. While invention is largely a personal pursuit, innovation is much more akin to social pursuit. Innovation warrants attention because it contributes immensely to social and industrial development.

I am confident that this Conference will come up with new findings, strategies and innovations on various issues laid out by the Organizers and will brain storm the mindset of the participating researchers. I would further expect that this Conference will identify the state -of -art and future directions in the mentioned areas so as to ensure demand driven and productive research to fulfill the societal needs and desire. This Conference must depict a future line transforming the concepts in the published papers into patenting and commercialization of the products.

Prof. (Dr.) Sparsha Mani Chatterjee

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MESSAGE FROM MANAGING DIRECTOR, JIS GROUP

I am chasing a dream that my father (Late Sardar Jodh Singh) cherished, to empower lives through knowledge and education. In this regard we have established the JIS educational initiative which is now one of the leading private educational service providers in India. JIS educational initiative has 25 educational institutes to its credit and holds an average of 25,000 students who have enrolled in diverse academic programmes. We have also created new standards in quality self-financed education and laid the foundation of the JIS University.

I am extremely delighted to share through this message my enthusiasm about the "3rdNational Conference on Science, Technology and Communication Skills (NCSTCS 2K20)",26-27th September, 2020digitally organised at Narula Institute of Technology, Agarpara, Kolkata, India. The National Conference promises to be a forum of research scholars and professionals from within the country and outside and will certainly provide a platform for the sharing of experience and the exchange of opinions on technological advancements.

I am sure that this event will draw talent from all over the globe and create a great learning experience for all participants, delegates and guests.

I appreciate the efforts taken by the Organizing Committee of the NCSTCS 2K20 and all the eminent persons involved. I wish them great success.

Mr. Taranjit Singh

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MESSAGE FROM THE PRINCIPAL, CONFERENCE CHAIR

On behalf of the Organizing Committee, I welcome all to the"3rdNational Conference on Science, Technology and Communication Skills (NCSTCS 2K20)", to be held on 26-27thSeptember, 2020 organised by Basic Science & Humanities Department of Narula Institute of Technology.

National Conference is a gathering of academicians, researchers and students from several part of our country in a single platform in order to have the opportunity to interact and share ideas among themselves.

I extend my sincere thanks to our Managing Director Mr. Taranjit Singh for motivating us to organize the event successfully. I would like to appreciate the collective efforts put in by the members of different Committees and staff members of the Institute for making **NCSTCS 2K20** a grand success without whom it would have been very difficult for us to arrange the event.

I also offer my thanks to all the participants for their immense support and active participation with sincerity and punctuality. I appreciate the effective assistance of every faculty and staff of the institute in direct and indirect manner to make **NCSTCS 2K20** a grand success.

I hope, every individual will be satisfied and will enjoy the Conference to a great extent.

Prof. (Dr.) M. R. Kanjilal

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MESSAGE FROM THE PROGRAMME COORDINATOR

I consider conducting **NCSTCS 2K20** a very challenging job on behalf of the Organizing Committee of the National Conference. The main aim to arrange this National Conference is to bring academicians, researchers and students in a single platform in order to have the opportunity to interact and share ideas among themselves. To make the program most fruitful, the availability of the suitable speakers was our high concern. We are really thankful that the speakers showed their enthusiasm and lend their valuable time to educate our participants in regards to **NCSTCS 2K20**.

The eminent speakers from different disciplines as resource persons are invited to share their valuable research and ideas among students during the Conference to raise the interest of the students on research activity.

Our Principal and the committee members of **NCSTCS 2K20** gave their best effort to materialize the smooth functioning of the Conference. We find immense satisfaction after the successful completion of the Programme. We hope to organize such programme in future to benefit our students as well as the Nation by providing future Researchers. I hope, every participant will be benefitted and will enjoy the Conference to the most.

Dr. Sumit Nandi
Programme Coordinator

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MESSAGE FROM THE CONVENER

I feel honored and privileged to get the opportunity to propose a vote of thanks on this grand inaugural occasion of the digitally organised"3rdNational Conference on Science, Technology and Communication Skills (NCSTCS 2K20)", on26-27 September.

It is indeed a very memorable day for all the members of the Basic Science & Humanities department. As we usher the opening of the National Conference in the presence of the honourable Principal and the dignitaries. I, on behalf of Organizing Committee convey deep regards and heartfelt thanks to the respected dignitaries, participants and fellow colleagues. I am thankful to all the participants across West Bengal for participating in the Conference.

I, on behalf of the entire team of organizing committee, wish to extend a very hearty vote of thanks and deep gratitude to our honourable Managing Director Mr. Taranjit Singh for motivating us and giving us such a platform to organize such effective program for teaching and research fraternity. I extend my whole hearted vote of thanks and deep gratitude to our friend, philosopher and guide, our honourable Principal, Prof. (Dr.) M. R. Kanjilal for extending her unfailing support towards our initiative to organize this Conference. I am very much thankful to our HOD, Dr. Sumit Nandi for his continuous support and advices which have greatly helped towards the successful organization of **NCSTCS 2020**. I am thankful to our registrar Ms. Nidhi Singh and the steering committee members of **NCSTCS 2020** for their whole hearted support and for working relentlessly for the past few weeks in order to achieve grand success in **NCSTCS 2020**. I thank all the HODs of all the respective departments, the invited speakers, delegates and specially students, reviewers for their enthusiastic participation in this Conference. I also convey my sincere thanks to all the people who have given their precious time in organizing this grand occasion.

Dr. Sarbani Ganguly

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INVITED TALKS

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Dr. Arundhati Biswas

Manager, Technical Affairs, Protab Laboratories, California, USA

Dietary Supplements: A Brief Review

According to the Dietary Supplement Health and Education Act (DSHEA) of 1994, a dietary supplement is a manufactured product intended to supplement the diet. A supplement can provide nutrients either extracted from food sources or synthetic. FDA regulates both dietary supplement products and ingredients. FDA regulates dietary supplements under set of regulations than those covering "conventional" foods and drug products. In India, Dietary Supplements are regulated by FSSAI (Food Safety and Standards Authority India)

Major dietary ingredients are minerals, vitamins, amino acids, enzymes, proteins, fibers, herbs or other botanicals, metabolite, prebiotics & probiotics or combination of any of the stated items. Most common forms of dietary supplements are tablets, capsules, lozenges, chewable tablets, powders, solutions or syrups, soft gels, nutrition bars. Dietary supplements could be natural, semi synthetic or synthetic.

Do we really need to take Supplement?? Not everyone needs to take supplements. "It's possible to get all of the nutrients you need by eating a variety of healthy foods, so you don't have to take one," says Carol Haggans, a registered dietician and consultant to NIH. "But supplements can be useful for filling in gaps in your diet."

Dietary Supplement Manufacturing companies are following these basic major steps to bring these products to their product marketing clients.

- Market study & research
- Clients or marketing companies bring product proposal to manufacturing company
- Formulation
- Quotation
- Research & Development
- Approval of the products
- Production/Manufacturing

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- QC/QA
- Packaging

Bilayer Tablet is the novel technology for the development of controlled release formulation. Developing a combination of two or more active ingredients in a single dosage form is known as a **bilayer tablet**. **Bilayer Tablet** is more suitable for gradual release of two active ingredients in combination.

Is there any Supplements which can help during this Pandemic Situation?? Below is your answers

- Zinchelps nasal congestion, nasal drainage, sore throat, and cough. It produces and activate T-cells (t-lymphocytes), which trigger the body to respond to infections [according to the NIH]
- Vitamin C fight for cold symptoms. It has antioxidant, ant inflammation properties. Lung inflammation is a severe symptom of COVID-19, which can lead to respiratory distress or even death. So, if you're still healthy, it doesn't hurt to start taking vitamin C now.
- Vitamin D maintain optimal blood levels, calcium and phosphorous balance, protect from respiratory tract infection.
- Garlic gas antiviral properties which is reducing the severity of symptoms in colds, flu or COVID-19 infections.
- Ginger has anticancer, anti-inflammatory, anti-fungal, antioxidant, and gastroprotective properties.
- Curcumin has anti-inflammatory, antiseptic activities.

As we don't have medicines and vaccines at this present moment, only Supplement can help to boost up your immune system and can fight against the similar symptoms like Covid.

https://www.medicinenet.com/covid_19_supplements/article.htm

Please note that, this statement or "**disclaimer**" is required by law (DSHEA) when a manufacturer makes a structure/function claim on a dietary **supplement** label. The **disclaimer** must also state that this product is not intended to "diagnose, treat, cure or prevent any disease," because only a drug can legally make such a claim.

"He who has health has hope, and he who has hope has everything."
Good Health is a good nutrition.
Good Nutrition is a good Diet.
Good Diet Support is **Dietary Supplement.**

Take home message:
You should take Supplements Everyday like food if needed.

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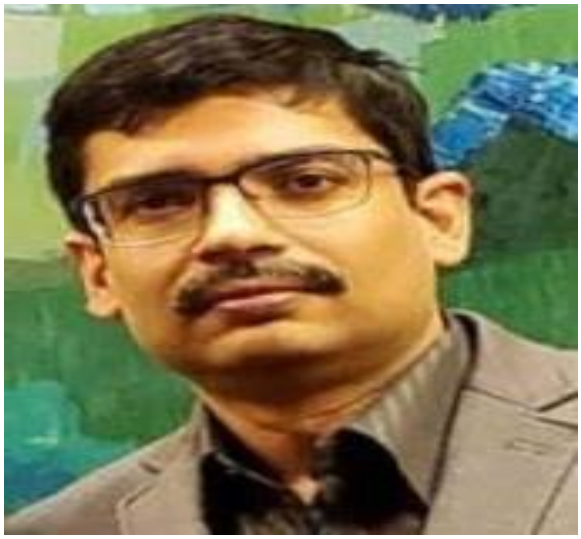

Dr. Abhisek Ghosal
Senior Scientist, Research Dx, California, USA

Brief overview on Corona virus and vaccine development

The pandemic with corona virus started in 2019 from Wuhan in China. Since then it got multiple mutations and the current strain is more infective than the previous one. The virus can spread through aerosols and hence social distancing is important to prevent the spread. Corona is a + stranded RNA virus which infect lungs and causes cytokine storm in a cascade of cellular signalling and as result it collapses the alveolar sacs, resulting deprivation in oxygen exchange. The cytokine storm also can cause damages to major organs. Diagnosis is very important for the mitigations. Two methods are available,1. RT PCR based, 2. Serology based. RT PCR based method convert the viral RNA to cDNA and then are amplified by polymerase chain reactions. This method is very sensitive compared to the serology-based method. On the other hand, serology-based method can detect previous infection as well as the current infection unlike RT-PCR based method. Globally many pharmaceutical giants are up to making the vaccine. With the blessings of immense funding and advancement of modern technologies pharmaceutical companies geared up to cross the long path of vaccine development in short period of time attempting to bring the vaccine in market. Different approaches are being tried and they are in different phases of clinical trials. To name a few RNA/DNA vaccines, attenuated or inactivated virus are the front runners. Moderna (Boston based) is trying to bring the RNA based vaccine and University of Oxford in collaboration with AstraZeneca is the other which is working on adenovirus-based vaccine development. In India, Bharat Biotech is working on inactivated virus vaccine called Covaxin. This vaccine is in phase 2 trial. Zydus Cadila is also working on DNA plasmid vaccine. There are few other companies like Serum Institute, Reddy's lab, Biological E Ltd are partnering with pharmaceutical giants like AstraZeneca, Johnson-Johnson as their manufacturing arm and the clinical trial partner. We need to wait until we see a vaccine which is really safe and effective. Historically not all vaccine trial, however, made to the market so it may be possible we don't get a vaccine in short period of time. So, it is important we keep safe distance to prevent the spread as much we can. The ideal vaccine candidate would be one which give us maximum immune response to provide effective antibodies without much of side effect. Also, the vaccine should be scalable and stable for mass production and worldwide distribution. Other important aspect would be the vaccine to be single dosed if possible. Till we get a vaccine that passes through all the clinical trials and regulatory hurdle to make to market, please safe and maintain social distancing.

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Prof. G.A. Ghanshyam
Officer on Special Duty
Directorate of Higher Education, Chhattisgarh, Raipur

Communicate to facilitate and elevate

Ever since our birth we started communicating with the things around us. Communication facilitates the environment we live in and the people around us. The art of communication leads to create a community of learners which becomes congenial, safe and supportive. The art of communication could be mastered only by maintaining a strong relationship with the society we live in which ultimately is the biggest laboratory of the world. The commune we create corresponds to our communication.

Our body comprises of hardware and software. Hardware of the body relates to 'headware' and the software relates to 'heartware.' Communication is carried out with both headware and heartware. The heart of communication is "Communicating from the heart." One has to open the heart which makes a lot of difference in communication. We all are 'human beings' and the way we communicate leads us to 'being human.' There are two things which are highly regarded and important in communication; 'content' and 'intent.' Intent is the soul of communication. All the communication made by using heart reaches the heart directly and facilitates and elevates the level of communication.

Emotional intelligence plays a vital role in shaping communication. Whenever we communicate, we need to understand the emotions of the other person we are speaking to and must provide a space to him/her for better communication which facilitates and elevates the essence of communication.

ELEVATE, the very word has been divided into parts to explore the meaning of communication.

E= Environment of Learning: Communication is to be learnt and practiced in the environment we live in. Creating a learning environment is the need of the hour. One has to nurture the belief through positive affirmation and praise efficiently. Use of humour is a must in communication.

L= Language of Emotions: In communication non-verbal form of communication matters a lot. 55% of the communication is done with the non-verbal form which covers our body language. Learners must be encouraged to learn the language of emotions.

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E= Establishing Relationships: Empathetic attitude towards the listener/audience is marked as highly essential element of communication which establishes the relationships with the listener/audience.

V= Validate Feeling: While communicating with a person, we need to validate and accept the verbal and non verbal forms of feelings and emotions.

A= Active Engagement: For communication, active engagement of the communicator and the listener is very important to lead to perfection. Learning must always engage senses.

T= Thinking Skills: The skills like Information processing skills, enquiry skills, creative thinking skills, critical thinking skills and reasoning skills and evaluation skills enhances learners' listening, speaking, comprehension and writing skills. There has to be a shift from LOTS (Low Order Thinking Skills) to HOTS (High Order Thinking Skills).

E= Empower through feedback: Feedback is very important for us to progress.

If we practice these things and keep it in mind, the larva of communication will certainly bloom into a colourful butterfly.

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Prof. Lokesh C Tribedi

Senior Professor, Department of Nuclear and Atomic Physics
Tata Institute of Fundamental Research, Colaba, Mumbai 400005, India

Atomic collisions involving meso-nano-bio systems and applications

Science builds knowledge continuously and systematically which not only explains the nature but also has capability of predicting. Scientific research drives technological development, by generating demand for new instruments to address a new scientific issues. In turn, technology drives new scientific investigations which involve sophisticated challenging techniques. Today's science in turn will generate new technology tomorrow. Accelerators and ion sources have not only widened the scope of the basic science research but also are being used for various applications. One uses hadron-therapy technique to treat cancers in which very high energy proton or carbon ions are used to remove the tumor inside human body. The basic mechanism is interaction with the slow secondary electrons and radicals which causes the radiation damage of such malignant cells. To increase the radio-biological effectiveness i.e. to increase the production of such slow electrons one proposes to have a metallic nanoparticle-inserted into the cancerous cells which poses a technological challenge. The nano-sensitization will finally help to reduce the ion-radiation dosage. We will give examples of applications involving mesocopic, objects, nano particles or large biological systems among which a common thread is collective plasmon excitation. A 400 kV ECR-based ion accelerator lab, and the existing Pelletron accelerator in TIFR, are being used for basic collision studies which will have implications towards these applications.

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PRESENTED PAPERS

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Comparative Analysis of Stress of A Knuckle Joint Made of Stainless Steel and Wrought Iron Using Computer Aided Engineering Tool

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Abstract
Knuckle joint is widely used to connect two rods whose axes either coincide or intersect and lie in one plane. The knuckle joint is used to transmit axial tensile force. The construction of knuckle joint permits limited angular movement between two rods or shafts, about the axis of pin. This type of joint is popular in many machines and structure. A knuckle joint can be implied to connect, the links of a bicycle chain, the tie bars in roof trusses. Now a day the increasing weight, of a vehicle is a major problem in automobile industry, due to increasing accessories and luxuries which may affect the cost. The analyzation is focused on to reduce the weight, shape, size as well as the cost of Knuckle Joint by developing a proper design with an increasing strength. A Computer Aided Design (CAD) model is prepared in AutoCAD 2018 and then it's exported in ABAQUS 6.14 to determine the Finite Element Analyzation (FEA). In these work two different materials, Stainless steel and Wrought Iron, is used for comparison. In case of same applied force, the Von-misses stress development inside the Stainless steel model is lesser than Wrought Iron model. But it has been observed that the difference of stresses between two models is less, so Wrought Iron model can be used as a replacement of Stainless Steel model as Wrought Iron is cheaper in cost than Stainless Steel.

Keywords: Knuckle Joint; Von-misses stress; AUTOCAD 2018; ABAQUS 6.14; FEA

Introduction & Objectives
Knuckle joint is a type of mechanical joint used in structures to connect two intersecting shafts, whose axes lie on the same plane. It permits some angular movement between shafts (in their plane). It is specially designed to withstand tensile loads. Knuckle joint is named so because it is free to rotate about the axis of a knuckle pin. Knuckle joints are used to connect two rods when some degree of flexibility or angular movement is needed. These joints are used for different types of connections e.g. tie rods, tension links in bridge structure and also in automobiles. One of the rods has an eye at the rod end and the other one is forked with eyes at both the legs. A pin (knuckle pin) is inserted through the rod-end eye and fork-end eyes and is secured by a collar and a split pin. In this analysis wrought iron and stainless steel is being used. In first case the analysed model is made of wrought iron second one is made of stainless steel but for third case we use the combination of wrought iron and stainless steel. The pin of knuckle joint is made of wrought iron and the rest of the pieces are made of stainless steel.

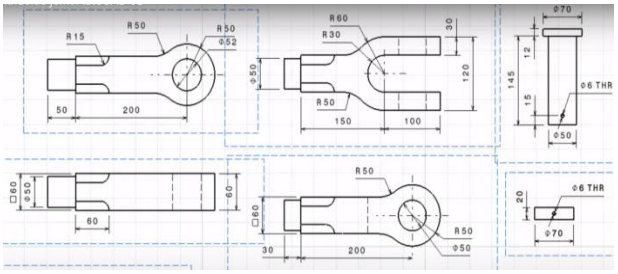
The objective behind this analysis is to minimise the production cost of automobiles and different kind of machine where the knuckle joint is vastly used. We have studied on the knuckle joint to reduce their weight and shape and size due to proper designing of knuckle joint and also increase their strength.

Literature review
K. S. Chang et al. [1] discussed an integrated design and manufacturing approach that supports the shape optimization. R. Roy et al. [2] focused on recent approaches to automating the manual optimization process and the challenges that it presents to the engineering community. The study identifies scalability as the major challenge for design optimization techniques. S. Vijayarangan et al. [3] used the different materials than regular material for optimization of steering knuckle. They used Metal Matrix Composites (MMCs) as it has potential

to meet demanded design requirements of the automotive industry, compared with conventional materials. P. Nirala et al. [4] carried out the topology optimization of clamp cylinder using CAE tools to reduce weight with the constraints of standard operating condition. The new optimized design of configuration is proposed. FEA of optimized cylinder is also carried out and compared with acceptance criterion.

Methodology

A knuckle joint of diameter 50 mm is subjected to tensile force is considered. CAD model of knuckle joint is prepared in AUTOCAD 2018. The dimension of knuckle joint is given in the Fig.:1 & 2 respectively. After that the model is analyzed in ABAQUS software.



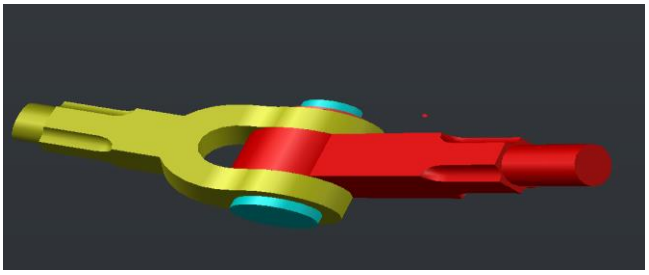


Fig.1: Dimensions of Knuckle JointFig.2: Design of Knuckle Joint in AUTOCADThe finite element analysis is an indispensable technology used in modeling and simulation of advanced engineering problems. We import the CAD file into ABAQUS2016 to complete the analysis of the knuckle joint. The following figure shows the meshed model of knuckle joint in ABAQUS having 6297 elements.

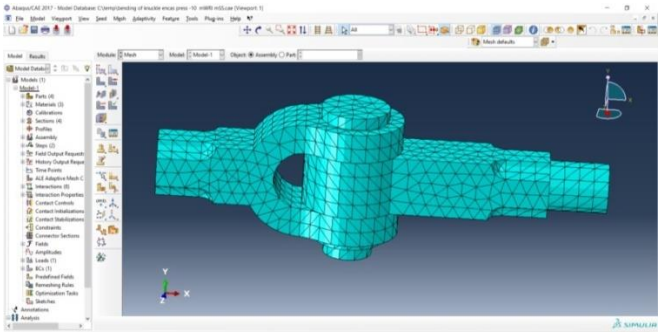


Fig.3: Meshed model of Knuckle Joint

Table1: Mechanical properties of Materials

Sl no	Name of Mechanical Property	Stainless Steel(304)	Wrought Iron
1	Young's Modulus	200GPA	120GPA
2	Poisson's Ratio	0.29	0.278
3	Coefficient of Friction	0.285	0.44

Results & Discussion

In this analysis 100KN force is used in each of the models of stainless steel and wrought iron respectively. As wrought iron and stainless steel both are malleable in nature, it is possible that it may deform due to higher load.

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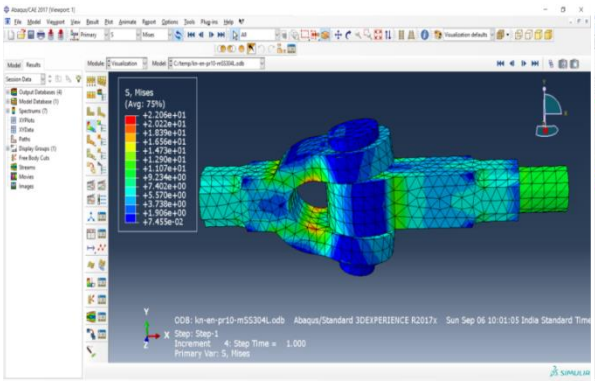

Fig.4:Deformation of knuckle joint made of stainless steel (304)

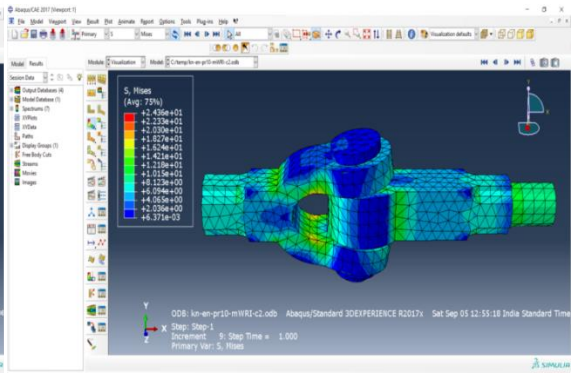

Fig.5: Deformation of knuckle joint made of wrought iron

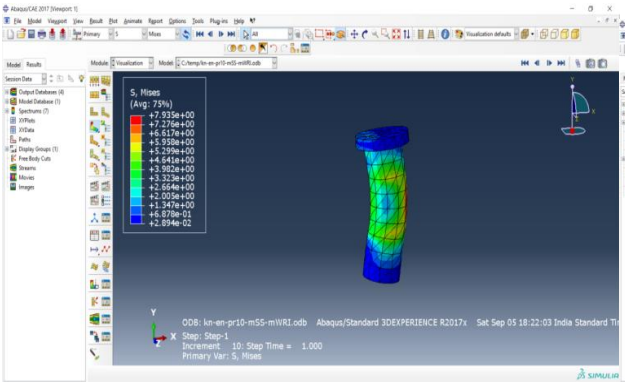

Fig.6: Stress development in the knuckle pin made of wrought iron

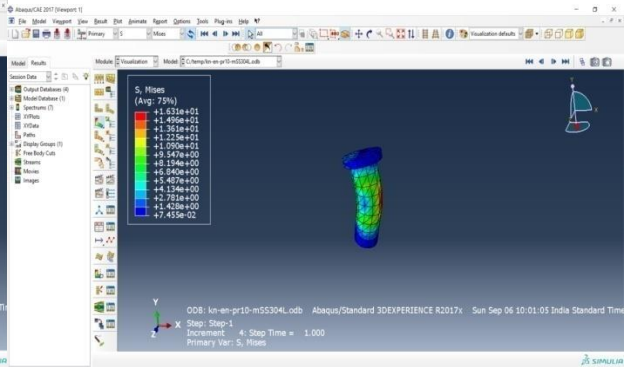

Fig.7: Stress development in the knuckle pin made of stainless steel (304)

In Fig.1 & 2 the blue region indicates the low level stress development on the other hand the red region indicates the high stress development inside the body. In case of materials, Stainless steel as well as Wrought Iron, the percentage of area of deformation due to Von-misses stress is near about same. As compare to wrought iron the ductility of stainless steel is much higher than the wrought iron. Due to this reason stainless steel can sustain much more load than wrought iron. In that case stainless steel is much referrer than the wrought iron. Through the static analysis of the body we get the developed stresses in knuckle joint made of wrought iron as well as stainless steel (304). The values of stresses are given:

Table2: Stress development of Knuckle Joint in case of different material

Sl no	**Material and the combination**	**Stress developed**
1	Stainless steel(304)	22.04MPa
2	Wrought iron	24.06MPa

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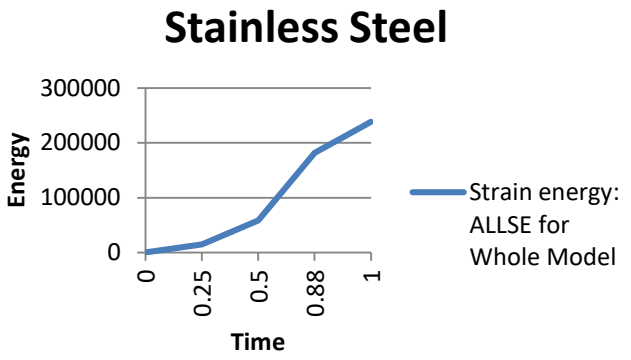

Fig.8: Strain graph for stainless steel

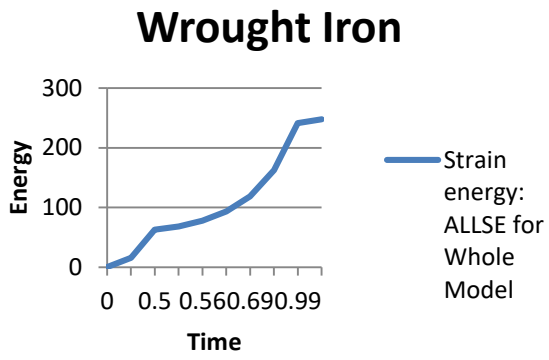

Fig.9: Strain energy graph for wrought iron

From the Table2 it's clearly observed that the load sustaining capacity of stainless steel higher than the wrought iron. The stress development inside the stainless steel is lesser than the wrought iron due to the application of same load.

From Fig.9 and 10, a relation can be established in between the strain energy density of a material to the deformation gradient. It can easily observe that the absorption of energy in case of stainless steel is linearly increased moderately, but on the other hand the energy absorption of wrought iron is increased in cubic variation with lesser time than the stainless steel material as well as the slop of the curve is negative slop. It implies that the stainless steel is more capable to tolerate the sudden shock waves than the wrought iron. The difference of energy absorption rate, between two materials, is very less.

Conclusion

It has been found that knuckle joint, made of Stainless steel has developed less stress i.e. 22.04 MPa as compared to wrought iron i.e. 24.06MPa. So Stainless steel is more preferable for the development of knuckle joint. But the price of stainless steel is much higher. So, in that case wrought iron can be used as the difference of stresses between two materials is less and it's also cheaper in cost than Stainless steel.

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Design of IOT Based Real-Time Monitoring of Wind Turbine System

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Abstract

As renewable energy has become one of the main sources of power production, the implementation of wind turbines has increased. And due to the large size of wind turbines and the arduous environment has led to a higher failure rate and it degrades habitat for wildlife. As a result, unplanned maintenance and repairment increases, also as the wind turbines are installed far away in mountains and forests, so the maintenance is difficult. If minor faults occur that people have to travel a long distance to the location of that Turbine for repair. Thus, this procedure requires a lot of manpower, as well as time making the maintenance cost increase. To overcome these problems, the concept of the Internet of Things is introduced which gives great reliability. Most of the existing systems use PC for data logging of a particular plant whether in our proposed system IoT takes the lead. This paper proposes a low-cost Real-time monitoring and controlling system. And simultaneously it can store real-time data for future analysis and can reduce habitat degradation.

Keywords: Wind turbine; IoT; Renewable energy; Power

Introduction

At this present moment, the world is rapidly moving towards Renewable Energy due to the quantitative and eminence impact of fossil fuels on the environment. Energy transfiguration and efficiency improvement have become the most prime concern to secure the energy and protect from external hazards caused by natural action. Energy from a source that is not depleted and stored for future use is known as renewable energy which generally comes from natural resources like sunlight, wind, tides, rain, etc. Renewable energy provides energy in important areas like generating electricity, heating or cooling of air and water. This sort of business is raising as days are passing by due to the role of the Internet of Things (IoT), which plays an important role in the domain. Wind Turbines look simple but they are extremely complex constructions that are placed in natural wild conditions like the open sea and faraway field. To make them stay efficient and work at the full potential they are added with adaptive features to survive in the changing environment as well as timely maintenance is needed as days passed by. So, monitoring and diagnosis of the Wind Turbines become essential to reduce the maintenance cost and secure the production because if those wind Turbines stopped working then this could lead to expensive repairs. For this reason, there is a huge increase need to implement a lot of efficient maintains. Online surveillance allows the early detection of faults whether it's mechanical or electrical to prevent component failures, which becomes one of the important topics nowadays in researches as well as industries.

Objective

The main objective behind this paper is to advance the existing Wind Turbines by adding extra features to them and to design the real-time monitoring and controlling of the system of those. The main purpose of this paper is to save the lives of birds as well as to avoid those problems related to the economy by using the data acquisition system through the microcontroller. The control and monitoring part is carried out with the implementation of IoT which includes a server to monitor real-time data of those systems as well as to control the system according to the data. Sensors are used to collect data and process for further steps, including switching off the Wind Turbines.

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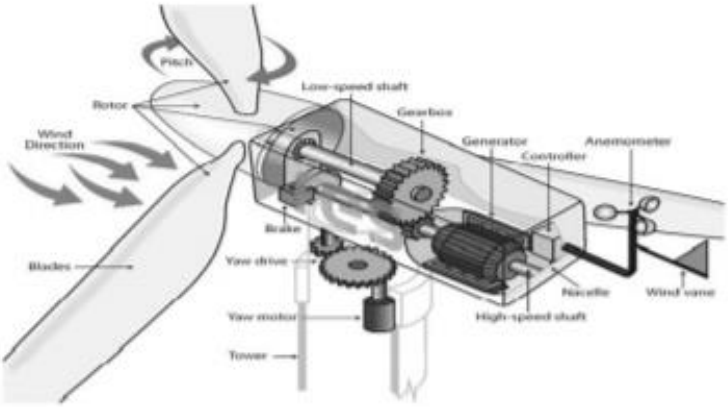

Fig. 1: Internal Structure of Wind Turbine

Methods

This system consists of sensor elements that are used to sense the Wind turbine parameters; the monitoring section deals with the monitoring of the sensed values of Wind Turbines by comparing with the reference values and instructs the control section to control the parameters by controlling the relays. Sensor outputs collaborate with the raspberry pi which read and writes the data and sends it to the server for further data analysis. Wind Turbine parameters like temperature, vibration level of, speed of the wind, generator speed, voltage generation, current, and power are measured using sensors like temperature sensor, accelerometer, voltage sensor, current sensor, temperature sensor, humidity sensor, anemometer with an encoded pulse generator. The control unit compares the sensed values with the reference ones and if the value exceeds the limit it will give relays to take precaution including to make the Turbine stop. Wind Turbine control is adapted on the temperature measurement of the gearbox, generator, the speed measured by anemometer using encoded pulse generator and the vibration level of the gearbox, generator, blade measured by accelerometer and if the vibration gets higher than the safer limits then the high-speed protection is there to protect the Turbine from damage by turning OFF the power generation system and coolants are turned on to maintain an optimum temperature of the generator. The proposed system also provides acquire to the users of the monitor and control the Wind Turbine parameters anywhere where the presence of the internet is, using the IoT technology.

This proposed system also deals with the implementation of an array of Ultrasonic sensors and the color of Wind Turbines is changed to purple, which saves the lives of birds and bats by making them distracted. The accelerometer monitors the vibration which occurs from the gearbox, generator blades, and tower which prevents any type of damage. The temperature sensor detects the temperature of the generator and gearbox to assure if the device is working properly or not. The encoder monitors the speed of the Wind Turbine. The data thus converged to calculate the wind speed, wind direction, and temperature and also conclude the energy that is generated.

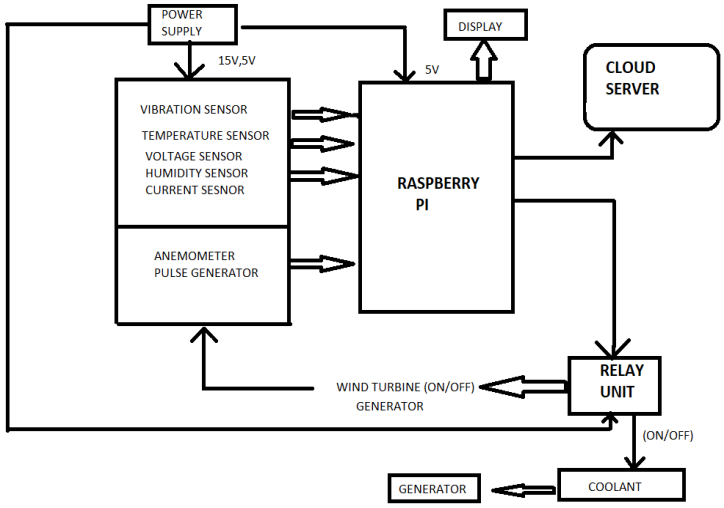

Fig.2: Process of controlling the Proposed System

Results and discussion

Every system consists of two parts, the hardware, and the software part. In this proposed system there are a temperature sensor, accelerometer, voltage sensor, current sensor, temperature sensor, humidity sensor, anemometer with an encoded pulse generator as well as Raspberry Pi.

- **Temperature Sensor:** The temperature sensor is a kind of electronic device that measures the temperature of its surrounding environment and converts the input data into electronic data to record the respective temperature changes.
- **Voltage Sensor:** The Voltage Sensor is a device that converts voltage measured between two points of an electrical circuit into a physical signal.
- **Accelerometer:** The accelerometer is one of the electronic sensors that measure the acceleration forces acting on an object, to determine the object's position and monitor the object's movement.
- **Current sensor:** A *current sensor* is a device that detects the electric current and generates a signal proportional to that current. The output signal can be of digital as well as analog.
- **Humidity Sensor:** The **humidity sensor** is a device that detects and measures water vapor. It is also known as hygrometer senses and measures both moisture and air temperature.
- **Anemometer: It is** an instrument that measures the speed of the wind, or any kind of gas.
- **IoT:** The word IoT stands for Internet of Things which refers to a system of interrelated, internet-connected objects that can collect and transfer data over a wireless network communication without any need for human interference.

Finally, we have successfully implemented the desires of this proposed system. By making Wind Turbines cost-efficient in maintaining and servicing. The ultrasonic sensor is also there to distract birds and bats from Wind Turbines, thus their lives are saved. Also, the Wind Turbines are colored purple to less distract the birds and bats. With the help of IoT, the hectic manpower is sorted out in our proposed system. Also, low-cost Real-time monitoring and controlling system are introduced in the proposed system. The respective parameters are measured and analyzed with due care so that the boosting of the wind turbines can be done easily.

In the study of our proposed system, the wind speed is measured and collected and stored in the server. The data

are sorted out from the server which is provided by us. Figure 3 shows the graphical representation of the wind turbines' speed. Anyone can analyze the data and graphs stored in the provided server. From this figure, it can be predicted that which of the Wind Turbine is best and can provide good potential energy as well as high speed. Thus, the provided server can compare all the Wind Turbines while it's faulty or it's working well. The identification of faults is done whether it's electrical or it's mechanical. The parameters are measured and the data obtained are analyzed and thus the maximization of the turbine power generation is done. The proposed system reduces the manpower requirement, time as well as the cost. This system ensures the operation safety and trustworthy.

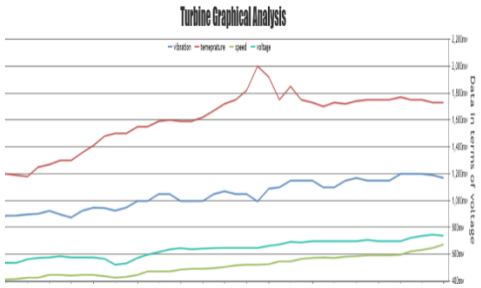

Fig. 3 Graphical analysis of Wind Turbine

Monitoring of all Wind Turbines helps to-

- Improvise Return On Investment (ROI).
- Improve the production of the Turbine.
- Reduce downtime.
- Reduce the annual maintenance costs.

Provide real-time and secure data transfer system.

Conclusion

Wind energy of different countries including India depends upon the energy demandsof that country. Many development centres as well as research centres should be obtainable for the progress of the existing systems. The wind energy field has enormous scope for innovation and applying that to a regular lifestyle. Wind Energy supports the domestic power supply chain and has the potential to brace job opportunities in manufacturing, installation, maintenance, and servicing of the products.

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Safety Wearable Device for Children

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Abstract
The future of the world depends upon the growth of the young generation in knowledge as well as education. In the present scenario, child protection is one of the important issues. Many crimes against children' are increasing as days are passing by and one of them is child abduction. As years are passing the kidnapping of a child is increasing without any decrement of this serious issue. So, parents are always in stress about how to protect their children from should be these things. This paper proposes a system to monitor the situation of children by assuming the incidence of crimes against them. This paper illustrates the concept of a wearable device for the little ones. The proposed device helps the parents to locate their children through their phones, which consists of a GPS Module, GSM Module, and Arduino. The location of the child wearing that system is sent to the registered number through the GSM module. The proposed system ensures the safety and tracking of achild.

Keywords: Children; Safety; GSM; GPS.

Introduction
The current expectations of parents are how to care for their children and assure safety to them when the yare away from the morinremote places. Different types of crimes are happening all around the world, of them, many are life-threatening as well. Thus the crime rate is growing since the previous few decades. Firstly, children cannot protest about the abuse they are facing in daily life to their guardians as they even can't realize what's happening to they is it abusive or not. So, for their parents, it's also difficult to search out their problems and solve each of them. Since to prevent those kinds of attacks, a system is proposed by us to monitor every child out there by their parents. These days, children's' face crimes like- physical and emotional abuse, exploitation, kidnapping as well as child labor.

Technology is the best way to solve these kinds of problems. The proposed system is designed with an IoT device, which senses the child's particular location and environment and send alert notifications to parents automatically. So, by this parents can use this device to get accurate data about their little one's status and their location. The system provides SMS notification between the child's wearable and registered parents' numbers as communication plays an important role. At present, there are many proposed systems and devices but they are not in market price or the commons can't afford it. So, we proposed this system at a reasonable price which can be afforded by the parents in the market as soon as possible.

Objective
The prime motive behind this paper is to share the knowledge of the proposed system by changing our lives with technology, how it can change our daily life and can be trusted easily. This project aims to provide security to children as well as to decrease the stress level of their parents. Thus, we can save many families with the help of this system as well as small lives that can be saved from being child laborers. A device like this improves and assures the safety of that innocent child.

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Materials and methods

The child safety device acts as one of the smart IoT devices. It provides parents with the real-time location, and the ability to locate their little ones and know the exact location. The proposed system receives coordinate inputs from the Arduino mini. The GPS module always looks for the child's location-based coordinates.

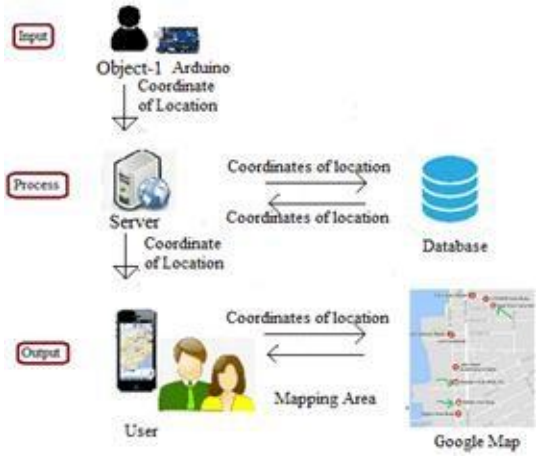
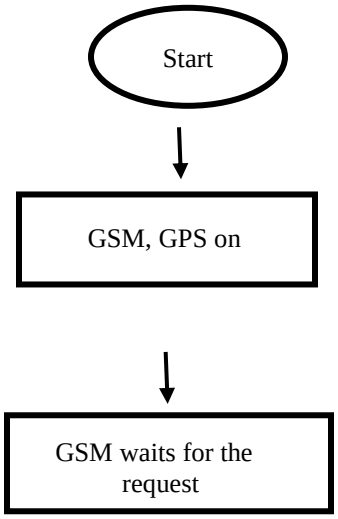


Fig. 1: Generalarchitecture

The three modules GPS, GSM, and Arduino are used in this project to develop the desired system and outputs. In the device, Arduino is used as the mainboard and GPS served as the coordinator picking of location, while the GSM module sends the coordinate to the server, and it is derived tous. After uploading the data, the program can run a GPS module to know the coordinate of the child's location. Thus, GPS sends data through the GSM-based server on the provided IP address. The server sorts the coordinate point in the database and sends it back via SMS. The live location of the wearable device will be updated on the server and the website after every few seconds.

Thus, the user or the parents will get notifications or alert calls after login to the respective website. Parents who monitored the location of their child can create a restriction on that area. Thus, the server compares the coded values with the obtained values and if it exceeds the given values then it generates the alert notifications with the help of GSM.



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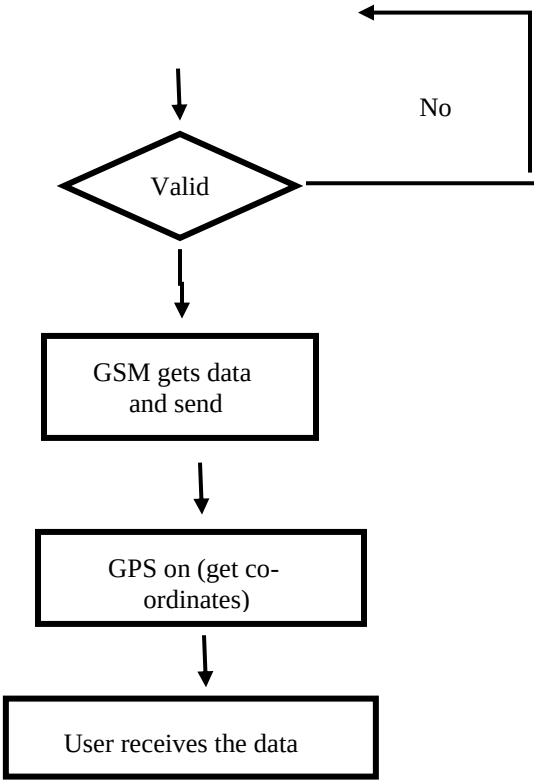

Fig- 2 Block diagram

The process of sending point of that object location starts from the sensor present, which sends all the data to the provided server. Therefore, the database continues to update with the point of object location to know the change in the coordinates, received by the server stored in the database. Our proposed system consists of a wrist band in which all the GPS, GSM, and Arduino modules are embedded. The proposed device will be given to the children for monitoring them every moment. The microprocessor is used to control all the actions of the proposed system and finally, the alert notifications will be sent to a specific user's device of the registered number.

MEMS or Micro-Electro-Mechanical System is a technology that deals with the miniature structure and our proposed system are made up of MEMS. These MEMS use micro fabrication techniques and the physical dimensions vary bellow 1 micron. GPS Module stands for Global Positioning System which is a satellite- based navigation system. It provides the exact time and location of a particular place to a GPS receiver. In this proposed system the GPS is interfaced with the GSM and thus a simple local web server is created and location details are updated on that website or webpage. GSM module sends alert calls or notifications to the registered number of parents as per command. The architecture and the block diagram of this study can be seen in Fig- 1 and Fig-2.

Results and discussions

The proposed system is designed basically in two parts. The first one is the hardware part which consists of the GPS and GSM module by which locations are sent to the registered number. Another feature is added to locate the pattern of child movement in a bounded area with the help of Google maps. The software part is based upon

the server which helps to deal with the notification sending and receiving via the GSM module.
Parents receive alert notifications and calls to their respective registered numbers, shown below:

a) GSM Module: The GSM or the GPRS Module is used to enable the communication between a microcontroller and the GSM or the GPSR Network. The word GSM stands for Global System for Mobile Communication and the word GPRS stands for General Packet Radio Service. The GSM Module digitizes and reduces the data or information, then sends those data through a channel with various streams of client data and information, each in its particular timeslot.

b) GPS Module: The word GPS stands for Global Positioning System which is a navigation system using the satellites, deals with a receiver and algorithms to synchronize every location, velocity, and time data for air, sea, and land travel. GPS uses a lot of detailed technology, but the concept of its uses is very simple. The GPS receiver gets a signal from each of the GPS satellites. Then the satellites transmit the exact time the signals by subtracting the time from the time the signal was received.

c) ARDUINO: Arduino is an open- source of electronics platform based one asytouse whether it'shardware or software. Arduino boards can read various kinds of inputs andcan turn it into an output. The main advantage of using Arduino technologies that it directly load the programs into the device without any need of ah ardware programmer to burn that specific program.

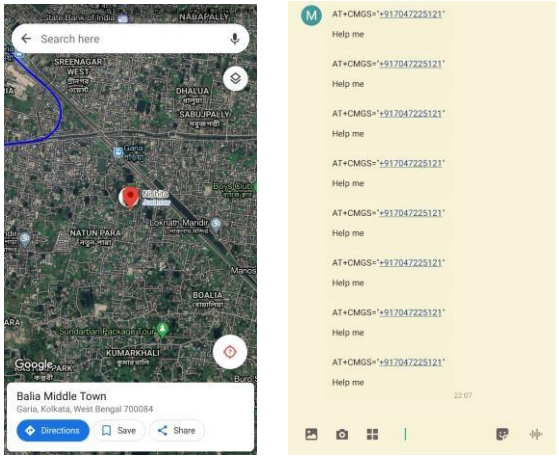

Fig- 3 System application testing

Table testing on children Movement			
No	**Latitude**	**Longitude**	**Time**
1	22.699002	88.454370	13.01
2	22.698445	88.453965	13.03
3	22.699805	88.454846	13.05
4	22.700813	88.454087	13.07

Table testing on Notification System			
No	**Latitude**	**Longitude**	**Time**
1	22.699002	88.454370	13.01
2	22.698445	88.453965	13.03
3	22.699805	88.454846	13.05
4	22.700813	88.454087	13.07

Fig- 6 Notification system

Conclusion

The word "future" resembles with the word Children, as Dr. A.P.J Abdul Kalam's words "Youngsters are the future pillars of one's nation", today's children are tomorrow's youngsters so preserving their dreams and life for a better future in a better technologically advanced world is necessary. This paper gives the desired result to the parents in the way of getting alert via SMS on their registered number. From the notifications, the parents received they can find their child easily without any critical state. With the help of this device, the violent acts and crimes against children can be stopped easily. This is the first step to reduce violence, theft as well as rapes. Hence, considering the significance of our coming generation, this project makes it easy for parents to track their children which makes the men sure the safety of their children as well as reduces the rate of incidents of child abuse as days will be passed by.

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IoT BasedSaline Level Monitoring System

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Abstract
Saline solution or commonly known as Saline Water is specially composed to match the level of electrolytes present in our blood plasma which causes less osmotic effect compared to other solutions. So, monitoring those water levels of each patient in a hospital is difficult for a single nurse. Thus this paper aims to implement a Saline level indicator in each bottle by using the Internet of Things or IoT as the main platform. The proposed system consists of a load cell that is used to detect the critical level changes in the weight of the Saline Water bottle. Whenever the level of saline Water bottle reaches the critical lower limit then the buzzer alert system turns on as well as the hospital staff receives notifications in the registered number to change the bottle immediately. The notifications are sent to the registered number with the help of GSM. The microcontroller plays a role to establish a connection between the hardware and software portion. IR sensor is used for the measurement of droplets to check if it is coming properly or not. Thus, an innovative way to monitor the Saline Water level is developed with less interference of humans at low cost which can be available in moderate cities including the rural areas.

Keywords: Saline Water; IoT; Load Cell; IR sensor; Microcontroller.

Introduction
Smart healthcare in India currently is a crucial requirement. In this era of technology as days are passing by peoples are expecting improved technologies and devices especially when it's about their health care. Medical science is one of the most section which has a huge amount of applications in daily life. So, the need to improvise the devices is dominant as technology is growing at a very high speed and human lives are too dependent on electronic devices. The main motive behind this proposed system is to develop a saline level indicating and monitoring systems at a low cost. Saline Water is needed in a patient's body when it's dehydrated or he can't consume foods properly. And if the saline water bottle is fully consumed by a patient and that bottle is not replaced in an immediate action then the pressure of the patient's body and bottle creates a reverse flow of blood into the bottle. The reverse flowed blood causes immense pain to the patient and also that blood is wasted cause it can't be put back to the patient's body. So, controlling these kinds of a situation is one of the significant situations. Thus, the proposed system in this paper will create an enormous change in daily life. Hospitals can easily adopt this system to avoid any kind of inconvenience regarding patients in case of a lack of constant monitoring.

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Objective

The primary motive behind this paper is to share the idea of the proposed system by us which can change our daily life with technology and can be trusted easily. This project aims to provide an advanced saline level monitoring system in the field of healthcare. The idea is to provide a low cost-effective and reliable saline flow monitoring system that can be easily implemented in any kind of hospital whether in cities or in rural areas by which the hospital staff can easily monitor every patient who is salinized, from any place of the hospital.

Methods

In the proposed system, the detection of Saline water level and drops of water are counts to ease the monitoring system of the bottle. The entire system is based on the IoT (Internet of Things) platform by which the monitoring can be done comfortably. The system is operated by two parts whereas the first part deals with the detection of saline water level which is the transmission part whereas the second part deals with the data transmission as well as the determination of water level present inside the bottle. If the water level is less than the expected value then an alert message will send to the registered number which is the receiver part.

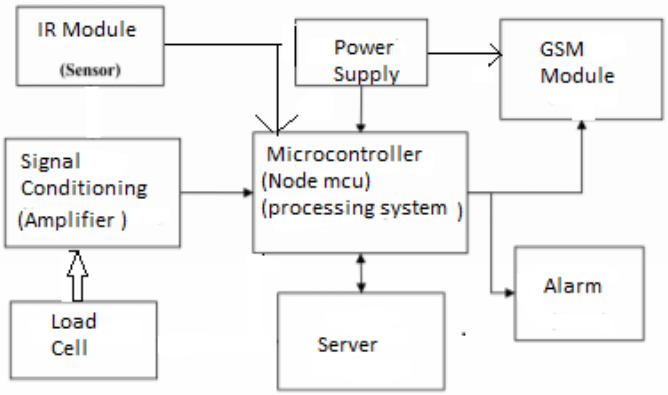

Fig. 1: Overview of the system

The load cell is the main component that is placed to determine the actual weight of the Saline Bottle with the water present in it and tracks the rapid weight change of the bottle. After that, the weight change of the bottle is compared with the present value of the saline water, given by the operator and thus generates signals. So, for the signals, a special type of amplifier is used for the amplification of low signals. The microcontroller acts as the connecting link between the hardware and software portions by taking the input from the load cell and uploading it to live Hospital's server and also compares the rapid changes of data with both initial and crucial values. If the water level crosses the critical value the processing unit generates an alert signal by activating the buzzer and sends notifications to the registered number with the patient's details like the bed number, patient number, ward number, etc. A separate power supply is used to take control of this proposed system. Thus when the system is powered om the IR sensor detects the droplets of saline water whereas the microcontroller calculates the rate of the droplet with the aspect of time. It will compare the counted drops with the preinstalled drop count and also the level of Saline water present in that bottle.

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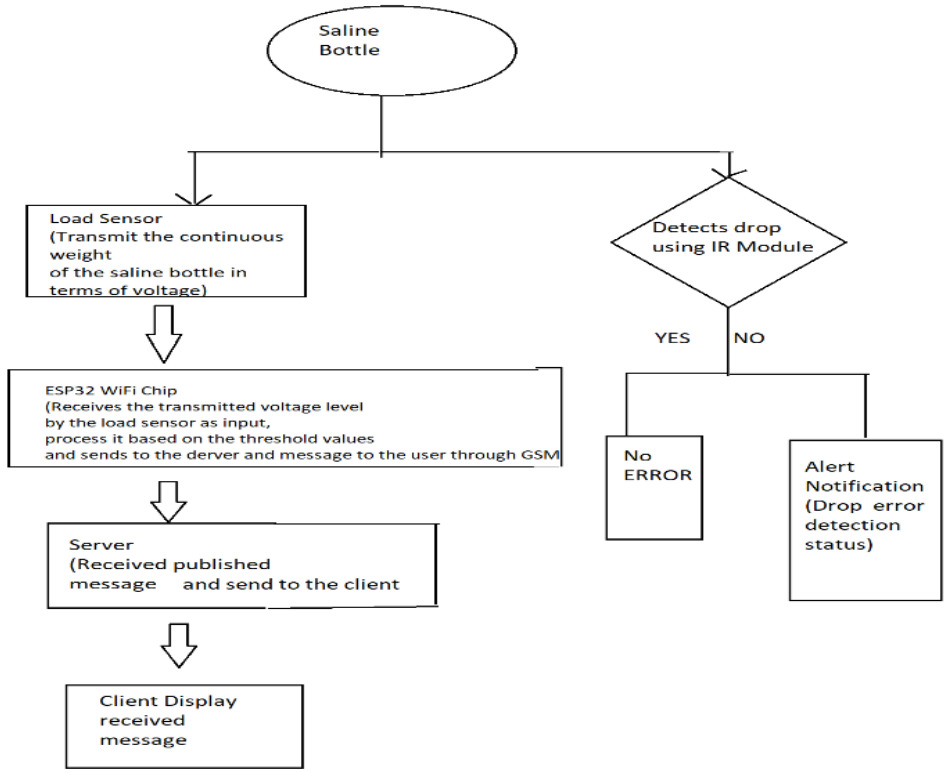

Fig. 2: Flowchart demonstrating the workflow of the proposed system

Results and discussions

Every automation system consists of two parts, the transmitter, and the receiver part. In this proposed system there are IR Sensor, Arduino micro-controller which will be programmed to send alert sound by the buzzer to hospital staffas to indicate the critical level of saline water.

A) Load Cell:A load cell is a type of transducer, used to convert mechanical force input into an electrical output. Load cells are of different shapes and sizes so that they can be added to various types of machinery and weighing equipment.

B) IoT: The word IoT stands for the Internet of Things refers to a system of interrelated, internet-connected objects that can collect and transfer data over a wireless network communication without any human interference.

C) IR sensor: The word IR sensor means the Infrared sensor which is an electronic device that measures and detects infrared radiation in its surrounding environment. It is an electronic instrument that is used to sense characteristics of the surrounding environment, by either emitting or detecting infrared radiation.

D) Microcontroller: A microcontroller is a small computer that is on a single metal-oxide-semiconductor, integrated circuit chip. It contains one or more CPUs with memory and programmable input or output peripherals. A microcontroller consists of components like -the memory, peripherals, and processor.

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E) Buzzer: A buzzer is a mechanical, electromechanical, magnetic, electromagnetic, electro-acoustic, or piezoelectric audio signalling device that can create sound with one click or pressing of a button.

Finally, we have successfully implemented the desires of this proposed system. By making the Saline Water Bottle monitoring process cost-efficient to use in daily lifestyle. The load cell is there to observe the changes in the weight of the bottle and send respective signals to the amplifier. The amplifier receives the signal and sends it to the server, if the bottle changing is needed buzzer is there to create sounds and alert hospital staff. Thus millions of lives are saved as the reverse flow can be stopped at ease. With the help of IoT, the hectic manpower is sorted out in our proposed system. Also, low-cost Real-time monitoring and controlling system are introduced in the proposed system. The respective parameters of the Saline bottles are measured and analyzed, with due care patients are observed so that no human faults or negligence occurs.
In the study of our proposed system, the weight change of the Saline Bottle is measured and collected and stored in the server. The data are sorted out from the server which is provided by us. Anyone can analyze the data and graphs stored in the provided server. Thus, the provided server store all kinds of Saline Bottle related data and can compare with the present value and can observe if all the Saline Bottles working well or it's faulty.

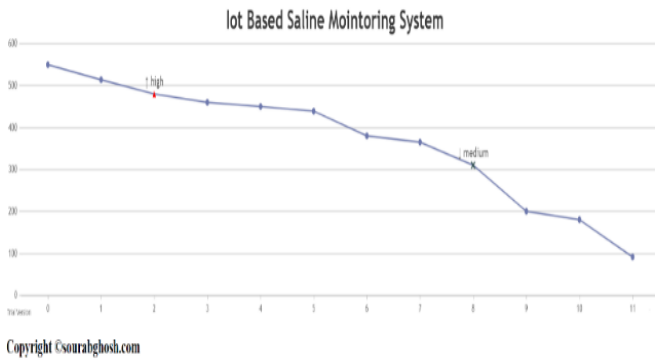

Fig. 3: Flow of Saline Water graphical analysis

Conclusion

The proposed system of this paper will reduce manual efforts. It requires less human interactions as the system is based on IoT. The system is very favourable, especially for the night time since there is no need for continuous monitoring of the Saline Water Bottles levels by the hospital staff. This system can also be used at home especially in any pandemic period or for serious patients who can't be transmitted to the hospital because of the low cost of this system. This system also reduces operational costs. Patients can be easily monitored in time without the need for frequent visits by a doctor or nurse or any other hospital staff. As the patients are monitored uninterrupted basis thus the chances of reverse flow of the blood can be controlled and can reduce any kind of inconvenience. This proposed system will eventually reduce the human errors caused by negligence. By implementing this kind of system, patients will be assured about their health which will help them to recover soon as well as their family members will get relief and less concerned about them.

In the future, this system will get much more advanced because of these increasing technologies. Thus, human power will more or less reduce to minimal effort. If possible the size of saline containers may be changed or any kind of improvement can be done easily after this proposed system takes the market. This system will make an

impact in our daily life especially in rural lives.

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Design of Smart Security Surveillance System for Country's Border Areas

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Abstract
Security is one of the most important factors in today's daily life whether it's to secure money or rare gems or our lives. To serve our nation is the main motto of our soldiers who risk their lives to protect us. So, being an Indian citizen we must provide them with innovative security systems to protect their lives and to make them spent more time with their family. So, the technology of security should be modern with the time being to protect the trespassing. This paper reviews the challenges faced by the soldiers while patrolling the border areas and compounds. A lot of man-hours being spent there, the fencing wires are not so reliable and easy to breach, and also a lot of time is required to cover the whole area and it's impossible to be indifferent locations at the same time. Fencing aims to keep the intruder away from the border areas, thus avoids the trespassing. This proposed work is based on the combination of different technologies that afford a high level of detection, surveillance, and barrier system with cost-effective equipment. In this paper, we introduced laser light to cover

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a large area in the borders. It also helps to overcome the problems of the existing systems and does not have any harmful consequences of the intruder.

Keywords: Security; surveillance; laser

Introduction

As technology is developing day by day in the world as well the crime is also being increased. The main factor is about our security may it's for home or those border areas. So, the technology of security should be modern with emerging technologies. This project deals with laser light to create a defence system over a large area. Lasers are a very effective perimeter as this light goes through long distances without any scattering effect with alarm systems. A Laser security system is introduced which acts as a standalone system, makes a sound when it detects any irregular activity. The laser alarm system operates by projecting a beam of laser light across the fence and when the light is broken, activates the buzzer which makes sounds. The laser diode-based laser fencing is acquiring a lot of popularity for securing the perimeter of border areas. The Laser fence is one of the best security systems but integrating with the image processing device enhances it to a great level of extent.

At present days, a lot of man-hours are being spent on physical patrolling of border areas and compounds thus laser security will reduce that immense manual work. Existing fencing wires are not reliable as much and are easy to breach, and in large areas, it is difficult to be available at all the locations at the same time, also it takes a lot of time to cover the compound areas.

Objective

The main objective behind this paper is to provide security help to the soldiers of our country to minimize their manual works while patrolling in the borders. For smarter India, the need for Smart Surveillance System, which can be developed through modular design which is easy to assemble. This paper approaches the object detection and classification of man, animal, and vehicle using an AI-enabled laser fence security system. Any security agency that is securing a larger area can install this system and can track through a single control room. Lesser efforts can be given on surveillance with the help of this system.

Methods

Module-based pre-fabricated rail channels along with towers are designed based on the requirements. The system includes railing channels, concrete pre-fabricated base, and surveillance unit which are moved on those railing-based sensors. All these things can be controlled from the control room. The proposed system occurs in the following described process.

A. Designing of sensors: In this project, we place two lasers operated doors. The need of adding the laser sensors and transmitter for the gate is there. From which we can understand whether anything or any object is passing or not. If anything passes from the barrier system, an alarm will be generated automatically. The entrance gate made up of an RFID system is introduced, from where our soldiers can enter. The entrance gate is turned off by activating the lasers of the gate automatically. The RFID system counts the number of person's entry and exit which are stored in our server. After counting by the RFID system, then image processing plays a vital role here. If any error occurs an alarm will be generated automatically.

B. Digital Image processing: Image processing gets the data from digital images provided by the user. Here, a technique with object identification both in daylight and night is introduced. In this process, the camera

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recognizes a human or an object by using the preinstalled data in the respective database. Even at night, the system can identify a person or an object and can detect whether their data is preloaded or not.

C. Internet of things: The IoT or Internet of Things is the main part of this work. The parameters on a website can be handled by the control room. Before IoT was introduced in the technology of today's world, these systems were controlled manually but nowadays IoT takes the lead. The data are stored in the database for future reference.

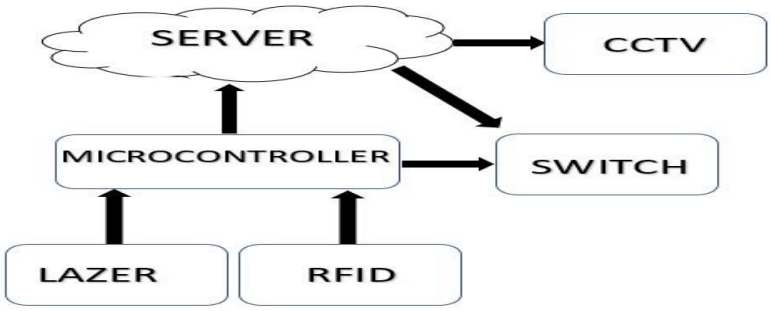

Fig.1: Block diagram of the system

Results and discussions

The implementation of the circuits and all components are done successfully. Thus, the detection of human beings and other objects identifications in the night as well as in daylight, object detection technology are also introduced here.

- **Laser:** The word laser stands for Light Amplification by Stimulated Emission of Radiation. *The laser* is a kind of device that emits light through the process of optical amplification, based on the stimulated emission of electromagnetic radiation. It produces a narrow beam of light that is useful in many technologies as well as instruments. Lasers are described by the kind of lasing medium they use that is solid-state, gas, exciter, dye, or semiconductor. The applications of lasers include medicine, communications.
- **Transmitter:** It is a set of equipment used to generate and transmit electromagnetic waves which carry messages or signals, especially those of radio or television, phones, etc. for the case of high power transmitters, a power supply circuit is there to transform the input power to the higher voltages to produce the required output.
- **RFID:** *RFID* is an acronym for "radio-frequency identification" and refers to technology. The digital data are encoded in RFID tags or smart labels are captured by a reader via radio waves. RFID Technology is used in various kinds of industries and a wide variety of applications are there as it can deliver several benefits for any organization.

- **Microcontroller:** A microcontroller is a small computer that is placed on a single metal-oxide-semiconductor, integrated circuit chip. It contains one or more CPUs with memory and the programmable input or output peripherals. A microcontroller consists of few components like the memory, peripherals, and processor.
- **Buzzer:** A buzzer is a mechanical, electromechanical, magnetic, electromagnetic, electro-acoustic, or piezoelectric audio signalling device that can create sound with one click or pressing of a button.

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- **CCTV:** The word CCTV stands for Closed-circuit television which is used for video surveillance. It uses video cameras to transmit a signal to a specific place, on a specific set of monitors.

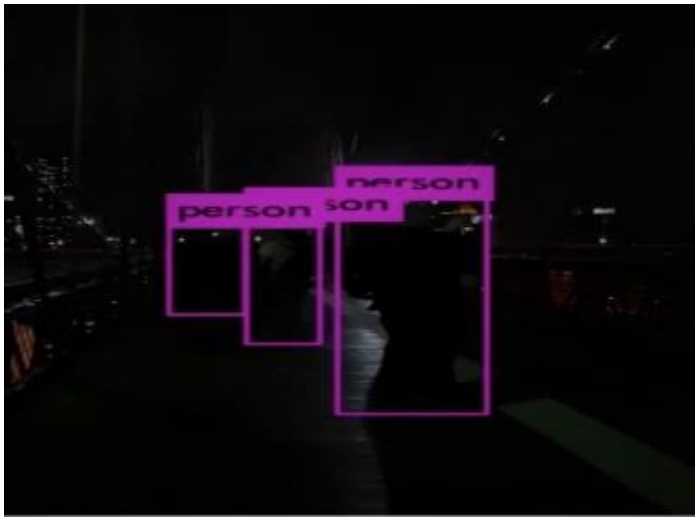

Fig. 2: Picture of Object detection

All information is shown on a website which is made by us. You can show the states of the parameters here. RFID stores the number of people who entered and exited that restricted area. And the data thus compare with the preinstalled data and easily detect who is inside that restricted zone.

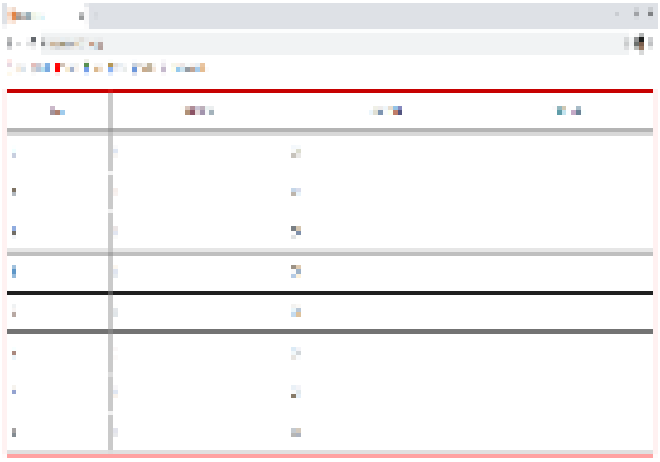

Fig. 3: Picture of showing data online

Outcome includes

Improvise Smart Surveillance System, Lesser efforts on Surveillance System in border areas, Lesser breach of security and No need for extra manual work, so lesser casualty on borders.

Conclusion

Thus, an AI-enabled laser security fence is capable of the classification of objects whether it's human, animal, or

any kind of vehicle based on its height, length, or speed. The data are transferred throughout the transmitter and receiver, as per the sensors present in those areas. This system also identifies the direction of trespass. The system is capable to survive in all type of weather conditions as well as the underground vibration is detected by the UGS sensor.

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Design of Smart Helmet to Maintain Traffic Rules and Reduce Accidents alongside Providing Quick Treatment to Injured Person

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Abstract
Road accidents are increasing day by day because the riders are not using the helmet and due to consumption of alcohol. In today's world, huge numbers of people are dying on road accidents. By using this helmet, the accidents can be detected. The main target of the project is designing a helmet for accident avoidance and alcohol detection. The helmet will be consisting of several components as follows: a switch which will get only activated when the driver puts on the helmet, otherwise the vehicle will not take ignition start, a GPS tracker to know whether the driver is wearing the helmet throughout the distance he/she has travelled, and an alcohol - recognition system which will lead to know whether the driver is drunken. Apart from this, if the driver is found drunken, it will send an automated signal to the nearby police station as well as the vehicle will not get started if the driver is found drunken. And it can also send alert message to the family members, nearest police station if the driver gets injured. All these alerts will go through message.

Keywords: Helmet;two-wheeler vehicle;GPS; GSM; Internet of things.

Introduction & Objectives
In every aspect of our life safety and security are the major vital things. The scenario that we come across in many cases of human deaths and severe injuries to people is because of two-wheeler road accidents now a days. And it is a very important issue that requires everybody's attention, for every 4-5 minutes there is one death being reported in India. We have identified that 1214 road crashes are occur every day in India. Two wheelers account for 25% of total road crash deaths. The highest death happened was in Tamil Nadu. A total no. of 6,105 (around 16 per cent) two-wheeler users who died due to road accidents did not wear a helmet.

People wearing and using these helmets are ought to wear these helmets to start their vehicle. Otherwise, the vehicle will not move. Besides, it also sends an automatic signal or informative message to the nearby police station about the location of the driver. With the help of this, it's quite obvious that the number of road

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accidents will decrease to an extent another people will be more conscious while driving on roads.

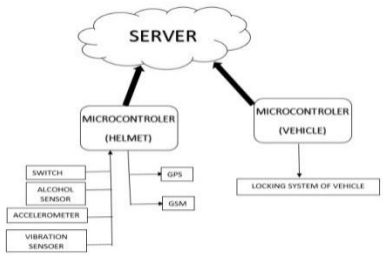
The idea of proposing this system has mainly come from the social responsibilities towards the society. The proposed system allows the rider to start a bike only on wearing the helmet. Accident still is a matter of big concern to the relatives of the bike rider, for which a system is proposed based on Internet of things (IOT) and also keeps a full continuous track of the location as well as the speed data of the vehicle while driving. All these alerts will go through gsm.

The objective of the project is to make a helmet which will be provided with a GPS system, an automated sensing switch and an alcohol recognition system which will prevent the driver to drive if he/she is drunken. All these alerts will go to through GSM.

Methods

To reduce the accidents and save the peoples life we need to take an action for this. Most dangerous accidents happened with two wheelers for this we need to solve the problems. Placing such kind of sensors on the helmet can measures some parameters. To discussing about the whole things, we divided it in three parts.

A. Designing of sensors: While studying this topic we found that many people avoid to wearing helmet, being alcoholic, these two major points is noticed by us. So, we designed our sensors in a way that it can detect the state of helmet. It's wearing or not, the person is alcoholic or not. Not only will that if the users break the rule in first attempt the system warn the user through message. In second time it will send message to the nearest police station with his live location. Here we add a feature to detect accident that if the bike got accident then a message will be sent to his family and nearest police station with the live location. We use here switch, GSM, GPS, Alcohol Sensor, Vibration Sensor, accelerometer and most important nodemcu to complete the protype design through sensors. Through our microcontroller it gets data and transfer to each other. The switch is placed in the helmet. From that portion the data will transfer to the bike's locking system. And do the operation as given. Lastly if accident happened by mistake, the accelerometer and vibration sensor do its work and send message through GSM with the data of GPS.



B. Internet of things: Another thing here we can see that Internet of Things. The data is modified by IoT, where we can see after wearing the helmet the lock will automatically unlocked if the user isn't alcoholic. We can see here the state of each and every data for practical usage.

Results and Discussions

Here we use the gas monitoring system for Alcohol Sensing. The gas monitoring system is able for detect various types of parameters. Here we use the MQ3 in the prototype for detect the range of the alcohol. This sensor is working from -10^0 to 50^0 C with power supply that is 150 Ma to 5V. This sensor gives the nearest data till now.

The switch is placed on the helmet. If the switched is pressed then the lock of the bike will be turned on. If the user is avoiding to wear the helmet then the engine will not be started. And it worked fine

Accelerometers mainly an electromechanical device which can measure the acceleration forces. It can sense the movement of vibration. We used it on helmet. If any accident held the it can sense and took the actions.

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The vibration sensor is used to detect the vibration and this is used for accident detection. Till now this works fine with other sensors.

The GPS and GSM do its work, it will notify people that they are breaking any rule or not. The whole process is merging with the system. If any accident happened then it sends the data of accident with the location. If the user breaks any rule then the police station got location wise message and the user got alert message.

Here we use nodemcu which is a popular microcontroller uses in Internet of things. This is connected with server and does the whole process.

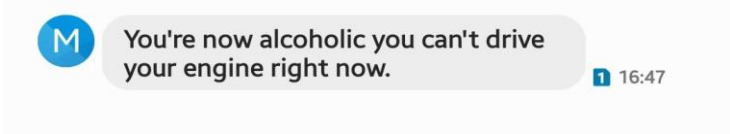

Fig. 1: Picture of getting alert message

The implementation of the circuits and all components are done successfully. The system works fine. It detects the helmet then the alcohol sensing part is also working fine along with engine starting part. In the fig. 1, Can see the alert message sending through GSM and lot of more things are there as we say the GSM can send data with the data of GPS.

Sl No	Helmet	Alcohol	Bike State	Accident Status
1	ON	NO	ON	NO
2	OFF	NO	OFF	NO
3	ON	YES	OFF	NO
4	ON	NO	ON	YES

Fig. 2. Data online visualisation

In fig.2, we can see a data table where we can see such parameters of our project. This picture is taken from our website. Where a server is created and all data stored in that. People can view the real time data through this. The process is called Internet of Things, where the data is automatically updated in website. The all part are we design till now are working fine. But still we have to upgrade our system. But in this system people can alert about things, and this can be cause of less accidents and can save life of people. And the main thing is people obviously maintain traffic rules after this project is fulfilled.

Conclusion

Thus, the system is able to locate the location and can alert person before they break any rule. It reduces the accidents and if any accident happened it can inform instantly. This can make a major change in our society. We're working on more progress and more efficiency of the system. To increase the security and more efficient value we are trying to reach our goals. We are replacing the better sensor and devices to maintain it.

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Remedial Measures to Landslides and Utilisation of Runoff Water

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Abstract
Landslides are very hazardous environmental phenomenon which occurs in many parts of the world. A preliminary study stated that one of the major causes of landslides in India is heavy rainfall. The soil on the high terrain are weakly bonded and because of this when rainfall occurs it triggers the movement of the slopes as the soil gets completely saturated with water .This paper contains one of the preventive measures which if bought into use can reduce landslide to great extent in the rainfall prone region. The major focus here is to reduce the impact of rainfall .It will be effective if an open channel pipeline along the slope of the mountains is installed ,such that the water before hitting the surface hits the pipe and also most of the water will get retained by the pipe. Due to this the surface of the mountain won't get saturated and thereby the sliding of the soil will be prevented.

Keywords: Landslide;weakly bonded;heavy rainfall;Open channel;pipeline

Introduction and Objective
The highest mountain chain on earth is found in India .The major hydro geological hazards that affects large part of India is because to landslides and avalanches. Mostly the north eastern regions are badly affected by landslide problem. Landslide occurs when forces acting down slope exceed the strength of the earth materials that composes the slope. Earthquakes, snowmelt, stream erosion and heavy rainfall are the factors which triggers landslides.

Landslide is classified as: 1.debris flow usually takes place when slope surface is over saturated with water 2.

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Earth flow usually takes place when the pore pressure increases in a fine grained mass until enough of the weight of the material is supported by pore water to significantly decrease the internal shearing strength of the material. 3. Debris slide occurs by catastrophic debris avalanches. 4. Rock avalanche is rare than other landslides. 5. Shallow landslide occurs in area with high permeable soils on top of low permeable bottom soils. 6. Deep seated landslide usually occurs in tectonic active region like Zagros Mountain in Iran. Landslide not only causes loss of property but also loss of lives. It brings daily life at a halt and takes quite a long time to recover from it.

The objective of the paper is to prevent landslide by using methods which are economical. This paper is focusing mostly on the regions where rainfall is the triggering factor for landslide.

Methods

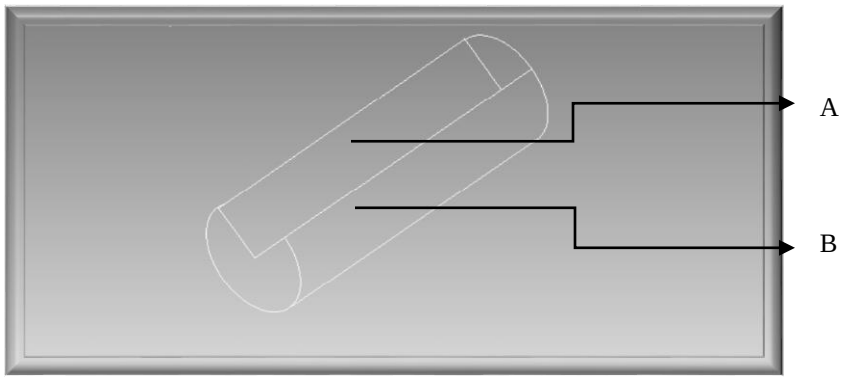

Figure 1: Design of pipe; 1. A- extended curved portion of the pipe; 2. B- smaller curved portion of the pipe.

Quality of pipe: A corrosion less stainless steel pipe can be used for the construction of open channel pipe line.

Larger diameter pipe is required and it will be installed along the slope using steel or timber rods .The pipes will be arranged in a circular manner and they will be along certain height and distance from the surface of the soil. The rainwater collected in the pipe will be carried downward along the channel and will be collected in a tank. This water can be latter purified and used by the local people for other purposes.

Depending upon the slope of the terrain the size of the pipe may vary.

Result

Based on costing:

The pipes and rods which is needed here are cheaper as compared to the recently used methods for preventing landslides. So this is more economical.

Based on effectiveness:

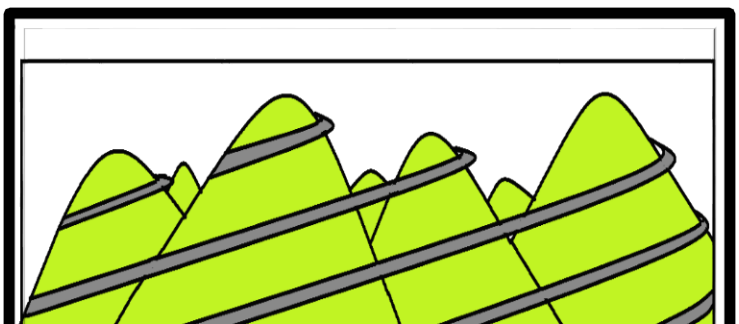

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Figure 2: circular slider

Figure 3.1 : layout of the open channel pipe.

The pi just like the slider the open channel pipeline will be covering the entire slope of the mountain. Since it is installed in this manner so when rainfall occurs most of the water will be touching the surface of pipe instead of directly hitting the surface of the slope. Moreover the water which will be hitting the surface will be of lesser impact as the flow of rainfallwill be obstructed by the pipe first. In every step the runoff is getting stopped as most of the water is getting collected by the pipe .The water collected by the pipe in every layer is finally getting discharged into a reservoir which is build up at the bottom. The water collected in the reservoir undergoes through purification process. First screening of water is done, followed by aeration and for better results we do add alum to the water .Aeration of water is done by tray tower method. The water after getting freed from gases like carbon dioxide, hydrogen sulphide and many others undergoes filtration. Taking into consideration about the environmental phenomenon in the mountains, rapid sand filter is preferred over slow sand filter. The rate of filtration will be quite fast because of high sand filter .After removal of all impurities it will go through absorption .It is done in order to free the water from any dissolved organics. Lastly the disinfection of water is required using chloride as it is cheaper as compared to other disinfectants. The purified water is now ready for local use of people and this can be either supplied directly or kept in store for emergency purposes.

Talking about the pipe which is suggested to be used here, has it's one surface extended (the one facing away from the mountain) than the one facing towards the mountain. This will try to collect much more water and also will be a good obstacle for the rainfall.

The water which will come down through the channel along the slope will get collected in a reservoir at the end. This water can then be utilised for many other works.

Conclusion

Landslides has a serious effects on the people, many people have lost their lives because of this. There have been some preventive measures taken by our government but still the outcome isn't long lasting. If in future a system like this is installed then it's serving two purposes which are:

1. It's preventing over saturation of soil in the slope and thereby preventing landslide.
2. The rainwater getting stored can letter be put into use.

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Design of Smart LPG Monitoring System

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Abstract
In recent times, most fire mishaps have taken place because of LPG (liquefied petroleum gas) cylinder blast. Due to a lack of gas leakage surveillance in the domestic cylinders, the fire breaks out mostly, destroying the property and lives nearby. The cylinder re-fill date tracking seems to be hectic because of non- recognizable changes when the LGP is about to exhaust.

The Gas monitoring system is a preferable solution to these problems. It is a must need for every domestic cylinder to monitor the gas leakage and avoid any destructive accidents. This system automatically detects and alerts in case of any gas leakage and also reminds to re-fill the cylinder. The gas sensor senses the leakage of the main constituent of LPG and sends a message on the mobile phone to the concerned user using IoT (Internet of things). It also alerts the user when the gas is about to exhaust completely and remind them to rebook for re-filling of gas before it gets used up completely.

Keywords: Gas leakage; Gas sensor; IOT; alerts; Detects

Introduction & Objectives:
LPG(liquefied petroleum gas) is an explosive mixture of hydrogen gases used as fuel in heating, mainly in cooking equipment (cylinders) and vehicles. It is composed mainly of propane and butane [1]. It is a highly inflammable gas; if leaked, it can cause major damage to life and property. It needs to be dealt with very carefully, and precaution should be taken for any outbreak. Sometimes a very small quantity of gas leakage is unnoticed and is responsible for major accidents. Our proposed system manages the recognition, checking, and control arrangement of any LPG spillage.Prabhakar.S et al have developed an LPG detection system in the year 2017, which was IoT based system[2]. Macker et al. has developed an aurduino based LPG monitoring system [3].

The primary objective of the device is to detect gas leakage. Using a gas sensor which can detect the presence of propane and butane in the air and sends a high pulse to the server, buzzer and then transmit emergency alert message to the user and for monitoring for the amount of gas still present in cylinder lies in load cell. When a gas container is placed on the load cell, it measures the weight and sense electric pulse do the micro controller which will compare the value with ideal value. If the compared value is low then it will send a data to the server and send a message for re-fill of the gas.

Methods
The cylinder placed on top of the load cell, first measures the weight of it, the voltage generated by the loadcell is very small, and after signal conditioning using an amplifier and the signal is sent to the microcontroller. Then it will be transmitted to the server, and others will send a message to the GSM module. Now, when the weight will decrease and cross the set weight, one alert message will be sent through the GSM module and other through the server to the website.The block diagram of the proposed system is shown in figure 1.

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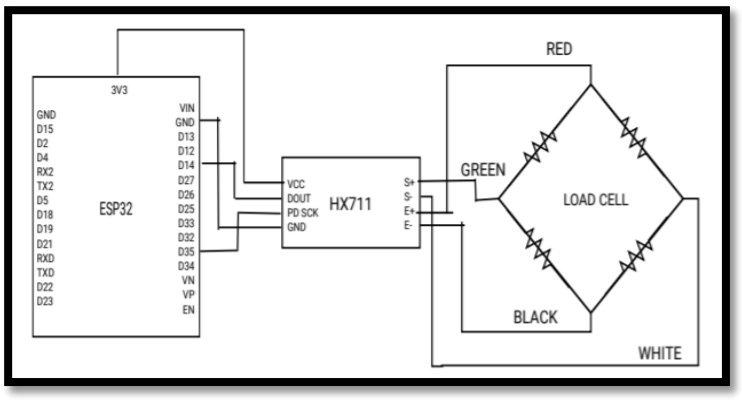

Fig. 1: Block Diagram of the proposed system

The gas sensor, MQ-6 sensor, will detect the gas (if leaked) and send it to the microcontroller. The buzzer connected to it will buzz, and also, a message will be sent on the phone and the server website. And also, the microcontroller will be connected to a relay that will be connected to the exhaust fan to escape the leaked gas from the room (kitchen) and turns off the gas valve. The system's flow chart depicts the working of the system conventionally.This helps us to get proper output data and curve (graph) is shown in figure 2.

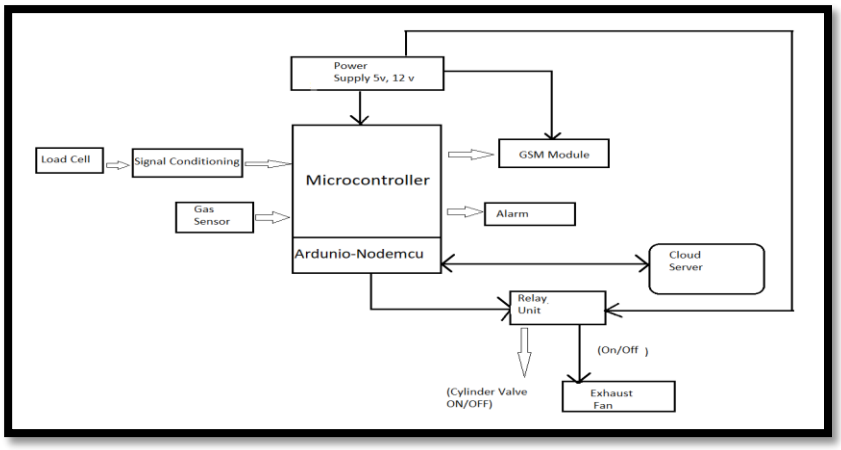

Fig. 2: Flowchart of the program

Results & Discussion

The proposed system is designed and successfully implemented. The primary component which helps in detection of gas is MQ-6. It can detect gas concentration anywhere from 200 to 10000 ppm and also hasfast response time [4].The weight of the gas cylinder measurement is done by using Internet of Things. The load cell measures the weight of the cylinder and sends the data to microcontroler by amplying data using an amplifier and from there, the data was send to the server and server send it to the client for real time data analysis. And the gas sensor used to measure the leakage of gas in air. The gas sensor's output graph depicts the amount of propane or butane present in the air in ppm. If it is less than 500 ppm, then it is considered safe, and green color light glows, but if the ppm is greater than 500 and less than(or equal to1000), it means it is lightly dangerous and therefore shows yellow color.If the presence is more than 1000, it signifies danger,which simply means there is a good amount of gas in the air that signifies that the gas has leaked and hence shows a red light, alert is

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observedby the user . Table I shows the recorded experimental obeservations.

Table I: Experimentantal observations

Level	Light Indicator	LPG (ppm)	Sensor value in MQ-6	Voltage (V)
Safety	Green	<500	<342	<1. 78
Precaution	Yellow	> = 500 < = 1000	> = 342 < = 512	>=1.78 <=2.50
Dangerous	Red	> 1000	> 512	>2.50

And as it shows precaution alert , our system closes the gas valve,which wasopen and sends a sms alert to the user using GSM moduleand thensends the data to the website aswell, and when it shows a red alert, it makes an automated call and the buzzer alert to the user for awareness and also it turns on the exhaust and sends data to website and displays an alert message as danger.

The data is also converted to a graph and shows danger when the peak reaches a good height.

A graph depicting the same is shown in figure 3.

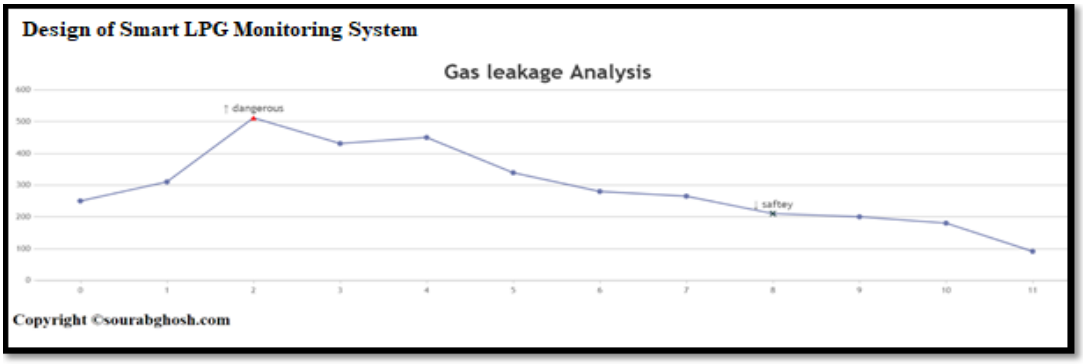

Fig. 3: The Graph of gas leakage analysis

Similarly, as the load cell measures the weight and after signal conditioning it is send to the microcontroller, which sends the data to the website for real time monitoring. The graph depicting the weight of the cylinder had measured the weight of the gas-filled cylinder and slowly-slowly when the gas is used up, and it's going to exhaust completely, then user is send an alertand the graph shows a complete fall is shown in figure 4.

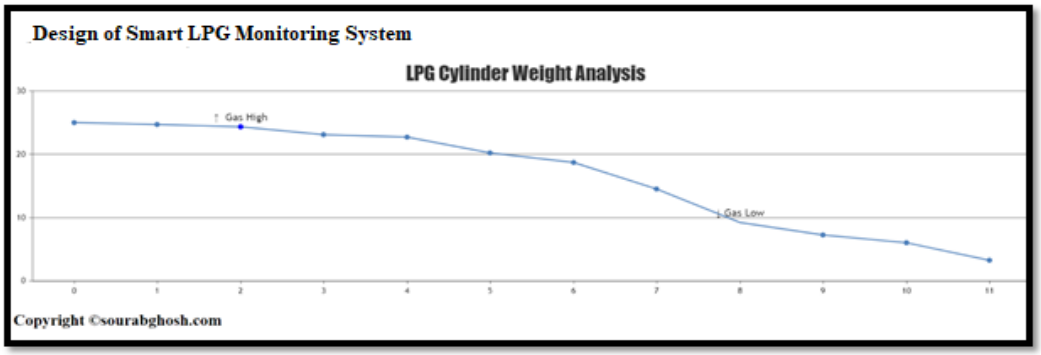

Fig. 4: The Graph of LPG Cylinder weight analysis

Conclusion

This system can make managing and keeping track of gas manageable and handy. This canalso prevent a large number of fire accidents in the household due to leakage of gas. This can also be further improved by improving the accuracy and precision in the measurement. Also, the Pressure sensor can also be used instead of a load cell, which measures the amount of gas in the cylinder and the pressure of the gas in the cylinder pipe.

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Design Approach of Protected Area Monitoring System

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Abstract

Surveillance procedure of protected areas such as some important premises, border areas, rural regions, is a challenging work. The Defence department has allotted a huge number of security forces along with some cameras in hidden places , but the coverage area is limited also the mounted cameras are fixed. There are more limitations such as it is impossible to mount the cameras in the forest areas or somewhere the numbers on trees other view of the camera is obstructed. An enemy can easily disguise within those trees without getting noticed. Our idea is to design a system with wireless robot with movable cameras and position detection system. This will enable us to control the robot with the help of internet and it'll be able to detect the living bodies with the help of PIR (Passive Infra-Red) sensor. Hence real time monitoring and the user can control the robotic views through Internet of Things (IOT). Information regarding the detection of living bodies will also be given to user

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on the webpage from the PIR sensor simultaneously. User is able to access the video transmission from the robot. The camera mounted on the robot is able to move in all possible directions. The camera movement is controlled using the servo motors. The PIR sensor is also connected with an alert generation part which will give alert if any movable body is detected.

Keyword: Surveillance, IoT (Internet of things), Raspberry pi 3, PIR sensor, Movable camera,

Introduction

All security departments are very important sectors which needs continuous monitoring with some advanced procedure as these hold the effectiveness and efficiency of the defence forces, to ensure the boundaries and public security of our country against the external threats. Enlarge force allotment, mounted hidden cameras, patrolling is still not enough to ensure the security. All these methods have some back falls like, cameras cannot work in forest regions as the trees obstruct the view. An enemy can easily disguise within those trees without getting caught by the cameras, patrolling the border in hostile conditions risking their life. Some real time monitoring with the help of current technology like robotics not only can take the process one step forward also make it a bit easy for them. Surveillance is necessary for security, such as to prevent crime or acts of terrorism where lack of surveillance can easily hamper our country's defence system, boundary and government. To avoid such situation improvement is needed with some updated technology. Real time monitoring and use of robotic application is a safe and suitable approach for it. Robotics is being used in various industrial applications for various activities, with the simultaneous growth of the networking, incorporating the intelligence level of that device one step forward. Thus they can work to provide service, security and entertainment etc. Some applications of robotics are surveillance cameras, telescopes, manipulators and mobile robots. Specially places like in army regions it is very difficult to monitor a huge area at the top of a tower but with technology we can implement a robot in disguise which can detect enemy's identification and word in advance. Our aim is to upgrade the surveillance procedure such a way that it can detect moving bodies and generate alert by using the IoT (Internet of things). While ensuring that the robot itself must be un-identified and our own army man can do their own field inspection without any alert generation at the head-office.

Methodology

The approached system has some modified components like Raspberry pi 3. It is a credit-card sized small computer that plugs into the monitor. It can be used in various electronics projects also for many works that a PC does. A Raspberry Pi has a strong processing capacity because of the ARM11 architecture and Linux-based system. In this project, high-definition video playing capability is needed, which is helping for the image processing and the data capturing by some movable cameras. The movement is programmed with basic servo motors. The data analysis part of this system have another portion which is based on PIR sensor. PIR sensor (Passive Infrared Sensor) is used for living body detection. If the active elements of the PIR sensor are exposed to a change in the surrounding temperature field, electrical charges are separated within the sensor elements. The voltage across the sensors controls a J-FET source follower impedance converter and thus modulates the output current of the PIR detector. While detecting any change it generates an alert signal which will inform the head office of that range. The total data will go through real time Surveillance but virtually with the help of IoT.

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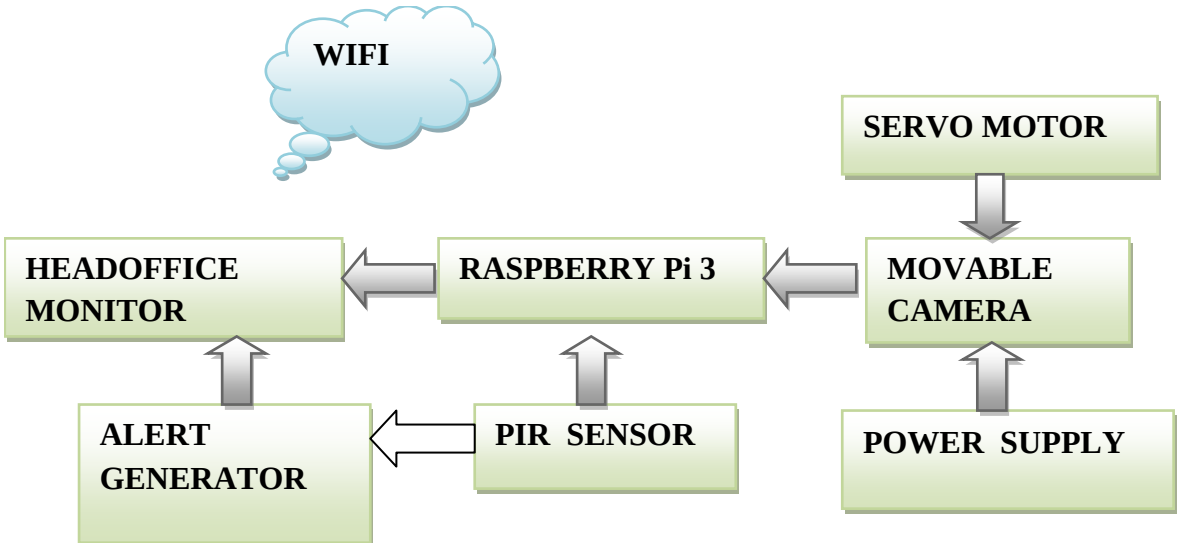

Fig. 1: Block diagram of the proposed system

The designed system is considered to have a huge part of programming and logical background. The programming has been done such a way that it could take the initial stage to protect the considered area. At first the data collection is done with pi cameras& PIR sensor. Pi camera is programmer with some reference images like human, fire etc. It compares the captured data with the reference and perform the image processing. If something different is captured it will generate an alert along with a message saying “something went wrong”. Similarly, the PIR sensor is also programmed this way that if it detects some movement and temperature changes in the region then it will generate alert signals to aware the security forces. By using IoT, real time monitoring collect data and record it for further security purpose. The programming approach is described with flow chart.

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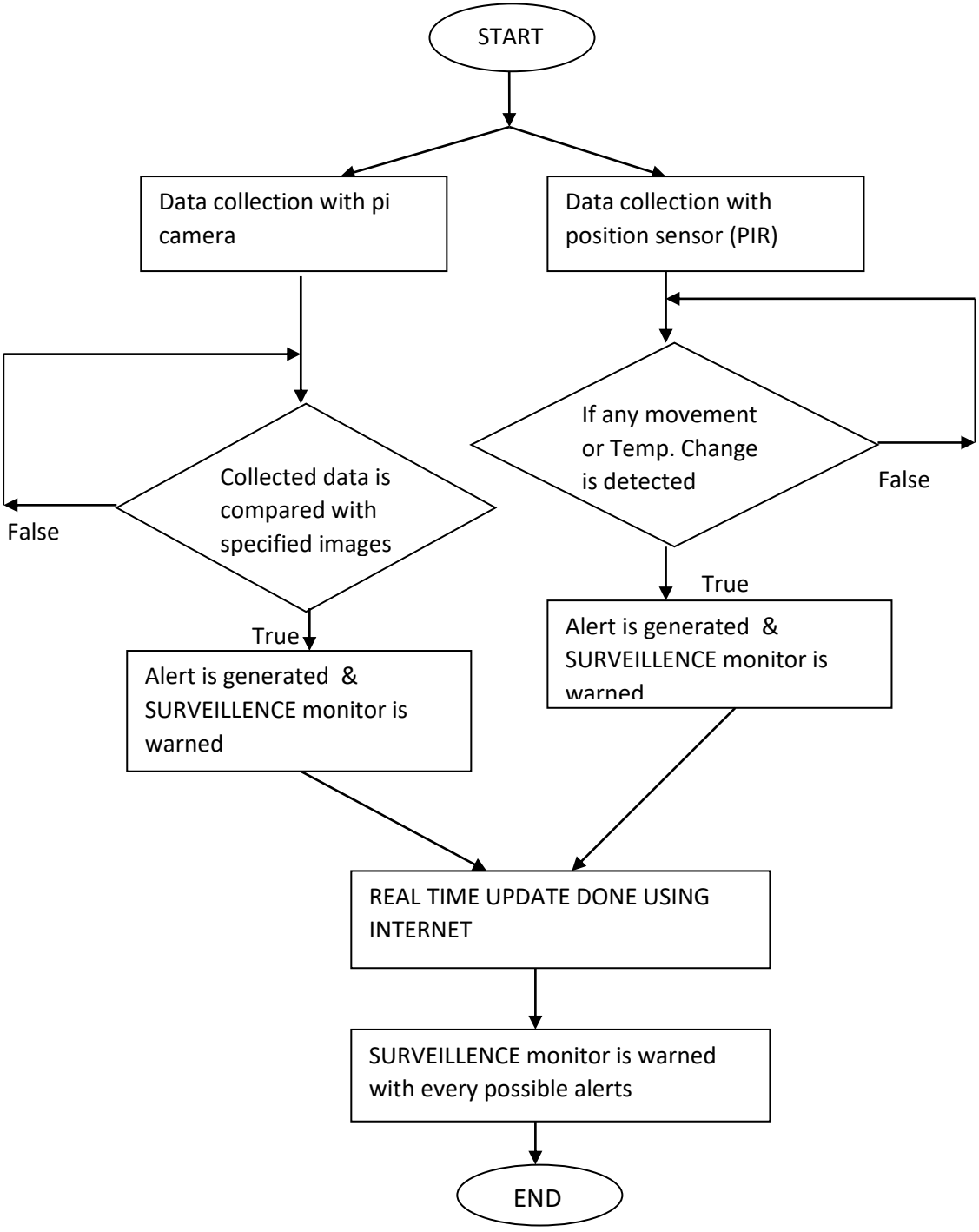

Fig. 2: Flowchart

Conclusion

The proposed method will act like an additional helping hand for the defence or security and make their working procedure a bit soothing as well. This can be used in any area where it is difficult for a human to survive and serve their beloved country. The proposed robotic system can also be used in finding the injured

persons during disasters such as earthquakes, collapsing of buildings and also in the mining fields and it can be used as a spy robot. In future to avoid the patrolling time misconception and alert generation, trans-receiver pair can be used. This technique will help us not only to overcome the situation but also some misconception of enemy movement and own army man's movement.

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Art and the Future of Artificial Intelligence

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Abstract

Artificial intelligence (AI) can be described as problem solving acts of machines or devices that appear to demonstrate intelligence by taking into their environment tasks to perform that help in achieving its objective. Using AI in the field of art is an approach that has evolved over the years, from AI as a tool to AI as a collaborator and with the leaps in technology, new boundaries are cross every day. In the present study, the idea of the future of AI where it itself can create a piece of media from its environment without direct human interaction has been presented. Also it has been focused on the fact that whether it can even be considered as an art or not. It has been stated in literature that the lack of consciousness is not a fundamental reason to deny the potential for creativity or even the potential for intelligence. The computers would not be the first example of unconscious creators but evolution is the first example. In this context, this study is based on building the reasoning on this idea for a future device or algorithm with sufficient "intelligence" (be it apparent intelligence or not). In this hypothetical situation, a device such as a black box is considered where, as it takes the input in

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data related to history, fiction, human emotions & interactions etc. from its environment, we get a consumable piece of media as an output.

Keywords: Artificial Intelligence; Art; Input; Output

Introduction and Objectives

Artificial intelligence can be described as problem solving acts of machines or devices that appear to demonstrate intelligence by taking in their environment to perform tasks that help in achieving its objective. Using AI in the field of art is an approach that has evolved over the years, from AI as a tool to AI as a collaborator and with the leaps in technology new boundaries are crossed every day, But the argument still stands today if machines can truly be creative or if it's the creativity of humans that nudges machines along the path we want it to take, and that prompts the question, if there can ever be an artificial intelligence that can be the sole owner of its artistic endeavors. How much of that art is defined by us through algorithms and human creativity and how much can be attributed to artificial intelligence, which in turn brings forth the discussion of the definition of art and if an anthropocentric idea of art is sufficient for understanding art.

In this article the idea of the future of AI is considered, where it in-self can create a piece of media from its environment without direct human interaction and if it can even be considered art.

Methods

It has been stated in literature that the lack of consciousness is not a fundamental reason to deny the potential for creativity or even the potential for intelligence. The computers would not be the first example of unconscious creators but evolution is the first example [1] and from that reasoning a future device or algorithm with sufficient "intelligence" (be it apparent intelligence or not) is considered. In this hypothetical situation we consider the device as a black box, where, as input it takes in data related to history, fiction, human emotions & interactions, etc from its environment and we get a consumable piece of media as an output which in turn is compared with traditional art to establish its position in art.

Results& Discussion

To question the validity of machine made media as art, a clear definition of art is needed. But, the dictionary definition of art [2] which specifies human creative skill to be considered art creates a block for machine made media, But that same formal definition of art cannot encompass or define artists like Congo, a chimp who created about 400 paintings in the in the 1960s, and that same definition fails again in front of cave paintings by Neanderthals. Hence making the definition invalid and incomplete. A definition that is universal in art as a whole comes from John Dewey when he writes "*the actual work of art is what the product does with and in experience.*" [3], and we find this common ground in all of artworks that have ever been created, from the stencil hand print made by primitive humans, to the "The creation of Adam" by Michelangelo. They are considered art works because of how we interact and experience them based on our own understanding. They exist in our interaction with the object in question.

In the discussion of the intention of the artist and how that might be a characteristic that is unique to us as a species, we have to consider, all our intentions are based on circumstances we live through weather we can perceive it or not, as an example we can talk about songs,How the artist communicates their feelings through the song might be unique, but the circumstances that have lead to the point of creation of that song were not for the artist to choose; in the same vain the output of the black box might be unique, but how that comes to being is the result of circumstances beyond its control.

We experience the universe based on stimuli and our past experiences, and in the case of art it can be color, shapes, words etc that stimulates the mind and we perceive it according to our own experience based on the intentions of the artist.

In the case of the black box of intelligence that outputs a consumable piece of media; the "intelligence" has clear intentions, to create a piece based on the data taken as its input. From that output we as individual audiences will experience it, and in our experience we will give the rest of meaning to the piece, to be understood, related to and felt. From this we can reason that the machine made media will definitely fall under the broad definition of Art.

Conclusion

In conclusion, it can be speculated that Artificial Intelligence will be able to create Art from the environment we will share and our own history, for us to experience. AI will become another bridge of humanity to the rest of everything in our pursuit of meaning, and it will be a fascinating journey for us as humans to experience.

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An Automated Approach of Health Monitoring System of Disabled Person Using Electrocardiogram and PIR Based Motion Sensor

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Abstract

It is not always possible to keep on monitoring or carry any disabled family member along with us, and sometimes they also may feel unsafe with unknown caretaker. So the aim of our project is to make a disabled or partially disable person able to communicate with their loved ones. In this project we have implemented the concept of Electrocardiogram (ECG). While detecting the ECG, using electrodes attached to their skin near the chest area to capture the signals formed, specially three fingers of the patient is used with maximum of 2-3PIR motion sensors. If the disable patient is able to move their finger, then the implementation can be done easily by those PIR motion sensors that are connected to the fingers of the patient. So basically, the electrocardiogram is suggested, to check the condition of the patient's heart. And as a result, the test report shows a graphical representation of the pulse generated by the heartbeat of the patient. And also there will be a GSM module connected to it and by which if the patient move their fingers their loved one will easily get a call or a message will be notified to them. For further implementation, we will also be using the concept of Electro-oculogram (EOG) and Electroencephalogram (EEG) by which the eyeball movement and the brainwave signals can be detected (especially in case of those patient who are fully paralyzed and mentally disabled).

Keywords: ECG electrodes; PIR sensor; Arduino Uno; GSM module; LabVIEW Software.

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Introduction and Objectives

As it is not always possible to keep on monitoring or carry any disable family member along with us, our project would be helpful there. Totally disabled or partially disable person will able to communicate with their loved ones. As this project is basically design for the paralyzed person who may feel that they are left alone. After implementing the electrodes and the sensors with the paralyzed person, they will be able to communicate easily with their loved ones. We just need to take care about few things in concerned before the implementation of this project work. Ford the initial use of this project we are going to use the concept of electrocardiogram and the PIR motion sensor, by which the patient will be communicate.
For further implementation, the concept of EEG and EOG is to be used**.**

EEG will be used for the mentally disabled person to read their brain signals and EOG is to be used to read their eye movement.

So the main objectives of a project are given below:

- This work is to use to detect different conditions of the heart. Whether the heart is beating normally or not, as there are different types of heart rates where a normal heart rate (60 rpm) is called bradycardia and a faster or abnormal heart rate (100rpm) is called Tachycardia, may give an indication of heart attack.

★ Using motion sensors, the disabled person can communicate with one other person in a difficult situation by doing tiny movements of fingers.

Methods

At first the electrodes are to be placed in the chest near the patient's heart. While detecting the Electrocardiogram (ECG), especially the index finger, middle finger and the thumb finger of the patient is used to sense with the maximum of 2-3 motion sensors. If the disabled patient is able to move their finger, then the implementation can be done with ease by those motion sensors that are connected to the fingers of the patient. Basically the electrocardiogram is suggested, to check the condition of the patient's heart. As a result the test report shows a graphical representation of the pulse generated by the heartbeat of the patient. So to implement the process the PIR sensor then connected with the Arduino UNO and the GSM module which as a reserved leave a phone call to the patient's family member. Below is the connection of the PIR to make the phone call.

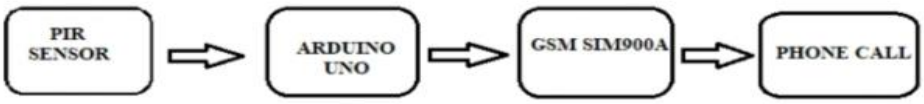

Fig.1. Block diagram of the connection from PIR sensor to the phone call

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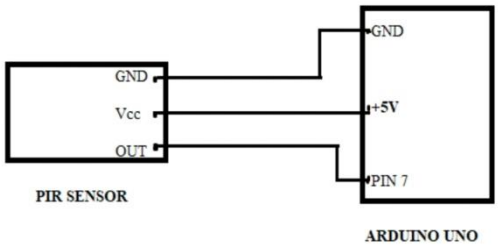

Fig.2. Circuit diagram for PIR sensor with the arduino UNO

When the LabVIEW software is connected to the Arduino UNO, the PIR sensor must be soldered properly with the Arduino UNO shown in the upper diagram, where the ground of the Arduino is connected to the PIR ground and the VCC of the PIP sensor is connected to the 5 Volt of the Arduino UNO and the Pin 7 of the Arduino UNO is connected to the output of the PIR sensor.

After the PIR sensor is soldered properly with the Arduino the GSM module would be connected. Below is the block diagram of the GSM module connected to the board.

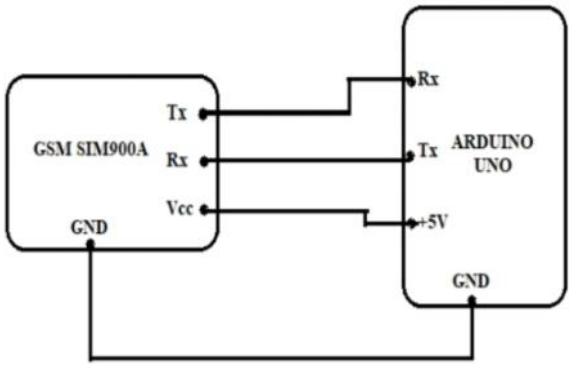

Fig.3. Block diagram of GSM module with Arduino UNO

In the above connection, the ground of the GSM module is connected to the Arduino UNO ground. Here the Rx of the GSM is connected to the Tx of the Arduino UNO, and the Tx of the GSM is connected to the Rx of the UNO board. And the vicinity of the GSM is connected to the 5 volt of the UNO board.

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Fig.4. Snapshot of our project work

Results and Discussions

The components are connected according to the circuit diagram described in the methodology. The Arduino is also programmed to fulfil the objective that whenever any of the patient's finger moves in front of the PIR sensor, within a few seconds a phone call will be received to a specific phone number fixed by the programming. After programming the Arduino the circuit is tested by moving different objects in front of the PIR sensor. In all the cases a phone call is received to a specific phone number fixed by the programming. If this PIR sensor is fixed with one member of our project group and again the experiment is done. This time also the result is same as before as expected before that whenever the patient moves their finger a phone call is received to the previously fixed phone number. No physically disabled person can move more than one finger or two different body parts like hand one toe then the Arduino can be programmed in a different way so that for different finger or body part movement call will be received to different phone numbers.

Few advantages as well as disadvantages to be discussed below:

Advantages:

- The implementation of the electrode as well as the PIR motion sensor is completely harmless.
- It is easy to use and also not harmful for children's as well.
- It has also a good flexibility
- If any of the part of the component is doesn't work, then you can only change the particular component so you don't have to change the whole components circuit, as a result it is cost effective.
- The designed project is also very helpful to the paralyzed patient in the hospital as well as any patient who resides and home under the care of nurses.
- Future upgradation of this project also can be done very easily.
- It can also be designed with more than one PIR sensors so according to the need of the patient.

Disadvantages:

- To make the phone call there must be a good mobile network connected always.
- To implement there must be a continuous power supply. So in case of a power cut there will be the failure of this device.

- Electrodes in the patient body must be connected properly otherwise there won't be any result.
- Soldering must be done with care otherwise as a result there will be a loose connection so the process won't work.
- Sometimes the bio-signal we get are not strong enough. There may be the device failure.

So here we have discussed the results what we have got from the testing of our circuit and the advantages and disadvantages of the whole procedure.

Conclusion

A new method is implemented in order to reduce the risk levels of an aged or disabled family member when he or she is alone in a room. By this method, the patient will be able to communicate easily with others by using their finger movements for bio-potentials.This project will decrease the communication gap between disabled people with the other person as well. The work can be further upgraded by implementing IOT and incorporating EEG and EOG technique. Using IOT data of bio-signals the patient health conditions can be extensively monitored through a webpage with predefined log-in and security systems.

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Importance of Smart Meter in Smart Grid

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Abstract

A Smart Grid is designed to integrate advanced communication and networking technologies into electrical power grids in order to ensure economically efficient, sustainable power system with low losses and high levels of quality and security of supply and safety, creating a two-way dialogue in which electricity and information exchange can take place between the utility and the consumers via Smart Metering Systems. Most of the blackouts and voltage sags could be prevented with intelligent systems automatically identifying and rerouting power delivery. Therefore, we conduct a systematic review of communication/networking technologies in

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Smart grid and the importance of Smart Metering systems via which consumers can keep an updated database of their daily usage and can balance the demand of electricity usage around the household. Consumers with home based Solar power generating system can also contribute to the grid thereby reducing their overall electricity cost and consumption.

Keywords: smart grid; smart meter; networking; information; solar-system

Introduction & Objectives

The conventional electrical grid system's main purpose is generation, transmission, distribution and utilisation of electricity. In contrast to this a smart grid is an unconventional power grid system which allows both power flow as well as information flow to create a new distribution system advantageous for both consumers and distribution companies. The most vital component in this system is a Smart meter connected to the Smart grid via a wireless network or power line communication system. The smart meter is the integral part of every smart grid as it is expected to provide economical and reliable solution to various stakeholders. The smart grid along with the smart meter uses AMI (Advanced Metering Infrastructure) which includes HAN (Home Area Network), WAN (Wide Area Network), NAN (Neighbourhood Area Network) to transmit information and shift peak loads at some other time. Smart meters have the ability to manage high loads at certain times, manages the grid sources efficiently, the consumers benefit in a no of ways, such as accurate and more timely electric billing, the tariff plans make the consumers think and then switch from conventional sources to renewable sources which gives an added benefit to the consumers. They can contribute to the grid by transferring energy from their home based solar power generating system to the grid, and can as well keep track of the units of energy used daily and the units sent to the grid, thereby reducing their overall cost of electricity. Collection of the data sent to the grid from the smart meter is analysed using various methods by the security and management department at the grid.

Methods

The increasing amount of energy usage, level of energy theft and non-payment of electricity bills has begun to challenge the traditional system of energy distribution and meter reading. The distribution companies are running at high losses. As well as lack of information on the consumer side and the mismanagement at the grid, the distribution companies are charging unnecessary amount to their customers. That is why using a Smart meter is important as it takes care of all these problems. Analysis of load data is required, the primary step is to check for missing or unusual data, this is done by the method of Bad Data Detection-Data that is unaccounted for or missing due to failure in collection of data is referred to as bad data. This data is automatically detected via a smart meter linked to a smart grid. Energy Theft Detection- This kind of data detection also falls under the above category but there is a keen difference, energy theft can last for longer period of time and is intentional. If the recorded consumption is lower than the forecasted value then the customer may be a malicious one. Load Profiling- It is the classification of consumers under the basis of energy consumption. Clustering techniques like hierarchical clustering, model based clustering is implemented using the smart meter data to represent the load profiles. Load Forecasting- It is the method used to predict the power or energy requirement for near future purposes so as to meet the demand to supply ratio. There are three types of load forecasting short term, medium term and long term, using the data of past several years a probable estimate is used so as to match the demand and supply equilibrium. These are the methods used to analyse and interpret the data and depending on this data it is evident that smart meters are way more advantageous than traditional meters.

Results & Discussion

Implementing above methods we can create much more trustable data and make the system more user-friendly. Consumers have a wide range of potential benefits with the smart meters, they can estimate their bills from the

information given by the meter and can manage and reduce their overall cost. Companies can analyze this real time data and use it to encourage consumers to use their high power consuming machines during off-peak hours so as to reduce cost. Smart meters are a way to the future, countries like UK, China have already implemented the use of smart meters on a large scale. India's national smart meter initiative is said to replace 250 million conventional meters to smart meters. The figures given by theEnergy Efficiency Services Limited (EESL) show that 1.4 million smart meters have been installed successfully in India till this date. The distribution companies have experienced an average 21% increase in efficient billing and reduction in losses between11% to 36%. Load forecasting with smart meter data is much more accurate and can be applied to every single household rather than the traditional method of forecasting for an aggregate number of houses. The distribution companies can now better understand the requirement of their customers and plan according to the needs. The data collected from the smart meters can be used for many purposes leading to a threat to data privacy. Under two European directives data protection is specified so that any kind of personal data cannot be accessed without permission. Smart meters cannot send any kind of sensitive data such as customer name, address. They can only send smart meter ID no, meter readings, type of information and payment details. Therefore energy suppliers and consumers both have to comply with data protection laws to ensure data privacy. Demand side management (DSM) popularly known as load management is the process of supplying electricity on the network by controlling or adjusting the load rather than controlling the power station output. Load can be controlled by using DSM control using smart meters. The power consumption of the customers is going to remain unaffected by this proposed load control method at peak load consumption times. Additionally, the smart meter will allow a good communication between the companies and the consumers to economical usage of loads at a time providing it to a consumer who needs it the most and switching it off for the one who is not using appliances.

Conclusion

In this paper, we have tried to throw light in the importance of smart meters and how with their implementation distribution companies can escape loss and theft in energy as well as consumers can remain informed about their consumption rate, creating a secured and connected network. In the upcoming days smart meters are going to pave the way for economical utilization of renewable energy and provide our future generations a digital method of monitoring energy.

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Electroencephalogram and Electro-oculogram based Patient Health Monitoring System

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Abstract
Every time it is not possible to leave a fully or partially disabled person or aged person alone with an unfamiliar or unknown caretaker. For this their family members are worried every time when they are outside of their house and also at working place whether the person is fully protected from or not exposed to danger or risk. Through our project we tried to decrease the communication gap between a disabled person and a normal person. Through this disabled person can easily communicate with their one family member. In this project we have used Electroencephalogram (EEG) and Electro-oculogram (EOG) signals to communication. To record the EEG signal and EOG signal we have used Neurosky and Electrodes in this project. Neurosky is a wireless Bluetooth device through which we can easily measure the EEG signal through various brain activity. In different emotional patterns such as attention, meditation the brain signals are recorded by Neurosky. Through these signals the disabled person or their family member can easily communicate with them. Neurosky is connected with LabVIEW software. From Neurosky all signals are transfer to the Arduino Uno through LabVIEW software. From Arduino Uno a call will be send to his or her one family member's phone through GSM module. Electrooculography is a technique to check eye condition by measuring the cornea-retinal potential of the human eye. Using electrodes, electrooculogram can be recorded. We get this voltage signal for every movement of eye-ball. To get proper output signal the electrodes are placed near the both side of the eye or on the skin near the eye like forehead. To pick up the voltage corresponding to the vertical eye ball and horizontal eye ball, one pair of electrodes are placed above and below the eye and another pair placing to the left and right of the eye respectively. We get the output signal in range of microvolt for the movements of eye ball. In biomedical field this technique has different types of application. The output signals are transfer to Arduino Uno from electrodes. Then a call will be sent to his or her one family member through GSM module for communication.

Keywords: Neurosky; Arduino Uno; GSM module; Electrodes; EEG; EOG

Introduction & Objectives
As of the year 2020; 1,378,085,450 people of different ages live in India. Among them, 60%-70% aged people (age 60+) are fully or partially disabled. Most of the disabled people live in the rural area from which they have to face many problems in their daily life. In rural area this is very hard to communicate with one another person as the houses are placed in distances. The aged or disabled person may suffer from different types of disabilities such as vision problems, hearing problems, speaking problems etc. In urban areas there are many developed technologies used by us and our family members. But in rural areas, no such technologies are available and the hospitals and medical staffs are also very rare in numbers. Also, the technologies available are not affordable for every people in rural areas and also in some places in the urban areas. So, mainly our work is for those people who cannot invest their money more than one time for disabled people. When they are alone in their house and nobody is present with them, they are facing a lot of problems. In any emergency situations, they

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may not communicate with the relatives, nearby neighbours or nearby doctors because of their ill-health and disabilities. Through this work the aged person can communicate with one caring family member or a nearby neighbour or a nearby doctor in any difficult and emergency situations using his/her bio-signals such as EEG and EOG.

Our objectives behind this project are:

- This work is to use differentbrainsignals to send EEG signals are recorded using Neurosky communication system will be occur using GSM module.
- With the help of EOG sensors, a disabled person can easily communicate with another person using his/her eyeball.

Methods

EEG (electroencephalogram) signal is recorded by Neurosky through the disabled person's brain activity. The EEG process is mainly used to detect the condition of the brain of physically or sometimes to the mentally disabled person. So, if the disabled person is not able to move their fingers or any other organ or any body parts, through Neurosky the brain signals are recorded. Through this signal a call will be generated by GSM module which can help to communicate the disabled person with his or her one family member in an emergency situation.

In the technique of EOG (electrooculogram), the condition of the patient's eye movement can be detected, which as a result will be showing a graphical representation of the electrical pulse generated during the movement of the cornea. To get the EOG signal, we need to place the electrodes on the skin near the eye like in the forehead area, up and down or both side of the eye. So, one pair of electrodes is placed upside and another to the downside of the eye to pick up the voltages during the vertical movement of the eyeball and another pair of the electrodes is placed to the left and right of both side of the eye to record the horizontal movement of the eyeballs. Through the eye ball movement, a signal will be generated and through that signal a call will be send to his or her loving one using GSM module.

Results & Discussion

We implement this project mainly for disabled person to able them for communicate with another person. Mainly we used here EEG & EOG signals through which they are able to communicate with their one family member. Let us now discuss the advantages and disadvantages of this device.

The main advantages of this device are:

- In this procedure no component has to be inserted into body this procedure is completely harmless.
- As none of the procedure discussed here are directly linked with the nervous system of the person this will not affect the nervous system any way.
- This is very easy to use and to maintain.
- It has good flexibility.
- It is also reliable. If the components are once connected well and programming is done properly then no doubt the device will work properly.
- Cost effective as if a part is not working then only that has to be changed not the whole circuit.
- Using EOG and EEG the device can be made more reliable.
- If EOG and EEG technique can be implemented properly then this device is also useful for fully physically disabled person.

- In hospitals it is very useful as a patient can call the doctor or nurse just moving his / her finger.
- For further up gradation the ECG signal also can be used in this procedure to monitor the cardio system parameters.

The main disadvantages of this device are:

- The main dis advantage of this device is to complete the procedure a good mobile network must be maintained at the both the places of sender person as well as at the place of the receiver person. Otherwise the procedure will not work.
- Soldering has to be done properly. If soldering is not done properly and any component is not connected correctly and at the right place the circuit will not work as expected.
- Getting the bio-signal is not an easy task always. If the electrodes are loosely connected noise may be present in the bio-signal which can disturb the expected result.
- Sometimes the bio-signal we get is not strong enough. This also can be a reason of failure of the system.
- Another small disadvantage is a constant power supply is needed. If there is any power cut during a period for that time this device will not work. This problem can be easily by connecting a rechargeable battery as power supply.

So here we have discussed the result what we have get from the testing of our circuit and the advantages and disadvantages of the whole procedure.

Conclusion

A new method is implemented in order to reduce the risk levels of an aged or disabled family member when a disabled person is alone in a room. Through this project, the communication gap will be decrease between disabled and normal people. This will definitely decrease the communication gap between disabled people with other normal persons. The work can be further upgraded by implementing IOT and incorporating ECG and PIR technique. Using IOT data of bio-signals the patient health conditions can be extensively monitored through a web page with predefined log-in and security systems.

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A Review on Continuous Monitoring Using Geo-Fencing Technology in Manifold Post COVID Future Aspect

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Abstract
Geo-fencing and its location-based serviceability feature can be utilized with an application or other software which uses Global Positioning System (GPS), Radio-frequency identification (RFID), Wireless Fidelity (Wi-Fi), or cellular data to elicit a pre-programmed action when a mobile device or RFID tag invades or go out in a virtual boundary set up around a geographical location. It helps to deal with the current pandemic situation. It can track the COVID-19 patients who have mild symptoms or are currently recovered from it. According to the study of researchers including a recent report of the U.S.A doctor's medicine team (DMD), the COVID-19 virus remains in the throat for 3 months after recovery. This technology is useful for continuous monitoring and generating a virtual boundary around the device, not necessary to be a smart phone thus ensuring economic feasibility. Geo-fence uses background location and addresses the position of the object to bring to light to the concerned administrator. According to the U.S.A, based report (SARS-CoV-2) finding in the air is one of the main reasons for these vastly communicable diseases. As an effect of generating heat due to the friction among the viruses, the system helps to detect the exact location by the RFID sensor as an add-on with the existing app. As a result, the system triggers an alert with the coordinates which can prevent the spread of the corona virus. In this paper, we review some of the key points on the prevention of corona virus spreading using some technological aspects of Geo-Fencing.

Keywords: Geo-fencing; Global Positioning System; COVID-19

Introduction & Objectives
Continuous monitoring using Geo Fencing technology in the post covid arena for every aspect of the society is itself a unique and challenging thing to be implemented successfully. As the name demonstrates it is an application that uses the worldwide situating framework, GPS as all of you think about it or even the radio recurrence distinguishing proof (RFID) which helps in characterizing the geological limits. This technology creates a virtual perimeter around the physical location of any active hardware & software incorporated device. Using this feature and without hampering the privacy issue of all the mobile active nodes within the defined region it is possible to imply any kind of notification or trigger any text messages or alert through any platform independent network enabled device specific applications [1-5]. The main objective of this work is to understand and detect the identity tracking service through the geo fencing technology. It will provide the following benefits in terms of covid patient/vulnerable case tracking scenarios [6-8].
• Increase Analytics and Tools for Metric Analysis
• Provide Personalization for Intruders or vulnerable entities
• Show and store all the information of that surrounding geographical physical region.

Review of Methodology:
In the context of preventing the community from spreading as much as possible concerning the current covid 19 scenarios in different segments of the society, this review work concentrates on technological Expedia like geo-fencing at the best to imply it. Currently through all over the globe various research work is going on in this

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context as a bull's eye. Using the Geofencing technology along with the firebase API helps to make the network-enabled device application that enables the open-source location services of the Google about different movement activity by the user. In conventional geofence, as shown in Fig.1, the location service process sends the entry & exit timestamp to the respective server-based architecture of every entrant within that radius or the system can specify a duration within the geo-fence area to wait or dwell, before triggering an event. In those proposed methodologies, that depends on several parameters like duration, local services, geofence expiration, etc. also be manipulated or re-programmed to detect all vulnerabilities [1,4-7].

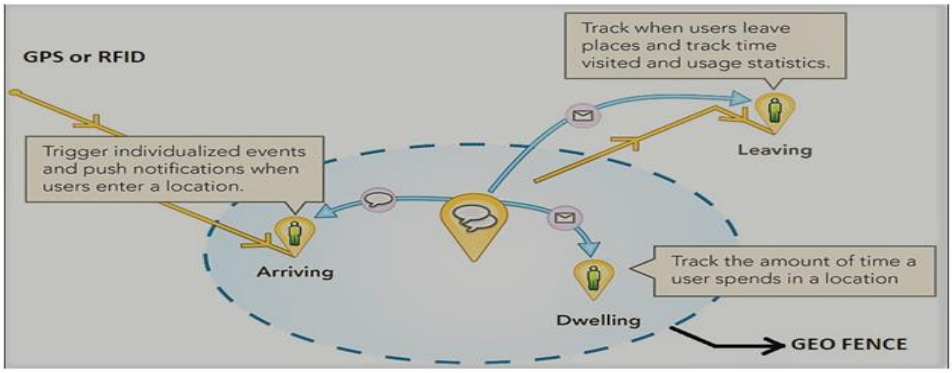

Fig.1. Conventional architecture of identity tracker through Geofencing [9]

The following are the consecutive processes for implementing a successful system which eventually prevents the corona virus spreading using some technological aspects of Geo-Fencing [1,8].

- Set up for Geo-fence monitoring
- Create and add Geo-fences
- Create Geo-fence objects
- Specify Geo-fences and initial triggers
- Handle Geo-fence transitions
- Stop Geo-fence monitoring

Future Aspect and Conclusion

The location-based geo-fencing and its integration with different technologies have an imperative aspect in mobile marketing, remote security precision monitoring, managing, control, track on road transport, etc. This paper mainly reviewed the methodological perspectives of Android application with Geo-Fencing technology in continuous monitoring as well as creating social awareness for various aspects of the precautionary measures in our post COVID society.

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EOQ Model with Delay in Payment under Inflations as Triangular Fuzzy Number

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Abstract
The classical model EOQ considered constant demand rate through year. Also, the classical model does not consider the deterioration of the item with time which is not realistic. In reality the demand depends on the price, inventory level, time, etc. In this paper we consider EOQ model for deteriorating items with price and stock dependent demand. The classical model EOQ consider constant demand rate through year. We have noticed the effect of shortages with under inflation. In first case, the credit period is less than or equal to cycle time and in second case the credit period is greater than the cycle time for settling the account. Here we have considered the effect of inflation in fuzzy environment along with the crisp's environment. Further we have obtained the optimal total cost. We have inflation as triangular fuzzy number and have used total λ-integral value to defuzzied the solution. Further we have observed the model with numeric example and analyse the model by calculating the sensitivity of few essential parameters in order to give the managerial insight of the model.

Keywords: Price and Stock Dependent Demand; Delay in Payment; Triangular Fuzzy Number; Total λ-Integrated Value; Shortages

Introduction & Objective

The word inventory refers to kind of resources having economic value and is maintained to fulfil the present and future need of the organisation. An inventory problem deals with decision that minimizes total cost of organization or maximizes the total average profit and serves to the customer by fulfilling their demand. It is difficult both to devise and operate with a real-world model as normally these are not amenable to mathematical treatment. So, some approximation and simplification are made during model building process. Sometime it may happen that the stock is finished (or damaged, spoiled) but still there is a demand in the market, this leads to shortage or backorder. The inventory problem is to find the specific value of the variables that minimize the total cost. The demand rate is directly related to the amount of inventory displayed and sometime it also

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depends on the price of the item. Decision which are taken to minimize are usually made in term of time and quantity variables that are subject to control in an inventory system. Our aim is to develop some inventory model in deterministic and probabilistic environment. So, the task is to construct mathematical model related with real life inventory system which will control whole inventory system. In this paper we haveconsidered a production inventory model for deteriorating items with ramp type demand rate under the effect of inflation and shortages under fuzziness. Also, in this paper inventory model are numerically illustrated by sensitivity analysis and other process.

Methods

In this paper we have considered a production inventory model for deteriorating items with ramp type demand rate under the effect of inflation and shortages under fuzziness. In this paper we have use triangular fuzzy number. And to defuzzify we use λ-integral value. To optimize the total cost, we have done trial with formula we have established. To keep the model relative with the reality we assume that are-

The demand rate of an item is price and stock dependent., Shortages are allowed and these are fully backlogged, The deterioration rate is constant on the on-hand inventory per unit time and there is no repair or replenishment of the deterioration item within the cycle, If the retailer pays by the offered credit period *M*, then the supplier does not charge any interest to the retailer. If the retailer pays after *M* then he has to pay interest at the rate I_p to the supplier.

Notation we have use in this paper:

Demand rate is D(I(t), p) =r(p) [α + β I(t)], where r(p)= d exp(-pz).

K is the inflation rate,θ is constant rate of deterioration,T_1 is the time when the stock level finishes,*T* is replenishment cycle,*M* is credit period settled by the supplier to the retailer, *p* is selling price per unit item per unit time,I_e is rate of interest earned, I_p *r*ate of interest payable or charged due to delay in payment.

Mathematical Model:

- $\frac{dI(t)}{dt} + \theta I(t) = -r(p)[\alpha + \beta I(t)] 0 \leq t \leq T1$ --------- (2.1)
- $\frac{dI(t)}{dt} + \theta I(t) = -r(p)\alpha T1 \leq t \leq T$----------(2.2)

For Case 1:

IE_1 = Interest earned due to sale up to T_1

$= C_1 I_e \int_0^{T_1} tD(I(t), p)\, dt$

IP1= Interest payable due to arrival of supplier before the stock ends.

$= C_1 I_P \int_M^T I(t)\, dt$

- Total Cost per unit item per unit time : TC1 = (OC + HC + SC + DC + PC – IE1 + IP1)/T

For Case 2:

Here retailer do not have to any interest to supplier,IE2 = Interest earned due to arrival of supplier after the stock ends-

$= C_1 I_e \int_0^{T_1} tD(I(t), p)\, dt + (M-T_1) \int_0^{T_1} D(I(t), p)\, dt$

The total cost in this case: TC2= (OC + HC + DC + SC + PC - IE2 + IP2) /T

To optimized the total cost in each case using necessary and sufficient conditions of optimality. Further we consider optimum value of $T_1 = t_1^*$ and for $T_2 = t_2^*$. We have taken K as triangular fuzzy number and after defuzzifing using total λ-integral value –

$I_\lambda(\widetilde{k}) = k + (\lambda - \frac{1}{2})\delta_1$,

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So, we get- $\widetilde{TC}(\tilde{k})=\tilde{c_1}$ + (DC+PC+HC+LC+S+SC)($\frac{1-e^{-k+(\lambda-\frac{1}{2})\delta_1 mT}}{1-e^{-k+(\lambda-\frac{1}{2})\delta_1 t}}$)

Result and Discussion

Considering the parameter values of the inventory system as θ= 0.1, β= 0.15, A= 250 per order, α= 500 units per year, d= 200, z= 1.3, p= 6, h= 0.6 per year, k= 0.12, c_1= 3 per year, g= 2 per year, I_e= 0.15 per year, I_p= 0.2 per year, T= 1 , and only by changing the credit period M

Get the bellow table-

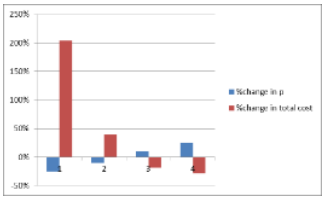
SL No	Credit Period(M)	t_1^*	t_2^*	T_1	T_2	Remarks
1	0.3	0.41	0.23	376.28	381.67	Case 1, Case 2 both satisfied
2	0.42	0.44	0.28	376.099	374.74	Case 1, Case 2 both satisfied
3	0.15	0.375	0.172	376.906	388.503	Case 1 satisfied
4	0.5	0.45	0.31	376.13	369.401	Case 2 Satisfied

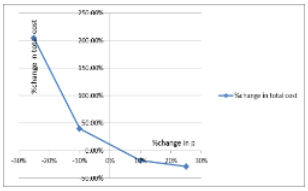
Now, while solving problems we are considering Fuzzy Environment and also provide the value of lambda.

DELAY OF PAYMENT		**FUZZY**	**CASE 1**		**CASE 2**	
Months	**M**	**Lambda**	**TC1**	**T1**	**TC2**	**T1**
1	0.0833	0	378.140	0.373	392.030	0.148
		0.2	377.820	0.368	391.570	0.146
		0.5	377.325	0.360	390.899	0.145
		0.7	376.990	0.355	390.449	0.144
		1	376.502	0.348	389.775	0.143
3	0.25	0	377.204	0.410	385.208	0.215
		0.2	376.901	0.405	384.794	0.214
		0.5	376.442	0.398	384.175	0.212
		0.7	376.135	0.393	383.763	0.211
		1	375.671	0.385	383.148	0.210
5	0.417	0	376.811	0.447	375.869	0.282
		0.2	376.528	0.442	375.494	0.281
		0.5	376.100	0.435	374.933	0.279
		0.7	375.813	0.430	374.560	0.278
		1	375.380	0.423	374.002	0.277
6	0.5	0	376.815	0.465	370.290	0.315
		0.2	376.542	0.461	369.934	0.314
		0.5	376.130	0.453	369.401	0.312
		0.7	375.853	0.448	369.047	0.311
		1	375.434	0.441	368.517	0.310

Next, we have done sensitivity analysis on the base of example 3 and get some relation of the variable with Total cost and the results are shown below-

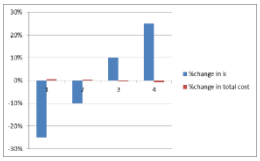
- **CHANGE OF p vs CHANGE IN TOTAL COST**

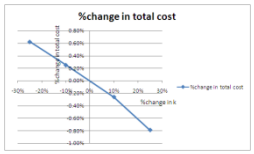




parameters	%changes	t_1^*	$TC_1(t_1^*)$	t_2^*	$TC_2(t_2^*)$	Remarks	change%	Command
	-0.25	0.345	1146.37	0.362	1195.27	$t_1^*>M$	2.0415	TC_1 , TC_2, t_2^* are highly sensitive
P	-0.1	0.369	527.126	0.245	549.34	$t_1^*>M$	0.3986	t_1^* is moderately sensitive
	0.1	0.378	308.146	0.125	313.39	$t_1^*>M>t_2^*$	-0.1808	
	0.25	0.38	268.042	0.0917	268.933	$t_1^*>M>t_2^*$	-0.2889	

- **CHANGE OF k vs CHANGE IN TOTAL COST**





Parameters	%changes	t_1^*	$TC_1(t_1^*)$	t_2^*	$TC_2(t_2^*)$	Remarks	change%	Command
	-0.25	0.412	379.255	0.18	391.797	$t_1^*>M$	0.00623	TC_1, TC_2 are less sensitive
K	-0.1	0.39	377.856	0.175	389.814	$t_1^*>M$	0.0025	t_1^*, t_2^* are moderately sensitive
	0.1	0.36	375.041	0.169	387.202	$t_1^*>M$	-0.0026	
	0.25	0.34	374.269	0.164	385.269	$t_1^*>M$	-0.0079	

Conclusion

We have successfully established equation which will help us to optimize the total value of the total cost only by adjusting the declared variables. We have considered five values of λthose are 0,0.2,0,.5,0.7 and 1. Where we get 0 as pessimist,0.2 about pessimist, 0.5 moderate,0.7 about optimist,1 as optimistic. We also able to find out the base case is 0.5 and the best case is 1. As in 1 the total cost is optimized.

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Mechanical Property Modification of PVCby Nano Graphene Oxide

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Abstract
Polyvinyl chloride (PVC) is one of the sustainable polymers which has widespread indoor and outdoor applications. Butthe problems of poor impact strength, difficult processibility and poor thermal stability are some of the disadvantages which are associated with it. So overcome these drawbacks in properties, several modifiers may be used which are often referred to as impact modifiers or processing aids. However, by the usage of the common modifiers, one of the properties of the polymer is enhanced but it induces deterioration in the other properties of the same. Therefore, in order to optimize all the mechanical parameters namely ultimate tensile strength, modulus, elongation at break and toughness, nanographene oxide is incorporated within PVC. With this endeavor, the present study aims at improving the properties of PVC in terms of the mechanical parameters stated, which are essential for effective environmental stability. Also, the estimation of the dynamics of the system over a range of incorporated nanofiller can be obtained from the present study.

Keywords: Poly(vinyl chloride); Nano graphene oxide; mechanical properties

Introduction & Objectives
Poly (vinyl chloride) (PVC) is a widely used commodity plastic which is endowed with the problems of poor impact strength and difficult processibility. These problems have been overcome to a certain extent by the use of polymeric or non-polymeric modifiers which are referred to as impact modifiers and processing aids. With this conception in view, the present study aims at improving the properties of PVC even further by incorporating nano materials within it and study the dynamics of the incorporated system over a range of added nanofiller [1,2].
Nanotechnology and nanocomposite formation is the new word of the world today. After the concept of nanocomposites was introduced, PVC nanocomposites have attracted great interest. Many properties of the PVC polymer such as strength, hardness, fire retardancy, etc. can be tailored by the blending of a wide range of nanofillers to extend the application range of PVC. Several authors have reported about the incorporation of various nanofillers to enhance the properties of PVC. The electrical behavior of PVC is significantly improved

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by the addition of multiwalled carbon nanotubes. PVC composites containing well dispersed nanoclays exhibits increased hardness and decreased smoke production. Introduction of copper or silver nanoparticles in PVC influences the antimicrobial property and photostability of PVC [3,4,5].
In the present study, an endeavour has been made to estimate the change in mechanical properties of PVC in terms of its ultimate tensile strength, modulus, elongation at break and toughness by using nano graphene oxide as the nanofiller. Nano graphene oxide has been introduced within PVC in different proportion to investigate the changes in the mechanical parameters over a range of the nano graphene oxide incorporation.

Methods

PVC resin was taken in an air tight dry blender and mixed with 30 parts dioctylphthalate (DOP) plasticizer and 2 parts tribasic lead sulphate (TBLS) heat stabilizer with respect to the amount of PVC resin taken. The graphene oxide nanofiller (3 to 15 parts) is then added and mixed thoroughly in the blender with the PVC mix at a slightly elevated temperature. A number of batches were prepared by varying the dose of the nanofiller (3 to 15 parts). The mix was then compression moulded into sheets under heat and pressure which was then subjected for mechanical testing in Instron Universal tester.

Results and Discussion

The mechanical properties of the nano graphene oxide incorporated PVC blends have been investigated in terms of the mechanical parameters like modulus, ultimate tensile strength, elongation at break and toughness. The dynamical changes in the parameters have been studied over increasing doses of the nano graphene oxide nanofiller from 3 to 15 parts by weight. Fig. 1 represents the changes in modulus of the blend over increasing range of nanofiller incorporation. It has been observed that there is a gradual rise in the modulus values on going from 3 to 15 parts of nano graphene oxide. The modulus rise was from 432 to 471 MPa starting from unblended PVC matrix to 15 parts of incorporated nanofiller. The rise however levelled off at 15 parts of nanographene oxide. Nano graphene oxide exerts its reinforcing influence to increase the modulus values of PVC. The dispersion of the nanofiller within the PVC matrix induces a modifying influence in the modulus values probably due to its extended surface area owing to its particle size within the nano range.

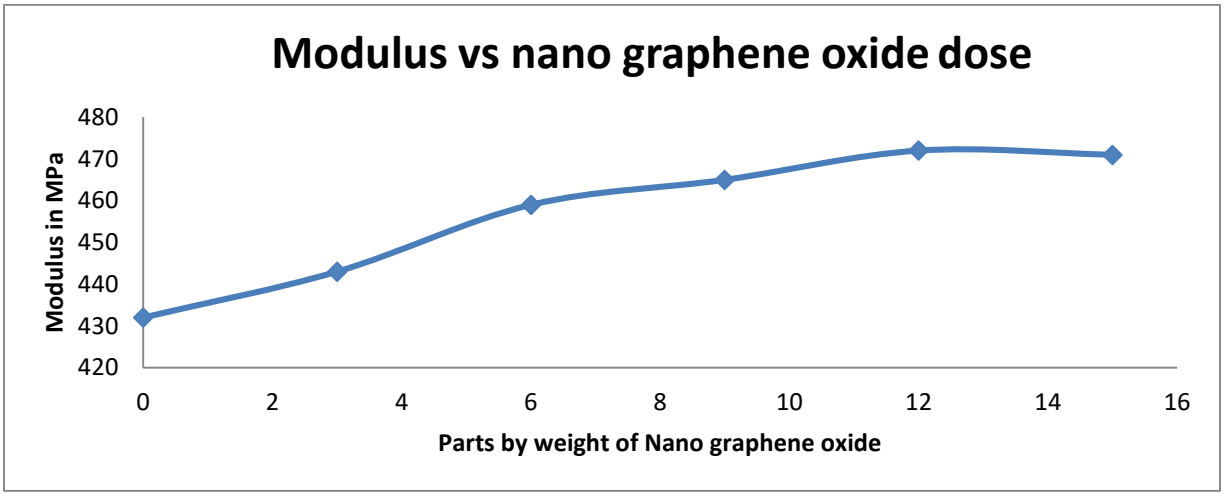

Fig 1: Variation of modulus with increasing nano graphene oxide dose

Similar trend of rise in Ultimate Tensile strength (UTS) in observed with increasing nano graphene oxide dose

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as depicted in Fig. 2. The ultimate tensile strength curve exhibits a gradual rise from 25 MPa of unmodified PVC to about 46 MPa at 15 parts of nano graphene oxide incorporation. In this study also, it has been revealed that the superior properties of the nanomaterials aid in modifying the properties of the polymers which is under consideration. Here, the directing influence of the nanofiller (nano graphene oxide) modifies the modulus and ultimate tensile strength of PVC and gradually raises the parameter values with rising nanofiller incorporation. However, in both the cases, it has been observed that the properties tend to level off at 15 parts of nano graphene oxide incorporation.

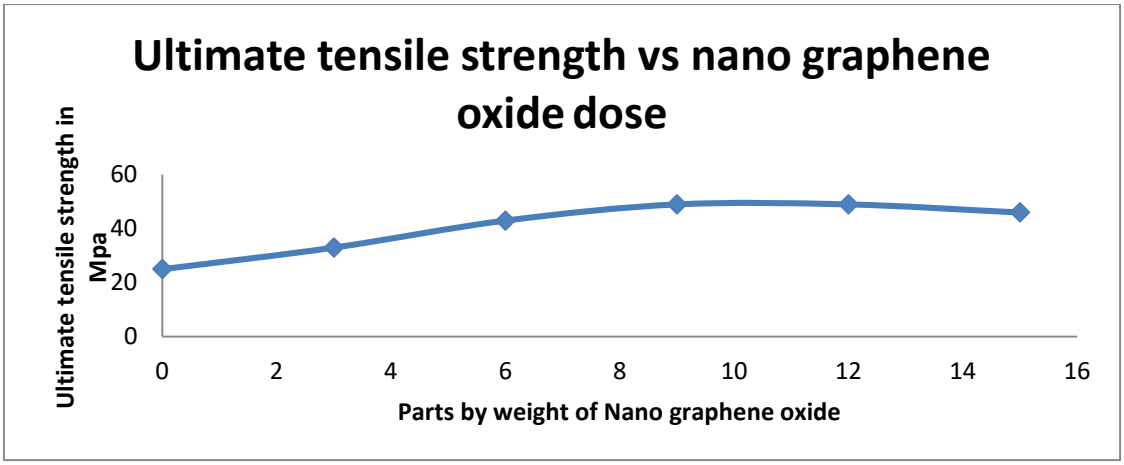

Fig2: Variation of ultimate tensile strength with increasing nano graphene oxide dose

The changes in elongation at break and toughness corroborated with the changes in modulus and ultimate tensile strength as depicted in Fig.3 and Fig.4 respectively. The elongation at break values showed a marginal decrease from 119% to 112 % which revealed that the nanomaterial improved the modulus and ultimate tensile strength of PVC not at the compensation of deteriorated values of elongation at break and toughness.

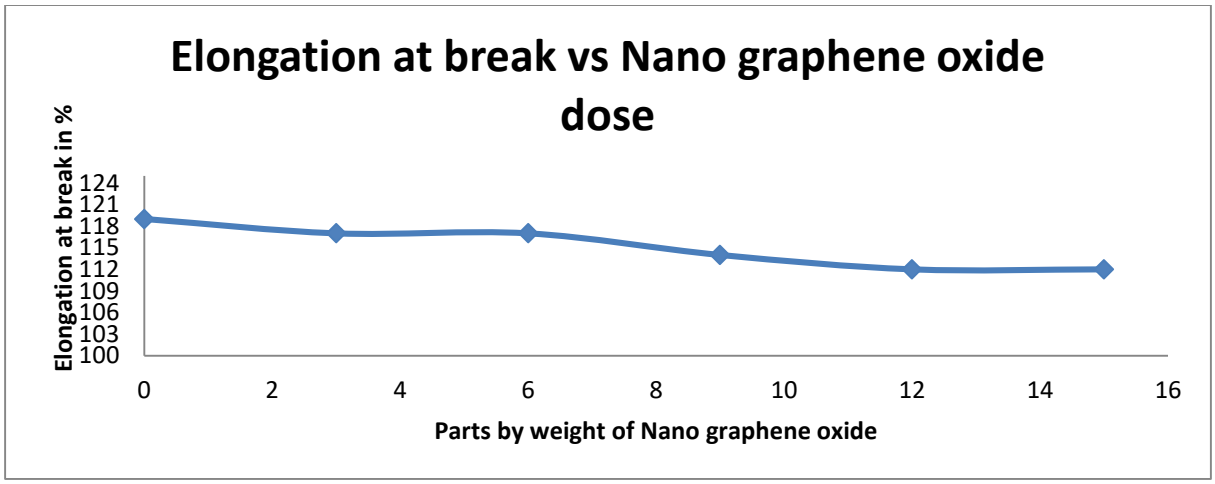

Fig 3: Variation of elongation at break with increasing nano graphene oxide dose

The toughness also reduced very marginally from 5 to 4.7 MPa showing an overall improvement of the mechanical properties of unmodified PVC in terms of modulus, ultimate tensile strength, elongation at break and toughness.

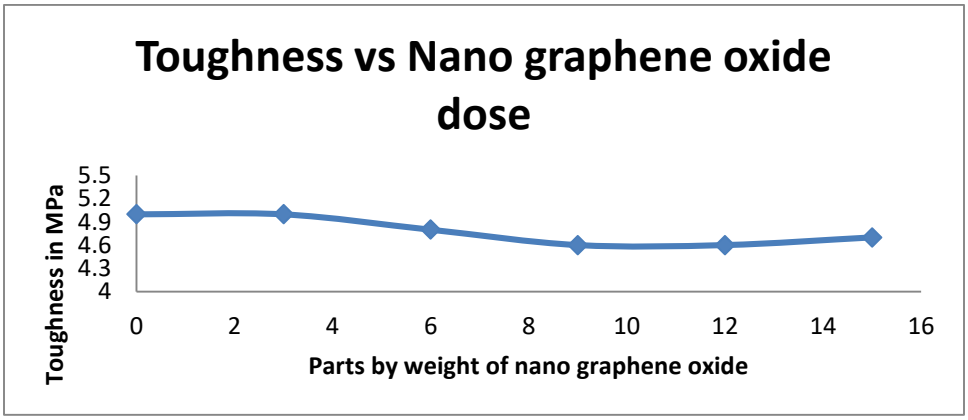

Fig 4: Variation of toughness with increasing nano graphene oxide dose

Conclusion

The improvement in the mechanical parameters of poly (vinyl chloride) polymer by the incorporation of a nanomaterial (nano graphene oxide) was investigated in the present study. It was observed that there was an overall increase in the modulus and ultimate tensile strength values over the range of incorporated nanofiller but not at the compensation of reduced elongation at break and toughness.

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Solar Tree

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Abstract

Now a days with the growing population and energy demand we should take a renewable option of energy source and also, we should keep in mind that energy should not cause pollution and other natural hazards. In this case the solar energy is the best option for us. India is a highly populated country, so we should take the advantage of such an energy which requires a very less space to produce energy efficiently. In this case solar tree could be the best one for us. We can also use the technique called “SPIRALLING PHYLLOTAXY” to

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improve the efficiency of the plant. It can be applied in street lightening system, industrial power supply etc. It is much better than the traditional solar PV system in area point of view and also more efficient. So, this will be a very good option and should be implemented. It is a form of renewable energy resource that is some measure competitive with fossil fuels. Hydro power is the force of energy of moving water. Hydroelectric power plants do not use any resources to create electricity or they do not pollute the air. The sun is a hydrodynamic spherical body of extremely hot ionized gases(plasma), generating energy by the process of the thermonuclear fusion. The temperature of interior of sun is released by fusion of hydrogen and helium.

Solar energy is available in abundance and considered as the easiest and cleanest means of tapping the renewable energy. For direct conversion of solar radiation into usable form, the routes are solar thermal, solar photovoltaic and solar architecture. However, the main problem associated with tapping solar energy is the requirement to install large solar collectors which require a very big space. To avoid this problem, we can install a solar tree in spite of a number of solar panels which require a very small space.

Keywords: Solar Panel;Phyllotaxy; Hazards; Thermonuclear fusion;Ionized gases

Introduction & Objectives

A solar tree is a decorative means of producing solar energy and also electricity. It uses multiple numbers of solar panels which forms the shape of a tree. The panels are arranged in a tree fashion in a tall tower or pole.

Thus, we can say the full form tree as

T = Tree Generating
R = Renewable
E = Energy and
E = Electricity

Solar trees are intended to bring visibility to solar technology and to enhance the landscape and architecture they complement, usually in a commercial or public context. An objective of many solar tree installations is to promote awareness, understanding, and adoption of renewable energy.As we know trees are present in nature and they can produce their own food material by the process called Photosynthesis. It is the process by which green plants collect energy from sun and the water present in soil at the day time and can produce their own food material. By this process they are indirectly providing food to the human society because we are depending on the green plants for our food directly or indirectly. We waste electricity in huge rate in roads, railway stations as well as in our households also. We can minimize the electricity consumption and use only that much electricity that we need, but for that we have to self-control first. Without changing yourself first one cannot change the surrounding habitats.

Here we are considering the example for understanding about the solar tree. This is a tree in which the stems connected acts as the branches of the tree and the solar panels are like the leaves. Green leaves are producing food materials for human beings likewise these leaves are producing energy for the society. So, it is very appropriate to called it as tree.

Methods

Green plants collect energy from sun and the water present in soil at the day time and can produce their own food material. This process they are indirectly providing the food to the human society as we all depends on the green plants for food directly or indirectly. In a solar tree the stems of the respective trees are connected as a branch of the tree and the solar panels are like the leaves. Green leaves are producing food materials for human beings likewise this leaf is producing energy for the society.

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The solar tree consists of some important parts in its design. They are as follows:

- Solar Panels
- Long Tower
- LEDs
- Batteries
- Stems for connecting the panels

Working Procedure:

- Batteries are charged during the day time.
- LEDs are automatically switched on
- These are used to indicate how much charge or energy remains left.
- Batteries are also used to store the energy so that we can use it at night and in cloudy days when no sunlight is there.

We will install one sensor device which will help to reduce the wastage of electricity in roads as well as railway station. This sensor will turn on the street lights after dusk when any person or vehicle passing by the roads & after passing the sensor will turn off the lights, this will save electricity. Same in railway stations, also an empty railway platform doesn't need any kind of lights. So there also this sensor will help to save electricity in huge rate. When train will enter in a railway track that respective platform's lights will be turned on as well as whenever any person enters in the platform the platform lights will turn on.

Results & Discussion

Efficient energy generation is possible compared to traditional system. Due to the technique called spiralling phyllotaxy its efficiency further increases. Though it is somehow costly but as compared to all cost involved in traditional system it is more efficient. It can also collect energy from wind, the stems are flexible so that they can rotate in any direction and by shaking themselves they produce energy also from wind as in the case of a natural tree. It is the best option of energy generation because it requires very less land as compare to the traditional PV system. Now a day's land becomes the costliest commodity for the human beings because of high population growth. So, we require such plant which can generate maximum energy using minimum land.

It is the best option of energy generation because it requires very less land as compared to the traditional PV system. Now a day's land becomes the costliest commodity for the human society because of high population growth. So, we require such as a plant which can generate maximum energy using minimum land. It can generate energy very efficiently as compare to traditional system. Due to the technique called Spiralling Phyllotaxyits efficiency further increase. Though it is somehow cosy but as compare to all cost involve in traditional system it is more efficient.

As the name suggest this is a device to generate energy from sun but it has some unique feature to generate energy from wind. The stems are flexible so that they can rotate in any direction and by shaking themselves they produce energy also from wind as in the case of a natural tree.

If we install a sensor device, wherever needed, then it will play an important role in our daily life & will save electricity for our future.

- WHY IT IS BETTER THAN TRADITIONAL SYSTEM?
  For the traditional system we require large size of land to generate a small amount of power. It requires about 1% land as compare to the traditional system.
  Example - To generate 2 MV power from a PV module we require 10 – 12 acres of land for housing of panels only.

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But for the same amount of energy we require only 0.10 – 0.12 acres of land in case of solar tree.

- SPIRALLING PHYLLOTAXY
  It is a technique used in designing of solar tree. It provides the way to help the lower panels from the shadow of upper ones, so that it can track maximum power from sun.

- WHY IT IS UNIQUE?
  The Unique technique is that flexible panels connected to the stem which can be rotated as our desire. So that flexibility avoidance of wind pressure can be possible. Flexibility offers manual rotating so that maximum power can be obtained.

- ADVANTAGES
  1. No air pollution
  2. We wouldn't have to worry as much about future energy sources
  3. People in poor country would have access to electricity
  4. People can save money
  5. Land requirement is very less

- DISADVANTAGES
  1. Cost is high
  2. May cause hazards to the birds and insects
  3. Hazards to eyesight from solar reflectors

- APPLICATIONS
  1. Street lights
  2. House supply
  3. Industrial power supply

India being a developing country and highly populated requires a power plant where maximum energy can be generated by using minimum land. Solar tree will be the best option to avoid this problem. We must try to produce energy from sun by using solar tree in our country to increase our per capita land and fulfil the growing energy demands.

Conclusion

It produces less air pollution. We don't have to worry as much about future energy sources. People in poor country would have access to electricity. People can save money as well as land requirement is very less.
To fulfill the increasing energy demand, the people and saving of land this project is very successful one. This can provide electricity without any power cut problem. The installation of the sensor device can save huge power loss. The extra energy can be provided to the grid.

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Recovery of Nickel and Cadmium from Household E-Waste

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Abstract
E-waste comprises a broad range of electronic equipments starting from most modern small electronic devices to the large household electronic devices. Disposal of the E-wastes has become a serious environmental issue due to the presence of deadly chemicals as well astoxic metals. The various techniques available till date for recovery of metals from E-wastes are Pyrometallurigal, hyrdrometallurgical and biometallurgical processes. Our present work reviews some of the recent developments in the field of biometallurgy as this is the most promising as well as green technology. Biometallurgy includes two processes like bioleaching and biosorption which has been successfully utilized in recovery of several metals from E-waste.
The present work reviews the most recent researches in biometalurgy for recovery of two important metals i.e. Cadmium and Nickel from E-waste.

Keywords: E-waste; Cadmium; Nickel, Bioleaching

Introduction & Objectives
E-waste or electronic waste is generated when an electrical equipment is no longer in use and discarded. Robinson defined E-waste as any device connected to a power source that no longer satisfies the current owner to the purpose for which it was created [1]. The European WEEE Directive classifies E-waste in ten categories: Large household appliances (including cooling and freezing appliances), Small household appliances, IT equipment (including monitors), Consumer electronics (including TVs), Lamps and Luminaires, Toys, Tools, Medical devices, Monitoring and control instruments and Automatic dispensers.
Recycling of E-waste returns important materials for further use and reduces the demand for virgin materials asE-waste contains valuable metals (Cu, platinum group) as well as hazardous elements like Pb, Sb, Hg, Cd, Ni etc. Electronic waste may now be considered as a 'secondary ore' or 'artificial ore' for the concentrations of precious metals. Pyrometallurgical and Hydrometallurgical processes are the traditional methods of treating E-waste. However, pyrometallurgical treatment leads to the formation of brominated and chlorinated di-benzo furans and dioxins due to the presence of halogens in the plastic parts of electronic waste [2]. Hydrometallurgical processes are also associated with risks of environmental impact due to the toxicity of the reagents used and the generation of large amount of by-products[3]. These processes are also expensive and energy intensive processes.
Development of green and sustainable technology for recovery of the materials is the need of the hour. Biometallurgy includes Biosorption and Bioleachingare promising technologies which utilizes microorganisms to recover metals from E-waste and as well as from low grade ores [4].
The present work reviews the most recent green, sustainable as well as economic methods for recovery of two important metals i.e. Cadmium and Nickel from E-waste with special emphasis to the bioleaching process.
Cadmium is found in batteries, pigments solder alloys, circuit boards, computer batteries, monitor cathode ray tube.It can cause Itai itai disease as well as kidney malfunction. Cadmium from one mobile phone is enough to pollute 600 m^3 water.

Nickel is present in the heating coils of many common household electric appliances. New age mobiles, laptops rely on lithium ion &Nickel-cadmiumrechargeable batteries.Although nickel makes up only 1 percent of the total weight of a mobile phonenickel is also vital for the core electronic functioning of the device. Nickel causes lung, larynx, nose cancer, bronchitis, prostate cancer etc.Cadmium and Nickel both are carcinogens.

Results&Discussion

Sumana Sannigrahi et.al [5] studied the biodegradation of waste printed circuit boards (diode and resistors) with five strains *Magnetospirillum* sp. The samples were treated with the bacterial strains of *Magnetospirillum* sp. (RJS2, RJS5, RJS6, RJS7 and MSR-1) individually and in consortia for 12 days. Atomic absorption spectroscopy (AAS) analysis revealed the isolate RJS2, MSR-1 and RJS6 showed maximum recovery of cadmium (97%) and nickel (99%) from diode. The researchers further developed two groups of consortia MAG1 and MAG2 with the strains. MAG1 exhibited better recovery of metals i.e. 100% nickel from diode and 90% cadmium from resistor. M.Arshadi&S.M.Mousavi[6] examined bioleaching of heavy metals from mobile phone printed circuit boards using adapted *Acidithiobacillus ferrooxidans*. To maximize simultaneous extraction of Cu and Ni from MPPCBs, initial pH, initial Fe^{3+} concentration, pulp density and particle size factors were optimized using the central composite design of response surface methodology. An initial pH of 1, initial Fe^{3+} concentration of 4.18 g/l, pulp density of 8.5 g/l and particle size of 114.02 μm (#100 mesh) were determined as the optimal conditions. Under these conditions, 100% extraction of Cu and Ni was achieved. Dipali Rahangdaleand Anupama Kumar [7] provide a sustainable solution to the recovery of Cd from nickel-cadmium battery waste. Their work utilizes the affinity of the biopolymer chitosan towards different metals. Stability of chitosan in acidic medium was improved by grafting it with a suitable grafting agent and crosslinking. Further, it was used for the synthesis of acrylamide grafted chitosan based Cd ion imprinted polymer (CdIIP) using Cd as template and epichlorohydrin (EPI) as crosslinker for the selective recovery of Cd.
DumitruBulgariu and LauraBulgariu[8] adopted a cleaner method i.e. biosorption process for recovery of cadmium.Algae waste obtained after oil extraction was activated by alkaline treatment and used for cadmium(II) removal in batch and column systems. For batch systems, the effect of initial cadmium(II) concentration and contact time was studied at pH 5 and 8 g biomass·L^{-1}. For column studies, the alkaline treated algae waste biomass was mixed with an industrial ion exchanger resin (Purolite A-100) to prevent the clogging of column. Five biosorption/desorption cycles have yielded between 98.83 and 92.39% biosorbent regeneration.
S. Paul et.al. [9] conductedtheir study using sulfate-reducing bacteria for 10 days in batch process where initial concentrations of Cd^{2+}were20, 40 and 60 mg/L. They maintained a pH of 7.0 ± 0.2, temperature 30 ± 0.5 °C and stirrer speed 120 rpm. Analysis of extracellular polymeric substance revealed that protein secretion was enhanced, thereby forming Cd-EPS binding. They collected the biosolids, freeze-dried it for morphological analysis viz. FESEM/EDX, PXRD and TEM, which revealed the formation of CdS nanoparticles (JCPDS card #00-042-1411) in range of 2–6 nm. Similarly, combined effect with 5, 10 and 20 mg/L Ni^{2+} at 20 mg/L Cd^{2+} were also investigated.

Conclusion

The review shows that though different methods are available for extraction of metals from E-waste, biological methods like bioleaching process is more effective as these processes are less energy intensive and more eco friendly. There are several strains of bacteria, fungi, and actinobacteria from both terrestrial and aquatic ecosystems.

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Aggregation Operator Based Multi Criteria Group Decision Making Model in PNN Environment

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Abstract
In this current century, social media is one of the strongest platforms to popularize any sector. According to research work, it has been observed that most of the banks are lagging to the use of social media. The bank is a kind of sector where the customer relationship is very important and social media plays a huge role in maintaining the customer-banking relationship. Social media was initially developed to communicate with different people but it took a huge turn by connecting billions of people through a single application. Though every social media has its different purposes, advertising in such platforms can grow the popularity of a particular bank among people. Due to this online communication, it has been very easy for the customer to communicate with the bank. Through social media, banks can drastically expand their connection to different people across the globe in a much shorter time and acquire feedback and reviews to make the customer experience far better.
The main aim of this study is to establish the best social media platform as per the users and the impact of each social media platform on the banking domain expansion under the Pentagonal Neutrosophic (PNN) arena. PNN is a study that is done based on five parameters combining with neutrosophic set. The Neutrosophic set contains one true membership, one false membership, and the other as indeterminacy membership. This study is done on both the genders and at various age groups with real users. This will not only increase the customer relationship with the bank but also increase the number of satisfied customers. Also, we extensively augment weighted Operator based strategy to resolve our proposed MCGDM problem to sort out banking relationship issue in PNN realm. Finally, a numerical problem is illustrated to demonstrate the pertinence of our recommended strategy and sensitivity investigation is performed which exhibits an essential impact in MCGDM field.

Keywords: PNN; Social Media Platform; Banking Industry; Operator.

Introduction
In the earlier days when social media platform was not at this reach then it was too difficult to stay in contact with other people staying at various part of the world. Due to this social media nowadays people can connect from any part of the world in no time. The traditional way like printing, letters, etc. was a communication from

one to manyknown as a passive way. But social media platforms connect from many to many known as an active way. As social media connects so many people at the same time, communication is way too fast on social media platforms. Through social media posts, it is very easy to judge the mental condition of a particular person. And due to fast internet connection and extensive use of mobile phones the social media platform grew over the past years.

Social media is the platform for thousands of posts, share, likes, comments, feedbacks, and tweets which are made available to the whole world in a fraction of minute. Some of the well-known social media platforms are Facebook, Whatsapp, Twitter, YouTube, LinkedIn, and many more. Social media can be broadly classified as the message and communication, communities, social group, photos, and video sharing. All the social media platforms are made for some specific purpose like Facebook is a place for posts, contents, etc. In a recent study, it is observed that 70% of the total internet users are actively online on social media platforms. As per the statistics across the globe 3 billion people are on social media.

The banking sector is one of the most needed sectors in recent years. Therefore the banks which are lagging are highly vulnerable to lose their identity. So banking sectors have to take proper social media platforms to promote them and make a clear identity to compete with other banks. Through Social media platforms, the banks can easily reach their customers; expand their image by connecting with customers. Banks can easily know about customer's choices easily and the more satisfied customers will be, the more will be the revenue of the banks. In this way, banks can easily boost their connections with customers.

Nowadays the researchers are researching in the neutrosophic domain. This is currently an area of specializing and an increasing number of articles are being made in this domain.Some MCGDM articles that are based on this domain.

Objective

1. To know the factors which are required for the banks to accept the social media platform to enhance their reach to their customers.
2. To know which the best platform through which the banks can easily promote themselves.

Methods

In this study, the data has been collected from various people working in different sectors like banks, hospitals, private, and government sectors in the Metropolitan area Kolkata. The data is collected from 94 residents and then judged on the five-point Likert scale. The data is based on both the genders. There were three age groups 0-25years, 25-45years, 45, and above. There were 56 male respondents, 38 female respondents. There were 28 respondents from the age group 0-25years, 49 respondents from the age group 25-45 years, and 17 respondents from the age group 45 and above. The questions were mainly based on a social media platform preferred by banks and users.

The Multi Criteria Group Decision Making Problem in Pentagonal Neutrosophic Environment:

This MCGDM problem solution mainly focuses on the best option available among the finite number of options by applying different attributes. This MCGDM approach is very popular nowadays to take the best solution out of some given set of options.

Illustration of the MCGDM solution:

Now, let us assume that $G = \{G_1, G_2, G_3, G_4 \dots \dots \dots \dots G_m\}$be the distinct alternative set and $H = \{H_1, H_2, H_3, H_4, \dots \dots \dots \dots H_n$ be the distinct attribute set respectively. Let us assume that $\omega = \{\omega_1, \omega_2, \omega_3, \omega_4 \dots \dots \dots \dots \omega_n\}$ be the wet set and $D = \{D_1, D_2, D_3, D_4 \dots \dots \dots \dots . D_K\}$ and for each $\omega \geq 0$ it also

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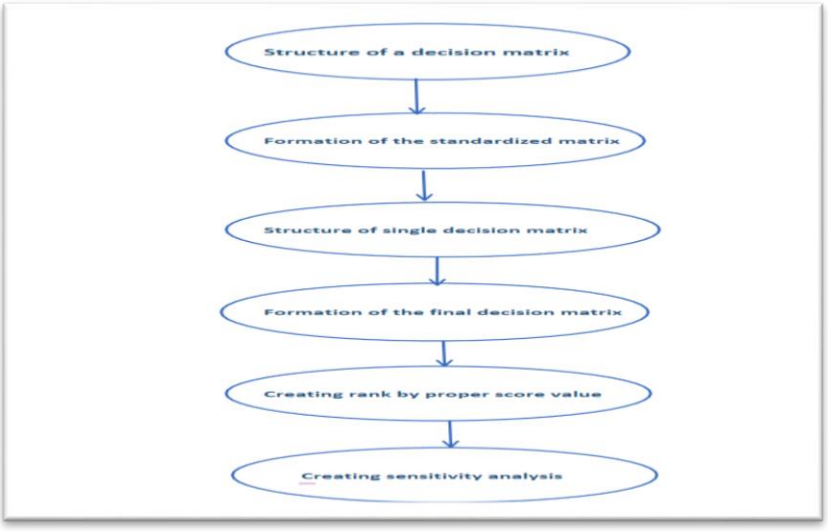
satisfies the relation$\sum_{i=1}^{n} \omega_i = 1$. Andthe weight attribute function is defined as $\delta = \{\delta_1, \delta_2, \delta_3, \delta_4 \dots \dots \dots \dots \delta_K$ where for each $\delta_i \geq 0$ which also satisfies the relation $\sum_{i=1}^{k} \delta_i = 1$.

Flowchart:



In this problem, the objective is to find the best social media platform according to the answer of the respondent. The solution is computed according to the three criteria safety & reliability, responsiveness & effectiveness, and ease of use & customer satisfaction of the system. Keeping in mind that the people make the decide on hesitation area, the problem is computed by placing in the pentagonal neutrosophic domain. Now in this example, we have taken three social media platforms namely Twitter, Facebook and YouTube.

Results

After the computation process we have observed that the final descending order access of these social media platform is Facebook, Twitter and YouTube. Also, we performed the sensitivity and numerical analysis after changing the weights of the attributes and finally found that the best accessed social media service provider is Facebook.

Discussion

This study is mainly based on finding the best social media platform which bank can use to popularize their identity. There are three parameters are mainly focused on are safety, efficiency, and ease of users. In this study, the weightage of decision is equal for both the genders and all the age groups. In this study, it is observed that youngsters are more dominating over social media but there was quite a good response from the ages under 45 years. And both the male and female have the same dominance over the social media platform. Sosocial media is proven as the fastest- growing network to popularize a particular domain. Therefore through this social media platform, the satisfied customer increases very quickly, and in turn the business expands to a different level.

Conclusion

So it can be concluded that social media is the best platform to increase connectivity. According to the response, it is observed that people prefer social media in case of ease of users and efficiency but the main issue is with the safety of the social media platform. Most of them showed a positive sign in applying the usage of social media in the banking sector. In this study according to the observation of the respondent and by computing the

result mathematically it is found that Facebook is the best option for the banks to popularize themselves. Hence this whole study can be concluded that banks can take social media but they have to take necessary measures on security and privacy of the data. Now the next main focus of the study is to make the security and privacy of the data because transactional social media would be more acceptable. Our future study would be based on more questions and feedback from the customer to suggest ways to analyse the better performance of transactional social media.

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Influence of PMMA on Nano Graphene Oxide Incorporated PVC

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Abstract

Poly (vinyl chloride) (PVC) is a widely used commodity plastic which is endowed with the problems of poor impact strength and difficult processibility. These problems have been overcome to a certain extent by the use of polymeric or non-polymeric modifiers which are referred to as impact modifiers and processing aids. However, the disadvantage of using a non-polymeric modifier is that one property of the polymer is modified at the cost of deterioration in some other property of the polymer. The incorporation of acrylic polymers in PVC behaves as equivalent to rubber toughening of glassy polymers. In this context, poly (methyl methacrylate) (PMMA) has been used as an effective polymeric modifier which influences the mechanical properties of PVC. So, in the present study, an endeavour has been made to estimate the change in mechanical properties of PVC in terms of its ultimate tensile strength, modulus, elongation and toughness by using PMMA with nano graphene oxide as the nanofiller.

Keywords: Poly(vinyl chloride); Nano graphene oxide; Poly(methyl methacryalate);mechanical properties

Introduction

Synergism in properties of materials is an inspiration to the scientists towards the formation of nanocomposites in the arena of Polymer Science and Technology. Incorporating multifunctional nanomaterials into polymers provides an effective approach towards enhanced performance and creation of new functionalities. The resulting polymer nanocomposites benefit from the advantages of both the polymer matrix and reinforcement phase. With this conception, a nanofiller, nanographene oxide, has been incorporated in poly(methyl methacrylate) (PMMA) blended PVC matrix to observe the dynamics of mechanical properties with variation in the proportion of the methacrylate polymer in presence of the nanofiller, nanographene oxide[1,2]Despite abundant usage of PVC in outdoors, the properties of the polymer demands further improvement when several environmental factors set in. To overcome these drawbacks of properties, polymeric or non polymeric modifiers may be used which are often referred to as impact modifiers or processing aid [3,4]. However, by the usage of a non polymeric modifier, one of the properties of the polymer is enhanced but it induces deterioration in the other properties of the same. The incorporation of methacrylates in PVC behaves as equivalent to rubber toughening of glassy polymers [5]. So, if a methacrylate polymer (polymeythylmethacrylate) (PMMA) is blended with PVC, the mechanical properties of the latter are largely influenced by increased elongation at break and toughness. With this basic observation, the present study aims at improving the properties of PVC even further in terms of modulus and ultimate tensile strength for effective environmental stability by incorporating nanographene oxide within it and estimate the dynamics of the incorporated system over a range of added methacrylate (PMMA).

Methods

PVC resin was taken in an air tight dry blender and mixed with 30 parts dioctylphthalate (DOP) plasticizer and 2 parts tribasic lead sulphate (TBLS) heat stabilizer with respect to the amount of PVC resin taken. The methyl methacrylate monomer (10 to 40 parts,in separate batches, premixed with benzoyl peroxide initiator (2 parts) was added to the PVC mix along with the nanographene oxide filler (6 parts) and mixed thoroughly in the blender at a slightly elevated temperature. A number of batches (10 to 40 parts) were prepared varying the dose of the methacrylate. The mix was then compression moulded into sheets under heat and pressure which was then subjected for mechanical testing in Instron Universal tester.

Results and Discussion

In the present study, the changes in the mechanical properties namely the modulus, ultimate tensile strength, elongation at break and toughness were investigated with the variation of the methacrylate monomer in PVC with 6 parts of nano graphene oxide incorporated. The variation of modulus with increasing concentration of PMMA has been depicted in Fig 1.

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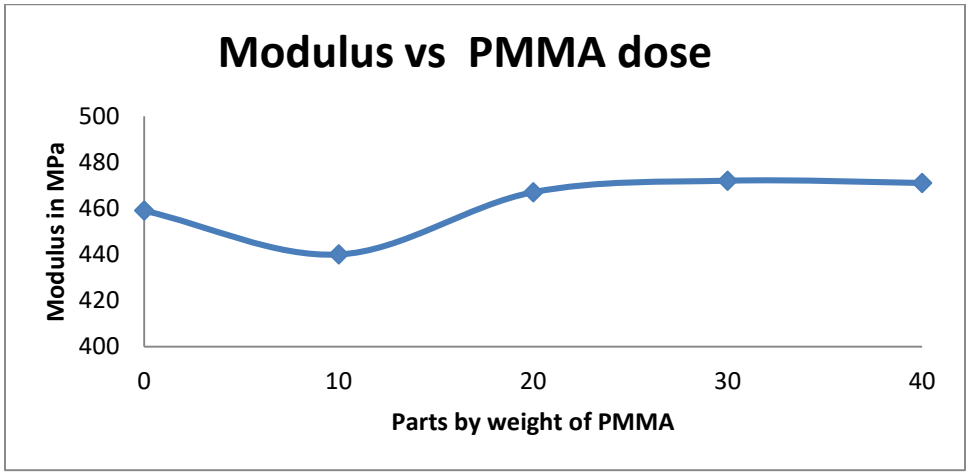

Fig. 1: Variation of modulus with increasing PMMA dose

It is observed that there is an initial drop of the modulus values but then it rises and levels off at a value slightly higher than that of the base reference compound PVC. This can be attributed to the initial plasticising effect of PMMA when it is first incorporated with PVC. Henceforth, the interacting effect of the PMMA with PVC in compatibility terms comes into action augmented by the dispersed nano particles which is the nano graphene oxide filler. The nanofiller exerts its reinforcing influence on the PVC-PMMA blended system and aids in lifting up the modulus of the system even above the base reference compound PVC, within the range of the methacrylate incorporation under consideration.

Similar change in the mechanical parameter of ultimate tensile strength can be perceived which is depicted in Fig 2. The ultimate tensile strength also shows an initial drop followed by a steady increase in the strength parameters. As already stated, this phenomenon may be owed to the plasticising effect of the PMMA molecules within the PVC matrix. With increasing PMMA content, the compatibility between the PVC and PMMA molecules increases which is further augmented by the reinforcing capability of nano graphene oxide.

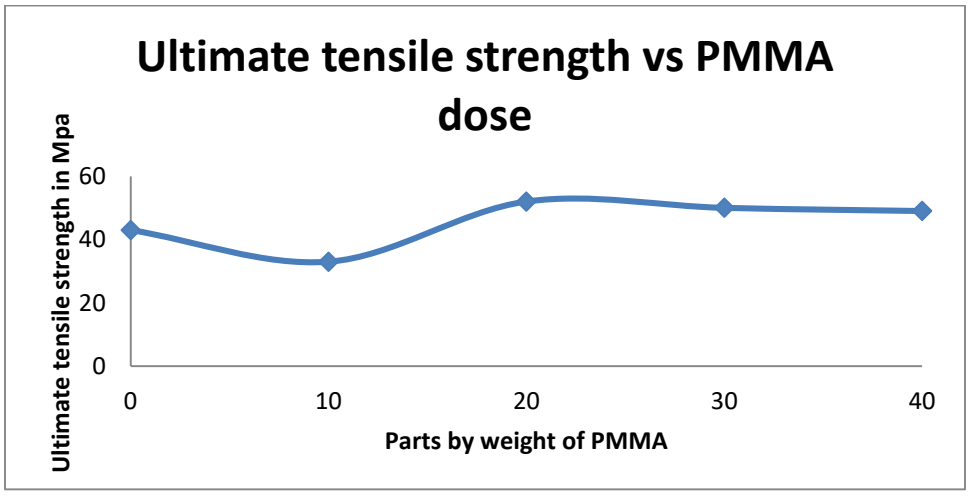

Fig. 2: Variation of ultimate tensile strength with increasing PMMA dose

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The elongation at break and toughness of the blended systems are exhibited in Fig 3 and Fig 4 respectively. The tendency of the variation of these two flexibility parameters corroborates with that of the changes in elongation at break and toughness.

In both the cases of flexibility parameters, the values show an overall rise compared to the base reference compound PVC which again establishes the fact that PMMA and the nanofillernano graphene oxide has a directing modifying influence on PVC and contributes to the overall improvement of the mechanical poroperties of PVC. So the influence of the polymethyl methacrylate polymer and nano graphene oxide on PVC is widely explicit with the range of the PMMA incorporation under study.

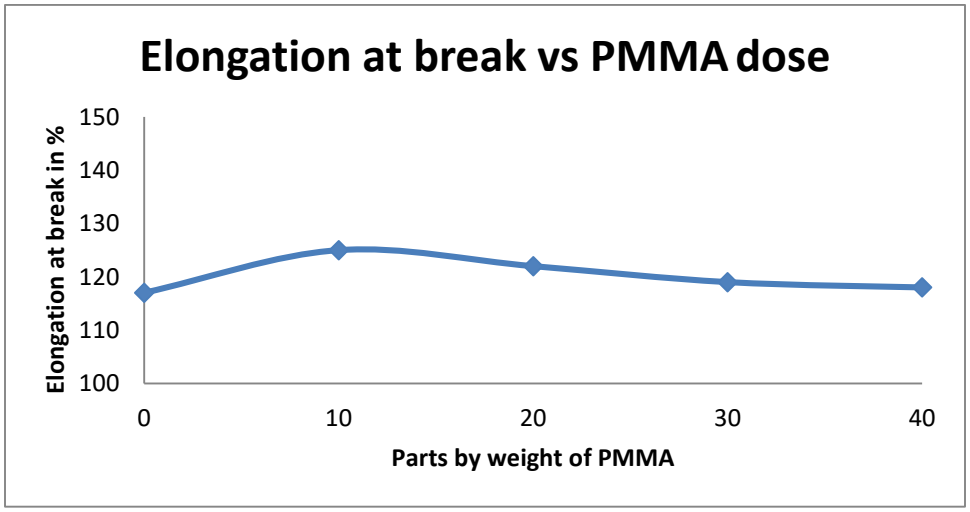

Fig. 3: Variation of elongation at break with increasing PMMA dose

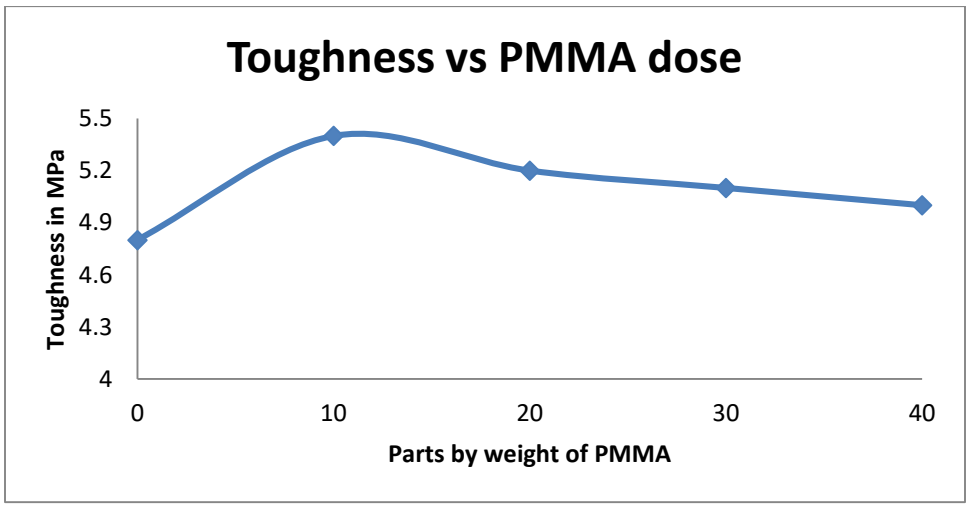

Fig. 4: Variation toughness with increasing PMMA dose

Conclusion

In the present study, an endeavour has been made to estimate the change in mechanical properties of PVC in

terms of its ultimate tensile strength and modulus by using poly(methylmethacrylate) with nanographene oxide as the nanofiller. The modifying influences of both the polymethylmethacrylate and nanographene oxide were thus significant in the mechanical properties observed.

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Impact on India's GDP Growth Rate by Increasing the Production Rate and Efficiency of the Management Operations of the Indian PSUs

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Abstract

The effects of production management and efficiency of India's PSUs on India's GDP are observed. Since we know that GDP (Gross Domestic Product) is the total monetary or market value of all the finished goods and services produced within a country's borders in a specific time period. Moreover we also know that the Japanese manufacturing industry depends on JIT (Just in time) system which believes in on-time delivery, zero defects and reliable equipment, stable schedule, small batch sizes and setup reduction, pull system of production control, cooperative workforce and reliable supplier base. So this system works on the principle of minimizing inventories and small buffers but the PSUs have a higher need of inventory and large batch sizes due to high requirement of items. Since India is a developing economy, so the JIT approach can be implemented in our PSUs partially in the form of Pareto principle which means 20% of the JIT philosophy can be implemented in our PSUs which will lead to increase in tax collection rates from major PSUs. Consumption of industrial products (steel plates, crude oil.etc.) at its full potential by the MSMEs, increasing employability in MSMEs(Micro, Small& Medium Enterprises) and thus also increasing PPP(Purchasing power parity) of the sub strata sections . Eventually it leads to increased consumption capacity of masses which will also help other industries because then these masses will aspire for getting quality lifestyle, education, healthcare services for themselves and their descendants. Therefore the JIT approach in the form of Pareto principle holistically contributing to the GDP of our nation and will help our nation to reach its aspired status quo.

Keywords: GDP growth rate; Management operations; Production Operations; Production Efficiency

Introduction& Objectives

Just-in-time (JIT) is an approach to production control that was developed by Toyota Motors in Japan to minimize inventories. Work-in-process and other inventories are viewed as waste that should be eliminated. Inventory ties up investment funds and takes up space. To reduce this form of waste, the JIT approach includes a number of principles and procedures aimed at reducing inventories, either directly or indirectly. JIT is an

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important component of lean production, a principal goal of which is to reduce all forms of waste in production operations.

Just-in-time procedures have proven most effective in high-volume repetitive manufacturing, such as the automobile industry. The potential for in-process inventory accumulation in this type of manufacturing is significant because both the quantities of products and the number of components per product are large. A just-in-time system produces exactly the right number of each component required to satisfy the next operation in the manufacturing sequence just when that component is needed; that is, "just in time." The ideal batch size is one part. As a practical matter, more than one part is produced at a time, but the batch size is kept small. Under JIT, producing too many units is to be avoided as much as producing too few units. JIT has been adopted by many U.S. companies in both the automotive and other manufacturing industries. Just-in-time procedures have proven most effective in high-volume repetitive manufacturing, such as the automobile industry. The potential for in-process inventory accumulation in this type of manufacturing is significant because both the quantities of products and the number of components per product are large. A just-in-time system produces exactly the right number of each component required to satisfy the next operation in the manufacturing sequence just when that component is needed; that is, "just in time." The ideal batch size is one part. As a practical matter, more than one part is produced at a time, but the batch size is kept small. Under JIT, producing too many units is to be avoided as much as producing too few units. JIT has been adopted by many U.S. companies in both the automotive and other manufacturing industries.

Pareto Analysis is a technique used for business decision making based on the 80/20 rule. It is a decision-making technique that statistically separates a limited number of input factors as having the greatest impact on an outcome, either desirable or undesirable. Pareto analysis is based on the idea that 80% of a project's benefit can be achieved by doing 20% of the work or conversely 80% of problems are traced to 20% of the causes.

The objective of this paper is to increase the growth rate of India's GDP and efficiency in management operations of the PSUs by implementing the amalgamation of JIT Philosophy& Pareto Principle.

Literature review

Sadao Sakakibara et al. [1] focused on developing and testing a model that includes both JIT practices and the infrastructure practices hypothesized to provide an environment in which JIT practices perform more effectively.Wilbur F.Monroe et. al. [2] discussed on how the West was becoming aware of the economic strides made by Japan in the quarter century since World War 2 & how the per capita income increased due to the increase in the contribution of manufacturing sector to Japan's economy.D.R. Kiran et. al. [3] discussed how JIT was initially invented by Henry Ford and further Taichii Ohno of Toyota Motor Corporation developed this system as kanban, which became popular as the Toyota Production System.

Methods

On application of JIT Philosophy in terms of Pareto principle we will get to see that if we apply 20% of the aspects of JIT Philosophy we will get to see 80% impact on the efficiency in the management operations of the PSUs. Here JIT system means choosing of right product; right time, right person (which is one of the aspects of market segmentation). Since we know that GDP is calculated in terms of four factors:

GDP= C+G+ I+ NX

GDP% = [(C+G+I+NX)*100] %

C= Private Consumption/ Consumption demand from private individuals like us (common mass/ Indian Citizens).

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I= Investment of private sector/ Demand generated by private sector businesses.
G= Demand for goods and services generated by the government.
NX= Export ratio= Export Rate- Import Rate

Results& Discussion

Since we know that our country imports more than it exports so if we increase the production rate of our PSUs which will lead to increase in export of finished products(steel rolls, high density steel plates, high density steel wires, crude oil.etc. which are used as raw materials for the industries abroad) thus it will lead to net positive increment in the export rate of our nation making the export ratio of our nation positive eventually lead to increase in tax collection rates from major PSUs(will also contribute to the RBI's reserves as well) &consumption of steels and other industrial products at its full potential by the medium and small scale industries(which uses end products of PSUs as raw materials) and thus increasing employability in MSMEs and thus also increasing PPP of the middle, marginalized and sub strata sections of the Indian society eventually leading to increased consumption capacity or spending power of this mass which will also help other industries like retail, FMCG, healthtech, edtech because then these masses will aspire for getting quality lifestyle, education, healthcare services for themselves and their descendants. Therefore holistically contributing to the GDP of our nation and will help our nation to reach its aspired status quo.

So it could be predicted that there is a high probability if we apply 20% of the JIT Philosophy in the manufacturing operations of the Indian PSUs then it could contribute to an 80% increase in production rate and efficiency in management operations of the Indian PSUs which will create more employment, thus PPP(Purchasing Power Parity) of the common mass will increase, thus consumerism(C) will increase(one of the factors in calculation of GDP), then the investment of the private companies(I) will also increase(another factor in measurement of GDP) and also demand for the goods and services produced by the government(G)(one of the measures in the calculation of GDP). On the other end if there is stable scheduling then production rate of end products will increase leading to increase in export of end products which will be used as raw materials for the industries abroad eventually leading to increase of the export ratio (NX) of our nation (one of the most important factor to be taken in consideration in calculation of GDP).The following graph shows the growth rate of Japan and India during the 1970s just after the implementation of JIT philosophy by Toyota Company:

Comparison of the contributions of the manufacturing sector to India's & Japan's economy during 1970s:

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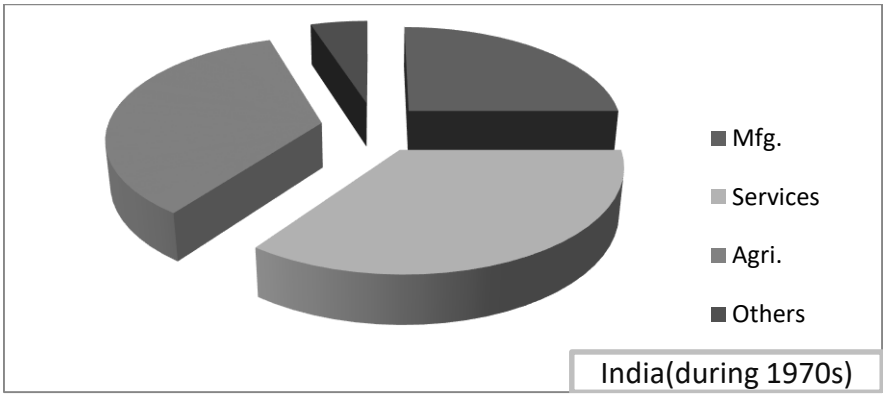
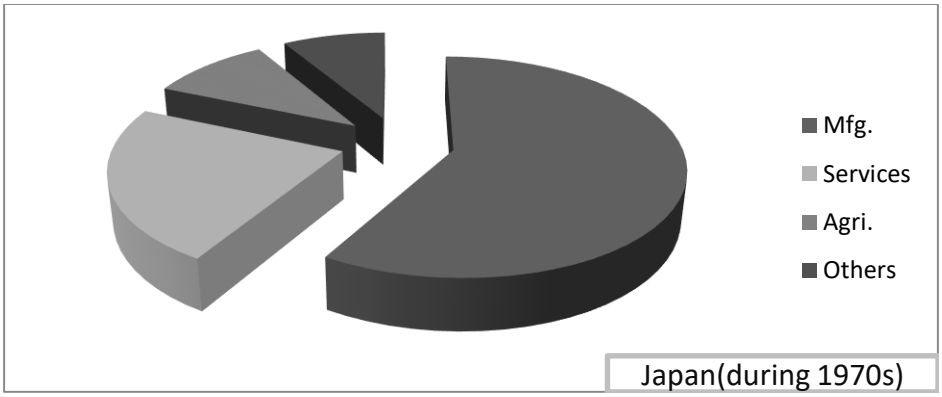
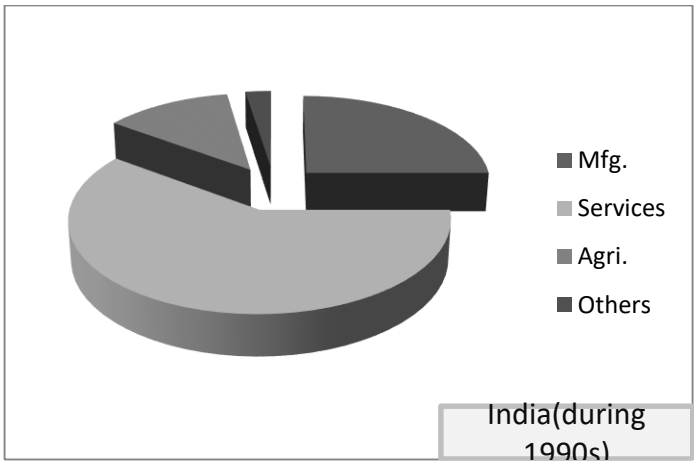
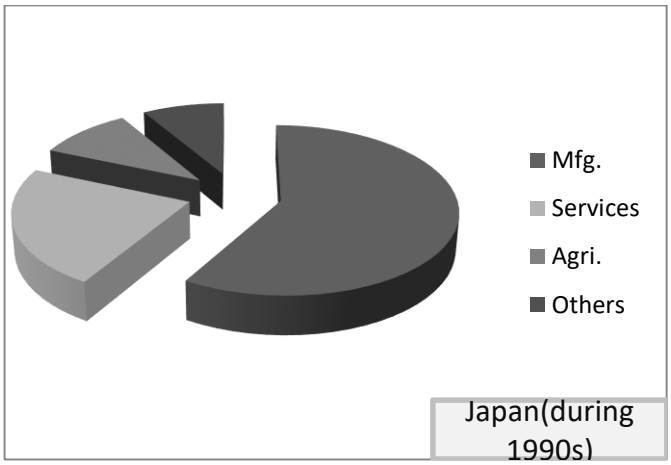




Comparison of the contributions of the manufacturing sector to India's and Japan's economy during 1990s:





Conclusion

Henceforth, it could be concluded that if we apply and amalgamate these innovative techniques in the operations of various industries of our nation then it could really impact our GDP growth rate

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Alcohol Efficiency for Biodiesel Conversion from Waste Cooking Oil

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Abstract
Alcohol plays an important role for the production of biodiesel in the transesterification reaction. In the present study, waste cooking oil (WCO) is used for the identification of alcohol efficiency for biodiesel production in the presence of enzyme catalyst. Alcohols like methanol, ethanol and propanol have been utilized for this purpose. Alcohol efficiency have been compared by applying same reaction parameters for the conversion of biodiesel. Experimental findings show that among the three alcohols, methanol has the ability for maximum conversion of BD from WCO using 7% enzyme Novozyme 40013 (*Candida antarctica*) as catalyst in the presence of solvent at 5:1 molar ratio of alcohol to WCO maintaining a temperature of 60^0C with 600 rpm of mixing intensity for 8 hrs. The conversion percentage for methanol, ethanol and propanol are 93.26%, 90.11% and 87.76% respectively for the above mentioned reaction conditions. The properties of biodiesel are also in good conformity with biodiesel standard and diesel fuel.

Keywords: *Candida Antarctica;* Waste cooking oil; Biodiesel; Methanol.

Introduction & Objectives
Alcohols are used for different purposes for the synthesis of different chemicals and other products. Alcohol is one of the important raw materials for the production of biodiesel also. Biodiesel can be made throughtransesterification process of vegetable oil or animal fat with alcohol in the presence of catalyst. This initiative is cheaper and environmentally friendly. WCO is one of the important cheap raw materials for synthesis of biodiesel. The WCO is generated from the fried food of different food shops, restaurants, hotels etc. which needs large amounts of oil attemperatures greater than 180°C. Due to the generation of high temperatures, the chemical and physical composition, as well as inits organoleptic properties of oil have been changed which affect both the food and oil quality.So WCO is an ideal source for the production of alternative energy in the present depleting nature of fossil fuels. Several studies [1-6] have been made for biodiesel synthesis from used cooking oil and different alcohols. Very few studies have been done for the comparison of alcohol efficiency. In the present research investigation, alcohol efficiency have been compared by using three alcohols, namely, methanol, ethanol and propanol using WCO as raw material for the production of biodiesel in the presence of enzyme catalyst.

Methods
250 ml of WCO was filtered and taken in an Erlenmeyer flask and heated up to 80^0C to drive off moisture by continuous stirring for about 1 h. After that, transesterification reaction was carried out by adding different

alcohols separately in 5:1 molar ratio (MeOH:WCO) using solvent hexane fitted with a water condenser and stirred by a magnetic stirrer for 8 hours in the presence of 7% (w/w) immobilized enzyme Novozyme40013 (w/w) at 60^0C. 600 rpm mixing intensity was maintained for all the alcohols. Stepwise addition of alcohol was allowed to minimize the deactivation of enzyme. After conversion, biodiesel was separated and tested for different properties.

Results & Discussion

Initially the analytical characteristics of WCO was determined and it showed that WCO contained 91.35% neutral glycerides and 6.32% free fatty acids. The iodine value, kinematic viscosity and peroxide value of WCO were found to be 111.72 g/100g, 27.72 mm^2/s at 40^0C and 14.22 meq/kg respectively.

Using methanol, ethanol and propanol at different ratios from 2:1 to 6:1 (alcohol:WCO) at 60^0C for 8 hrs with 7% (w/w) immobilized enzyme Novozyme 40013 showd that methanol contubuted the maximum conversion of biodiesel compared to other alcohols and 5:1 is the ideal moalr ratio for thie transesterification reaaction.

By varying the temperature from 40^0C to 70^0C with methanol, ethanol and propanol maintaining same recation parameters, experimenatl studies showed that metanol gives maximum conversion among the three different alcohols and 60^0C is the optimum temperature by which maximum reaction output has been obtained.

Mixing intensity is another important criteria for the optimum conversion of biodiesel from raw materials. Mixing intensity helps to enhance the contant between the reactnatns through the catalyst. Here, three alcohols are compared by varying the mixing intensity from 400 rpm to 800 rpm maintaining the other recation conditions same. Here, it has been observed that 600 rpm is the ideal mixing intensity and methanol contributed maximum comversion of biodiesel from WCO.

Duration of reaction is another important criteria which indicates the energy expenditure of the overall reaction. Here methanol, ethanol and propanol are utilised for the duration of 6 hrs, 7 hrs, 8 hrs and 9 hrs for the identification of their efficiency. Experiments showed that 8 hrs is the optimum time for the completion of reaction and methanol showed its maximum eficiency for the conversion than other alcohols at the identified reaction parameters.

After the production of biodiesel using methanol as the best alcohol among methanol, ethanol and propanol, the properties of biodiesel were compared with the diesel fuel and biodiesel standard and it showed close proximity.

Conclusion

Variation of alcohol affects the production process of the transesterification reaction of waste cooking oil in the presence of enzyme as catalyst. Among the three alcohols, namely, methanol, ethanol and propanol, methanol shows highest efficiency for biodiesel production from waste cooking oil. The experimental findings also prove that the stepwise addition of methanol contributed maximumconversion of biodiesel than other alcohols maintaining identical reaction parameters. So methanol may be used for biodiesel production from other sources also which can mitigate the scarcity of non-renewable fuels in future world.

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Blended Fuel

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Abstract
Blended fuel is one of the alternative fuels in the near future due to scarcity of fossil fuels. Ithas been prepared by mixing with biodiesel and diesel fuel in different proportions and analysed in the present research investigation. Initially, biodiesel from soybean oil deodorizer distillate (SODD) has been prepared through transesterification reaction withmethanol in the presence of enzyme Novozyme 435 (*Candida antarctica*), an immobilized nonspecific lipase maintaining optimum reaction conditions. After that, blending of diesel fuel with soybean oil deodorizer distillatebiodiesel (SODDB) has been done separately in definite proportions. SODDB has been added in volume percentages of 10% to 50% with the diesel fuel. The blending was done by slow mixing with constant smooth stirring. The density, kinematic viscosity and flash point of different blends of SODDB-diesel have been analysed and good outcomes have been observed. Results showed that blended fuels are good ways for reducing the substantial usage of fossil fuels along with better environmental sustainability for the future world.

Keywords: *Candida Antarctica;* Soybean oil deodorizer distillate; Biodiesel; Methanol.

Introduction
Blended fuel attracts considerable attention for the last few decades due to continuous scarcity of fossil fuels along with degradation environment. Blended fuel is prepared through the mixing of vegetable oil-diesel blends or biodiesel-diesel blends or ethanol-diesel blends etc. Different blends are prepared by various researchers and the properties are also being analysed [1-4]. Ali et al optimized the properties of blended fuels and studied the engine performance using mathematical techniques [5]. Ali and Jaafaranalysed the physical properties of waste cooking oil / diesel blends compare to biodiesel fuels [6].Wakil et al predicted the physicochemical properties of biodiesel blending through mathematical models [7].Analysis of properties of biodiesel-diesel blends have also been studied by many other researchers and academicians and prediction is done on the basis of different fuel properties.

In the present research investigation, initially SODD is transesterified with methanol for the production of biodiesel by maintaining optimum reaction parameters like molar ratio of alcohol to SODD, temperature, concentration of enzyme and mixing intensity for a definite time of reaction. After that,SODDB was mixed with

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diesel fuel for the preparation of blended fuel in different ratios separately maintaining the mixing parameters. The physico-chemical properties like density, kinematic viscosity and flash point of different blends have been analysed and compared with different blending ratios. The blended fuel properties were characterized according to the American society for testing and materials blended fuel standard.

Methods

SODD was taken in an Erlenmeyer flask and heated up to 80^0C to drive off moisture by continuous stirring for about 1 h. After that, methanol was added in stepwise manner in 5:1 molar ratio (MeOH:SODD) for the transesterification reaction using solvent hexane fitted with a water condenser. The mixture was then stirred by a magnetic stirrer for 6 hours in the presence of immobilized enzyme Novozyme 435 (w/w) at 60^0C. After 6hrs of reaction, biodiesel was prepared which was separated, washed and dried for blending purpose.

SODDB was added to diesel fuel through slow mixing. Then it was stirred for 30 mins and kept for equilibrium before analysis. SODDB was added in volume percentages of 10%, 20%, 30%, 40% and 50% to diesel fuels. Density, kinematic viscosity and flash point were measured for the blended fuel and compared with diesel fuel.

Results & Discussion

Initially, the analytical characteristics of SODD was analysed. It contains mainly about 79% free fatty acids, 9% unsaponifiable matters and 10% neutral glycerides. For the analysis of blended fuels, SODDB was mixed with diesel fuel in different ratios as shown in Table 1.

Table 1: Blending composition of SODDB and diesel fuel

Sample	SODDB (%v/v)	Diesel fuel (%v/v)
Diesel	0	100
B 10	10	90
B 20	20	80
B 30	30	70
B 40	40	60
B 50	50	50

Density of fuel affects the spray characteristics of blended fuels and power of diesel engines during combustion and fuel injection in cylinder. The densities of diesel fuel and of blended fuels were analysed at 15^0C and the indicated that the density is increasing as the concentration of the SODDB rises in the blends. So a linear proportional relationship was observed with the increasing percentage of SODDBin the blended fuels. For the blended fuel, maximum density was observed for B 50 (859 Kg/m3) and lowest density was observed for B10 (833 Kg/m3). Pure diesel fuel has the less density than any other blended fuel due to the higher dense of SODDB.

Viscosity plays an important role of fuel which affects engine performance. It controls fuel atomization upon injection into a combustion chamber and ultimately cause formation of engine deposits.Forthe analysis of kinematic viscosity of blended fuel, the viscosity was measured at 40^0C. diesel fuel along with the blended fuels in different ratios. It has been observed that enhancing the amount of SODDB in the diesel fuel increases the viscosity of the blended fuel at the specified temperatures due to higher viscosity of SODDB. Therefore, blending in different proportions may be used in the internal combustion engines to keep the viscosity and other

properties within the desired standards.

Flash point is an important property of fuel as it directly connected with safety issues. Higher flash point means safer is the fuel. Analysis shows that 10% blending of SODDB (B10) in diesel fuel enhances 13.65% of the flash point. Increasing the amount of SODDB in blends enhances the flash point and ultimately B50 has a flash point of 111^0C making it stable and safe for handling compare to diesel fuel. So study shows that 10% increase of SODDB in the blends may increase the flash point by nearly 10°C and it goes to safer side. So blending of WCOB with diesel fuel has a positive effect regarding the enhancement of properties of the blended fuels.

Conclusion

In summary, blended fuel in different ratios prepared from soybean oil deodoriser biodiesel-diesel fuel have been analysed based on density, kinematic viscosity and flash point. A good comparative results have been obtained regarding these properties. Finally, blended fuelsmay be usedas a good alternative fuel which helps to minimize fossil fuels in the near future.

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Growth and XRD Analysis of Pb Doped SnO_2

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Abstract

In this work single layer of SnO2 thin films are grown on GaSb substrates as antireflection coatings, by using vacuum evaporation followed by oxidation. Sn-Pb alloys of different weight percentages(37%, 63%) were also vacuum evaporated on GaSb substrates, followed by subsequent oxidation. XRD provided the evidences for polycrystalline structure of the grown layer over single crystal GaSb substrate.

Keywords: $PbSnO_2$; Vacuum evaporation;XRD; reduced bandgap.

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Introduction & Objectives

Tin Oxide (SnO2) has been of extensive criticalness attributable to its precisely steady nature, substance solidness and furthermore because of its financially savvy nature of development. Because of its enormous bandgap the utilization of SnO2 in different useful applications is compelled. According to our writing overview not many endeavors have been made for bandgap decrease of SnO2 [2]. SnO2 has broadly been viewed as a n-type semiconductor because of oxygen vacancies and interstitial deformities. Presentation of Pb in SnO2 is one of the suitable ways for extensive bandgap decrease, as indicated both hypothetically and trial in Ma.et al. [2] and Sarangi et. al. [3] separately. There are different strategies and techniques accessible for combination of doped SnO2 slender movies, for example, Spray pyrolysis [4], delicate substance courses [5], splashing [6], concoction fumes statement (CVD) framework [7,8], etc. In any case, the present business acknowledgment of these doped SnO2 slight movies, requests a quick and practical answer for its union. In this way the combination of warm vanishing of Pb-Sn alloy and ensuing strengthening for oxidation gives a financial just as protected course for dainty film amalgamation. The X-ray diffraction gave the morphological depiction of the as-grown films.

Methods

For the pristine SnO_2 growth 5N pure Sn shots were taken and cleaned in Trichloroethylene, acetone, methanol followed by rinsing in deionized water. The shots were then etched in dilute hydrochloric acid for further removal of any kind of remaining impurity. Glass substrates with dimension ($2.5 \times 6 \times .1$ cm^3) were first cleaned with acetone followed by through rinsing in deionized water. The substrates were also ultrasonically treated for the removal of any kind of dust particles. The Sn shots were kept in a Tungsten boat. The cleaned glass samples were subjected to thermal evaporation in a high vacuum chamber ($\sim 10^{-6}$ mbar). The evaporation rate is 50 Å/sec. Similar treatment was done for the $PbSnO_2$ samples with the only difference being the introduction of 5N pure Pb shots in requisite amounts for the respective weight percentages (37 wt % and 63 wt %). The Pb shots were introduced along with the Sn shots inside the vacuum chamber at the time of growth.

Results and Discussion

X-ray diffraction (XRD) for the said samples were done by PANanlytical X-ray, Philips analytical with Cu Kα radiation (λ = 1.54178Å).The spectra contain different diffraction peaks of lead oxides and tin oxides with different orientations, suggesting presence of both PbO and SnO_2 crystalline phases. The most prominent diffraction peaks of lead oxides are PbO [110], and Pb_3O_4 oriented in [110] and [101] directions. From the spectra, it is also observed that the intensity of tin oxides peaks is reduced compared to the lead oxides peaks which suggest that the crystallites of lead oxides are highly ordered compared to tin oxide crystallites in Pb doped SnO_2. Similar results are also observed in Pb doped (63 wt%) SnO_2 demonstrated in fig.1. (c) where the intensity of lead oxides peaks is stronger than the tin oxides peaks. However, the intensity of SnO_2[101] peak is stronger for 63 wt% Pb doped SnO_2 compared 37 wt% Pb doped SnO_2. In both Pb doped samples the intensity of PbO[110] diffraction peak is stronger than the other peak which suggest the highly ordered nature of this crystallite. The presence of rutile tetragonal SnO_2 is signified by three prominent peaks namely, [110], [101], [210] in both the $PbSnO_2$ samples.

The grain size for each type of sample along different planes are calculated by the Debye Scherrer formula [9], given by, $D = k\lambda/\beta\cos\theta$,where, D is the grain diameter, k is the Scherrer constant which is taken to be 1, β is the full-width-at-half-maximum (FWHM) of the XRD peak and λ is the X-ray wavelength. The grain size as calculated is reduced with the inclusion of more Pb in the sample.

Conclusion

SnO_2 is manufactured with high transmittance for radiation energies higher than the GaSb bandgap. The thermal stability of the TCO is also important. Vacuum evaporation along with simultaneous oxidation results in better high-quality film growth with film thickness of up to 800nm and is relatively cost effective in nature.

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E-Waste Management and Recycling in India

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Abstract
E-waste or electronic waste refers to discarded electronic equipment and devices that have reached the end of its usability, it's a contributor of health hazards and environmental pollution. In 2019 alone India has produced 3.2 million tonnes of e-waste, and has become the third largest contributor of electronic waste in the world, it is estimated to grow up to 5 million tonnes in the coming year, that leads us to the issue of waste management and recycling in India. This article highlights a few aspects of the problems in recycling electronic goods in India. A growing problem that has become prominent in India with the rise of smartphones is hoarding of unusable devices, a study has shown that about 50% of smartphone users in India have old phones stored in their homes. And when these devices are eventually recycled, about 43% is recycled through local improper channels. From which we come to another troubling fact of the Indian recycling industry, which is divided into two distinct parts: “formal” and “informal”. Informal recycling is an extremely large unregulated industry spanning all across India, and about 95% of our total generated e-waste is discarded and recycled through these improper ways generating hazardous waste and pollution, and in these unregulated poor working conditions the workers are suffering from serious health hazards. Thus by “recycling” the e-waste we are raising more environmental concerns. But this issue can be mitigated by taking in the unregulated bodies under government care.
In conclusion, with global e-waste being generated exponentially more and more each year we are facing an unprecedented global disaster in front of us, India being a lead contributor to the problem, but with the proper steps in environmental outreach and merging of the informal and formal recycling channels will facilitate to avoid the disaster that may come.

Keywords: e-waste; recycling; phones; unregulated recycling

Introduction & Objectives

E-waste or electronic waste refers to discarded electronic equipment and devices that have reached the end of its

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usability, it's a contributor of health hazards and environmental pollution. In 2019 alone India has produced 3.2 million tonnes of e-waste, and has become the third largest contributor of electronic waste in the world[1], it is estimated to grow up to 5 million tonnes in the coming year. Which in turn causes tremendous amounts of pollution and extreme health risks for the workers in the recycling and discardation profession, and due to the fact that a behemoth amount of waste management is done through the informal sector, only propagates the problem in a worse direction. This article highlights a few aspects of the problems in recycling electronic goods in India and as an example reviews the growing figures in phone disposal and how that ties in with the formal and informal sector of the economy, and lastly how the situation can be improved upon by taking in the unregulated networks under government jurisdiction. And how under government care this recycling sector might turn profitable for both the economy and environment.

Discussion

This review of the e-waste management in India is done by inspecting the growing numbers in the recycling sector, and how that affects the environment, peoples' well-being and in turn the sustainable economy of the country, and through understanding the issues in recycling a conclusion on how this situation might be salvaged is determined. E-waste is a growing issue that troubles the world of today, and with the growth in economy and technology the amount of electronic waste we are discarding into the world is growing with each passing day, that leads us to the issue of waste management and recycling in India. A growing problem that has become prominent in India with the rise of smartphones is hoarding of unusable devices, a study has shown that about 50% of smartphone users in India have old phones stored in their homes. And when these devices are eventually recycled, about 43% is recycled through local improper channels[2].Which brings us to a troubling issue about India and our recycling process, there's a great divide in the way e-waste is processed in India, one is through the formal sector under safety and health regulations, another is through the informal sector, the lack of rules and regulations is rampant in these places, and another troubling aspect of formal recycling is that, after dismantling and segregating parts the disposal is done through the informal sector. Informal recycling is an extremely large unregulated industry spanning all across India, and about 95% of our total generated e-waste is discarded and recycled through these improper ways generating hazardous waste and pollution [3], and in these unregulated poor working conditions the workers are suffering from serious health hazards. Thus by "recycling" the e-waste we are raising more environmental concerns. Another concerning issue that we have to keep in mind is that of wasted resources, due to the fact that most of the disposal is done in an uninformed approach a lot of valuable wastes are being lost, for example a report by UN states that due to poor extraction techniques and lack of regulations, the total recovery rate of cobalt, a material that is found in laptops, phones etc, is only 30%[4]. But this issue can be mitigated by taking in the unregulated bodies under government care. People who work in these troubling conditions will benefit from stable jobs & income and in turn we will be getting a well-regulated society, environment, and at the end of the day it will be profitable for the country both in financial aspects, and overall well-being of the population at large.

Conclusion

In conclusion, with global e-waste being generated exponentially every year the world is facing an unprecedented global disaster. India being a lead contributor to the problem, is required to take appropriate steps towards environmental outreach and merging of the informal and formal recycling channels will facilitate to avoid the disaster that may come.

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Artificial Intelligence and Covid-19 Pandemic: Comparative Study

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Abstract

The outbreak of the COVID-19 pandemic has left millions of people around the world infected with the death counts proliferating each day. This has not only impacted our lifestyle but has also changed the way of perceiving and doing things. To find solutions to several persisting problems associated with the pandemic situation, AI (Artificial Intelligence) has been a boon to mankind. The robots and drones are already in use to reduce human workload and the chance of infection. Robots are being used for disinfection, delivering medicines, and several other tasks that necessitate man to man contact. In some of the severely affected areas, where humans were at risk of catching the virus, drones came to the rescue. Drones were transporting both medical equipment and patient samples, saving time, and enhancing the speed of deliveries. Even with the aid of AI, the detection procedure has paced up to a great extent. The software is now capable to detect COVID-19 infection within some seconds using various methods and algorithms of machine learning, begetting an accuracy of more than 98% (in some specific cases, depending upon the methodology used). The automated vehicles are serving in several countries to ensure social distancing. Thus, this comparative study aims to highlight the impact of Artificial Intelligence in medical diagnosis during the COVID-19 pandemic situation.

Keywords: Artificial Intelligence; COVID-19; Medical diagnosis; Detection

Introduction & Objectives

The COVID-19 pandemic has left the whole world in shambles from various aspects. And the rapidness of mass infection and proliferation of mortality rate, requires the intervention of technology with the medical world. In this comparative study, the main focus was laid upon some specific cases, which highlights the blessings of Artificial Intelligence to evade the worst outcomes of the pandemic. Our study revolves around Artificial Intelligence and its vital role in detecting COVID-19 positive patients, the aid of robots, drones, and automated vehicles. With artificial intelligence as the fulcrum, our comparative study aims to highlight the facts thatthe technology playing a major role in battling out the pandemic, along with the relentless efforts of the frontline warriors. The robots and drones are being used in many ways, starting from contactless delivery of necessities, collecting samples of blood to “Ambubots” that can serve the patients during an emergency before the medical team arrives, and many more. The drones are primarily being used for the transportation of necessities. While the automated vehicles are there to ensure social distancing and safe traveling along with the disinfection of public places without human intervention. This comparative study will help the people, to understand the basics of the mechanism and pathway, of Artificial intelligence playing a pivotal role in bringing life back to normal rhythm amidst the pandemic situation.

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Methods

Three major aspects of using Artificial Intelligence to act as an aid during the COVID-19 pandemic are taken into consideration for our study. Though all the advancements have not been our area of concern primarily since the field of technology is advancing rapidly and it is not relevant to dive deeper into the details for each of them. Our study includes three areas of study: Robots and drones, Softwares and Automated vehicles. In section A, the details of Robots and drones will be discussed, while in Section B and section C the topics regarding software and Artificial Intelligence respectively will be discussed.

A. Robots and Drones:

Robots have been used in discrete sectors to aid the situation. The robots are being modified to perform the emergency medical tasks to save a patient's life during an emergency before the ambulance arrives. These kinds of robots are known as 'AmbuBot' [1]. Some of the robots are being used as receptionists in hospitals and even nurses to maintain the act of social distancing [2]. There is another category of robots that can understand the emotion of a person sitting in the vicinity of its action and does various acts to boost the mood of the person [3]. As mental instability and depression are common guests in many houses in this pandemic situation, the upliftment of emotions will play a major role in bringing the conditions back to normal. Moreover, they are widely being used for the disinfection of public places, cleaning purposes, and tele-communication [4]. The UAV's are being used to deliver medicines, food, and to collect blood samples, scum, etc. to enable mass testing. They are also being used to take Thermal images to check COVID-19 infection in a mass of people [2].

B. Softwares:

The arena of software is widely being used in several ways. Some of them are being used to address the Autobots [1] while maintaining the communication between patients admitted in hospitals and their family members [2]. There is a broad category of software that is being used to detect COVID-19 in various with the aid of machine learning [5]. They can also be programmed to detect the number of infected people in an area to become even more cautious and well informed [6]. Moreover, there are many of them installed in the CCTV surveillance camera to detect mask as a precautionary measure [7].

C. Automated vehicles:

Automated vehicles are being incorporated into the scenario, to ensure transportation facilities to human beings, by maintaining social distancing norms.A number of them are also being used for the disinfection of public places and cleaning purposes.

Results & Discussion

The world of Artificial Intelligence has been working hand in hand to stride over the pandemic situation for the last few months. The robots used for medical purposes has been equipped to handle emergencies to some extent and can check the patient's vitals for sending them to the medical team. One such robot is operational in the United States. A Danish company is manufacturing UVD robots to disinfect the patient's room without human contact. Various such robots have been imported by China and some other countries [7]. Two IIT alumni devised a gadget called 'Dozee' to monitor respiratory rates continuously during the quarantine period. Companies like Pixxon AI Solutions and Portea offered monitoring services and a reliable hub of information with the help of Artificial Intelligence. Intelli Automation developed the app 'Safety First' to protect anyone attacked by criminals automatically identifies the nearest police station, PCR van, and starts sending them the live feeds of audio, or video, or both with GPS locations. Robots of Asimov Robotics and KanavKahol are working effectively to dispatch sanitizers, masks, foods, and necessary medical amenities. They can even detect the motion of the person in its vicinity and can guide them through a series of guidance for stepwise proper

handwash, as a precautionary measure. Robots were on the frontline to prevent virus spread, as also for preparing meals at hospitals, performing waiters' duties, spraying disinfectants to vending rice, and dispensing hand sanitizers. In many hospitals, robots undertook diagnosis and thermal imaging and transporting medical samples. [8]. Moreover, the drones are being used extensively for surveillance on behalf of the police, mainly over the banks of Seine, Paris, and Mumbai, India. They are also patrolling to ensure the maintenance of social distancing norms [9]. One of the leading autonomous Vehicle technology-based company, Baidu, has produces 104 autonomous vehicles that are now ruling in the streets of 17 cities across China. They are performing tasks like cleaning, disinfecting, logistics, and transportation with the support from partner companies. Apollo also partnered with 'iDriverPlus' to provide autonomous vehicles to 16 hospitals for COVID-19 treatments nationwide. Each hospital is being supported with one or two disinfectant and delivery vehicles, aiming to minimize person-to-person transmission and alleviate the shortage of medical staff. Driverless cleaning and disinfection vehicles are operating in the Huashan Hospital, affiliated with the Shanghai Medical College of Fudan University, and The Eye, Ear, Nose, and Throat Hospital of Fudan University. These initiatives are being provided for free until the pandemic subsides. The ACE Transportation Engine is creating a dynamic intelligent vehicle innovation ecosystem and a modern transportation system that delivers safety, convenience, efficiency, environmental protection, and cost-effectiveness. More than 10 cities in China have implemented the engine [10].

Conclusion

In the period of crisis, the arena of technology has demonstrated rapid advancements. The medical teams and the domain of Artificial Intelligence have worked unitedly to battle out the tremendous darkness of the pandemic. The technological world has not only aided the medical teams all over the world, by helping them in their daily tasks but has also succeeded in reducing human workload to pace up treatment procedures starting from detection to cure. This paper shows the comparative study between the two diverse domains working as a whole to win over the pandemic situation.

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Use of Silica Nanoparticles in Modifying the Mechanical Properties of PVC

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Abstract
Polyvinyl chloride (PVC) is considered as one of the most widely used polymers which have widespread indoor and outdoor applications. However, the problems of poor impact strength, difficult processibility and poor thermal stability of PVC are some of the disadvantages which often limit its application. So in order to overcome these drawbacks in properties, several modifiers may be used which are often referred to as impact modifiers or processing aids. However, by the usage of the common modifiers, one of the properties of the polymer is enhanced but it induces deterioration in the other properties of the same. Therefore, in order to optimize the mechanical parameters like ultimate tensile strength, modulus, elongation at break and toughness, silica nano particle is incorporated within PVC in varying proportion. Thus, the present study aims at improving the properties of PVC in terms of the mechanical parameters stated by incorporation of silica nanofiller and also to observe the dynamics of property variation over the range of added nanofiller.

Keywords: Poly(vinyl chloride); Silica nanoparticles; mechanical properties

Introduction & Objectives
Nanotechnology strategy was used to improve the properties of PVC in terms of strength, hardness, fire retardancy, etc. For this purpose, a wide range of nano fillers could be employed for enhancing the inherent mechanical properties of PVC [1,2].
Nanotechnology and nanocomposite formation is the new word of the world today. After the concept of nanocomposites was introduced, PVC nanocomposites have attracted great interest. Many properties of the PVC polymer such as strength, hardness, fire retardancy, etc. can be tailored by the blending of a wide range of nanofillers to extend the application range of PVC. Several authors have reported about the incorporation of various nanofillers to enhance the properties of PVC. The electrical behavior of PVC is significantly improved by the addition of multiwalled carbon nanotubes. PVC composites containing well dispersed nanoclays exhibits increased hardness and decreased smoke production. Introduction of copper or silver nanoparticles in PVC influences the antimicrobial property and photostability of PVC. In the large field of nanotechnology, polymer matrix based nanocomposites have become a prominent area of current research and development [3,4,5].
In the present study, an endeavour has been made to estimate the change in mechanical properties of PVC in terms of its ultimate tensile strength, modulus, elongation at break and toughness by using silica nanoparticles as the nanofiller. Nano silica has been introduced within PVC in different proportion to investigate the changes in the mechanical parameters over a range of nanofiller incorporation.

Methods
PVC resin was taken in an air tight dry blender and mixed with 30 parts dioctylphthalate (DOP) plasticizer and 2 parts tribasic lead sulphate (TBLS) heat stabilizer with respect to the amount of PVC resin taken. The silicananofiller (3 to 15 parts) was then added and mixed thoroughly in the blender with the PVC mix at a slightly elevated temperature. A number of batches were prepared by varying the dose of the nanofiller (3 to 15 parts). The mix was then compression moulded into sheets under heat and pressure which was then subjected

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for mechanical testing in Instron Universal tester.

Results & Discussion

In the present study, the effect of nano silica on PVC to modify the latter's mechanical properties in terms of modulus, ultimate tensile strength, elongation at break and toughness have been investigated. Fig 1 depicts the change of modulus of the nanofiller incorporated PVC with gradual increase in the dose of nano silica. It has been observed that there is a gradual rise in modulus with the rise in dose of the nanofiller. This poses the idea that the nanoparticles with enhanced surface area get well distributed within the PVC matrix and augments the interaction between it and the polymer resulting in the modified and improved mechanical parameters. The rise in modulus as explicit in the curve reveals that the value rises from 432 MPa to 473 MPa.

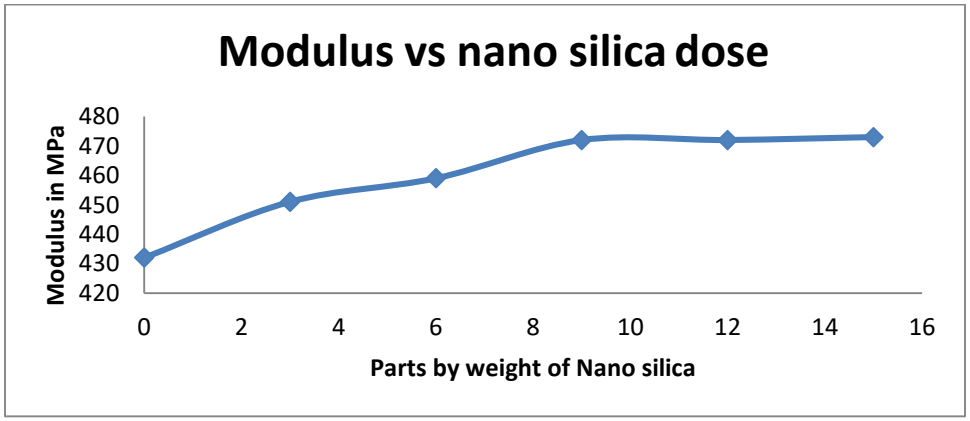

Fig. 1: Variation of Modulus with increasing dose of nano silica

Similar observation can be witnessed from the changes in ultimate tensile strength as depicted in Fig 2. The strength properties show a rise with higher doses of nano silica and tends to level off as the dose increases. In this case also, the effect of nano silica on PVC is evidenced and the nanomaterial acts as the reinforcing filler to enhance the strength parameter of PVC which is taken into consideration. The distribution of the nanofiller and its reinforcing action as exhibited by the rising ultimate tensile strength is explicit from the curve wherein the value rises from 25 MPa to 50 MPa. This doubling of the parameter value establishes the fact that nano materials as fillers are very effective modifying agents which can contribute enormously to the modification of the base polymer compound PVC.

The mechanical parameters of elongation at break and toughness corroborates with the changes of modulus and ultimate tensile strength. The elongation at break and toughness curves are exhibited in Fig 3 and Fig 4 respectively. The elongation at break value reduces from 119% to 112% while the toughness reduces from 5 to 4.4 MPa. In both the parameters, the reduction is not quite significant as it would have been in the absence of the nanofiller. So, it can be claimed that the nano silica acting as the nanofiller, raises the strength parameters of PVC with its increasing dose but in no case, the rise is achieved at the cost of the flexibility parameters namely the elongation at break and toughness.

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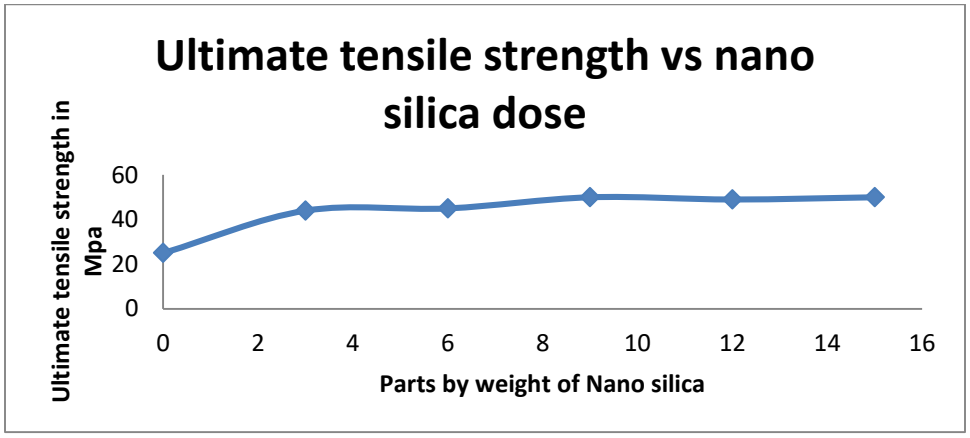

Fig. 2: Variation of Ultimate Tensile Strength with increasing dose of nano silica

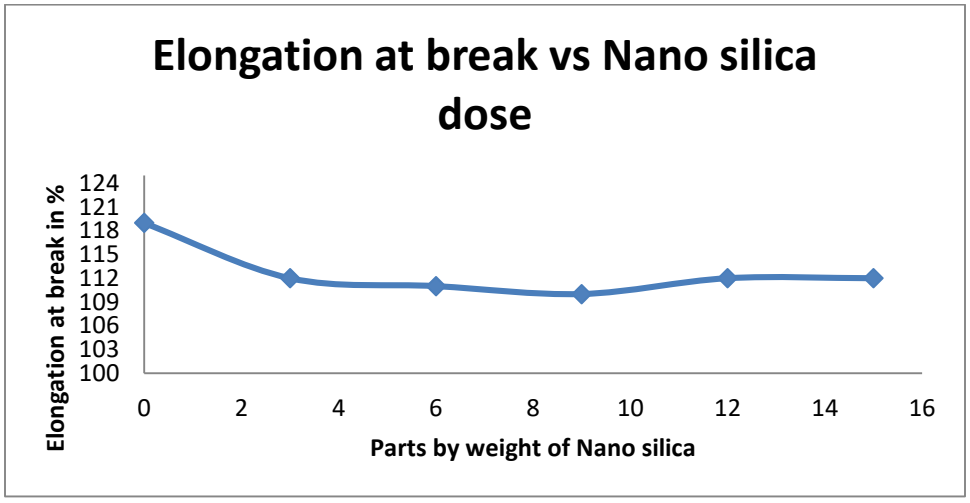

Fig. 3: Variation of Elongation at break with increasing dose of nano silica

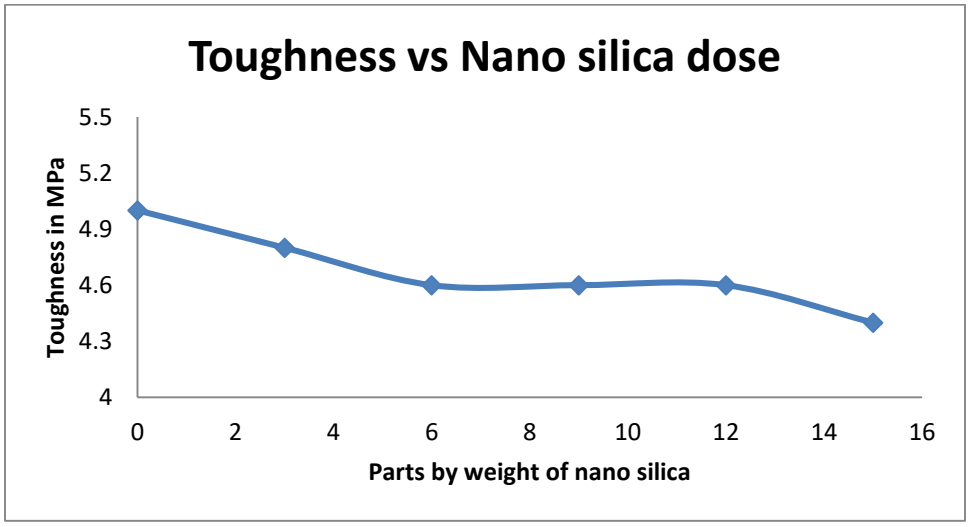

Fig. 4: Variation of Toughness with increasing dose of nano silica

Conclusion

Mechanically modified PVC compound has been achieved by incorporating nano silica as the nano filler within it. The strength properties of the polymer such as the modulus and ultimate tensile strength rise not at the compensation of the flexibility parameters like elongation at break and toughness. So mechanically improved PVC compounds have been obtained.

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Effect of Space Weather on Radio Communication-A Review

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Abstract

The Sun is ejecting continuously a very high amount of energetic particles by mainly two processes coronal mass ejections and solar flare effect which affects the conditions in the Sun-Earth environment known as "space weather". So, space weather is a condition and effect both due to the changes in the speed or density of the solar wind and the continuous flow of charged particles from the Sun to the Earth and into interplanetary space. The information about space weather is mainly supplied by three satellites SOHO, ACE and STEREO. ACE provides the information that Coronal mass ejections about to hit earth only whereas STEREO provides the three-dimensional observations of CME structure. The strongest space weather is due to the impact of CMEs. The momentum, size, magnetic field strength and configuration of coronal mass ejections are the parameters which decides the energy input into the geospace. The solar flares cause perturbations in deeper atmospheric layers. Solar energetic particles affect any human exploration to moon and beyond it. Just within 8 minutes of their occurrence at the Sun, the short wavelength flares, soft X-ray and intense radio bursts arrives to the earth. The cause and forecasting of intense radio bursts are not possible till now although they disrupt the radio communications including global positioning systems. The reason for non-forecasting of intense radio bursts is their arrival to the earth within 8 minutes to their occurrence at the Sun. All the comfort devices in the society depends on electric power distribution grids, global satellite communication, navigation systems and satellite imaging which are affected most due to the effects of space weather. The technological effects of space weather are reported since the nineteenth century. The telegraph tape ignited due to the high current flowing through the wires suddenly as an effect of storm occurred in September 1859.

The strength and direction of the magnetic field measured near the surface of the Earth is always varying because of the variations in the flow of solar wind. The flow of charged particles in ionosphere due to these

solar events severely disturb the ionosphere conditions and thus the high frequency communication got affected. The density of the lower layers of the ionosphere increases as a result of X-rays produced during solar flares which results in fading of high frequency signals. Solar radio bursts interfere with very high frequency, ultra-high frequency and L-band communication satellites. Satellite electronics can be affected by solar energetic particles which results in electrical failure. Radiation exposure and the atmospheric satellite drag are the two challenges seen in the satellite communication as a result of space weather effect. The interaction of electromagnetic radiation with charged particles at the satellite's surfaces, electronic components and instruments is termed as radiation exposure whereas satellite drag impacts on the orbital lifetime of low-earth orbiting satellites. The space near the earth is full of charged particles. These energetic particles are trapped in Van Allen radiation belts. The amount of radiation and the energy in this radiation belt is controlled by the space weather. The design of the space instruments like satellites and space crafts is done by keeping the effects of these charged particles into consideration. The highly energetic electrons can penetrate spacecraft or satellites and deposit their charge in the insulating materials in the circuit boards. If enough charge is built up, the electronic components will be failed or circuitry may fry out. This may have serious consequences as these electronic circuits are controlling different parts and working of these satellites or space crafts. The communications to the satellites from the ground is done through ionosphere. The areas of enhanced density are created in the ionosphere due to the space weather effect due to which the density profile of the space weather changes. The change in density profile of the charged particles affects the signal strength. Due to these localized gradients in density of the charged particles in the ionosphere the satellite communication and navigation got affected. There may be complete loss of signal due to complete absorption or reflection of the radio waves.
The height of the orbiting satellite can be lowered due to the enough density of the gas at a few hundred kilometers above earth surface. With the decrease in height of the satellite, its velocity and the neutral gas density increases which results in quick increase of drag. Due to this increased drag, the satellites reenter the atmosphere of the earth and then either it burns up or crash to the surface. The density of the upper atmosphere at any height depends on the solar radiation. So, during space weather effect like geomagnetic storms there is high probability of reentering of satellites in the earth's atmosphere. During solar radiation storms the radio communications are also blocked due to SEPs. The radio communications using global positioning system (GPS) and GNSS are also degraded due to geomagnetic storms. Polar cap absorption occurs due to the increase in absorption of high frequency signal as a result of ionization of lower ionosphere in the polar region caused by highly energetic solar particles.

Keywords: Coronal mass ejections; Solar wind; Interplanetary space; Communication; Space weather; Solar flare effect.

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Stability Analysis of Prey Predator ModelWith a Holling Type I Functional Response

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Abstract
The modelling for the population dynamics of a prey-predator system is one of the important and interesting goals in mathematical biology. There are many factors that impact the dynamics of prey-predator interactions such as disease, harvesting, prey refuge, delay, and many other factors. Several prey species have gone to extinction, and this extinction must be caused by external effects such as overutilization, over predation and environmental factors (pollution, famine). The prey grows as a logistic model when there is no interaction with the predator. The predator is assumed decreasing due to natural death and interspecific interaction when there is no interaction with its prey. This paper deals with a prey predator model with Holling response function of type I. Aprey predator model which consists of two distinct population is discussed. We have investigate dexistence of the positive equilibrium point and the stability of the equilibrium point. Equilibrium points of the model was determined and stability of the model was analysed by eigenvalues of Jacobian matrix. The behaviour of the dynamical system was analysed through this stability. Numerical simulation are represented as phase portraits to draw the stability of the equilibrium point. In our Numerical outcomes confirmed the analytical results and the local behaviour prey-predator model which start from their positive initial condition. We solved the prey-predator system and showed some phase portraits such as the existence of the stable or unstable equilibrium point under a suitable value of the parameter. The boundedness and equilibrium points of the prey predator model has been found. It is shown that the model has two equilibrium points. The trivial equilibrium point is always unstable and the positive equilibrium point is stable.

Keywords: Prey-predator; Logistic model; Equilibrium point; Phase portraits; Stability.

Introduction

We discuss the population model

$\dot{x}(t) = x\left(1 - \frac{x}{k}\right) - bxy - d_1 x$

$\dot{y}(t) = cxy - dy^2 - d_2 y, \quad c<b$

$x(0)>0$ and $y(0)>0$.

Where k is maximum carrying capacity of prey in a population, b is the predation rate, d_1 is the death rate of the

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prey, c is the growth rate of predator, d is the death rate due to intra-specific competition between predators, $d_2$is the death rate of predator. All the parameters are positive.

- Theorem: All positive solution of the system is uniformly bounded.

Ans. Let (x(t),y(t)) be the positive solution of the given system satisfy the initial condition.

We consider the function $\rho(t) = cx(t) + by(t)$

Then $\dot{\rho}(t) = c\dot{x}(t) + b\dot{y}(t)$

$$= c\left\{x\left(1-\frac{x}{k}\right) - bxy - d_1x\right\} + b\left(cxy - dy^2 - d_2y\right)$$

$$= c\left\{x\left(1-\frac{x}{k}\right) - d_1x\right\} - b(dy^2 + d_2y)$$

$$\leq cx\left(1-\frac{x}{k}\right) - (cd_1x + bd_2y)$$

Let $p = \min\{d_1, d_2\} > 0$

Then $\dot{\rho}(t) \leq cx\left(1-\frac{x}{k}\right) - p(cx+by)$

$\dot{\rho}(t) + p\rho(t) \leq cx\left(1-\frac{x}{k}\right)$

$\leq \frac{ack}{4}$ (>0)

Hence, $\rho(t) \leq c_5e^{-pt} + \frac{ack}{4p}$

Therefore $\rho(t)$ is bounded by a positive real number.

So our population is bounded.

Stability analysis

Clearly we see that there are two equilibrium points. one is trivial equilibrium point $E^0(x^0, y^0) = (0, 0)$ and other is positive equilibrium point $E^1(x^*, y^*) = \left(\frac{d(1-d_1)+bd_2}{bc+\frac{d}{k}}, \frac{c(1-d_1)-\frac{d_2}{k}}{bc+\frac{d}{k}}\right)$, according as $d_1 < 1$ and $ck(1-d_1) > d_2$

For the equilibrium $E^0(x^0, y^0) = (0, 0)$, the jacobian matrix at (0,0) is

$$J = \begin{bmatrix} \frac{\partial\dot{x}}{\partial x} & \frac{\partial\dot{x}}{\partial y} \\ \frac{\partial\dot{y}}{\partial x} & \frac{\partial\dot{y}}{\partial y} \end{bmatrix} = \begin{bmatrix} 1-d_1 & 0 \\ 0 & -d_2 \end{bmatrix}$$

This shows that eigen value of this matrix is $(1-d_1)$ and $-d_2$ where $(1-d_1)>0$

Since at least one eigen value is positive so the equilibrium $E^0(x^0, y^0) = (0, 0)$ is unstable.

The required trajectory is $Y = c_1 \exp((1-d_1)*t) + c_2 \exp(-d_2*t)$

Where $Y = \begin{pmatrix} x(t) \\ y(t) \end{pmatrix}, c_1 = \begin{pmatrix} c_{11} \\ c_{12} \end{pmatrix}, c_2 = \begin{pmatrix} c_{21} \\ c_{22} \end{pmatrix}$

For $c_1 = 0.2,\ c_2 = -10,\ d_1 = 0.75, d_2 = 0.1$

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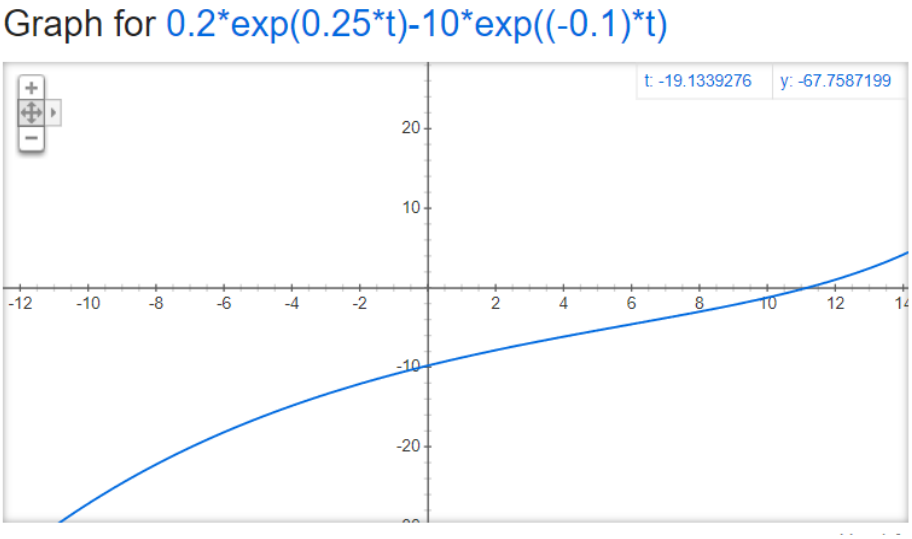

For the positive equilibrium point $E^1(x^*, y^*) = \left(\frac{d(1-d_1)+bd_2}{bc+\frac{d}{k}}, \frac{c(1-d_1)-\frac{d_2}{k}}{bc+\frac{d}{k}}\right)$, according as $d_1 < 1$ and $ck(1-d_1) > d_2$

The jacobian matrix at $E^1(x^*, y^*)$ is $J_1 = \begin{bmatrix} \frac{\partial \dot{x}}{\partial x} & \frac{\partial \dot{x}}{\partial y} \\ \frac{\partial \dot{y}}{\partial x} & \frac{\partial \dot{y}}{\partial y} \end{bmatrix}$

$= \begin{bmatrix} (1 - \frac{2x^*}{k} - by^* - d_1) & -bx^* \\ cy^* & (cx^* - 2dy^* - d_2) \end{bmatrix}$

$= \begin{bmatrix} -\frac{x^*}{k} & -bx^* \\ cy^* & -dy^* \end{bmatrix}$

This shows that sum of the eigen value =sum of diagonal elements

$= -\left(\frac{x^*}{k} + dy^*\right)$, which is negative and the product of eigen value =Det(J_1)

$= \left(\frac{dx^*y^*}{k} + bcx^*y^*\right)$, which is positive.

Hence, both eigen value is negative. Say $-\lambda_1$and $-\lambda_2$ where λ_1 and λ_2 both are positive. So the positive equilibrium point $E^1(x^*, y^*)$ is stable.

Hence, the required trajectory is

$$Y = c_3 \exp(-\lambda_1 * t) + c_4 \exp(-\lambda_2 * t)$$

where$Y = \begin{pmatrix} x(t) \\ y(t) \end{pmatrix}, c_3 = \begin{pmatrix} c_{31} \\ c_{32} \end{pmatrix}, c_4 = \begin{pmatrix} c_{41} \\ c_{42} \end{pmatrix}$

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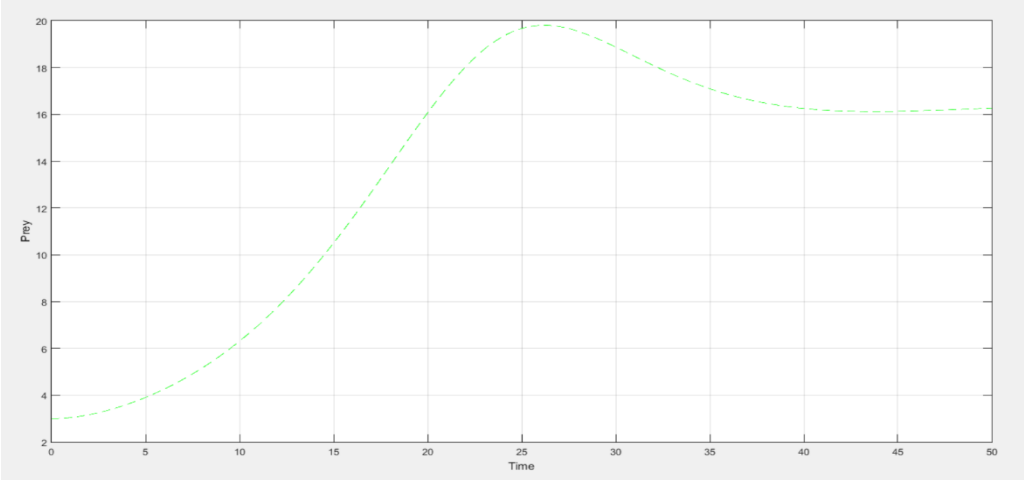

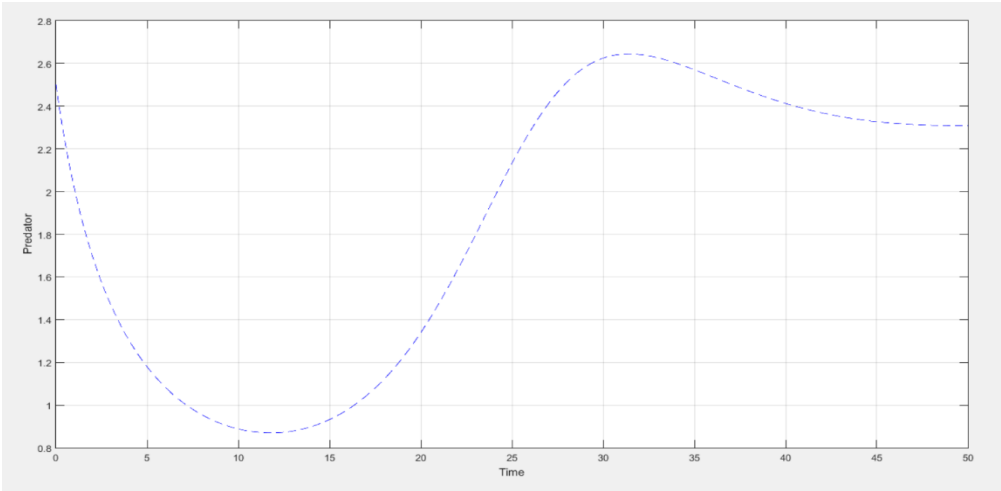

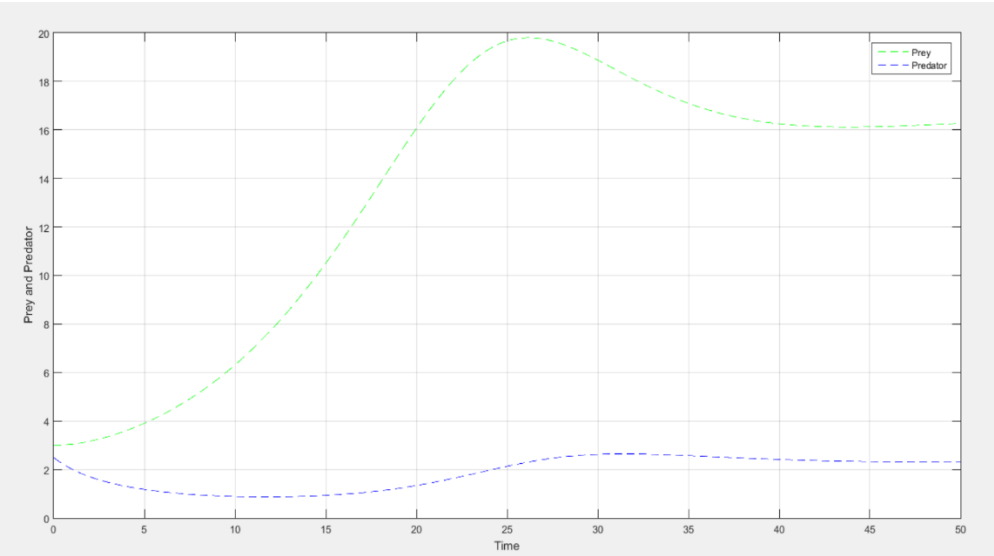

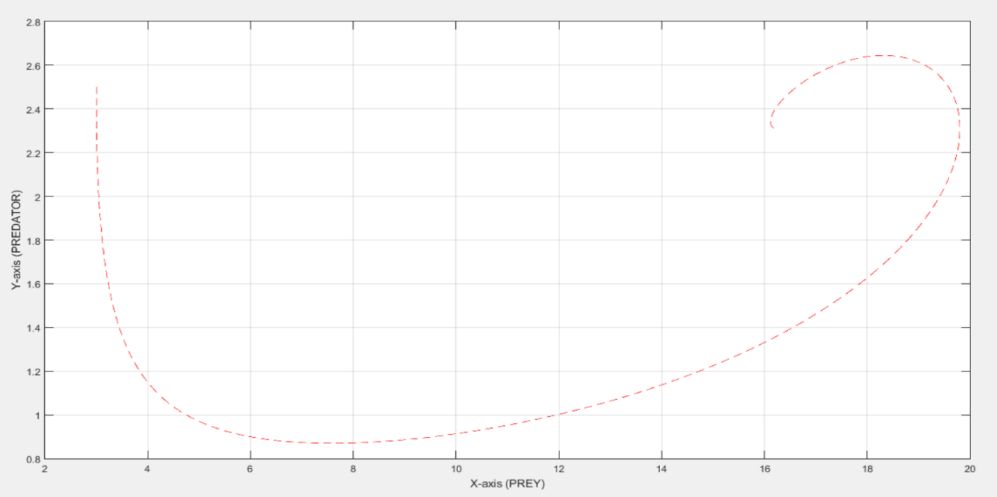

Conclusion

In our Numerical outcomes confirmed the analytical results and the local behaviour prey-predator model which start from their positive initial condition. We solved the prey-predator system and showed some phase portraits such as the existence of the stable or unstable equilibrium point under a suitable value of the parameter. The boundedness and equilibrium points of the prey predator model has been found. It is shown that the model has two equilibrium points. The trivial equilibrium point is always unstable and the positive equilibrium point is stable.

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The Behavior of Hepatitis C Virus Infectionin Fuzzy Environment

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Abstract

In the last few decades treatment of hepatitis C virus (HCV) is a major concern and it is lengthy, expensive and fraught with side-effects, only 50%patient are succeeding. Clinically short-term treatment response(so-called sustained virological response [SVR]) is used to predict prolonged viral suppression. Mathematical models for within-host HCV infection have illuminated the mechanisms underlying treatment with interferon (IFN) and ribavirin (RBV), they have difficulty producing SVR without the introduction of an external extinction threshold. When infected hepatocytes proliferate sufficiently much faster than uninfected hepatocytes,

bistability occur and produce SVRwithout an external extinction threshold under biologically relevant conditions.A lot of researcher shows their interest to find the mechanism of HCV infection. In the last few years much importance has been given on the role of uncertainty (fuzzy, interval etc.) in mathematical biology. In this paper we tried to study the dynamical behaviour of HCV infection in fyzzy environment. In this model we consider the initial condition as fuzzy number, formulate the mathematical model in fuzzy environment then we use the fuzzy derivative concept to convert the fuzzy model into crisp system model. Since the fuzzy system model and the crisp model are same so we can easily analyse the stability of the crisp model. Then we perform the numerical simulation of the transformed crisp model.

Keywords: Hepatitis C; HCV; Bistability; Mathematical models; Fuzzy environment.

Introduction & Objectives

Chronic Hepatitis C virus (HCV) infection is a global health problem affecting 10 million people in the south-east Asia alone. HCV infection causes insidious liver damage including chronic hepatitis, cirrhosis and liver cancer [5]. Treatment of HCV is sub-optimal, succeeding in only 50% of treated patients and causing several side-effects [6]. Chronic HCV infection can continue for decades, with or without treatment; thus, while treatments for HCV exist, it is hard to know whether they provide an absolute cure for the virus. Rather, the goal of treatment is to achieve sustained virological response (SVR), defined as undetectable HCV viral loads six months after the cessation of therapy. For stable liver function, SVR considered a “virological cure” is followed by many years [4].

In the last few decades, a lot of researcher shows their interest to clarify how variation among patients, and among HCV genotypes, can lead to this array of treatment responses, with the goal of improving prediction and treatment. Lot of mathematical models developed to capture the variation among patients, and among HCV genotypes. Dahari et al. [2] and Dixit et. al. [7] has made valuable contributions to explore the factors that determine the efficacy of peg-interferon and ribavirin treatment of HCV. The short-term nature of available treatment data, initial modeling efforts were geared towards producing short-term responses that accurately represented observed data. The short-term responses are good indicators of future cure; there is an increasing need for models to provide more definite predictions of medium- and long-term viral response.

In the last few years much importance has been given on the role of uncertainty (fuzzy, interval etc.) in mathematical biology. Bistability is an important criterion between treatment, HCV and host cells [6]. In this paper we tried to study the dynamical behaviour of this criterion in fuzzy environment.

Methods

In this paper we consider the mathematical model of the interaction between hepatocytes and HCV [2, 3]:

$$\frac{dT}{dt} = s + r_1 T\left(1 - \frac{T+I}{T_{\max}}\right) - dT + \beta TV$$

$$\frac{dI}{dt} = \beta TV + r_2 I\left(1 - \frac{T+I}{T_{\max}}\right) - \delta I$$

$$\frac{dV}{dt} = (1-\in) pI - cV$$

Where T representsuninfected hepatocytes, I represents infected hepatocytes and V represents free virus, or viral load. Time is measured in days, s is the baseline (absolute) recruitment rate of uninfected hepatocytes, d is the baseline (per capita) mortality rate, r_1, r_2, are the maximum proliferation rate of uninfected and infected hepatocytes respectively, T_{max} is the maximum hepatocyte density or carrying capacity of both uninfected and infected hepatocytes. β is the infection rate and δ is the natural death rate or death rate of infected hepatocytes due to drug action of infected hepatocytes, p is the rate of production of virus particles per infected hepatocytes and c is the clearance rate.

In the equilibrium state $\frac{dV}{dt} = 0$, so we convert this three dimensional mathematical model of HCV infection into two dimensional mathematical model, then we apply the concept of fuzzy differential equation [1], consider the initial condition as fuzzy number, formulate the mathematical model in fuzzy environment and use the fuzzy derivative concept to convert the fuzzy model into crisp system model. Since the fuzzy system model and the crisp model are same so we can easily analyse the stability of the crisp model. Then we perform the numerical simulation of the transformed crisp model to validate our analytical findings.

Results & Discussion

When T(t) and I(t) both are (i)-gH differentiable then the fuzzy system of equation has only co-existence equilibrium point which is E^{*1} ($T^{1}*_1$,$T^{1}*_2$,$I^{1}*_1$, $I^{1}*_2$), The characteristic equation is given by $|V_1^{*}-I\lambda|=0$ i.e. $\lambda^4+\lambda^3X_0+\lambda^2X_1+\lambda X_2+X_3=0$.Therefore by Routh-Hurwitz criteria the system isnot stable as$X_0 = 0$ and $X_2 = 0$

When T(t) is (i)-gH and I(t) is (ii)-gH differentiable then the fuzzy system of equation has only co-existence equilibrium point which is E^{*2} ($T^{2}*_1$,$T^{2}*_2$,$I^{2}*_1$, $I^{2}*_2$). The characteristic equation is given by $|V_2^{*}-I\lambda|=0$ i.e. $\lambda^4+\lambda^3Y_0+\lambda^2Y_1+\lambda Y_2+Y_3=0$. Therefore by Routh-Hurwitz criteria the system is not stable as$Y_0 < 0$

When T(t) is (ii)-gH and I(t) is (i)-gH differentiable then the fuzzy system of equation has only co-existence equilibrium point which is E^{*3} ($T^{3}*_1$,$T^{3}*_2$,$I^{3}*_1$, $I^{3}*_2$). The characteristic equation is given by $|V_3^{*}-I\lambda|=0$ i.e. $\lambda^4+\lambda^3W_0+\lambda^2W_1+\lambda W_2+W_3=0$. Therefore by Routh-Hurwitz criteria the system is not stable as$W_0 < 0$

When T(t) and I(t) both are (ii)-gH differentiable then the fuzzy system of equation has only co-existence equilibrium point which is E^{*4} ($T^{4}*_1$,$T^{4}*_2$,$I^{4}*_1$, $I^{4}*_2$). The characteristic equation is given by $|V_4^{*}-I\lambda|=0$ i.e. $\lambda^4+\lambda^3Z_0+\lambda^2Z_1+\lambda Z_2+Z_3=0$. Therefore by Routh-Hurwitz criteria the system is stable if

1. Z_0, Z_1, Z_2, Z_3 all are Positive.
2. $Z_0Z_1 - Z_2 > 0$
3. $Z_0Z_1Z_2 - Z_2^2 - Z_0^2Z_3 > 0$

$Z_0>0$ implies $(3T_1r_1A + R_1I_2A + 2d + GI_1 + GI_2 + 2T_2r_1A + r_2T_2A + 2I_2r_2A + 2\delta + r_2T_1A + 2I_2r_2A) > (2r_1 + GT_2 + 2r_2 + GT_1)$

$Z_1>0$ implies$(d_{11}d_{22} + d_{11}d_{33} + d_{22}d_{33} + d_{11}d_{44} + d_{22}d_{44}) > (d_{44}d_{23}d_{32} + d_{14}d_{41})$

$Z_2>0$ implies$(d_{11}d_{23}d_{32} + d_{14}d_{22}d_{41} + d_{14}d_{33}d_{41} + d_{23}d_{32}d_{44}) > (d_{11}d_{33}d_{44} + d_{22}d_{33}d_{44} + d_{11}d_{22}d_{44} + d_{11}d_{22}d_{33})$

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$Z_3>0$ implies $(d_{14}d_{23}d_{32}d_{41} + d_{11}d_{22}d_{33}d_{44}) > (d_{14}d_{22}d_{33}d_{41} + d_{11}d_{23}d_{32}d_{44})$
Where,

$$d_{11} = r_1 - 2Ar_1T_1 + Ar_1I_2 - d - GI_2$$
$$d_{14} = Ar_1T_1 - T_1G$$
$$d_{22} = r_1 - 2Ar_1T_2 + Ar_1I_1 - d - GI_1$$
$$d_{23} = Ar_1T_2 - T_2G$$
$$d_{32} = GI_1 - Ar_2I_1$$
$$d_{33} = GT_2 + r_2 - Ar_2T_2 - 2Ar_2I_1 - \delta$$
$$d_{41} = GI_2 - Ar_2I_2$$
$$d_{44} = GT_1 + r_2 - Ar_2T_1 - 2Ar_2I_2 - \delta$$

and

$$A = \frac{1}{T_{max}}, \qquad G = \frac{\beta(1-\epsilon)}{C}$$

Conclusion

In this paper we study a system of equation which representsthe interaction between hepatocytes and HCVin fuzzy environment which is considered to be an important research arena in epidemiological field. The approach of fuzzy differential equation were applied to elucidate the fuzzy solution of the given model. Here at first we see that the HCV infection with fuzzy parameters which are not stable in nature. So we introduce the concept of (i)-gH and (ii)-gH differentiable then after some mathematical formulation the system becomes stable. For the scarcity of datathe initial conditions of the biological model is quite difficult. So to handle this situation we employed the imprecise parameters in the models which are more realistic and helpful. To validate our analytical findings we perform the numerical simulation of the system.

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The Behaviour of Glucose-Insulin Regulatory Systemin Fuzzy Environment

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Abstract
Diabetes is a chronic and complex metabolic disease due to the raised of blood glucose concentration for long duration. When the glucose-insulin system is disturbed in the body, diabetes occurs and the disturbed glucose-insulin dynamics are still unknown. In the last few decades diabetes is a serious concern in our society. The application of Mathematical models in the glucose-insulin regulatory system, which describe different aspects of diabeties are growing rapidly. The mathematical models which describe the biological mechanism of the glucose-insulin regulatory system helps in the controll of diabetes. In this paper we tried to study the mechanism of glucose-insulin model which describe the glucose homeostasis, different aspects of diabetes and its consequences in fuzzy environment. In this model we consider the initial condition as fuzzy number, formulate the mathematical model in fuzzy environment then we use the fuzzy derivative concept to convert the fuzzy model into crisp system model. Since the fuzzy system model and the crisp model are same so we can easily analyze the stability of the crisp model. Then we perform the numerical simulation of the transformed crisp model.

Keywords: Diabetes; Glucose-insulin; Mathematical models; Fuzzy environment; Crisp system;

Introduction & Objectives
Diabetes is a chronic disease due to the disorder of the glucose-insulin regulatory system. There are mainly three type of diabetes: type 1 diabetes, type 2 diabetes and type 3 diabetes. Type 3 diabetes is known as gestational diabetes. Type 1 diabetes occurs as a result of an immunological destruction of the insulin-producing β cells[4]. When the resistance of the insulin occurs in the body, Type 2 diabetes occurs i.e. resistance of the body to the effect on glucose uptake increases, glucose stores in the blood due to excessive hepatic glucose production and defective β cell function[5]. Diabetes is a chronic disease in which glucose concentration is high in the blood for long duration due to the disturbed insulin-glucose-glucagon dynamics in the body. There are two hormones Glucagon and insulin secreted by α and β cells of the pancreas, which take part to maintain the normal range of glucose level in the blood. If the glucose-insulin regulatory system works properly, the range of glucose in the blood is (70- 110 mg/dl). After food intake, glucose level incresed in the blood, it activates the pancreas to discharge insulin which helps the body to balance the excessive glucose and in case of low concentration of glucose in the blood, glucagon triggers the liver to convert glycogen into glucose. In diabetic patient excessive glucose level persists in the blood for long time as a result multiple organ failures in the body [6].

In the last few decades, a lot of researcher shows their interest to find the inherent mechanism of disturbed glucose-insulin system and apply drug therapy to control the glucose level in blood [3, 2]. Lot of mathematical models developed to capture the physiological changes occurring in the human body with or without diabetes [7, 9]. Some of the mathematical models have significant contribution in the pathogenetic and physiological studies of diabetes [7, 8].

In the last few years much importance has been given on the role of uncertainty (fuzzy, interval etc.) in mathematical biology. In this paper we tried to study the mechanism of glucose-insulin regulatory system which described the glucose homeostasis, different aspects of diabetes and its consequences in fuzzy environment.

Methods

In this paper we consider the mathematical model proposed by Bolie, 1961 [3].

$$\frac{dx(t)}{dt} = p - \alpha x + \beta y$$
$$\frac{dy(t)}{dt} = q - \gamma x - \delta y$$

Where x represents the deviation in insulin concentration from their mean physiological value, y represents the deviation in glucose concentration from their mean physiological value, p is the intravenous injection functions I divided by extracellular compartment value, q is the intravenous injection functions Ġ divided by extracellular compartment value, α denotes the sensitivity of insulin's activity to elevate insulin concentration, β denotes the sensitivity of pancreatic insulin to elevate glucose concentration, γ represents the combined sensitivity of liver glycogen storage and tissue glucose utilization to elevate insulin concentration and δ represents the combinedsensitivity of liver glycogen storage and tissue glucose utilization to elevate glucose concentration [3].

In this model we apply the concept of fuzzy differential equation [1],consider the initial condition as fuzzy number, formulate the mathematical model in fuzzy environment then we use the fuzzy derivative concept to convert the fuzzy model into crisp system model. Since the fuzzy system model and the crisp model are same so we can easily analyse the stability of the crisp model. Then we perform the numerical simulation of the transformed crisp model to validate our analytical findings.

Results & Discussion

When x(t) and y(t) both are (i)-gH differentiable then the fuzzy system of equation has only co-existence equilibrium point which is E^{*1} (x^{1*}_1,x^{1*}_2,y^{1*}_1, y^{1*}_2), where

$$x_1^{1*} = \frac{\delta p + \beta q}{\beta\gamma + \alpha\delta},\ x_2^{1*} = \frac{\beta q - \delta p}{\beta\gamma + \alpha\delta},\ y_1^{1*} = \frac{\alpha q - \gamma p}{\beta\gamma + \alpha\delta},\ y_2^{1*} = \frac{\alpha q - \gamma p}{\alpha\delta - \beta\gamma}$$

The characteristic equation is$|V_1^* - \lambda I|=0\ \ i.e, a_1\lambda^4 + a_2\lambda^3 + a_3\lambda^2 + a_4\lambda + a_5=0,$ where,$a_2 = 0\ and\ a_4 = 0,$ therefore by Routh Hurwitz Criteria**,** the system is unstable

When x(t) is (i)-gH and y(t) is (ii)-gH differentiable then the fuzzy system of equation has only co-existence equilibrium point which is E^{*2} (x^{2*}_1,x^{2*}_2,y^{2*}_1, y^{2*}_2). Where

$$x_1^{2*} = \frac{\beta q - \delta p}{\beta\gamma - \alpha\delta},\ x_2^{2*} = \frac{\delta p - \beta q}{\alpha\delta - \beta\gamma},\ y_1^{2*} = \frac{\alpha q - \gamma p}{\beta\gamma - \alpha\delta}, y_2^{2*} = \frac{\gamma p - \alpha q}{\alpha\delta + \beta\gamma}$$

The characteristic equation **is** $|V_2^* - \lambda I|=0\ \ i.e, b_1\lambda^4 + b_2\lambda^3 + b_3\lambda^2 + b_4\lambda + b_5 = 0,$ where,$b_5 = -\alpha^2\delta^2 - \beta^2\gamma^2 - 2\alpha\beta\gamma\delta,$ therefor$b_5 < 0$. Therefore by Routh Hurwitz Criteria**,** the system is unstable

When x(t) is (ii)-gH and y(t) is (i)-gH differentiable then the fuzzy system of equation has only co-existence equilibrium point which is E^{*3} (x^{3*}_1,x^{3*}_2,y^{3*}_1, y^{3*}_2). Where

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$x_1^{3*} = \frac{\delta p + \beta q}{\beta\gamma - \alpha\delta}$, $x_2^{3*} = \frac{\beta q - \delta p}{\beta\gamma - \alpha\delta}$, $y_1^{3*} = \frac{\alpha q - \gamma p}{\beta\gamma + \alpha\delta}$, $y_2^{3*} = \frac{\alpha q - \gamma p}{\beta\gamma + \alpha\delta}$

The characteristic equation **is** $|V_3^* - \lambda I| = 0$ $i.e, c_1\lambda^4 + c_2\lambda^3 + c_3\lambda^2 + c_4\lambda + c_5 = 0$, where, $c_5 = -\alpha^2\delta^2 - \beta^2\gamma^2 - 2\alpha\beta\gamma\delta$. i.e., $c_5 < 0$. Therefore by Routh Hurwitz Criteria**,** the system is unstable

When x(t) and y(t) both are (ii)-gH differentiable then the fuzzy system of equation has only co-existence equilibrium point which is E^{*4} (x^{4*}_1,x^{4*}_2,y^{4*}_1, y^{4*}_2). Where

$x_1^{4*} = \frac{\delta p + \beta q}{\beta\gamma - \alpha\delta}$, $x_2^{4*} = \frac{\beta q - \delta p}{\beta\gamma - \alpha\delta}$, $y_1^{4*} = \frac{\alpha q - \gamma p}{\beta\gamma + \alpha\delta}$, $y_2^{4*} = \frac{\alpha q - \gamma p}{\beta\gamma + \alpha\delta}$

The characteristic equation **is** $|V_4^* - \lambda I| = 0$ $i.e, d_1\lambda^4 + d_2\lambda^3 + d_3\lambda^2 + d\lambda + d_5 = 0$, where, $d_1 = 1$ $d_2 = 2\alpha + 2\delta > 0$, $d_3 = \alpha^2 + \delta^2 + 4\alpha\delta + 4\beta\gamma > 0$, $d_4 = 2\alpha^2 - \delta + 2\alpha\delta^2 + 2\beta\gamma(\alpha + \delta) > 0$, $d_5 = \alpha^2\delta^2 + 2\alpha\beta\gamma\delta + \alpha^2\gamma^2 > 0$.Since d_1, d_2, d_3, d_4 ,d_5 all are greater than 0. Therefore by Routh Hurwitz Criteria**,** the system is stable

Conclusion

In this paper we study a system of equation which represent glucose-insulin regulatory system in fuzzy environment which is considered to be an important research arena in epidemiological field. The approach of fuzzy differential equation were applied to elucidate the fuzzy solution of the given model. Here at first we see that the glucose-insulin regulatory system with fuzzy parameters which are not stable in nature. So we introduce the concept of (i)-gH and (ii)-gH differentiable then after some mathematical formulation the system becomes stable. For the scarcity of datathe initial conditions of the biological model is quite difficult. So to handle this situation we employed the imprecise parameters in the models which are more realistic and helpful. To validate our analytical findings we perform the numerical simulation of the system.

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Role of Non-Verbal Communication in Corporate Life

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Abstract

The whole of corporate life is bound within the periphery of good communication. The better you are at your communication; the more is the chance for your personal as well as organisational success and this is the reason why organisations look forward to such candidates who have good communication skills apart from the technical skills required for the job. There are two types of communication that give one success in corporate life: Verbal communication and Non-verbal communication.

In any process of corporate communication, non-verbal communication plays a major role in turning the tables. Throughout the corporate life, one communicates more with non-verbal modes of communication rather than verbal modes of communication. Even non-verbal communication helps one to establish a good relation and a strong bond with his/her colleagues, subordinates as well as seniors. A person who can speak more with his/her body does not require to spend energy and time by speaking. Definitely, verbal mode of communication is required but it proves to be less impactful when it is compared to non-verbal modes of communication.

Non-verbal modes of communication not only includes body postures and gestures but it also includes the amount of pace and pitch with which we talk, our facial expressions, our eye contact while we are talking, the way we touch, our voice while speaking, the space that one maintains while speaking with others, paying attention to inconsistencies. Now, the way in which non-verbal communication helps corporate personnel can be summarised from real life situations like business meetings which mainly includes client meetings, while declaring any important announcement to the members of the organisation. It also plays a very important role when a person presents himself/herself in front of delegates or seniors or any other authorities of concern, especially during interviews, seminars, conferences and presentations. Apart from any business-related meets, this type of communication is used in other spheres of corporate life which eminently shows up in our relations with others in the organisation. This does not ever mean that a process of communication can only be carried out through the use of non-verbal modes but as previously stated it plays a significant role.

Well, a major cause of concern is that a proper means of non-verbal communication should be followed so that a process of communication should terminate in an appropriate manner. As is evident from the above given facts, the two types of communication namely, verbal communication and non-verbal communication are equally important but, in corporate sector non-verbal communication stands out to play the game which is why many orators or presenters do not get applauded for their presentations, even if they put very interesting facts together.

After all, in the corporate sector, the one who can impress his/her audience receives the maximum attention. If facts are taken into account then it is seen that a person who can speak a lot using non-verbal modes than verbal modes of communication, that person tends to be appreciated and respected more than others and he/she stands out from the crowd.

To summarize, nonverbal communication can be categorized into eight types: space, time, physical characteristics, body movements, touch, paralanguage, artifacts, and environment.

Space in a nonverbal communication means the distance between an object and a person. Space is something we all require according to our needs. In the corporate world, space of another person too is to be respected. In real world, when someone comes from a metropolitan city for he/she standing too close to another person is a normal experience, but on the other hand for people coming from small towns and villages where the population

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density is not high it might be the opposite. In the corporate world, be it an office or a business meeting, one needs to make sure to keep a proper distance when delivering a speech, working silently or interacting to one another as everyone wants some air around them in the office.

Time is a very keen and subtle element to non-verbally communicate with your peers. The importance of time shows a person's punctuality and responsibility in the corporate life as well as personal life.

Physical Characteristics such as one's skin color, height, hair color, eye color are not within anyone's control but people try to change and alter these physical characteristics all over the world by dyeing their hair, wearing lenses, hells and cosmetic surgeries. It's advisable that in the corporate life, one should be in his/her original appearance and not wear too fancy clothes or color their hair in a non-presentable manner because in corporate life too sometimes the first impression is the last impression.

Body movements and the study of it is also called 'kinesics', and it is one the pillars of understanding non-verbal communication. Body movements such as the posture of your body when you stand, nodding your head and being agreeable to your colleagues, raising your hands up to interrupt or ask a question in between a presentation, taking your palm out and asking someone to stop without uttering a word are all a part of body movements.

Touch is also a form of non-verbal communication. Gentle forms of touch like a handshake is a form of greeting and building trust with your clients and colleagues during a client meeting or before delivering an important presentation.

Paralanguage is another form of non-verbal communication which actually enhances and gives life to verbal communication. Paralanguage can be considered as the tone of one's voice while speaking, the intensity of your words, pausing between two sentences, the volume of your speech, and even silence. Paralanguage thus, accentuates the fact that too is not what one speaks, but the way one speaks that makes the most difference.

Artifacts, is another form of non-verbal communication where one's tattoos, rings, piercings, cloth logo's non verbally communicate with the other peers. In such cases, one must keep in mind that these artifacts may indirectly show one's status, thinking, gender role and personality as an individual.

Environment is the physical and psychological context of one's work. In corporate life, the environment of one's workplace is highly important for the employees, a good environment with proper chairs, alignment, neat and tidiness, food availability all cater to a positive mindset at work.

Non-verbal communication is the ornament of any sorts of communication. A good orator or presenter will always be admired for his/her communication skills which require a blend of verbal as well as non-verbal modes of communication. If we dive deep, we see that there is no one role that is played by non-verbal modes of communication in corporate sectors or corporate life. It plays many roles out of which some have already been stated above. The non-verbal modes of communication which have been stated above reflects the type of character, personality and mentality one has. It also shows your level of confidence. In short, they describe the type of person one is. Not only has the type of person but it also described the type of culture from which you come.

Non-verbal communication also helps the opposite person who has never seen you in person but has listened to you, to create an image of yours in his/her mind and this turns out to be very important especially, if the opposite person turns out to be a client of the organisation. It turns out that it is important to express yourself in corporate life but more important fact is how one expresses oneself.

Keywords: non verbal; corporate; gestures; presentation

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Role of Culture in Cross Cultural Communication

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Abstract

Culture can be defined as a system of values and beliefs which is shared within a community, culture improves the quality of life and also adds to the overall well-being of an individual and the clique. It is deeply entrenched in the society, so firmly established that it creates a sense of security, belonging and identity. Culture also means to forge an individual identity, it heartens celebration and contemplation. Characteristics, social habits, behaviours, interactions, values and knowledge of a particular group of people is culture.

There are many different cultures across the globe.

Western culture: Primarily western culture is the culture of European countries together with American countries. The rise of Christianity and the Classical Period of Greco-Roman era has influenced western culture to a great extent. Presently the ascendancy of western culture can be seen worldwide. Western culture is characterized by a host of philosophic, artistic, legal themes, literary and traditions.

Eastern culture: Eastern culture predominantly refers to the social customs of East Asian countries like Japan, Vietnam, China and the Indian subcontinent. Eastern traditions, literature, philosophy and religions are often found throughout the world, and the spread of Yoga and Ayurveda plays a very crucial role in establishing the Eastern culture.

Latin culture: Spain and Portugal are the European countries which are considered to be the chief influencers of Latin culture. Latin American culture is mainly influenced by Western culture, but also has an unquestionable amount of native American Asian and African tinge in their culture.

Middle Eastern culture: Language and religion has played a pivotal role in Middle Eastern culture. Middle East is the birthplace of Judaism, Christianity and Islam. Each religion shares many rules and beliefs. Here, religion plays a vital role in national as well as international politics.

African culture: According to many theories, human evolution is about the origin of human beings. Human life originated on this continent and then migrated to different parts of the world. Africa is the home of innumerable tribes, and the African culture is mainly influenced by the social and ethnic groups throughout the continent, with many different religions and a variety of ethnic and linguistic groups. Still, you can find a multitude of different cultures coexisting in the region.

Cross cultural communication is the communication between people who have differences in any one of the following: styles of working, age, nationality, ethnicity, race, gender, sexual orientation, etc. Cross cultural communication promotes the attempts that are made to exchange, negotiate and mediate cultural differences by means of language, gestures and body language. It is thus the way by which people of different cultures and backgrounds communicate with one another whenever they come across each other.

For people living in India, children are introduced to cross culture communication at a very tender age when they start going to school and interact with other fellow classmates, hailing from different religions,

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backgrounds and mother tongue. With the Constitution of India recognizing 22 languages, cross-culture communication is a mandatory life skill Indians develop with time. Culture plays a vital role here as well, although united in diversity everyone holds a separate superstition and point of view towards different things.

Culture can start from the language one is most proficient in to the eating habits. A school, college or office holds a number of people under one roof. Although a common medium of language often bridges the communication gap, yet it is highly likely that the colleague or classmate on the next table has exactly opposite eating habits from the other. One can be a vegetarian and the other a non-vegetarian although they belong from the same roots. Culture, too is the way one speaks and behaves around other people, body gestures and communicates in a verbal or nonverbal manner.

Cross cultural communication is the communication between people from different cultural backgrounds. However, intercultural communication may provide some cons as well. People from different cultures bring different dialects, different languages and different rituals. Hence, if people fail to understand and communicate with each other or have some misunderstanding within themselves, then people tend to make impulsive and implicit decisions and assume that the other person does not know how to behave properly. People from different cultures might experience feelings of uncertainty and anxiety about how to integrate into their host society. This can result in cross cultural conflicts, incompatibility and social alienation.

Cross cultural communication has five fundamentals which should be kept in mind to effectively communicate with a person of a different culture and instill deeper understanding amongst peers.

Awareness, preparation, language, humour, openness are few key elements for stronger and unchallenging cross-cultural communication.

Awareness is the first key element that needs to be remembered to avoid confusion while coming across someone new, be it in a family reception or a high profile business meeting. Truly, being aware of whom you are going to meet and throwing some light on their cultural patterns can save one from an awkward situation and lead to better interaction simultaneously.

Rightly quoted by Alexander Graham Bell - 'Before anything else, preparation is the key to successes is effective in cross-cultural communication as well. Preparing oneself by looking up details and reading about the background, ethnicity, rituals and etiquette of the second person can show them the respect one has for the other and might bring out a good first impression be it a romantic dinner or an office project presentation. Some preparation is always better than no preparation at all.

Language barriers are often bridged by finding an intermediate language to communicate with. Finding a language that both are comfortable in helps a lot in communication and with technology advancing each day at a steady pace, applications and internet technology can also be an effective translator to communicate one's thoughts into another effortlessly. Body language too can play a vital role in channeling one's thoughts.

Humor is a tool which should be dealt with utmost care whenever interacting with someone who is from a different country or cultural background. In many cultures, humor is not taken into good consideration whereas in few cultures it is seen as a friendly welcoming gesture such as in British culture, sarcasm- a form of friendly humor is a way of communication. So, being cautious whenever meeting someone new with humor is always a preferred option. Misinterpretation of humor can cause many difficulties.

Openness is the last but not the least important element in cross-cultural communication. While meeting a stranger from a different state, country or other corner of the world nervousness can be a common symptom but being open with your peer is the key to a smoother conversation. Make oneself and other people comfortable and be open to connect because communication means connection. Find a common discussion to talk about and ask for feedback if they too are comfortable or not.

Hence, culture plays the pivotal role in cross-cultural communication be it simple interaction of people from two sides of a country or a continent when coming under the same roof for purposes related to friendly occasions, university classrooms or office conference rooms. Culture is similar to a vast ocean where the deeper

we dive into, the further we end up discovering it. Making an effort at understanding and respecting other cultures and finding a common communication medium through care is what leads to effective and stronger bonds between people on two sides of an ocean.

Keywords: culture; clique; gestures; ethnicity

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Indianisation of English

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Abstract

For a country which is culturally and linguistically disparate in her native tongue, vernacularizing English from the British dialect was a much-anticipated notion. The term Indian English dates from 1696 with subsequent idiomatic forms derived from Indian literary languages and vernaculars to be characteristically absorbed into the language.

As India is temperamental by the heterogeneity of people with language, cultures and traditions, so is the Indian English with its various dialects, established and sociolinguistic ally institutionalised under the light of regional ambiguity. The five major varieties divided phonologically are Assamese English, Bengali English, West Indian English, Cultivated Indian English, Southern Indian English and General Indian English. These dialects are often macaronic with a rich input of the suburban language in relation. The main areas of disparities counted upon as Vowels, Consonants, Spelling pronunciation and Supra-segmental features being listed phonologically with additional divergence in Numbering System, Vocabularies, spellings and national differences.

With the Indian heritage as a British colonial country, its usage of English and availability could have been expected to be disseminate but owing to inadequate education to large parts of India, it is confined among the elites. A comprehensive grammar of Indian English is yet to be culminated even though the phonology, lexicon and syntax have been widely researched and scrutinised.

Keywords: Dialects; vernaculars; phonology; Linguistics

Introduction and Objectives

English remained the official language even after independence from the United Kingdom in 1947, but less than 0.1% of the Indian population speak English as their first language. With regional languages making its way to the Supreme Court, the Indian English is gradually being modified and popularized at the same time. Idiomatic forms derived from Indian literacy languages and vernaculars have been so absorbed into the dialect that homogeneity in phonetics, vocabulary and phraseology is almost identical.

Terms like Hinglish, Manglish, Tenglish, Kanglish, etc. are portmanteau of English with regional languages like Hindi, Malayalam, Kannada and Telegu respectively giving rise to a broad selection of macaronic hybrids. A detailed outlook into the regional dialects under the influence of English would be the objective of this paper.

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Methods

The three main assessment technologies used to divulge and evaluate the divergence into the various macaronic hybrids of the Indian English would be:

- Phonology; further surveyed via Vowels, Consonants, Spelling pronunciation and Supra-segmental features
- Numbering System
- Vocabulary

Other notable techniques would be to wallow into the spelling and national differences and dictionaries. The main areas of disparities counted upon as Vowels, Consonants, Spelling pronunciation and Supra-segmental features being listed phonologically with additional divergence in Numbering System, Vocabularies, spellings and national differences.

Discussion and results

Indian English is often argue as to be labelled as an established variety with an incipient or actual standard, but the notion is counteracted by others due to the fact that the kind of English used in India are too varied, both socially and geographically, and often too deviant or too limited, to be lumped together as one variety.

Indian English is a distinct dialect of English, spoken by a humongous population not only inside the country but abroad as well. While English is a stress-timed language, i.e., both syllable and word are stressed in a particular sentence, Indian native languages are syllable-timed languages where the speaker usually speaks with a syllabic rhythm. So, the Indian English often differs in pitch and stress accents that from the standardized English accent.

Most Indian native languages have a nearly phonetic spelling thereby providing room for the tendency to speak Indian English almost phonetically and differing from the vagaries of English spelling. The phenomenon is known as spelling pronunciation and is also responsible for pronouncing silent letters. While Indian English has fewer peculiarities in its vowel sounds than the consonants, the vowel phoneme have system have distinct similarities with that of British English. The spellings are an amalgamation of British and American English. The trap–bath split of Received Pronunciation is also diversely present in Indian pronunciations.

Digit grouping is preferred in the Indian numbering system. Numbers less than 100,000 are expressed the same as standard English but numbers beyond that and also including it, are expressed in subsets. For example, 1,000,000 is written as 10,00,000 and expressed as 10 lakhs instead of the generalised 1 million. The vocabulary includes many political, sociological and administrative terms with the incorporation of some Anglo-Indian words alongside slangs.

Among the Indian English dictionaries, Yule and Brunell's Hobson-Jobson's is the most famous which was later edited and expanded by William Crooke covering a wide collection of administratively useful words from local languages. Even though words in Indian English seem to deviate from conventional usage, they are often logically conceived as an expression of a concept. Specific connotations and word formations are often idiosyncratic with a rich intake of newly formed words.

Though English is the most spoken language in India (including it as second and third language) according to 2011 census, approximately 129 million Indians spoke English which is only 10.6% of the population. This was ideally quoted by Joseph Manu, "English is the de facto national language of India. It is a bitter truth.". It might be blamed upon the insubstantial literacy rate suffered by an exhaustive Indian population below the poverty line.

Conclusion

Indianisation of English or Indian English as a dialect is still scrutinized under the light of originality and regional diversity. But the formal establishment and the devout recognition is yet to be earned as it is often too interdependent on standard English and its phonology. The regional differences and dialects in Indian English is currently surpassing the operational presence of the British English due to its popularity in India and among the Indian diaspora elsewhere in the world.

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Enhancement of Communication Using Virtual Reality

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Abstract
Communication is the only thing that properly separates us from other animals and organisms. It is the back-bone which helps in innovations and transferring ideas. Although there are language barriers but still the nonverbal communication cues remain the same. Nonverbal communication plays a major role in effective communication, apparently, it's said that up to 55% percent of the effective communication can be set up by nonverbal mode of communication only. When it comes to deciding the meaning of a sentence people tend to take nonverbal cues or the body language of a person and his facial expressions into consideration as this mode of communication helps in interpreting a person's true intentions in a sentence. Visualization is also an important part of an effective communication as it can help to share the experience and knowledge by different images, pictorial representation etc. for better understanding.
In the present scenario we are using different platforms to conduct proper video conferences for communication. Although they are good enough, somehow, they fail to provide the key experiences and the needed impact to be achieved for a work to be done, which can only be done by non-verbal communication to bring the impact in the discussions among individuals.Virtualization is also an important part of an impactful communication when it comes to showcasing or demonstrating an idea to the person concerned.
In this condition to boost the productivityand efficiency of communication as a whole we can come up with ideas that include some innovative ways of using the recent technology of virtual reality. In this paper we have discussed a few of those ways of using the VR technology for the benefit and increased efficiency of communication by using a few other methods like simulations and sensors alongside the use of VR to make the viewing experience much better than the present 2D screens.
Keywords: Communication; Interpretation; Virtual Reality; Non-Verbal Communication; Visualization;Technology.

Introduction and Objectives:
Communication may be defined as the imparting or exchanging of information by speaking, writing, or using some other medium. It is the successful conveying or sharing of ideas and feeling.
Communication can be broadly classified into the following types:

a. Verbal communication – face to face, over telephone, or other medium
b. Non-verbal communication – using body language, gestures, etc
c. Written communication – emails, letters, etc
d. Visualization – photos, diagrams, etc.

Virtual Reality (VR) is the use of computer technology to create a simulated environment. Unlike traditional user interfaces, VR places the user inside an experience. Instead of viewing a screen in front of them, users are immersed and able to interact with 3D worlds [1].
The virtues of VR that make it more superior than present systems are:

i. 360 view and surroundings
ii. 3D stereo vision
iii. User Dynamic Control

Now our objectives to attain are:

1. To improvise the present system of communication which is presently done through 2D video chats to 3D open world interactions.
2. Using VR to boost non- verbal communication.
3. Using 3D models and simulations for better understanding and interaction.

Methods:
The things that we are going to use to enhance the VR experience for an effective communication are as follows: -

- Use of VR headsets [2]– helps in the 3D view instead of stock 2 D view,
- Use of 360º cameras- takes images of the surroundings of the speaker's environment and simulates the same environment in Virtual Reality [3].
- Use of gyroscopic sensors to monitor body movements of the speaker and to portray his overall presence [4].
- Use of simulator for better visualization experience in 3D [5].
- Presence of kinect sensors to portray the hand movements and gestures (used in VR game technology [6].

Discussion and results:
As we discussed earlier that the present scenario of communication using video conferencing lacks the valuable presence of non-verbal communication elements. By using the concept of VR, we want to counteract the present flaws in digital communication medium by bringing in those non-verbal communication skills to provide a better experience and effectiveness.
Presently VR are being used widely for gaming and entertainment purposes. We bring this concept of 3D virtualization into the digital communication platform, along with the use of 360º cameras, Kinetics sensor and gyroscope to provide the best possible way to show the gestures as well as facial expressions to the attendees of the meetings.
To classify broadly- we mainly assume a couple of different scenarios, (a) for students, (b) for working professionals:

- For students-

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- Face to Face interaction with teachers
- In the field of civil engineering it is quite difficult to express a structure of building and bridge using 3D and 2D plans, thus VR can able to communicate between an engineer and the structure to a level of proper understanding more conceptual with physical sense.
- VR simulation can bring a change in current educational system ,situation cannot provides us with proper conditions and environments now days, thus using VR in practical labs and training purposes brings a lump of changes , concept of chemistry ,physics and electronics can easily be visualised and understood by this concept.
- Not only for engineers but also for doctors in surgery where practical is quite rich and expensive unable to afford by many medical college, thus VR can bring a revolution in this field by using simulations.

- For Working Professionals-

  - Face to face interaction with clients
  - Conference meeting with whole team with a physical presence concept to boost efficiency of the team.
  - Visualization help in depicting important points to the team and structural representation.

Now coming on to the part of Results:

i. Using this method, we can replicate the working environment of any professional to boost their productivity while working and communicating which is seen to have dropped considerably in the present scenario where only digital platforms are the only way to continue such type of works.
ii. Visualization of anything becomes a lot easier and understandable using the VR technology.
iii. Physical presence plays an important role in level of understanding and concept-building, body language and gestures, facial moves depicts our confidence level and dominant over the topics and many more.
iv. Humans nature always depends upon their activity which they always follows from beginning, learning can be made easier with classroom feeling for children using VR.

Conclusion:

This paper as a whole does not only emphasize on proper communication even through the online medium. It talks about the importance of nonverbal communication in a proper communication and also about visualization as an important part of an effective communication as well as understanding. This paper also brings out a different possible scenario where the VR can be used to help the mases struggling with problem while working from home due to the lack of a working environment. The paper also talks about an innovative way of making the Virtual Reality better by not only emphasising on the use of simulations of the environment but by replacing it using the images of the actual environment around the speaker.

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English as theDominant Language inthe Field of Global Communication in Upcoming Years

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Abstract

"Communication is the key to success."

This paper highlights the importance of the English language for communication, in the career of the students of engineering both in global and local contexts. English is essentially the mother tongue of European natives, specifically of those who resided in England. Due to extensive colonization in the early 17-18th century, English have spread far and wide to almost all corners of the world. Call it a aftermath of colonization or the bare necessity of excelling in career, English thus has become an inevitable part of our everyday lives. Also, interestingly this is the one language that still now unites the professional font globally.

With the shifting economy and world politics, all the emerging superpowers are trying to develop a self-sustainable mode of production in their agriculture, defense and technology. We can deduce their goal quite easily which is the reduction of outsourcing with the reduced outsourcing the need for global interaction will slowly disappear thus dissolving the need for a lingua franca. With these possibilities in mind, the paper will explore different domains of English as an efficient interactive medium.

English, is the sole language of communication in the international arena presently, there is no other alternative that the engineers may opt. This is the current lingua-franca in international business, technology and aviation. The number of people speaking English reached 1.8 billion in the world and is still rising, next to Mandarin/Chinese; the most spoken language in the world. Besides analytical and problem solving skills, subject specific knowledge, research and improved decision making ability, management skills, understanding of other culture, confidence and competence to work in international environment are considered the most essential qualities for engineers. However, at the bottom of these lies an effective communication skill. After securing the job they are required to work in groups since their task seldom involve solution by an individual. English is used as the operational language on large extent. With advent of LPG (Liberalization, Privatization and Globalization), good communication expertise are the keys to unlock the doors of success.

Now the question arises, what is the future of English language in the communication sector? With the rapid rise in Asian power, slowly Mandarin and Korean (Hangul) is replacing English in the main corporate sectors of China and Korea. As they continue to claim their dominance, English is under potential threat. This paper summarizes the various aspects of English as the most lucid language for communication and how and why it

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can potentially survive in the upsurge of other alternative vernaculars, establishing the fact that no other language holds the ability to establish itself as the link language across the world.

Keywords*:* Communicative English, alternative language, globalization, world politics, self-sustainable language, corporate English, engineering communication.

Introduction

The role of English language in career advancement is undeniable in this era of LPG (Liberalisation, *privatisation and globalisation) Communication skills is the key to success.* We exist because we communicate. The ever growing need for good communication skills in English has created a huge demand for teaching and learning quality English around the world. The importance of the English language for communication, in the career of the students of engineering both in global and local contexts.As English has really became the global language as most of the native and non-native speakers of English are using English as their mode of communication in international travel, trade, science, medicine and on the Internet as well as in programming languages. Though English language proficiency is not the only criterion for career development, its importance in the corporate world is widely recognized. It is so obvious in countries like India how lack of English language skills affects the career prospects of many young graduates. Though low-paying jobs may not require advanced level of English proficiency, many organizations expect the graduates to possess intermediate level of language proficiency to carry out their responsibilities.
Today many research reports emphasize the relationship betweenmanyresearches studies conducted in various Asian countries have identified that English helps improve job performance and boosts the prospects of promotion. OjanperäMiina (2014) points out that poor English language skills slows down flow of effective communication, causes misinterpretation, create frustration and create barriers among the employees. In the corporate world, English is the most regularly used language and the knowledge of English has become one of the most important employability skills. Proper English does not mean only the ability to make grammatically correct sentences but also the other related skills for effective communication like presentation skills, convincing and negotiation skills and interpersonal skills using English. Due to the global market, the requirements of English language is likely to increase every year and employees without adequate English language skills may find it very challenging to grow professionally. Today's Corporate is troubled by untrained manpower and attrition for which reason again is a lack of communication skills. In the current scenario whether an individual is an Engineer, a graduate or undergraduate everybody needs to communicate in English somewhere. But they fall short as they are lacking in English language. Such is feedback from corporate and alarming reports of unemployable Indian graduates come as an eye opener for both the students and the Business Schools. It is a vehicle that gives you more advantage to work with people from different states & nations. It is a "lingua franca" – a link language. No other language has the same clout of becoming a link language. It is English language which makes a man very dominant to sustain him in the corporate world. Now a day in India its significance is amplified. Being vast country with various languages in different parts of the country it is difficult to communicate with people of other region with our common language.
English plays a dominant role in the media. It has been used as medium for inter-state communications and broadcasting both before and since India's independence.

Basic reason for engineers and corporate employees to learn English

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English is a tool that notably affect engineering students and corporate employees in academic life. While most of the assumptions in colleges and universities are taught in English, it requires to have good English communication proficiency. In academic life, students have to deal with the countless lectures, tutorials, labs, project reports and papers in English. Generally professors in various universities are also conducting lectures in English. English opens new career opportunities. English gives us wider access to knowledge. Most of the scientific papers and journals in the world are either written or translated to English. Due to its access and usages across the world, academicians conducts their research and lectures in English. The most apt source of information i.e. Internet provides generally the information in English. During the job seeking process in interviews, GD's, it is it is mandatory to achieve mastery in English proficiency. After securing the job they are necessary to work in groups since their task seldom be solved by an individual. A Large number of Indian engineers have to now travel to many continents and work away from their domicile country. Also, among the scientists, technologists and business experts from culturally and linguistically different communities, English has become the prime language for communication. .Fluent and proficient English speaking is considered important for many job profiles as most of the corporate communication happens in English in India. This ability to express ideas without ambiguity and the ability to comprehend are necessary for successful interview interaction. 97.4% of the participants have agreed that poor English communication skills harm the possibility of getting recruited during job interviews. Getting stuck due to lack of educated vocabulary could embarrass the candidate who is looking for a better job opportunity during the job interview. Using wrong tenses may confuse the interviewer and affect the communication process. A professional may belong to any field but the ability to use the right word at the right the survey have accepted that English skills affect their career in many aspects. Around half of all employers offer a better starting salary to candidates with good English language skills, which can also lead to faster headway through job grades and higher salary increases. So, an engineer or a corporate employee requires co-operating and communicating with different people from different part of the world. English is used as the operational language on large extent. In order to harmonize with the colleagues, engineers have to speak fluent English. So, English communication competence plays an important role in the academic life and career of engineering students .The skills of 'speaking' is considered the most important skill and around 44% of the respondents have accepted that speaking in English is their weakness. This result proves that oral communication remains the top skill at workplace. Oral communication is the ability to interact with others, to give and exchange information & ideas i.e. meetings, presentations, conversations. Oral communication skills need to be effective in order to solve problems, negotiate solutions or making decisions.

Acceptance of English as a global language

People often talk about English as a global language or lingua franca. With more than 350 million people around the world speaking English as a first language and more than 430 million speaking it as a second language, there are English speakers in most countries around the world. Why is English so popular, though? And why has it become a global language?

In the twenty-first century, the entire world has become narrow, accessible, sharable and familiar for all the people living on this earth as English is used as a common language even though there are some variations in habits, cultures, traditions, regions and idiosyncratic aspects. As English has got the common qualities, it has been accepted as the global language among the speakers of thousands of different languages. Since science and technology is progressing, there are tremendous changes taking place in the lives of the human beings

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everywhere in the world. As a result, the whole world has become a global village and the people have to maintain good relationship with the others. Moreover, business, trade and commerce have become international and most of the business organizations have their offices in most of the countries. In order to maintain international relationship in science, technology, business, education, travel, tourism and so on, English serves the purpose as a common language and a global language. It is the language mostly used not only by the scientists, business organizations and the internet but also in higher education, and tourism sectors. As English plays a dominant role in almost all the fields in the present globalized world, there is a need to discuss its role as a global language. The present paper highlights the importance of English as a global language as most of the world's communications is done in English. It also reveals how English is being widely used in scientific research, business and education. This paper also throws a light on how travel and tourism and entertainment fields are benefitted by adopting English as their principal language of communication. This paper also highlights the importance of English in education and employment. Finally, some useful suggestions are also given in order to extend the use of English into several other fields. Introduction With the ever-growing levels of interconnectivity and globalization around the world, the significance of immediate and appropriate modes of communication has been increasing very rapidly in this modern world. It is an undeniable fact that there is a need for a common language to communicate with the present growing commerce and trade between companies from all over the world. With the development of information as well as globalization, it is evident that most people all over the world are communicating with the people of other regions in only one internationally recognized language, that is, English. English is the language that is almost used between an agent and an international company. English, being the first world language, is said to be the first global lingua franca and it is the most widely used language in the world in international trade, diplomacy, mass entertainment, international telecommunications and scientific publications as well as publishing newspapers and other books.

Advantages of English

In an increasingly diverse, global economy, having a language in common greatly facilitates cross-cultural communication between people from different regions and nations. The English language is one of the most widely spoken languages in the world, second only to Mandarin. English being a widely-spoken language throughout the world is only one of the many advantages of learning the language.English is the primary language of business throughout the world. Most international business transactions, including emails, memos, reports and contracts, are written in English. Frequently translating purchase orders, forms, offers and correspondence is time consuming and potentially fraught with errors. The ability to fluently speak English in addition to your native language can be beneficial if you're seeking job opportunities with international companies. Many employers prefer or require English speaking and writing proficiency. Job interviews for international business positions are often conducted in English. The ability to speak this more universal business language can place you a step ahead of the competition. Major Hollywood movies and many television shows popular around the word have dialogue in English. The plot is easier to follow if the person watching the movie speaks English. Subtitles in other languages can sometimes cause the meanings of words to be lost in the translation, and they can be a distraction or even block the action taking place on the screen. Translating print materials like books or magazines is also time consuming. The English language is predominantly spoken throughout the world, so international travelers may find that speaking English can make their travels a little easier. Most hotel and restaurant employees, as well as store merchants, probably speak English to some degree. Being able to converse with people living in the area where you are vacationing adds to the richness of the cultural experience. Students from other countries who attend school in the United States will benefit greatly if

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they know basic English. This knowledge will help them communicate with their host families as well as students and teachers at their school. These international students will also have an easier time with their studies, including reading lengthy texts and researching topics for classes. A large amount of research in scholarly journals is written in English. Knowing English can helpful for scholars who wish to communicate their ideas and research findings to peers in their field. Most software programs are written in English. Those seeking to expand their computer knowledge can find the ability to read and understand the English language invaluable. Members of research teams need a shared language to exchange ideas. Because English is the language of the internet, people has to know and has to able to understand English if he/she want to get accurate and up-to-date information from the internet. By internet too, people can communicate with foreign people by sending an e-mail, but of course people must use English to make foreign people understand too. And over 80% of the information stored in the world's computers is in English, more than half the world's scientific journals are in English, it's the main language on the internet, and so on. English proficiency enables engineers and technicians to quickly adapt to new software tools of their company or the industry.

Need and usage of communication

Communications is fundamental to the existence and survival of humans as well as to an organization. It is a process of creating and sharing ideas, information, views, facts, feelings, etc. among the people to reach a common understanding. Communication is the key to the Directing function of management. No matter however qualified and proficient they might be in their academic career, they need to possess high level of proficiency in communication. Lack of sufficient communication skills serves only to undermine the image of the engineer. As a professional, an engineer is required to communicate with the clients of diverse fields, academic level and nationality. If they fail to deliver their ideas appropriately and effectively, it may have a negative impact on their image as engineers. An engineer has multi–faceted personality and multiple responsibilities on his/her shoulder, he/she is required to possess different kinds of abilities. For handling all these responsibilities, he/she needs to be perfect in communication. Besides analytical and problem solving skills, subject specific knowledge, research and improved decision making ability, management skills, understanding of other culture, confidence and competence to work in international environment are considered the most essential qualities for engineers.

There are many types of Communication:

Formal Communication- Formal communications are the one which flows through the official channels designed in the organizational chart. It may take place between a superior and a subordinate, a subordinate and a superior or among the same cadre employees or managers. These communications can be oral or in writing and are generally recorded and filed in the office. Formal communication may be further classified as Vertical communication and Horizontal communication.

Vertical Communication- Vertical Communication as the name suggests flows vertically upwards or downwards through formal channels. Upward communication refers to the flow of communication from a subordinate to a superior whereas downward communication flows from a superior to a subordinate. Application for grant of leave, submission of a progress report, request for loans etc. are some of the examples of upward communication. Sending notice to employees to attend a meeting, delegating work to the subordinates, informing them about the company policies, etc. are some examples of downward communication.

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Horizontal Communication- Horizontal or lateral communication takes place between one division and another. For example, a production manager may contact the finance manager to discuss the delivery of raw material or its purchase.

Virtual Communication- Virtual communication technology refers to any technology people use to communicate with each other when they can't be face to face. It favors the ability to see and hear one another in real time, simulating the experience of a physical visit. Such technology has been around for quite a few years, with the introduction of webcams in the 1990s. But what was once a poor-quality, non-secure, burdensome social experiment has developed into a productive technology that benefits families, friends and businesses alike in 2020 due to the Covid-19 pandemic situation.

Why most of the programming languages are made in English

The Computer doesn't understand any of the languages neither English nor Mandarin or other languages but it understands 0 & 1. Coding is for everybody. The purpose of these languages is to make it possible for you and I to communicate with our computers in a way that is similar to human language but can also be easily translated into machine code, the language your computer understands. It is humans who write programs, codes to speak to, control, or otherwise communicate with a machine (computer). "Code" is just a synonym for "computer language." Not all programming languages are in English, however the keywords used, for almost all languages, are in English. Comments, variables, user written classes and methods though are frequently in a programmer's own language. Over a third of all programming languages have been developed in countries where English is the primary language. Out of 8500+ programming languages recorded, around 2400 of them were developed in the United States, 600 in the United Kingdom, 160 in Canada, and 75 in Australia. In other words, over a third of all programming languages were developed in a country that primarily speaks English. Fourteen of the 25 largest tech companies in the world hail from the U.S., including seven of the top 10: Apple, Microsoft, Alphabet, Intel, IBM, Cisco Systems and Oracle. The Asia-Pacific region is well represented in the rest of the list with eight companies– three from China, two each from Taiwan and South Korea and one from India. Germany, Sweden and Finland round out the top 25 in tech. This does not take into account the usage share of each programming language, situations where a language was developed in a non-English-speaking country but used English to appeal to an international audience. Just see the case of Python from the Netherlands, Ruby from Japan, and Lua from Brazil , and situations where it was based on another programming language which used English. The official language of Netherland is Dutch but still they use English to communicate properly with other countries.

Dominance of English theory in the past years

By the end of 21st century English began to emerge as a global. It has a great acceptance at social, economic and political levels. The outlook behind the usage of English has been changing significantly. Countries such as Russia, France, USA, Germany, Spain have over the years attempted to reach new heights of power and glory. These superpowers have adopted English language and propagated it to foster Global trade and World politics. Though these countries have state languages of their own, yet they never practiced it Word wide due to the following reasons - Lack of popularity,Unwillingness of the citizens to improve and learn new languages, impotence of countries to continue their dominance. In our country middle class is also not keeping itself in isolation by neglecting the importance of English. No one can get mastery over communication skills in a day or two. It is an academic imbroglio for the students lacking in effective communicative skills. The world steadily heading towards economic globalization, it is essential to give importance to English, so that the common man can keep up with the world issues. Barriers of race, color and creed are no hindrance to

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continuing spread of the use of English. It is a language of the future. A positive attitude to English as a national language is essential for the integration of people into Indian society. There would appear to be virtually no disagreement in the commonly about the importance of English language. By using English one can become a citizen of the world almost naturally. The impact of English is not only continuing but increasing.

Future of English

English has been the dominant global language for a century, but is it the language of the future? If Mandarin Chinese is to challenge English globally, then it first has to conquer its own backyard, South East Asia.

Whenever China hosts the Asia-Pacific Economic Cooperation meeting in the capital city of Beijing, the meeting was not conducted in Chinese – or any Asian language. The official language of APEC is English and it was conducted in English.

In present, English has become an international language and the most spoken language in the world, with Chinese and French coming in a close second and third, which is use by dominant people in the world and use to make a bridge between people from other country who want to communicate each other's. Now shifting from European countries as mentioned before, new superpowers like Korea, China, Japan, etc are emerging from Asia. New treaties are coming up, growing awareness of preserving of own culture and language in you. The World is turning into global village with the interchange of cultures. Emergence of alternative career options like Interpreter, the need of learning different languages is reducing. Gone are the days when businesses and corporations were only limited to their country of origin. Today's world has shrunk to a global village—weaving together different nationalities, cultures and countries and globalization has been the biggest tool in taking business operations across continents. Investors in England are funding startups in Netherlands, who work with contractors in Japan and sell to customers in Portugal and Spain. This is just one example of the extent to which companies have gone global. And one of the key facilitator in this process is—you guessed it right, language. Languages such as English, Mandarin, and Russian have dominated the global landscape for as long as we can remember but these might not be the only important languages to see the light of the next century with the surfacing of other languages on the global front. The key is to understand which of the languages are the most important and useful ones, which will open pathways for securing the greatest return on investments and which ones will lead the way to the next 50 years. It is pre-mature to point out which languages will be the most useful ones but here is a list of 10 languages that will prove their mettle in the vast world of languages, enabling cross-border communications and trade. The number people speaking in English in 2020 is just a little bit greater than the number people speaking Mandarin.

Conclusion

This investigation was undertaken to understand the importance of English language skills required for performing responsibilities at the workplace by the employees working in various sectors. The results of the study have revealed that the employees are convinced that English language skills are required for getting a job and performing their responsibilities effectively. Irrespective of the technical skills an employee possesses, he/she needs to possess language skills in order to communicate to others effectively through emails, group discussions, presentations etc. In addition, the necessity of imparting in-house language training programs is emphasized by the employees preferably through online mode.

English language is transforming its multidimensional communicative structure day by day, and in the process has enhanced its utility quotient in India. English is available to us as a historical heritage in addition to our own language. We must make the best use of it to develop ourselves culturally and materially so that we can compete with the best in world of mind and matters. Many organizations have started training their employees in English from time to time. This has ameliorated the life styles of people who considered their future blocked forever it they failed to make it to teaching or some other tradition jobs. In fact, the knowledge of English plays you in all times.After analyzing various prospective throughout this paper concerned like World politics, Global harmony, Self-reliance and independence. We could all have formed a notion. But due to the Covid-19 pandemic of 2020, the statistics and calculations have altered drastically. The growth of most of the languages remained stagnant right now. All the countries have restored their former state of relationship, commanding respect and interdependent. So it is too early to give a verdict, the fate of English. At least 10 years from now we need to follow the rise and downfall of different languages before we can analyze is English is at all replaceable.

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Analysing Speech and Gesture

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Abstract
"Personality is an unbroken series of successful gestures." F. Scott Fitzgerald
Communication isn't simply bestowing data however it is more about how the data is being conveyed. Here comes the function of the nonverbal abilities. As indicated by an examination on students it was presumed that communication is just 7% verbal and the rest 93% is non-verbal. Communication isn't restricted to words however a mix of words, verbal conveyance and non-verbal communication.
Here speech and gesture recognition assume a significant job. During discussions, Interviews and parliamentary talks utilizing Computer vision one can break down the non-verbal communication of an individual precisely. Studies show specific gestures pass signals on pressure, level of certainty, regardless of whether an individual is lying and other conduct qualities.
Rochester Institute of Technology has made a novel method to change sign language into text, continuously. The application is expected for hard of hearing clients, who can possibly utilize the instrument to speak with any individual flawlessly. Utilizing Computer vision and AI models, communication via gestures (ASL), can be

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changed over into words that can be read on any gadget screen.
In this paper, we propose that through real time assessment of the words and body signals we can be able to identify the attributes of a person during an interview and even this can help us choose better political representatives. We will also be able to help deaf people communicate with any and every one with ease. We will be implementing this using different algorithms on artificial neural network.
Keywords: Speech; Gesture; Computer Vision; Sign language

Introduction & Objectives

The word communication has originated from the Latin word "communis" which implies something common. Communication is essentially the act of transferring or trading information, data, thoughts, sentiments and feelings from one individual to another.
Communication is essentially a cycle where the sender encodes the message and utilizing a medium send it to the receiver who deciphers the message and after processing the data sends back proper criticism utilizing a medium or channel.
Non-verbal communication is the transmission of messages or signals through outward appearances, tone and pitch of voice which can give pieces of information about an individual's enthusiastic state, personal introduction, motion showed through non-verbal communication which is fundamentally known as kinesics and the physical separation between the communicators which is known as proxemics. These non-verbal signs can give hints and extra data and importance over verbal communication.
If we analyse speech and gestures, we can accurately see how persuading an individual is based on the action words and descriptors the individual is utilizing alongside his hand gestures. Using Computer vision and Machine learning will give precise presumptions about the character and attributes of the individual.
In this paper we will be implementing speech and gesture recognition using the different artificial neural network algorithms.

Methods

Gesture recognition is a method for human-machine collaboration utilizing just body actions without the guide of voice. The idea of perceiving signals utilizing hands as well as other body parts depends on three layers: Detection, Tracking and Recognition. We utilize unique interfaces that can catch these developments, and later use computer vision technology & deep learning algorithms to comprehend the underlying pattern.

A gesture is explicitly characterized by any physical development, huge or little, that can be deciphered by a motion sensor anything from the pointing of a finger to a bouncing high kick, a gesture of the head, or even a squeeze or wave of the hand.
In Speech analysis the words serve as an input and the words are segregated under different groups like nouns, pronouns, adjectives, verbs, and other components of the grammar. The appropriate choices of the different elements of grammar can help us decipher the personality of the individual.
Working of Our Model: -

1. The image taken through a camera serves as the input to the primary sensing device. This device normally ascertains the depth of field and the development of the hand (or other body parts) through 3D space.
2. The mic serves as an input for the voice sensing device which then converts the speech to text. The text is in the form of a CSV file.
3. Deep Learning algorithms based on layered neural networks are then prepared to distinguish and connect important signals from a complete pre-assembled library of 'motions'.

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4. The CSV file acts as an input to the speech analysing Machine Learning algorithms.
5. Each signal or development is then coordinated progressively to a proposed activity explicit to the end-client's application.

Results & Discussion

The possible implications of several body gestures identified by our model:

- Clenched fist can demonstrate anger.
- A thumbs up and thumbs down implies approval and disapproval.
- Crossed arms imply defensive or self-protective nature. Standing with hands put on the hips can be a sign that an individual is prepared and in charge, or it can likewise be an indication of forcefulness.
- Rapidly tapping fingers or squirming can be an indication that an individual is exhausted, eager, or disappointed.
- Crossed legs can show that an individual is feeling shut off or needing protection.
- Pursed lips. Fixing the lips may be a marker of dislike, objection, or doubt.
- Lip gnawing can imply the individual is concerned or nervous.
- Covering the mouth can imply the person may be hiding grins or smiles.
- Gesture V using the fingers represents peace or victory or the number 2.
- Raising the little finger means the person is making a promise.
- The least demanding and most fundamental hand motion is mathematical. Any time a person states a number, he does the relating motion this makes number simpler to recollect for the audience, adds development and warmth to non-verbal communication, and fills in as a nonverbal anchor in the discussion.
- Palms facing the audience is a very God like pose usually meant to express a grand gesture.
- Hands drawn towards the heart or chest represents that the person is referring to himself/herself.
- The two palms joining may mean that the person is greeting in some culture also it can symbolically mean to show that two forces are joining.
- Palms down position represents power and dominance and commanding nature

Observations after analysing the speech: -

Due to the supremacy impact, words, non-verbal communication, and visuals in the discourse opening are largely basic to talking achievement.

- Was a snare utilized adequately to bring the crowd into the speech? Or then again did the speaker open with a dry "It's great to be here today."
- Did the speech open with a story? A joke? An alarming measurement? A disputable articulation? An incredible visual?
- Did the speech opening plainly set up the purpose of the presentation?
- Was the opening paramount?
- Was the introduction cantered? Did all contentions, stories, tales relate back to the essential goal?
- Were the metaphors symbolic?
- Were similitudes and imagery use to improve understanding?
- Was the speech sorted out coherently? Was it simple to follow?
- Did the speaker change easily starting with one aspect of the introduction then onto the next?

- Was the end succinct?
- Was the end vital?
- If fitting, was there a source of inspiration?

Conclusion

Communication is not just exchanging information yet in addition the manner by which the data is shared.93% relies upon non-verbal highlights and just 7% on words. The primary points of interest of speech and gesture analysis are that during interviews a more appropriate candidate can be selected by analysing his speech and body language. If we analyse the speech and gesture of politicians, we could identify when he is lying and making fake promises this could play a major role in selecting appropriate representatives in the parliament. The deaf and dumb individuals would be profit massively through this innovation as they would have the option to speak with any individual even if the person does not know sign language.

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Indianism as a Phenomenon and Behaviorism as Its Noumenon

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Abstract

Language being a universal phenomenon, has a diverse structure. It is featured for its social, arbitrary, vocal, creative, productive, symbolic and systematic attributes. In the process of acquiring a distinctive language, learning its phonological aspects plays vital role. Eventually, this phenomenon of learning a new language in an attempt to acquire it, gives rise to a new kind of phenomena which may be regarded as the outcome of convenience of a group of people.

In the light of this context, this paper deals with the phenomenon of Indianism, which is basically Indian English- a linguistic stigma. This paper revolves around an American linguist, Avram Noam Chomsky's Language Theory of Universal Grammar and Language Acquisition Devices (LADs). This paper will also discuss the concepts of role of First Language Acquisition asbarrier in learning English as second language in Indian context and Language Competence in Indian learners. In attempt to resolve this phenomenon of Indianism, during the research this paper found that to overcome the issue of Indianism behavior (B F Skinner, the American psychologists, known as the foremost pioneer of the theory of Behaviorism) of a learner highly matters. In fact, learner's concerns, interest towards the desired language and sincerity helps to overcome such issue and to deliver a quality of speech in desired language.

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Keywords: Indianism; Phenomenon; Language Acquisition; Chomsky's Universal Grammar; Behaviorism

Introduction & Objectives

The represented paper deals with the phenomenon of Indianism. Indianism refers to a word or phrase which may be a characteristic of Indian English or rather it's going to also ask the way a sentence has been structured as if it was absolutely translated from an Indian language to English. These are commonly employed words or phrases or expressions used in spoken English of Indians. Often, these could be misinterpreted or misunderstood by native English speakers, so it is important to avoid Indianism.

Our main objective is to overcome Indianism and to deliver a high quality of speech in desired language. During this context, this paper revolves around the Theory of Universal Grammar and Language Acquisition Devices (LADs) given by the American linguist, Avram Noam Chomsky, also known as the father of contemporary linguistics. In the 1960s, linguist Chomsky proposed a revolutionary idea: "We are all born with an innate knowledge of grammar that is the thought of all language acquisition. Linguistically, either an individual acquires language or he learns during his developing years. During the research, it was found that the first language acquisition acts as a barrier in second language acquisition.

In attempt to resolve the phenomenon of Indianism, we found a very common yet interesting factor that is 'behavior'. Our paper talks with the context of noumenon which means- 'itself'. Here behavior serves as a noumenon to the phenomenon of Indianism. Based on the theory of Behaviorism proposed by B.F. Skinner, it is the behavior of a learner that matters in learning a language.

Methods

B.F. Skinner believed that it is the behavior of a learner that matters in learning a replacement language. A learner shows keen interest, positive attitude and an overwhelming perception towards English language to learn at its apex. Along with these attributes, this section is additionally dedicatedto the aspect of phonology. It should be noted that India is a very complex multilingual country, with an oversized number of indigenous languages (including the so-called dialects and mother tongues).[3] The phonology of the regional varieties spoken within India, as an example, Marathi English, Rajasthani English, and Tamil English shows a great difference.

PHONOLOGY

Features associated with speech and pronunciation are easy to observe. As emphasised within the opening lines of Sahgal and Agnihotri: "Like other kinds of English, Indian English too has its own flavour. More than any other level, it is the phonological level which distinguishes it from other varieties of English"[7]. As a result, the phonology of Indian English and also the pronunciation of Indian English speakers have attracted the interest of inscribing this paper with the survey on phonology of Indian English.

Results & Discussion

Phonological studies of varied Indian English dominated in the 1970s and early 1980s.A great emphasis was given to the pronunciation of English and a good deal of time and labour within the English classroom in India was and still is dedicated to learning the "correct" pronunciation of "standard" English. Since English is taught as a second language in India, the issues of a standard for teaching has vexed and continues to vex classrooms."[4] As India is a very complex multilingual country, with an outsized number of indigenous languages including the so-called dialects and mother tongues, they have unique language-specific features. It is an undeniable fact that the local vernaculars influence the local English, as an example, the English spoken by a Tamil first language (L1) speaker, the English spoken by a Punjabi, and that by a Bihari L1 speaker are

expected to possess distinct linguistic properties [3][6].
As Chomsky believed that language is a basic instinct for humans, it is empirically proved that second language(L2) English is influenced by the speaker's L1, and therefore in India where the English speakers are of diverse L1 backgrounds, the phonological features of English spoken in one region differs from those of another.[1]Considering two different dialects, the absence of the fricative /ś/ as in 'sheet' and 'push'(that is a type of consonant made by the friction of breath in a narrow opening) in the speech of certain Bihari speakers of English and the absence of alveolar fricative /s/ as in 'something'(that is a type of consonant pronounced with the tip or blade of the tongue against the alveolar ridge just behind the teeth) in the speech of many Bengali speakers of English are due to the phonological systems of the Bihari and Bengali languages, respectively. Therefore, under L1 influence the respective Bihari dialects speakers replace the sound /ś/ with /s/ and many Bengali speakers replace the sounds /s/ with /ś/ in their speech of English [3].
In India, often in an attempt of learning English language, people end up with underestimating the prevailing vernacular language. In the journey of acquiring a new language, we should not forget to respect the mother tongue language or other vernacular languages. To learn any language, requires behaviour of respect and bright outlook towards it. As English is a global and demanding language and it is fairly essential in professional field too, it is significant to learn English and it is vital to learn it correctly in terms of syntax, grammar and pronunciation irrespective of mother tongue languages [4].

Conclusion

This paper discusses how the first language acquired by an individual behaves as a barrier to acquire the second language. People in India face Indianism due to the influence of local vernaculars with distinct dialects and mother tongues. The phonological features of English spoken in one region differs from those of another. It is important to maintain a behaviour of respect, interest, positive attitude and bright outlook towards the acquiring language along with qualitative aspects like grammar, pronunciations and syntax.

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Can Robots or Automatons be Effective Communicators?

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Abstract

Robots are humanoid automatons that can closely mimic human actions and functions. However, so far scientists have been unable to create a robot that would be a perfect replacement for a human being. Which implies that there are still several human actions that robots cannot mimic. Specific human actions that automatons cannot reproduce involve emotions and experience. Communication is one such area. While many commercial sectors have opted for robots to perform repetitive communications such as announcements, human involvement is still preferred for communication, transfer of information etc. In this paper we are questioning, whether it is possible for an automaton or a robot to master the requirements of being a through human communicator. In doing so we will be examining what makes a good communicator, what specialties or capabilities in humans make their communication with other humans more effective in certain ways. The implications of this would be to illuminate the new paths into research around the communication skills of automatons. The research and development in robotic enterprises is reaching an all-time high. Newer innovations are being made and documented every year.To add to the communication skills of automatons would make them more pliable and suitable in human hands and more suited to daily human use.

Keywords: Robot; Automaton; Communicator; Communication-Innovation

Introduction

Communication is a process Exchanging words, sounds, signs or behaviours to express our ideas, thoughts feelings etc.When we communicate, we must give people ample opportunity to speak their minds. Listening isn't just about hearing words; it's also about listening to the tone, speed, and volume of the voice Accuracy in communication helps to avoid misunderstanding and conflict. Giving feedback is one of the important communication skills. Talking in a clear and engaging manner helps. Confidence is quickly recognised by an audience on a sub-conscious level. Knowing the subject matter well always helps this will help to influence others, too.

Objectives

1. Human-Robot Communication (HRC) is of primary importance for the development of robots that operate outside production lines and cooperate with humans.
2. Byunderstanding and perceiving social cues, robots can enable collaborative scenarios with humans.
3. The goal is to build an intuitive, and easy communication with the robot through speech, gestures, and facial expressions.
4. Human-robot interaction prioritizes the safety of humans that interact with potentially dangerous robotics equipment.

Methods

A large body of work in the field of human-robot interaction has looked at how humans and robots may better collaborate. The primary social cue for humans while collaborating is the shared perception of an activity, to

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this end researchers have investigated anticipatory robot control through various methods including: monitoring the behaviors of human partners using eye tracking, making inferences about human task intent, and proactive action on the part of the robot.The studies revealed that the anticipatory control helped users perform tasks faster than with reactive control alone.

Discussion

Being respectful is the best way to put forward our views and ideas to your co-workers or managers. Robots are equipped with internal digital cameras by which they are able to receive digital images of their visual environments. Modern social robots are fitted with integral microphones, allowing them to receive analogue audio data. This is then converted into digital audio by on-board Analogue-to-Digital Converters (ADCs) and fed into their programs.One of the primary modes by which social robots function is to seek to respond to clues that could be giving them permission to start a conversation – most especially, an individual greeting them .As a good communicator Sophia can sustain eye contact and she is able to process speech and have Conversions. Lucy has the ability to talk and search Wikipedia answer to any question.

Human-Robot Interaction (HRI) is a field of study dedicated to understanding, designing, and evaluating robotic systems for use by or with humans.Humanbehaviour is complex, but structured along individual and social lines.Emotions are important modifier of human behavior.Robots can observe the facial expression of the interacting humans.Robots are getting better at learning, and applying their learnings to new situations.Robots never get sick or need to rest, so they can work 24 hours a day, 7 days a week.We created a communication structure for successful human-robot communication on which further research may be based to make human-robot communication as effective as possible.They're probably better than humans for them, the fact that robots don't have feelings and therefore cannot get bored. Creativity, on the other hand, is the gift of humanity, and is not something that can be programmed into logic boards.

Conclusion

HRI is a rapidly evolving field. Specialized robots under human teleportation have proven successful in hazardous environments and medical application, as have specialized telerobots under human supervisory control for space and repetitive industrial tasks. Research in areas of self-driving cars, intimate collaboration with humans in manipulation tasks, human control of humanoid robots for hazardous environments, and social interaction with robots is at initial stages. The efficacy of humanoid general-purpose robots has yet to be proven.

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Role of Communication in Social Entrepreneurship

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Abstract

Social Entrepreneurship is fast becoming a most innovative approach to development and sustainability practices. The principle idea behind Social Entrepreneurship is to create profit as well as bring development or positive changes to a community or to an existing problem. It is perhaps the closest that we will ever come to having ethical capitalism. Just like any other entrepreneurship or business venture, social entrepreneurship requires human resource and communication skills in order to run profitably and make a positive impact. Be it communication from business point of view or communication for spreading awareness in a community, to educate a community; Communication as such remains an irreplaceable and invaluable asset. In this paper we want to examine what kind of a role communication plays in the running of social entrepreneurial ventures and how communication can make a difference in the kind of effect it has on a community. In a world that is fast becoming a global village there are still backward communities in dark corners of our country where development is yet to make an appearance.

Keywords: Social Entrepreneurship, Communication Development, Community

Introduction

Communication is one of the important keys for functioning of any enterprises or managements. It promotes the both verbal and non-verbal codes and improves the overall business. Communication helps both the entrepreneurs and employees to put their point across at a common ground for negotiating the pros and cons of the business. Communication efficiently works for the smooth running of enterprise and to educate the underprivileged.Communication binds any business together. It helps any enterprise to grow.It builds effective line of interaction between investor and community.

Objectives

1. In order to help the underprivileged and commercialise their skills or teach them any skills so they can work and earn money, we need communication. Unlike any other business, in social entrepreneurship the people one has to deal with are either underprivileged or deficient.
2. We need communication to teach/transmit skills. From basic reading or writing to advanced business communications and soft skills.
3. In order to have business relations with the outside world, one has to learn business etiquettes and that is also transmitted through communication.
4.Open channels of communication with socially backward communities. Strengthen the bond between clients and stakeholders.

Methods

Communication skills can be improved by conducting workshops among the employees and entrepreneurs, dealing with their problems in their vernacular language. Communication makes the process of seeking people's advice easy and profitable. Sharing point of views and opinions with the clients and members of the enterprise makes them more speak able and widens their thought process.

Discussion

Communication is one way in which social entrepreneurship can be made better. It helps not only with interacting with the community but also connects potential buyers with prospective sellers. To explain different thoughts and ideas, they need good communication. If they are not able to express their ideas then it's hard for them to achieve success. A good communication is the only way to express their works and ideas to different people.

Communicating with others helps strengthening bonds in the community. It's also help to develop understand between them. Communication is the basis of any healthy market to consumer relationships. For a healthy business and its progressive communication is the basic need. Communication clears out the conflicts and problems between the clients and entrepreneurs and provides an open and friendly environment to share their thoughts. It builds up confidence in those who hesitate to open up with their views and ideas result in making them more speak able so that it would help the overall business to make profit.

Conclusion

This helps the underprivileged people to communicate more freely and overcome their problems with educated financial advices. Not only has it helped to introduce basic literacy among the employees and a working understanding of how commercial finance works but also given enough social soft skills.

Information and Communication Technology (ICT) and Its Application

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Abstract

Information and Communication Technology (ICT) is the most common name when it’s come to anything digital. It generally refers to any kind of devices, systems, applications or systems which have a connection with a digital world. It leaves a great effect on people’s lifestyle, communications, learnings and working. It continues to bring revolution in all parts of human society from computers to robots. The main purpose of it is to develop and transport different kind of technologies at a cheap cost. Though it has some disadvantages like cybercrime, displacement of workers we have to look into it’s huge contribution in modern digital life.

ICT has a variety of applications, for example, e-learning will enhance and optimize the information reaching the students. It would bring about inclusivity so the students with special needs would no longer be at a disadvantage than the others.

E-agriculture educates the farmers on the latest innovations in the field of agriculture as a result developing strategies to increase productivity and promote agricultural and rural development. The use of ICT would help the country in producing smart and precise weapons to strengthen its defence.

The other applications of ICT include its contribution in the fields of medicine, commercial applications, banking, etc. We can say that the access to internet and knowledge to ICT has brought about drastic change in our lives.

Keywords: introduction; e-learning; e-agriculture; inclusivity

Introduction

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Information and communication technology abbreviated as ICT is the most common name when it comes to anything digital. It is the study of developing and using technology to process information and Communication. ICT is an umbrella term that is the integration of information and digital communication tools as well as telecommunications infrastructure. Recent years have seen a complete revolution in how information is gathered, archived and used in business and government throughout the whole world.

There is a thin line of difference between ICT and IT. Where IT refers to an entire industry that uses computers, networking, software and other equipment to manage information, ICT can be seen as an integration of IT with media broadcasting technologies, audio/video processing and transmission and telephony. We can say in one word that ICT is an extended acronym for IT.

Coming to its application, the most important and necessary one is its effect on e-learning. At first we need to know about e-learning. Actually E-learning is generally taken to be computer mediated learning with no in-person or face-to-face interaction taking place. In recent years, many people consider e-learning as learning by anyone, any time and any place over the internet.

So ICT in e-learning helps to enhance the quality of higher education. Side by side it increases the interest and engagements of students in terms of helping them to make a bright career. It increases the chance of learning more and make the student self-sufficient and self-independent which is going to help them in long run. Last but not the least it improves the communication between teachers and students and redefines the so-called definition between teachers and students. It makes easier the sharing of knowledge and exchanges information. Basically it opens a new door for students to enrich themselves.

Through this paper we propose to reduce pronunciation error through e learning with the help of ICT. With the proper use of technology aided with internet can effectively help in reducing the problem of communication to a large extent if not completely eradicate it.

Method

In changing scenario of education system, the importance of proper communication skills has become undeniable. We all have either seen people or ourselves have been harassed because of incorrect pronunciation of words or due to lack of fluency. This problem which we face regularly encouraged us to find the solution. The methods that can help students solve their problems are –

- Besides learning alphabets students should also give equal importance to phonetics.
- Proper use of softwares like lingq, fluentu, etc. which provides proper pronunciation models.
- Organizing seminars in schools, colleges and universities to make people aware of the importance of fluent communication and proper pronunciation as well as the softwares which provide the necessary aids.
- Arranging campaigns and workshops in rural areas where internet is not accessible, so to spread awareness and provide help in terms of audio tapes and visual aids.

  If this steps are successfully implemented then it would help in bringing a drastic change in solving the current problems.

Result

The lack of effective communication skills can put an extremely talented student at an added disadvantage. Implementing the above mentioned steps can help in overcoming the problems.

In India where English is mainly learnt through books, the problem of incorrect pronunciation is a very rampant issue. Here the focus is more on rectifying grammatical errors than errors in pronunciation. Giving equal importance to phonetics is an essential step in rectifying this problem. If alphabets are integral tools for constructing sentences then phonetics do the same thing for pronunciation. So from the primary level we should give same importance to phonetics if we want us to sound good. Phonetics is the basic pillar of pronunciation so it should get same focus as alphabets.

In the era of computers and robots nothing is unachievable. Learning and improving a skill is just a search away. There are various softwares like lingq and fluentu which provide resources according to ones need. These softwares help in providing interactive English lessons. These also help the user in enriching their vocabulary. With the help of the templates and models provided by these softwares, the user gets to know correct pronunciation of the words. As a result they get an opportunity to rectify their mistakes.

Most of the students do not realize that they are pronouncing a word in a wrong way and that they should rectify it. However much a student might be brilliant, if he cannot convey his thoughts efficiently then how can provide the desired result? So with this we are trying to spread awareness in this modern generation about one of their major weakness which can be easily rectified with very little effort. After making they realize we introduce these softwares to them by which they can easily rectify their problem. To get maximum benefit the authorities need to also be made aware about this issue to get a clear view of the advancement in science in order to solve their problems and also arrange for proper training.

As mentioned earlier the basic need for all the proposed solutions are proper resources, internet connection and electricity. In a third world country like India till now some of the villages face issues like lack of electricity and network connection. There will be campaigns and workshops to provide help in terms of audio tapes and visual aids. They will also be educated on how to use them.

If these solutions are successfully implemented then no student will have to take a backseat in terms of their career choices because of the lack of proper communication skills.

Conclusion

With the rapidly changing times it is very important for us to stay in pace with it. Having proper communication skills has become very important in today's times. Although there are lot of people who gain essential communication skills through MOOC's and other platforms but still it is very important to spread the word through schools, colleges and universities. If the educational institutions help in reaching out to more students compared to internet based soft wares. Awareness programs would help in spreading the message. If the proposed solutions are effectively carried out then it would help a lot of students, especially the ones who did not have the opportunity of learning English from the very beginning of their formal education.

The Rise of Digital Marketing Communications

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Abstract

With the world having transitioned from analogous to digital horizons, one of the most important parts of our existence as consumers, the consumer-producer interface has also become digital. Most producers have to keep up with this fast changing market trend or fall back. This gives rise to trends in Digital Marketing communications.

Now the question: How is communication helping digital marketing?

The solution: Communication is the key to any business transaction. In order for a commodity to reach the consumer, there should be a certain degree of advertisement. Advertisement is one sector where digital marketing works with the help of communication. As the world is becoming more dependent on the internet

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advertisement has reached newer pinnacles with digital communications.
Case of Influencers- The internet has become more than a media of communication, it has become a marketing hub in itself. A few years ago the term "online shopping" was treated with mistrust. Now online mode of shopping is fast becoming the only mode of buying and selling for many commodities. Influencer culture has been primarily helpful in that. Influencers symbolize the unique interface between consumer and producer who use digital communications to interact with both the buyers and sellers. One could say they provide a real life simulation of "usage" of the product concerned, which is the next level in digital marketing.

Keywords: Digital Marketing-Consumer-Business Communication-Advertisement

Introduction & Objectives

Digital marketing communications are essentially the digital equivalent of the traditional marketing communications mix. Digital marketing communication is directed at profiled targets, and uses communication theory actively. Every flow of communication can ask for an information in form of an answer from the market or specifically the consumer. It employs some or all communication tools which are adapted to the online marketing challenge. This opportunity grants immediate feed-backs and feed-forwards, so that digital communication can be easily and cheaply quantified. There will of course be new and innovative online tools which are also employed within the digital marketing communications mix. Digital marketing communications tools include display ads, pay per click advertising, search engine optimization and many more. Through our presentation we will try to cover the advantages and different ways of digital marketing communications and in doing so try an examine why and how Digital Marketing has become the steadily rising star in commercial marketing sector.

Results and Discussion

It may come as no surprise that the marketplace has become increasingly more digital as technology continues to evolve. The benefits of digital marketing are becoming more prevalent every day. More and more consumers are researching and buying products online. According to Forbes, 82% of consumers conduct research online. And, Tech Crunch reports that 79% of people shop online. So how do you reach these consumers? Here's the answer: digital marketing.
So, more and more small businesses are implementing digital marketing tactics to effectively reach and engage their target consumers online. Digital marketing tactics has proven to be the most cost-effective way to reach potential customers.
The only way to know for sure is to measure your success over time. While it can be difficult to track the success of a traditional marketing campaign like a radio advertisement or mailer, every digital marketing tactic that you use is measurable. This benefit is every reason why anyone needs to invest into digital marketing. Digital marketing is the most measurable form of marketing. By measuring your digital marketing campaigns in real-time, one can see which tactics are working and which are not.
With digital marketing, you can ensure that the right consumers are viewing your content. SEO allows you to reach those consumers who are searching the web for content and topics that are relevant to your business. While pay-per-click, display, and social media advertising enables you to target those who are most likely to be interested in your products or services based on demographic information and general characteristics. One of the greatest benefits of digital marketing is that it allows you to target your ideal buyers.
Most people are starting their buyer's journey online. Think about how often you turn to Google or another search engine to find the information you need. Your customers are no different when they start to research the products or services that can help them solve their biggest problems.

With traditional marketing tactics like television or newspaper ads, you have to wait until after the campaign is complete to see the results. And although you can use what you learn to adjust later campaign tactics, there isn't much you can do "in-the-moment" to adapt your strategies for best results. Digital marketing allows someone to view the real-time results of your campaigns and adapt your tactics to improve results as they go.

Conclusion

The importance of marketing on the Internet is increasingly important for company. In fact, online marketing has become an important focus for most companies as they look to reach customers online and grow sales. This is a growing business field. Digital marketing is nothing more than taking advantage of new technologies to achieve marketing objectives.

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The Importance of the Study of Conflict Resolution and Decision Making in the Technical and Management Curriculum

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Abstract

This paper aims to bring out to the readers the importance and relevance of the study of Conflict management strategies, Bargaining and Negotiation Skills by the students of Technical and Management curriculum. In this respect the question that arises in our mind at first is, What is Conflict? I would like to explain Conflict as an expressed struggle between at least two interdependent parties who perceive incompatible goals, scare resources and interference from others in achieving their goals . Behavioural scientists widely recognize that conflict in any organization both professional and non-professional is a basic process that needs to carefully manage. Many Scholars argue that it is vital to continuous improvement in organisations (conflicts that are positive in nature) and conflict management is crucial to the sustained growth and continuous success of any high performance resilient organizations. We have seen that 'Conflicts are often resolved in the work places .Conflicts between groups can be resolved by various methods like 'Collective bargaining', Negotiation , Meditation, and arbitration while conflict between a boss and a subordinate can be managed by collaboration and accommodation. Conflict accelerates change in an organization. This abstract focuses on the need to incorporate to the technical students the study of various techniques and methods to acquire these conflict resolution management skills and also learn certain practical procedures to handle such type of situations through role play practise in language laboratories etc. Conflict management and' decision making' are essential soft skills that every technical and management students should acquire to emerge as an efficient and valuable resource in the organisation. This study will not only held them to be an able and efficient technocrat but also it will provide them the ideal platform to gain good exposure that will add value to themselves as well as add value to the organization.

So I may conclude that the study of Conflict management and decision making should be taught to the students to meet their future needs. It is an important soft skill which all the technical and management students should nurture along with the basic soft skills like Effective Communication skills, team spirit, leadership qualities, Group Behaviour etc. The study of this domain can be made effective through practical works, case study and virtual practices.

Decision making helps to set goals in our work place and to fulfil our set targets there are certain decision making policies that a manager has to acquire in order to carry forward his projects .Decision Making skills are not inbuilt in a resource they have to be acquired and nurtured. This paper aims to bring out the importance of the study of Decision making for the students to meet their upcoming professional needs and requirements in their professional field. There are certain Policies of decision making that are to be taught at the Undergraduate level. In Psychology "Decision Making ' Is defined as the cognitive process resulting in the selection of a belief or a course of action among several possible alternative options .Decision Making is the process of choosing and identifying alternatives based on the values , preferences and beliefs of the decision maker. In a nutshell i would like to state the fact that there are certain steps for decision making i.e that Identify the decision , Gather Relevant information , Identify the Alternatives , weigh the evidence , Choose among Alternatives , take Action , Review your decision and its consequences. The Methods to be followed in Conflict management are Collaboration, Compromise, Competition, Accommodation, Avoidance, Collective Bargaining, Conciliation, Negotiation, Mediation, and Arbitration. Conflict Resolution involves the reduction, elimination or termination of all forms and types of conflict through these methodologies .The curbing of conflict in a professional or non professionalplace helps to resume peace harmony and promotes ideal synergistic and conducive environment.

Key words: Conflict Management, Decision Making, team spirit, leadership qualities, Resolution Management, Group Behaviour.

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NecessityofEnglishCommunication for Engineers: A Study Based on Globalization Perspective

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Abstract

India adopted the 'New Economic Policy' since early 1990's. The era of LPG (Liberalization, Privatization and Globalization) yielded plethora of opportunities in technical job market. The Capitalist economy has enabled us to connect global power houses in engineering arena and thus cross border communication became obvious. Today engineering sector is the pioneer contributor in Indian GDP and more competent manpower is the need

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of the hour. A good speaker with ascendency over English is a more successful engineer that an average or poor speaker. In today's professional world, giving presentation, preparing project plans, going onsite and illuminating the technical competency through language, all requires excellent command over English. The economic liberalization has abolished all the cross-border bindings and engineers have to communicate with foreign clients day in and day out. Moreover, in this new normal era, when social distance is an essential component, engineers have to work from home through various digital platforms and thus language competency has become an inevitable tool of communication.

Keywords: English speaking Skills; Fluency; Language Competency; Employability.

Introduction and Objectives

The process of globalization has created a favourable situation for engineers. With plenty of foreign investment pouring in, the employment market has expanded substantially. Technical knowledge with language competency has become the thumb rule of getting quality employment. The process of globalization has some significant impacts on Indian socio-economic system, which are:

1. Abrogating the caste based job system
2. Prioritizing the quality of man power.
3. Denying personal reference based employment.
4. Exposing cutting edge technology to the Indian people.
5. Expediting social mobility.

Globalized economy has no boundary and connects people globally. The only aim of this economic system is to yield profit and to gain the objective managements are always in search of quality man power.

India has become the most popular outsourcing destination in recent years. With quality and cheap employee availability, the destination has huge future potential. Therefore, it is extremely important to access the actual need of the industries. The objectives of this study are to find out the role of English communication to get desired success in engineering field and to find out the hindrances faced by new engineering graduates for getting quality jobs. Moreover, this study will try to give some corrective measures.

Method

Observation method has been adopted to judge the situation. Two groups were identified comprising 10 students each. One group has scored above 80% in their business communication classes during their engineering studies. On the other hand the 2nd group had not performed so well at the business communication subject and scored less than 80% in that particular subject during their engineering studies. Both the groups were more or less similar in their technical subject result. After the completion of the engineering graduation, the interview conducted in the campus was closely observed and the success rates of both the groups were recorded for analysis and discussion.

Result and Discussion

After completion of the graduation, 70% of the students of the 1st group were placed in quality multinational companies through 1st and 2nd campus interview. At the same time only 30% of 2ndgroup members were able to crack 1st or 2nd campus interview. As the technical subject results of both the groups were more or less equal, therefore the independent variable English communication played a major role to influence the dependent variable which is success at the interview. Good communication skills and excellent command over English

language worked as a positive catalyst to get a job in quality multinationals. On the other hand, lack of good command over English has made the 2nd group less competent to crack the interview.

The above observation signifies that it is extremely important to have excellent command over English to have success in employment eco system in this globalized economy. Employee sustainability and enhancement of work quality can only be achieved by getting desired communication skills. As the global economy has no boundary, it has become crucial for employees to have good knowledge of English to communicate with foreign clients. For this purpose, some of the colleges and universities have already taken a comprehensive endeavour to impart English communication training in graduation level. AICTE has also framed syllabus inculcating the necessity of English communication. But the holistic approach should start from primary level. Most of the government schools in India don't have adequate infrastructure to provide language training in primary level. Therefore it becomes difficult to train engineering students from the basic level of communication skills in a short period of time. The paranoia of communicating in English should be treated at the primary level and adequate steps needs to be taken accordingly.

The above observation shows the manifestation of giving importance to the Business Communication subject during the journey of engineering study. Often this subject is neglected as an auxiliary subject and the students fail to give importance to equip themselves in English communication from their 1st semester. Therefore by the time they understand the necessity of English communication during their campus interviews, it becomes quite late for them to strengthen their communication skills.. Whatever technical knowledge one have, must be expressed and the medium of expression is always English. Thus the ascendency over language plays a significant role through the journey of job tenure. Language skills have become the most important weapon that an engineering student should have in their arsenal to overcome all the impediments.

Conclusion

A cohesive and holistic approach is required to impart English communication training among all the students as employment required such skills. Every engineering graduate requires good command over English to succeed in their professional life. Therefore, educational institutions and all the stakeholders should give more priority to enhance the level of English communication skills among engineering students to cut a mark in this globalized world.

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Lack of Proficiency in EnglishCommunication: Is it posing a Barrier to the Professional Growth of Engineers?

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Abstract
The engineering profession has emerged as the most promising sector to create employment. The implementation of mixed economic policy is leading India to march ahead for creating job opportunities in technical fields. With the acceleration of investment from multinationals, the Indian job market has expanded commendably. To use these opportunities, English fluency is important along with technical knowledge. The English communication skills of Indian engineers need to be enhanced through proper training. Most often, they are coming from vernacular medium background and are afraid to speak English .The hindrances of English communication is also caused by lack of infrastructure in graduation level, inadequate language laboratories, and lack of proper curriculum in government sector engineering colleges. The fear of English often conquers the mind of future engineers and they feel shy to speak .The syllabus in the school level is not properly equipped to meet the increasing demands of communication skills in the professional world. The inception of English learning as a special curriculum at grass root level is absent in government based primary education system. A holistic approach is required to abrogate all the hindrances in this regards.

Keywords: Communication skill, employment,technicalsector, curriculum

Introduction and Objectives
The era of globalization has ajar the door of foreign investment in India. Many multinationals are investing in IT and ITES in India and our nation has become the most popular outsourcing destination for investors. Information Technology has increased many folds in recent years. It has contributed a significant share in Indian GDP and creating employment opportunities for technical andnon-technical students. To embraces the opportunities, the educated youth of India needs to be well equipped and industry ready.
The study will try to evaluate the importance the communication skills, particularly English communication skills to achieve desired success in job market. It will churn and yield the prospect of English communication skills in primary, secondary and graduation level for comprehensive development of engineering students. The objectives are to identify the core issues in work field which requires communication competency to deal with. The objectives are as follows:

1. To find out the necessity of English communication in Information technology and it's enabled sector.
2. To compare the situation of employees who have good English communication and who don't have such language ascendency in IT (Information Technology) and ITES (Information technology enable services).

The study will try to assess the above two objectives by a small test and its result.

Methods
To review the situation, a null hypothesis has been created which is as follows:
There is no co-relation between fluency in English communication skills and employee retention and sustainability in ITES (BPO)

Two groups were identified comprising of 10 members each at the time of joining a BPO. One group of people(1st group) are regularly exposed to language training in their school and engineering level and the other

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groups (2nd group) are not so familiar to the English communication skills. These two are closely monitored for 2 months. In BPO, they have to communicate with foreign customers and clients in English. Along with that they have to communicate with their colleagues and managers in English. After two months the first group shows 100% employee sustainability as no employees of this group have left the job. But in second group 20% employees left the job or asked to leave the job.

Results &Discussion

The result proves that the group having good command over English language are more sustainable in ITES sector than the group who are not so compatible with English. 100% retention rate signifies the both way satisfaction in work place. The management is happy with the 1st group as the have good command over language along with technical competency and they are considered as performers. In this group, employees are also comfortable with the work culture as they have the requisite skills. Not a single employee has left the job because they are happy with the work condition. On the other hand, 20% of the employees in the second group left the job or asked to leave the job signify both ways dissatisfaction. The management is not happy with them as they are not able to perform the desired deliverables. Lack of English communication made them a less performing group. Some of them left the job because they are not comfortable or able to cope up the situation and demand of the job. The low employee's retention and sustainability rate signifies the lack of competency in this sector. As both the groups are technically equipped, it is clear that only the language competency had made all the differences. If the 2nd group of employees were properly trained in English language, they will also have the same retention capacity in job market like the 1st group. Therefore, the null hypothesis which stated that there is no co-relation between English communication and employee retention and sustainability proves wrong. The alternative hypothesis, which is 'There is co-relation between fluency in English communication and employee's retention and sustainability is correct.

In this short observation, it is proved that English language has become extremely important component for engineering students to get a job and to sustain in that job. It is the responsibility of all the stakeholders to create an education system which is inclusive and multi-facial. English learning should be incepted from grass root level in all the schools with new innovative methods. Engineering colleges should have proper infrastructure like language laboratories and trained faculties to impart such language training. Syllabus should be re-designed and modified for the purpose of enhancement of English communication. Government and private colleges need to redefine a uniform English teaching process in engineering level for uniformity in language competency. The optimum level of employment can only be achieved by creating a holistic education system which gives paramount priority in English learning system.

Conclusion

The IT and ITES are booming in India and the foreign investment is pouring in. It is the right time for engineering graduates to have a dream job. But, to grab the opportunities, they need to train themselves with proper English language training. It will be extremely difficult for them to get a job in this field without ascendency over English,. At the same time, all the stake holders like government and private schools and engineering colleges need to give more priority for English language enhancement programme. With a collaborative effort, more employment opportunities can be created for the youth of India.

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Are Black Holes Just Limited to Our Knowledge or Beyond That

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Abstract

This paper is the first in a series of papers which focuses on how black hole and it's parameters are highly related to time and how this time Is related to space and Events.Well this paper will not deal with the overall explaination of my entire work but will try to lay a foundation from where we can make reasonable arguments .Well the concepts which are taken from this paper is necessary(as per my concept) to show that how the present theories are lagging behind to explain all the parameters .Well thie formulas in this paper may also give some relation which can help us in understanding the big bang more precisely.
We will also compare our theory with Einstein's general theory of relativity to show the validation of our theory. This theory is important, as because, I really think that my entire work on black hole is able to answer many questions which are still unanswered. This paper is just like threshold of my entire work which will lay a foundation of my rest of the theories.

Keywords: Singularity; Spacetime; Black hole well; Event horizon; Strings

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Introduction with Some Assumptions

let there be a Singularity, let it had a mass M and radius R.So the energy of that mass if converted and confined within R would be

$E = MC^2$. -------(1)

And the effect of gravity due to that singularity region of radius R will be

$g = \frac{GM}{R^2}$. ----------(2)

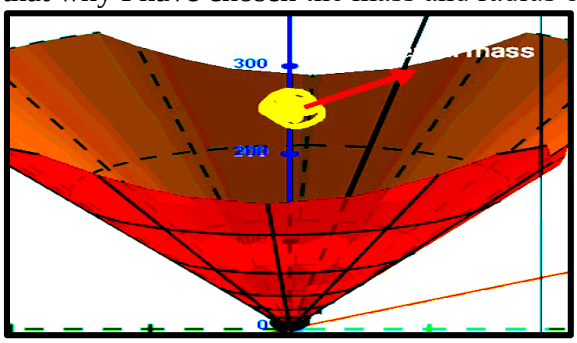
So, combining these two equations, we get, $E = \frac{gR^2C^2}{G}$----------(3)

Hypothetical Experiment

let's start our theory,as per initial assumption.

A mass say m is placed at the Centre of the surface of the event horizon and we will further include that this mass has the value same as the planks mass, and the increase of gravity of the Singularity is just of equal magnitude i.e., g' will be due to that plank mass and the decrease in radius of the singularity will be of order of plank length.

We have taken the smallest units for mass and length in our experimental setup. This has a very significant reason and is discussed broadly in my later chapters. But here without any detailed description, we will prove that why I have chosen the mass and radius of plank's degree mathematically.



So it will have a potential energy, if we consider that the Singularity as the frame of reference of our universe and same, it will have some kinetic energy, and the gravity is due to that singularity, i.e.,

p. e. = mgh ----------(5)

and

k. e. = $\frac{1}{2}mc^2$----------(6)

but according to law of conservation of energy the initial and the final energy of our experimental setup should be same, i.e.,

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$\frac{m(gh-C^2)}{2} = \frac{C^2}{G}\cdot[g\{(R-r)^2 - R^2\} + g'(R-r)^2]$

This equation is written with the intention of balancing the energy of our system.
Here, (R-r) ~ R && R<<r. Therefore, we can neglect r^2 term.

[Note: here we have used h=Δt·C, where h= length of our assumed well,Δt is the time difference between two points that light crosses while travelling distance h]

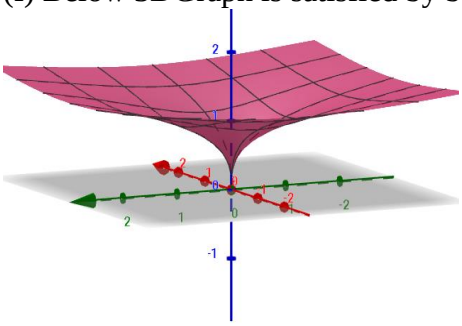
Results and Discussions

After solving the above equations with the above properties, we get two important equations:

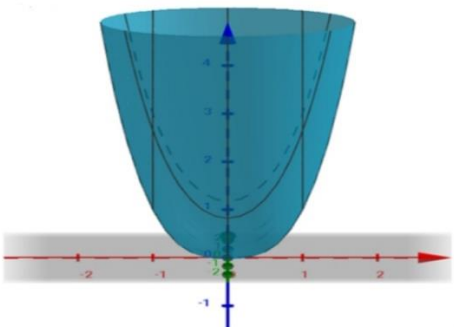
h (well) = $\frac{4\pi C^3 R^3}{hG}$

t (well) = $\frac{4\pi C^2 R^3}{hG}$

(I) Below 3DGraph is satisfied by both equations when time or space is independent.



(II) Bellow 3D Graph is satisfied by both equations when the hole radius is independent.



Both the equations satisfy both of graph.The graph (I) has R as the independent variable and (h,t) are dependent variables and the graph (II) has R as the dependent variable and thus it is exactly same as the deformation curve of spacetime. So, we can have the curve for time equivalent to the possible image of curve of time proposed by NASA.

Validation of Our Experiment and TheAssumptions inIt

$E = MC^2$-------(1)

$R = \frac{2GM}{C^2}$---------(radius of black hole)

Or, $M = \frac{RC^2}{2G}$---------(2)

Combining both equations,

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$E = \frac{RC^4}{2G}$

Now for maintaining the total energy of our system, as per last assumptions we have,

$mgh + \frac{RC^4}{2G} = \frac{MC^2}{2} + \frac{(R-r)C^4}{2G}$

Or, $m(gh - \frac{C^2}{2}) = \frac{C^4}{2G} ((R-r)-R)$

Or, $m (gh - \frac{C^2}{2}) = - \frac{rC^4}{2G}$

Or, $m (\frac{C^2}{2} - gh) = \frac{rC^4}{2G}$

Now, as per the escape velocity formula,

$m (\frac{C^2}{2} - \frac{C^2 h}{2R}) = \frac{rC^4}{2G}$

Or, $m (1 - \frac{h}{R}) = \frac{RC^2}{G}$

Now, from equation (2), We get, $h = 2M (\frac{G}{C^2} - \frac{r}{m})$----------(3)

If again considering, $h = \Delta t \cdot C$, then from equation (3),

$\Delta t = 2M (\frac{G}{C^3} - \frac{r}{mC})$----------(4)

Now, equation (4) will have – ve value for large values, and the least value of $\frac{r}{m}$, where the Δt is not negative, i.e., ($\Delta t \geq 0$) can be,

Let $\Delta t = 0$ at some value of $\frac{r}{m}$

Therefore,

$\frac{G}{C^3} - \frac{r}{mC} = 0$

or, $\frac{G}{C^2} = \frac{r}{m}$ ----------(5)

and the value of $\frac{r}{m}$ in equation (5) is exactly equals to plank's $\frac{r}{m}$, thus we can show that why our assumptions are significant and this is also described broadly on the later chapters of my work.

Conclusion

So here we can see that there is some relation between space, time and the concept of black hole, but still these assumptions need a proper foundation, so in the later chapters, a totally different approach which is the advanced version of present string theory is discussed, which will overcome all these demerits of present theories.

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Sun Tracking Solar Energy System

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Abstract

Solar Energy is rapidly gaining popularity all an important means of expending renewable energy resources. Solar panels have been used increasingly in recent years to convert solar energy to electrical energy. As such, it is vital that those engineering fields understand the technologies associated with the areas.

The solar panels can be used either as a stand-alone system or as a large solar system that is connected to the electricity grids. The earth received 84 Terawatts of power per day on an average and our world consumes about 12 Terawatts of power per day on average. We are trying to consume more energy from the sun using solar panels. In order to minimise the conversation from solar to electrical energy, the solar panels have to be positioned perpendicular to the sun. We have to keep the solar photovoltaic panels in the perpendicular to the sun throughout the year in order to make it more efficient.

The goal of the project is to design an automatic tracking system, which can locate the position of the sun. The tracking system will move the solar panel so that it is positioned perpendicularly to the sun for maximum energy conservation all the time.

The Sun tracking solar panel consists of two LDRs, solar panel and a servo motor and ATmega328 Micro controller.

Two light dependent resistors are arranged on the edges of the solar panel. Light dependent resistors produce low resistance when light falls on them. The servo motor connected to the panel rotates the panel in the direction of Sun. Panel is arranged in such a way that light on two LDRs is compared and panel is rotated towards LDR which have high intensity i.e. low resistance compared to other. Servo motor rotates the panel at certain angle.

When the intensity of the light falling on right LDR is more, panel slowly moves towards right and if intensity on the left LDR is more, panel slowly moves towards left. In the noon time, Sun is ahead and intensity of light on both the panels is same. In such cases, panel is constant and there is no rotation.

Keywords: LDR ; Buck – Boost; Sun tracking ; servo motor.

Introduction & Objectives

The Sun tracking solar panel consists of two LDRs, solar panel and a servo motor and ATmega328 Micro controller.

Two light dependent resistors are arranged on the edges of the solar panel. Light dependent resistors produce low resistance when light falls on them. The servo motor connected to the panel rotates the panel in the direction of Sun. Panel is arranged in such a way that light on two LDRs is compared and panel is rotated towards LDR which have high intensity i.e. low resistance compared to other. Servo motor rotates the panel at certain angle.

When the intensity of the light falling on right LDR is more, panel slowly moves towards right and if intensity on the left LDR is more, panel slowly moves towards left. In the noon time, Sun is ahead and intensity of light on both the panels is same. In such cases, panel is constant and there is no rotation.

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Conventional energy resources such as coal, oil etc. Are getting depleted due to which humans are compelled to be aware on non-conventional energy and research and exploit non-conventional resources such as solar energy, wind energy etc. Among non-conventional sources, solar energy is a promising alternative source. Solar electrical energy generation provides several advantages with respect to other energy sources like it uses the inexhaustible world-wide available sunlight as a source of energy, it does not generate environmental pollutants. This is a solar tracking system which can be used as a power generating method from sunlight. This method of power generation is simple and is taken from natural resource. This needs only maximum sunlight to generate power. This project helps for power generation by setting the equipment to get maximum sunlight automatically.

The main objective of the project is to drive a DC motor using Solar Energy, which consists of a solar panel to convert the solar power to electrical power using solar cells. The power output obtained should be independent of the input, which is the output obtained should be constant for any change in the input factors. A typical DC-DC converter can operate in both Buck and Boost operations such that the optimized output is obtained.

Methods

A sun tracking solar system maximizes solar system's electricity production by moving the panels to follow the solar tracking system sun throughout the day, which optimizes the angle at which the panels receive solar radiation. Solar trackers are typically used for ground-mounted solar panels and large, free-standing solar installations like solar trees. They are typically not used in most residential solar projects, but have a place in the utility-scale and commercial/industrial solar market.

When solar panels are exposed to sunlight, the angle at which the sun's rays meet the surface of the solar panel (known as the "angle of incidence") determines how well the panel can convert the incoming light into electricity. The narrower the angle of incidence, the more energy a photovoltaic panel can produce. Solar trackers help to minimize this angle by working to orient panels so that light strikes them perpendicular to their surface.

There are two types of solar tracking systems:
single-axis
Dual-axis.

Single-axis tracker:

A single-axis tracker moves your panels on one axis of movement, usually aligned with north and south. These setups allow your panels to arc from east to west and track the sun as it rises and sets.

Dual –axis tracker:

A dual-axis tracker allows your panels to move on two axes, aligned both north-south and an east-west. This type of system is designed to maximize your solar energy collection throughout the year. It can track seasonal variations in the height of the sun in addition to normal daily motion.

Typically, dual-axis trackers (made by companies like AllEarth Renewables) are a much less popular option for solar installations, even among large, utility-scale projects. A situation where dual-axis trackers may be appropriate would be on some commercial properties – due to limited commercial rooftop space for solar panels to be installed, dual-axis trackers that can produce up to 45% more energy than typical static panels can help businesses produce enough power to fuel their operations in a small space. Utility-scale installations usually don't need dual-axis setups, because they are located on large plots of land without the tight space constraints of a commercial roof space.

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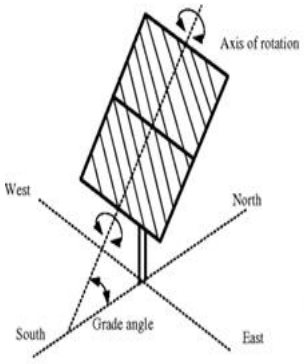
The factors which affect the output or the efficiency of the solar panel are as follows:

Direction: Incase of the location being Northern Hemisphere, the panels should face due north and the location being Southern Hemisphere, the panels should face due south.
Tilt or Orientation: Solar Panels must have a tilt equal to the latitude of their location. As the tilt of the earth rotation changes, the solar panels need to be adjusted to get maximum light.
Type of surface: A broader surface is mostly preferred, as it receives maximum amount of sunlight.
To make efficient mounting of the panels, so that they receive adequate sunlight, devices called Trackers are used which point the panels towards the earth.

There are two types of tracker

- Passive Tracker
- Active Tracker



(a) mechanical structure

(a) a photograph of the system

a. Passive Tracker:
Passive trackers use a system whereby a liquid moves as it is heated by the sun and is used to move the panel, automatically returning to the correct position for the morning. It basically consists of two tube tanks placed at sides of the solar panel such that in case of Panel not being aligned with the sun, the liquid in the tanks gets unevenly heated causing a pressure difference. This pressure difference in turn causes the liquid to move towards the tank with low temperature. Thus as the liquid level fluctuates between the two tanks, the shift in weight causes gravity to rotate the tracker along with the orientation of the Sun. They are less expensive and require no electrical appliances and require less maintenance. However conventional light sensing mechanism may not prove accurate during cloudy days and also they are not efficient.

b. Active Tracker:
An Active Tracker usually consists of motors like a Servo Motor or a Stepper motor to rotate the panel. Ideally solar radiation strikes the panel at 90º angles. The motor maintains the panel at that angle, so as to receive the maximum radiation. The control of the motor can be done in either of the two ways. One way is using an electronic system to calculate the astronomical position of the sun at the particular location and accordingly rotate the solar panel at an orientation perpendicular to the sun at preset time intervals. Another of control is using a sensor arrangement to sense the brightness in the sky and accordingly rotate the panel at right angles to the orientation of the sun.

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Results & Discussion

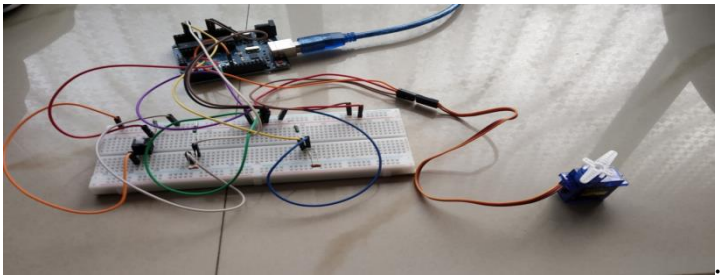
In this project, we will see a simple Sun Tracking Solar Panel circuit which will track the Sun and position the solar panels accordingly.

As the non renewable energy resources are decreasing, use of renewable resources for producing electricity is increasing. Solar panels are becoming more popular day by day. Solar panel absorbs the energy from the Sun, converts it into electrical energy and stores the energy in a battery.

This energy can be utilized when required or can be used as a direct alternative to the grid supply. Utilization of the energy stored in batteries is mentioned in below given applications.

The position of the Sun with respect to the solar panel is not fixed due to the rotation of the Earth. For an efficient usage of the solar energy, the Solar panels should absorb energy to a maximum extent.

This can be done only if the panels are continuously placed towards the direction of the Sun. So, solar panel should continuously rotate in the direction of Sun. This article describes about circuit that rotates solar panel.



The Sun tracking solar panel consists of two LDRs, solar panel and a servo motor and ATmega328 Micro controller.

Two light dependent resistors are arranged on the edges of the solar panel. Light dependent resistors produce low resistance when light falls on them. The servo motor connected to the panel rotates the panel in the direction of Sun. Panel is arranged in such a way that light on two LDRs is compared and panel is rotated towards LDR which have high intensity i.e. low resistance compared to other. Servo motor rotates the panel at certain angle.

When the intensity of the light falling on right LDR is more, panel slowly moves towards right and if intensity on the left LDR is more, panel slowly moves towards left. In the noon time, Sun is ahead and intensity of light on both the panels is same. In such cases, panel is constant and there is no rotation.

Conclusion

From the design of experimental set up with Micro Controller Based Solar Tracking System Using Stepper Motor If we compare Tracking by the use of LDR with Fixed Solar Panel System we found that the efficiency of Micro Controller Based Solar Tracking System is improved by 30-45% and it was found that all the parts of the experimental setup are giving good results. The required Power is used to run the motor by using Step-Down T/F by using 220V AC. Moreover, this tracking system does track the sun in a continuous manner. And this system is more efficient and cost effective in long run. From the results it is found that, by automatic tracking system, there is 30 % gain in increase of efficiency when compared with non-tracking system. The solar tracker can be still enhanced additional features like rain protection and wind protection which can be done as future work.

On one hand we can see the world's energy resources depletion to be a major problem. On the other hand global warming, this is a major concern. Switching to solar power, which is clean and green and enhancing its efficiency by using sun trackers is a great option in the near future.

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Real Time Object Detection

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Abstract
An AI (Artificial Intelligence) based object detection platform is proposed which can identify objects in real time, using a convenient machine learning library to accomplish the tasks without wasting more computational resources. So, tensor flow lite 2 has been chosen for the work. The YOLOv3 algorithm or the 'You Only Look Once' v3 is found the most appropriate one. This method is among the most widely used methods that could help to reach the goal without using much of our computational resources. YOLO v3 method has been designed to use the k-means cluster method. By using this method this algorithm, as one of the fastest object detection framework it gives points for the objects for each bounding boxes and logistic regression used for predicting the points. It uses Darknet53 which has 53 convolutional layer that means it can build good CNN's (Convolution Neural Network) and this network also has shortcut connections. YOLO v3 also uses the Feature Pyramid Networks Architecture. Through this platform the detection of objects is possible via an IoT (Internet of Things) based CCTV or camera enabled device.

Keywords: Real Time Object Detection; YOLOv3 method; Tensor flow; Deep Learning.

Introduction
As the era of Self Driving Vehicles and Bots are coming, it is the need of the hour to have an object detection platform which will give the bot/car the information about the objects around it so that it can interact with these using necessary steps. For getting the necessary tasks to be completed the detection has to be real time and also it has to take less computational power and time else it would not be possible for the vehicle or the bot to interact within the required time and that might cause huge loss including major road accidents and malfunctions of the bot. So, it is proposed to build an object detection system that will be real time and will take less time and power. Object Detection is not only useful for autonomous cars and robots but it also has other uses too. Security systems can have the autonomous object detection platform so that if there is no human presence, the camera can sense any moving object in the secured zone. If a model can be trained using medical dataset it can also help the doctors. A real time Object Detection System takes less time and use less computational sources which is the need in this present scenario. Our objective is to build a platform that will use web camera of any IoT enabled device and detect objects in real which are captured through the camera.

Methodology:
Yolo v3 considers object detection as a logical regression problem. In YOLOv3, the input image is divided into square shaped small grid cells. When the centre of an object is there into a grid cell then the grid cell will

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be responsible for the detection of the object. Each of the cell predicts the information about where the bounding boxes are and finds a score to these bounding boxes according to their object presence. Every score can be obtained using this formula given below:

$$C_i^j = P_{i,j}(Object) * IOU_{pred}^{truth}$$

Here C^j_i is the objectness score of the bounding box,
Bounding box is jth bounding box in the i^{th} grid cell,
$P_{i,j}$(Object) is actually a function of the object.
The YOLOv3 method uses binary cross-entropy of predicted objectness. It's loss function can be shown as given below:

$$E_1 = \sum_{i=0}^{S^2} \sum_{j=0}^{B} W_{ij}^{obj} [\hat{C}_i^j \log(C_i^j) - (1 - \hat{C}_i^j) \log(1 - C_i^j)]$$

In this term S^2 = grid cells of the image, B = no. of bounding boxes present. C_{ji} = predicted abjectness score, $\hat{}$ C_{ji} = truth abjectness score.
The system has been run via tensor flow.

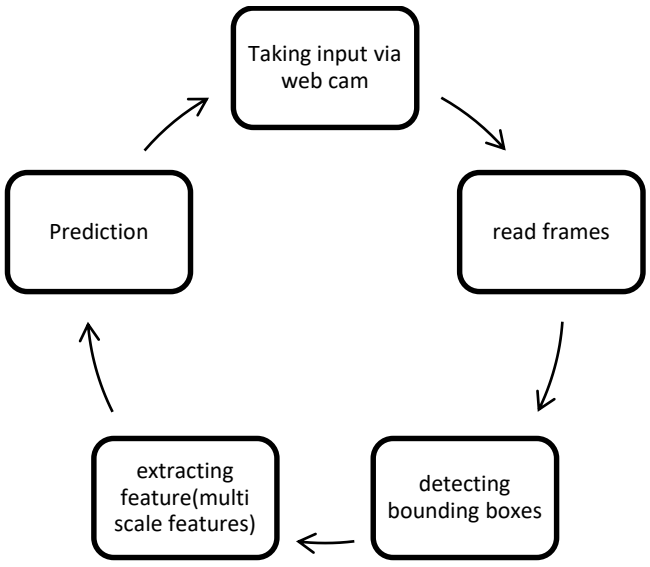

Fig. 1: Workflow of the system

Results & Discussion

The execution has been done using python programing language. Python 3.7 is used and Tensor flow 2.0/Tensor flow Lite package for deep learning, NumPy package for numerical computing, Pillow package for image processing, Opens package for computer vision and seaborn as a visualization package are used too. Official pretrained weight based on coco dataset is used. Then, the loading of the weights or clone using the repository has been done via git clone. In the directory run this command detects by webcam 0.5 0.5 to use the

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laptop webcam or the address of the IoT device that is camera enabled. After running the codes, the estimated results are received. This method can detect all the objects in real time using less CPU power. RYZEN 5 3rd generation is used here and it had worked well without showing any type of lagging and overheating problem. A snapshot of the detection has been given here in the Fig. 2.

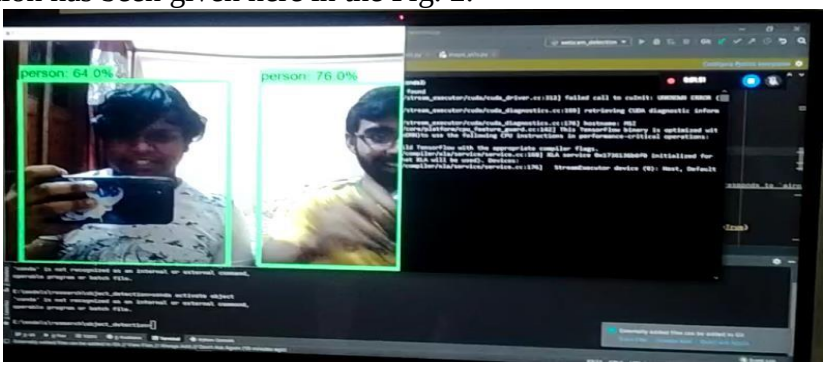

Fig. 2: Snapshot of the project work

So, it can be seen that there are two people in the frame and the lighting condition is not that great still the model successfully detected the two persons. It is not only tested using person but also tested via different objects such as cell phone, dogs, pen, exercise copy, fruits etc. The presented model has given the desired output. So it's based on one of the fastest deep learning algorithm present such as YOLO v3, based on one of the most popular and easy programming language available like Python. It is based on open source libraries and that's why it is cost efficient. All the libraries will be free to use and is developed by IT experts. The accuracy and speed that has the power to compete with most of the other methods present. As one of the promising deep learning method used for object detection YOLOv3 has proved its necessity. Using Darknet-53 to build neural network with networking structure as FPN or Featured Primary Network, Detecting Bounding Box in a fast way (via logistic regression) etc. many feature has made YOLO the best method. YOLO detects the entire image during training and test and that is the reason it implicitly encodes contextual information about classes and also their appearances. YOLO has another feature that is multi label that means YOLO can detect a person and a man simultaneously. Having all the features tested with all real time objects, it can be ensured that this platform for object detection is trust worthy and real time also takes less computational resources.

Conclusion

In conclusion it can be said that object detection is one of the major application of deep learning that will not only give a safe and reliable autonomous instruments but also will open up major paths for more discoveries and advancements in the field of AI. Without Real-time object detection the advancement of AI in major field is not possible. So, the designed system will contribute in a major role in the revolutionary time of AI.

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Review of Future of Indian Automobile Industry:EVs

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Abstract

The world has become a lot easier upon the discovery and modifications of internal combustion engine vehicles over the years and has subsequently entered into a new era of civilization. However, the IC engine vehicles require a noticeable amount of energy source such as gasoline, diesel etc. for their working and due to that there has been a significant increase in the amount of pollution over the decades. However, in order to mitigate the pollution electric vehicles (EV) have been introduced in the market which use electricity for its working. The vehicles are powered by electricity either from an external electrical source or by means of batteries, solar panels, electric generators etc. for the propulsion. The first concept of EV came into existence in middle of 19th century when electricity was first highlighted by Edison and since then the concept has been developed and reinstated as one of the sophisticated developments to motor vehicles with an increased level of comfort and ease of operation which could not be achieved by IC engine vehicles. Since the dawn of 21st century a number of motor companies have participated in the uprising of EVs including Tesla Inc., Tata Motors, Mahindra Electric etc. and have produced a number of improved and versatile EV models. At the very early stage, EVs had barely any creature comfort. But now EVs get all type of creature comfort that anyone can expect from his/her vehicle. Now EVs come in various sizes and price ranges. One can opt for an EV in some thousand rupees to a handsome crore amount of rupees in India.

Keywords:EV; IC engine; electric car; electric motor; regenerative braking;

Introduction & Objective

One of the major problems that humankind today have is increase in pollution day by day. And one of the major source of pollution is the vehicles running on fossil fuels. From the very beginning, automobile industry is majorly dependent upon the usage of fossil fuels. Generally petrol or gasoline, diesel, coal are commonly used fossil fuels. These fuels are being used since a very long time. Harmful gases are emitted from these cars and the environment gets affected. As a result the balance of nature gets affected. Many more hazards(like-greenhouse effect, acid rain, dense smog in winter etc.) has been proven to be caused by the emission of these harmful gases like- sulfur-dioxide(SO_2), carbon monoxide(CO), sulfur-trioxide(SO_3), oxides of nitrogen(NO_x) etc. Humans are not also spared from health problems due to these pollutions. After the discovery of such problems, solution of these problems is also being searched by mankind. One of the major solution of this problem is to reduce the pollution due to combustion of fossil fuels. Here an **'Electric Vehicle (EV)'** comes

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into scene as an alternate choice for mode of transportation.
An electric vehicle (EV) is a vehicle that uses one or more electric motors or traction motors for propulsion. An electric vehicle may be powered through a collector system by electricity from off-vehicle sources, or may be self-contained with a battery, solar panels, fuel cells or an electric generator to convert fuel to electricity. EVs include, but are not limited to, road and rail vehicles, surface and underwater vessels, electric aircraft and electric spacecraft.

EVs first came into existence in the middle of 19th century, when electricity was among the preferred methods for motor vehicle propulsion, providing a level of comfort and ease of operation that could not be achieved by the fossil fuel cars of that time.

Electric motive power started in 1827, when Hungarian priest Ányos Jedlik built the first crude but viable electric motor, provided with stator, rotor and commutator, and the year after he used it to power a tiny car. A few years later, in 1835, Professor Sibrandus Stratingh of the University of Groningen, the Netherlands, built a small-scale electric car, and between 1832 and 1839 (the exact year is uncertain).

The main objective for the development of EVs as an alternate to IC engine powered vehicles is to reduce the amount of pollution due to these vehicles. But not only this an electric vehicle helps the Mother Nature in many other ways. Some of the benefits of having an electric vehicle are followings:-

a. EVs don't employ any IC engine. So these cars don't emit harmful gases to the environment. So, a small number of EVs can reduce a significant amount of carbon and harmful gas emission.
b. It's known to us that, IC engine cars make a lot of noise while running or standing at idle position. But, not in the case of an EV. As there is no engine, so there is no disturbing noise at idle or while running. So, an EV doesn't give any sort of excitement to sound or noise pollution.
c. One can save a lot of money (used to buy fuel for an IC engine vehicle) by buying an EV.
d. Tax benefits from government. Government is offering attractive tax benefits to a buyer, buying an EV. These tax benefits are offered in terms of registration fee, road taxes, GST and many more.

Methods

Currently there are 5 types of electric vehicles are available globally. All of them are not same. These types are-

a. BEVs (Battery Electric Vehicles)
b. HEVs (Hybrid Electric Vehicles)
c. PHEVs (Plug-in Hybrid Electric Vehicles)
d. E-REVs (Extended Range Electric Vehicles)
e. FCEVs (Fuel Cell Electric Vehicles)

Let's see how these EVs work on the road. Most common types of EVs are BEVs, HEVs, PHEVs.

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a. BEVs: BEV stands for Battery operated Electric Vehicle. These cars use one or more than one electric motors or traction motors for propulsion. Generally cars have one traction motor and a battery pack to generate power. Depending upon the drive mechanism, the motor generates power to two or four wheels of the vehicle. One gearbox is also there to control the power in various drive modes like- D,P,R,N etc.

Tata Nexon EV, Mahindra e2o Plus are example of BEVs. All electric two-wheelers are also BEVs(like- TVS iQube etc).

The owner have to charge the battery when it gets exhausted. These cars are also called "Pure Electric Vehicle" as the vehicle gets power only from the battery.

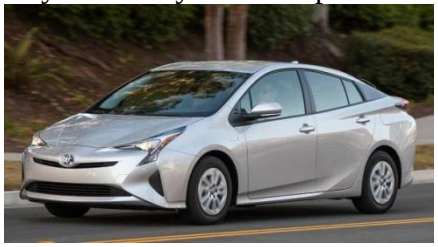
b. HEVs:

c. HEV stands for Hybrid Electric Vehicle. These type of EVs have an IC engine (either petrol or diesel). These cars mainly run on the IC engine. But there is a Li-ion battery pack and motor, which additionally generates some more horsepower and torque. As a result of this combo the fuel efficiency is increased i.e. the vehicle covers more distance on one unit of fuel. These cars

are getting popularity a lot in India.

Depending upon the power output from the engine and the battery pack these cars are divided in various categories like Micro Hybrid, Mild Hybrid or Full Hybrid.

Mahindra Scorpio (Micro Hybrid), Toyota Camry are example of such HEVs.



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d. PHEVs: PHEV stands for Plug-in Hybrid Electric Vehicle. These cars are structurally HEVs but with slight change. Battery packs in these cars can be charged time and again from any charging station or home chargers.

Toyota Prius is a PHEV, sold in India.

Charging processes

Charging the battery of an EV is an important part of the vehicle. EVs are charged in mainly four ways. Theseways are the followings-

a. Slow AC chargers are installed in the home. These chargers take a huge time (approximately 20-24 hrs) to full charge the battery. These are single phase connections.
b. Fast AC chargers are generally installed in the office parking space, cafeterias or in public spaces like shopping malls. These 3-phase chargers are comparatively fast than the previously mentioned chargers(approximately 4-5 hrs for 80% of charging).
c. DC fast chargers are installed in car showrooms, service centre, fuel stations etc. These chargers are able charge the battery very fast. These are capable of charging 80% of battery in just 1hr.
d. Battery Swapping is another option for EVs. Here the drained battery is swapped with a fully charged battery by professionals.

Advantages

We have become familiar with different types of EVs. Let's look at some of the advantages of an EV.

a. Electric motors are very simple technically. They achieve almost 90% energy conversion efficiency over the full range of speeds and power output can be controlled precisely. Regenerative braking is also associated with EVs in order to increase the efficiency of the vehicle.
b. They can be finely controlled and provide high torque from rest, unlike internal combustion engines, and do not need multiple gears to match power curves. This removes the need for torque converters.
c. Air quality indices related to India indicate that the air in many cities of India is no longer healthy. Automobile related pollution has been one of the causes for this.
d. Aspects related to global warming needs a shift to automobile solutions that reduce / do not produce greenhouse gas emissions. If electric vehicles run on electricity produced from non-polluting sources of energy like hydro, solar, wind, tidal and nuclear, they reduce emissions due to vehicles almost to zero.
e. People living in some Indian cities are being affected by noise pollution. Some of the Indian cities have the worst noise pollution levels in the world. Electric vehicles are much quieter and may contribute to a reduction in noise pollution levels in the cities.
f. Electric vehicles have much fewer moving parts as compared to vehicles with IC engines. Thus, being simpler, they are cheaper and easier to maintain.
g. Electric motors deliver high torque at low speeds. As a result, EVs deliver much better performance while starting off and on slopes than IC engine vehicles.
h. On a report issued by Energy Efficiency Service Ltd. (EESL) on 9th Sept. 2020 claims that EVs deployed by EESL have helped to reduce air pollution and mitigate 5,604 tons of CO_2 emissions.

Indian market

In India EVs are still now not so responsive to EVs in terms of four-wheelers. But for two-wheelers people are accepting electric scooters, cycles as an option for a sustainable society. Almost all vehicle manufacturers (both two and four wheelers) are testing their vehicles. Indian EV market has grown itself in some recent years. Customers are also considering EVs due to increase in the number of choices.

In India currently Mahindra & Mahindra, Tata Motors, Hyundai Motors, MG Motors all have launched their electric vehicles. Mahindra e2o was one of the first electric vehicle in India. Launching e2o back in 2013 Mahindra gave a clear message that it's time for EVs now. But due to lack of infrastructure e2o failed miserably. As the time goes up Mahindra launches more EVs like eVerito, e2o+, eSupro etc. Tata has Tigor EV and Nexon EV in their offerings to customers. Hyundai and MG have Kona Electric and ZS EV to offer its customers.

Recently a report has come out that govt. will deploy 250 electric SUVs for govt. officials in Delhi to reduce pollution. EESL says that 150 number of Tata Nexon EV and 100 number of Hyundai Kona Electric will be supplied for this purpose.

Initially the EVs in India had a very range and lacked creature comforts. But nowadays EVs come with a moderately considerable range and good creature comforts. In India we also have HEVs selling in very good numbers as compared t the BEVs. Some famous HEVs in India are Maruti Ertiga, MG Hector, Toyota Camry, Volvo XC90 etc.

In the two-wheeler market Bajaj Chetak, TVS iQube, Revolt RV300 & RV400, Ather 450,450X has been launched and they are doing quite well considering the current infrastructure.

In the three-wheeler market Mahindra Treo, eAlfa and many other from the local manufacturers are doing well also.

Conclusion

India is a little slower in adopting electric vehicles. But these adaptation rate is increasing gradually. Govt. policies are also helping for faster adaptation of electric vehicles. National Electric Mobility Mission Plan 2020 and Faster Adoption and Manufacturing of Hybrid and Electric vehicles (FAME) are to name a few.

The Government started FAME scheme which provides incentives for purchasing electric vehicles. Phase I of the scheme lasted from 2015 to 2019, while Phase II began in 2019 and is planned to be completed in 2022.

In India over several decades automobile industry has evolved itself and evolving now also. Now, Indian automobile industry is welcoming EVs to provide citizens a sustainable environment. Government is setting up policies and infrastructure in order to provide a better tomorrow to our next generation. We should come forward to make these policies successful.

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Dr.Sumit Nandi did B.Sc. (Hons.) in Chemistry, B.Tech. (Chemical Technology), M.Tech. (1st class 1st& Gold Medalist) in Chemical Technology and Ph.D. (Tech.) from Calcutta University. After that he completed MBA with dual specialization in finance and marketing. He also completed one year Post Graduate Diploma in Environmental Management from Kalyani University. Dr. Nandi has been teaching for the last fifteen years at Narula Institute of Technology under JIS Group and presently working as Head and Associate Professor, Dept. of Basic Science of Humanities in the same institute. Dr. Nandi has been teaching as a Visiting faculty in the Department of Chemical Technology, Calcutta University for the last twenty one years. He has several years industrial experience also. His main research area is enzyme kinetics, environment friendly biofuels, mathematical modeling in environmental issues, characterization of blended polymers etc. Several prestigious projects from DBT and UGC have also added many feathers in his cap. He has two patents and published one book on "Engineering Chemistry Simplified" for the B.Tech. students. He guided several research scholars also. He has got best paper presentation award several times in different international conferences in India and abroad. Dr. Nandi contributes more than 100 research publications in reputed international journals and conferences. He visited different countries like Germany, China, Poland, Czec Republic, Hungary, Bulgaria and Lithuania for invited talk and attending international conferences.

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