

**PROF. BISWA NATH CHATTERJI, DEAN (ACADEMIC AFFAIRS)**

Flat No. - 78 CC/1, Anupama Housing Complex

Phase-2, VIP Road, Kolkata-700052.

Email – bnchatterji@gmail.com.

**Date of Birth** : November 10, 1942.

**Present Position** : Professor, Electronics & Comm. Engg. And  
Dean (Academic Affairs)

**Academic Qualifications :**

Sl. No.	Degree	Year	University/Institution
1.	B.Sc. 1 <sup>st</sup> Class 81% 3 <sup>rd</sup> rank	1961	Univ. of Allahabad
2.	B.Tech.(Hons) 85% 2 <sup>nd</sup> rank	1965	IIT Kharagpur
3.	Ph.D.	1970	IIT Kharagpur
4.	Post-Doctoral	1972-1973	Univ. of Erlangen, Germany

**Positions Held (in chronological order) :**

Sl. No.	University/Institution	Year	Position
1.	Telerad Pvt.Ltd.	1965	Asst. Development Engineer
2.	Central Electronics Engg. Research Inst. Pilani.	1965-1966	Senior Research Fellow
3.	IIT Kharagpur, Department of Electronics & Elect. Communication Engg.	1967-1970	Assoc. Lecturer
		1970-1973	Lecturer
		1973-1980	Asst. Professor
		1980-2005	Professor
		1987-1991	Head of the Department
4.	IIT Kharagpur	1994-1997	Dean of Academic Affairs
5.	IIT Kharagpur	1999-2001	Member of Board of Governors
6.	B.P.Poddar Institution of Management and Technology	2005- till date	Professor, Electronics & Comm. Engg. And Dean (Academic Affairs).

**Field of Specialization :**

Electronics and Electronics Communication Engineering with Specialization in Image Processing, Computer Vision, Pattern Recognition and Current Interest Based Image Retrieval, watermarking, 3-D Image Processing, Neural Networks, Multimedia Image Processing, Speech Processing.

### **Academic Honors :**

1. Received the prestigious Shri Hari Om Ashram Pandit Dr. Vikram Saravhai Award consisting of a medal and cash prize in the year 1983 for his achievement in the field of Electronics and Communication.
2. Received the prestigious National Crime Records Bureau's prize for his research papers in Fingerprint Related Techniques and Technologies for **three years 1990, 1991, 1992**.
3. Received Bharat Jyoti Award of India International Friendship Society in the year 2003 for his contributions in Electronics and Communication Engineering.
4. Received Certificate of Achievement of Indian Society for Technical Education and Larson & Turbo Ltd., Bombay for guiding best M.Tech thesis (II Prize) for the year 2003.
5. Received Best Citizens Award in the year 2004 by International Publishing House, New Delhi in recognition of exceptional caliber and outstanding performance in Electronics and Communication Engineering.
6. Received Rashtriya Gaurav Award of India International Society, New Delhi in the year 2004 for obtaining great excellence in Electronics and Communication Engineering.
7. Indian Conference on Vision Graphics and Image Processing (ICVGIP - 2002), Ahmedabad arranged B.N.Chatterji lecture and honored him after completion of 60 years.
8. National Conference on Vision , Graphics and Image Processing, NVGIP - 05 Shimoga, Karnataka, March 2-3, 2005, Felicitated Prof. B.N.Chatterji for his Research and Academic Contribution and arranged a special session in his honor.
9. IEEE International Conference on Signal and Image Processing, Hubli (7 - 9, Dec 2006)Facilitated Prof. B.N.Chatterji by presenting him Life Time Achievement Award in Signal and Image Processing.

### **Highlights of Major Academic Contributions :**

Dr. Chatterji has significant research contributions in Pattern Recognition, Image Processing and Computer Vision. He has developed new techniques in Content Based Image Retrieval. H has developed new Rotation, Translation and Scale Invariant Image Matching Technique which is very widely referred even in

slandered text books. He has worked extensively in Digital watermarking and Cryptography for Image Security. He has original contribution in Wavelet Based Image Compression. He has developed a new method for Stereo Image Matching using Zernike Moments and Fuzzy set theory. He has worked extensively for the use of Neural Networks and Fuzzy Sets in 3-D Image Processing. He has original research contributions in Splines and Spline Transforms for Signal and Image Processing. He has given new Algorithms for Rotation and Scale Invariant Texture Classifications. He has developed Image Processing Transforms for Multiprocessor Architecture. He has found out new Algorithms for Segmentation and Classification of range Images. He has very significant research contributions in Level Sets for Low Level Vision and Image Segmentation. He has worked extensively for Metallographic Image analysis and Synthesis. He has done a significant research work on Medial Axis and Medial Sphere Representation of 3-D Images.

His work on Paths and Distances in Digital Geometry is original and has tremendous potential for solving Complex Multi-Dimensional Pattern Recognition Problems. He has introduced novel concept of De-enhancement and Forced Enhancement and has developed adaptive Generalized Spatial Domain Techniques for Image Enhancement. He is one of the first workers of 3-D Image Analysis. He has utilized Abstract Mathematics, Fuzzy Similarity, Splines and Viterbi Algorithm and is the first Scientist to work for the Recognition of Oriya and Kannada Characters. He has used the Pattern Recognition Concept for the Identification of Distributed Parameter Systems. His work on Data Reduction Algorithm, Recursive Digital Filters, Microprocessors Based System for Scanner and ECG Signal Recognition is Significant R & D contribution in Pattern Recognition. Dr. Chatterji has published about 200 papers in Journals and Conference Proceedings. He has worked as chief Investigators of 24 Sponsored Projects. He has supervised 37 Doctoral, about 150 M.Tech and about 200 B.Tech and about 200 B.Tech thesis.

Dr. Chatterji has more than 40 years of experience of teaching various undergraduate / postgraduate subjects like Basic Electronics, Linear Electronics, Digital Electronics, Control Systems, System Identification, Optical Control, Adaptive Control, Industrial Electronics, Pattern Recognition, Image Processing, Computer Vision, Neural Networks, Microprocessor, Introduction to Computers, Computer Technology and Medical Electronics at IIT Kharagpur and BPPIMT, Kolkata. He has introduced some of these subjects in the Curricula and Syllabi of IIT Kharagpur. He has introduced the M.Tech course on Automation and Computer Vision at IIT Kharagpur and is the key person for setting up the Laboratories like (i) Image Processing and (ii) Computer Vision.

## **Membership of Professional Societies :**

Fellow of the Institution of Engineers  
Fellow of the Institution of Electronics and Telecommunication Engineers.  
Life Member of Indian Society for Technical Education.  
Member Indian Unit of Pattern Recognition and Artificial Intelligence.  
Member Indian Society of Fuzzy Mathematics and Image Processing.

## **Publications (Vide annexure -I)**

(a)	In Referred Journal	110
(b)	In Conferences with Proceedings	130
©	Books	- 3
	Books Chapters	- 7

## **Research Projects Coordinated and the Name of the Sponsoring Body (Vide Annexure II)**

Total - 24

## **Doctoral (Ph.D) Thesis Supervised:**

Total number of Doctoral Thesis	-	37
Number of Scholars working for Ph.D degree at present	-	7

## **Awards Received by Doctoral Students of Dr. Chatterji on the Basis of their Ph.D work**

1. Dr. P.P.Das - INSA (Indian National Science Academy) Young Scientist Award, 1991.
2. Dr. B.Mehtre - National Crime Records Bureau Prize, 1992.
3. Dr. J.Mukhopadhyay - INSA (Indian National Science Academy) Young Scientist Award, 1993.
4. Dr. B.K.Das - INSE (Indian National academy of Engineers) Young Scientist Award, 1997.
5. Dr. B.K.Das - Orissa Vigyan Academy Award, 1998.
6. Dr. B.K.Das - N.R.D.C. Award, 2000.
7. Dr. S.Mahapatra - Orissa Vigyan Academy Award, 2002.
8. Mr. R.K.Jha - Indian Society for Technical Education and Larsen & Turbo Ltd., Bombay National Award for best M.Tech thesis (ii prize) in the year 2003.
9. Dr. M.Kokare - Indian Society for Technical Education, Career Research Award in Image and Signal Processing -2005.

### **Short Term Course Organized :**

Number of Short Term Course Coordinated for Engineering College Teachers and Industry Engineers – 30.

### **Conferences Organized :**

Number of International Conferences Organized as chairman – 3.  
Number of National Conferences Organized as Chairman – 10.  
Number of Advisory / Program / Organizing Committees – 50.

## **ANNEXURE I**

### **LIST OF PUBLICATIONS OF PROF. BISWA NATH CHATTERJI**

#### **A) JOURNAL PUBLICATIONS**

1. Ambar Dutta, B.N. Chatterji and Avijit Kar., 'Comparing and Evaluating Intensity Based Spatial Domain Corner Detectors' , IJIP 2008, Dec-Jan 2009 issue (accepted)
2. Ambar Dutta, B.N. Chatterji and Avijit Kar, 'Corner Detection Algorithms in digital images in last three decades', IETE Technical Review, Vol 25, No.3, pp. 123-134, May-June 2008.
3. Ch Srinivas Rao, S.Srinivaskumar and B.N.Chatterji, 'Content Based Image Retrieval Using Contourlet Transform', ICGST -GVIP, Vol 7, No-3, pp. 9-15, Nov 2007.
4. K.Veerawamy, S.Srinivaskumar and B.N.Chatterji, 'Lossless Image Compression Using Topological Pixel Re-ordering and Switched Predictor', IETE Journal of Research, Vol 53, No. 6, pp. 505 -512, Nov-Dec, 2007.
5. K.Veerawamy, S.Srinivaskumar and B.N.Chatterji, 'Designing Quantization Table for Hadamard Transform Based on Human Visual System for Image Compression', ICGST-GVIP, Vol 7, pp. 31-38, Nov 2007.
6. Ivy Majumdar, Avijit Kar, B.N.Chatterji , 'Texture Feature Matching Methods for Content Based Image Retrieval', IETE Technical Review, Vol 24, No.4, pp. 257, July-August 2007.
7. Manesh Kokare, P.K. Biswas and B.N. Chatterji, 'Texture Image Retrieval Using Rotated Complex Wavelet filters', Pattern Recognition Letters, Vol 28, pp. 1240-1249, March 2007

8. B.C.Mohan, S.S.Kumar and B.N.Chatterji, 'A Robust Digital Image Watermarking Scheme Using Singular Value Decomposition (SVD), Dither Quantization and Edge Detection', ICGST Graphics Vision and Image Processing (GVIP), Vol 8, No. 2, pp. 17-23, 2007.
9. Manesh Kokare, P.K. Biswas and B.N. Chatterji, 'Rotation -Invariant Texture Image Retrieval Using Rotated Complex Wavelet filters', IEEE Trans on Systems, Man and Cybernetics, Part B : Cybernetics, Vol 36, No:6, pp. 1273-1282, Dec 2006.
10. Manesh Kokare, P.K. Biswas and B.N. Chatterji, 'Texture Image Retrieval Using New Rotated Complex Wavelet Filters', IEEE Trans on Systems, Man and Cybernetics, Part B : Cybernetics, Vol 35, No:6, pp. 1168-1178, Dec 2005
11. Manesh Kokare, P.K. Biswas and B.N. Chatterji, 'Cosine Modulated Wavelet Packet Based Texture Features Content Based Image Retrieval', IETE Journal of Research, Vol 51, pp. 477, Nov-Dec, 2005.
12. A. Adhipathi Reddy and B.N. Chatterji, 'A New Wavelet Based Logo Watermarking Scheme', Pattern Recognition Letters, Nov. 2004.
13. S. Srinivas Kumar and B.N. Chatterji, 'Robust Similarity Measures for Stereo Correspondence', Journal of IE(India), CP, Vol. 85, pp.44-51, Nov. 2004.
14. Manesh Kokare, B.N. Chatterji and P.K. Biswas, 'Cosine Modulated Wavelet Based Texture Feature for Content Based Image Retrieval', Pattern Recognition Letters, Vol.25(4), p 391-398, Mar 2004.
15. S. Srinivas Kumar and B.N. Chatterji, 'Two-Frame Stereo Matching Algorithms — A Review', IETE Journal of Research, vol. 50(1), p 49-62, Jan. 2004.
16. A. Adhipathi Reddy and B.N. Chatterji, 'Texture Image Compression using Tree Structure Wavelet Transform', IETE Journal of Research, vol.50(1), p 63-68, Jan. 2004.
17. Ramchandra Manthalkar, P.K. Biswas and B.N. Chatterji, 'Rotation and Scale Invariant Texture Features using Discrete Wavelet Packet Transform', Pattern Recognition Letters, vol. 24, p 2455- 2462, Oct.2003.
18. Ramchandra Manthalkar, P.K. Biswas and B.N. Chatterji, 'Rotation Invariant Texture Classification using Even Symmetric Gabor Filters', Pattern Recognition Letters, vol.24, pp. 2061- 2068, 2003.

19. S. Srinivas Kumar and B.N. Chatterji, 'Stereo Matching Algorithms Based on Fuzzy Approach', International Journal on Pattern Recognition and Artificial Intelligence, vol. 16, No.7, pp. 883- 899, 2002.
20. Manesh Kokare, B.N. Chatterji and P.K. Biswas, 'A Survey On Current Content Based Image Retrieval Methods', IETE Journal of Research, vol. 48, No. 3&4, pp. 261-271, May-Aug 2002.
21. S. Kulkarni and B.N. Chatterji, 'Anisotropic Diffusion in Image Processing', IETE Journal on Research, vol.48, No. 3&4, pp. 171 -180, May-Aug. 2002.
22. B.N. Chatterji and S.Kulkarni, 'Accurate Shape Modelling With Front Propagation Using Adaptive Level Sets', Pattern Recognition Letters, 23, 1559 - 1568, 2002.
23. B.N. Chatterji and R. Panda, 'Least Squares Generalized B -Spline Signal/Image Processing', Signal Processing, 81(10), 2005 -2017, Sep/Oct 2001.
24. B.N. Chatterji and R. Panda, 'Wavelet Decomposition using Fast Recursive Generalized hR Filters', IETE Journal on Research, 47(3&4), 137 -139, Aug. 2001.
25. Mukherjee, J., Aswatha Kumar, M., Das , P.P. and Chatterji, B.N., 'Fast Computing of Cross Sections of 3-D objects from their Medial Axis Transforms', Pattern Recognition Letters, vol21,2000, pp. 605 -613.
26. Mukherjee, J., Das, PP., Aswatha Kumar, M., and Chatterji, B.N., 'On Approximating, Euclidian Matrices by Their Distances in 2D and 3D', Pattern Recognition Letters, vol. 21, 2000, pp. 573 -582.
27. Mukherjee, J., Aswatha Kumar, M., Chatterji, B.N. and Das, P.P., 'Discrete Shading of Three — Dimensional Objects From Medial Axis Transform, Pattern Recognition Letters', Vol. 20, 1999 pp., 1533 -1544.
28. Mukherjee, J. , Aswatha Kumar, M., Chatterji, B.N., Das, P.P., 'Discrete Shading of Three Dimensional Objects from Medial Axis Transform', Pattern Recognition Letters, Vol. 20, 1999,pp 1533 -1544.
29. Panda, R. and Chatterji, B.N., 'B-Spline Signal Processing using Harmonic Basis Function, Signal Processing', Vol. 72, No. 3, 1999, pp. 147 -166.
30. Patra, J.C., Pal, R.N. and Chatterji, B.N., 'Identification of Nonlinear Dynamic Systems using Functional Link Artificial Neural Networks', IEEE Trans. Systems, Man and Cybernetics, vol 29, No. 2, 1999, pp. 254 -262.

31. Mahapatra, S., Mahapatra, R.N. and Chatterji B.N., 'Mapping of Neural Network Models onto Massively Hierarchical Computer Systems', Journal of Systems Architecture, vol. 45, No. 10, 1999, pp. 919-929.
32. Patra, J.C., Panda, G., Pal, RN. and Chatterji, B.N., 'Neural Networks for Signal Processing Applications', Journal of Computer Society of India, Dec. 1998.
33. Panda, R. and Chatterji, B.N., 'The L<sup>2</sup> Polynomial Spline Wavelet Transform: A Signal and Image Processing Perspective', IETE Technical Review, vol 15, No. 3, 1998, pp. 153-164.
34. Panda, R. and Chatterji, B.N., 'Unsupervised Texture Segmentation Using Tuned Filters In Gaborian Space', Pattern Recognition Letters, vol. 18, 1997, pp. 445-453.
35. Rastogi, A.K., Chatterji, B.N. and Ray, A.K., 'Design of a Real-Time Tracking System for Fast Moving Objects', IETE Journal of Research, vol.43, No. 5, 1997, pp. 359-370.
36. Mandal, S.K., Ramachandra Rao, P. and Chatterji, B.N., 'Assessment of Precipitates in Materials Through Image Processing', Acta Stereologica, Slovenia, Dec. 1997.
37. Mahapatra, R.N., Kumar, A and Chatterji, B.N., 'Performance Analysis of 2-D Inverse Fast Cosine Transform Employing Multiprocessors', IEEE Trans. On Signal Processing, vol. 45, No. 5, May 1997, pp. 1323-1335.
38. Das, B.K., Mahapatra, R.N. and Chatterji, B.N., 'Modelling Harmard Haar Transform Algorithm for Omega Connected Multiprocessor', Signal Processing, vol. 58, No. 3, 1997, pp. 293-301.
39. Mahapatra, S., Mahapatra, R.N. and Chatterji, B.N., A Parallel Formulation of Back-Propagation Learning on Distributed Memory Multiprocessors. Parallel Computing (North Holland). March 1997, vol.22, 1997, pp. 1661-1675.
40. Reddy, B.S. and Chatterji, B.N., An FF<sup>1</sup>' Based Technique for Translation, Rotation and Scale Invariant Image Registration, IEEE Trans. On Image Processing, vol. 5, No. 8, August 1996, pp.1266-1271.
41. Panda, R., Rath, G.S. and Chatterji, B.N., Generalized B-spline Signal Processing, Signal Processing vol 55(1), 1996, pp. 1-14.
42. Das, B.K., Mahapatra, R.N., and Chatterji, B.N., Performance Modelling of Discrete Cosine Transform for Star-Graph connected Multiprocessors,

International Journal of Circuits, Systems and Computers, vol.6. No. 6. 1996, pp. 635-648.

43. Panda R and Chatterji, B.N., Gabor Function: An Efficient Tool for Digital Image Processing, ZETE Technical Review, vol. 13, No. 4, 1996, pp. 14 -20.

44. Aswatha Kumar, M., Chatterji, B.N., Mukherjee, J. and Das P.P., Representation of 2D and 3D Binary Image using Medial Circles and Spheres, International Journal of Pattern Recognition and Artificial Intelligence, vol. 10, No. 4, 1996, pp. 365-387.

45. Dasgupta B. and Chatterji, B.N.. Fourier Mellin Transform Based Image Matching Algorithm, Journal of the Institution of Electronics & Telecommunication Engineers, vol. 42, No. 1., 1996, pp. 3-10.

46. Jagdish, S., Biswas, P.K., Mukherjee, J. and Chatterji, B.N., Surface Characterization and Parameter Estimation for Industrial Vision Systems, Sadhana, vol. 20, October 1995, pp. 759-780.

47. Deka, B., Pan P.K., Mukherjee J, and Chatterji, B.N., Scene Matching of aerial Images, Journal of the Institution of Electronics & Telecommunication Engineers, vol. 41, no.3, 1995, pp. 165-174.

48. Biswas P.K., Biswas S.S. and Chatterji. B.N., An SIMD Algorithm for Range Image Segmentation, Pattern Recognition, vol. 28, no. 2, 1995, pp. 255-267.

49. Mukherji, D. and Chatterji. B.N., Adaptive Neighbourhood Extended Contrast Enhancement and its Modification. Computer Vision and Image Processing, vol. 57, no. 2, March 1995, pp. 1-12.

50. Chatterji, B.N., and Dash, L., Image Enhancement with Emphasis on Adaptive Enhancement and Deenhancement, Journal of Franklin Institute, vol. 331/B. No. 5, 1994, pp. 479-494.

51. Chatterji, B.N., PID Controllers, Students Journal of the Institution of Electronics & Telecommunication Engineers, vol 35, No. 3 & 4, Dec. 1994. pp. 169-174.

52. Biswas, P.K. and Chatterji B.N., Surface Description in Range Images — A Parallel Approach, Indian Journal of Pure and Applied Math, vol. 25(1 & 2), Jan & Feb. 1994, pp. 205-230.

53. Chatterji B.N.. Adaptive Contrast Enhancement of Finger Print Images, Indian Journal of Engineers, vol. 23, No. 1 & 2, 1993, pp. 31 -41.

54. Biswas, P.K., Mukherjee, J. and Chatterji B.N., Component Labelling in Pyramid Architecture, Pattern Recognition, vol. 26. no. 7, July 1993, pp. 1099 - 1115.
55. Das P.P. and Chatterji B.N., Digital Distance Geometry, Sadhana, vol. 18, Pt. II, 1993, PP. 1-29.
56. Chatterji B.N., Analog Computer Simulation, Student Journal of IETE, vol. 33, Dec. 1992, pp. 27-38.
57. Das, S., Mukherjee, J. and Chatterji, B.N., Thresholding for Edge Extraction of Intensity Images, Indian Journal of Engineers, vol. 22, no. 3, 1992, pp. 20 -29.
58. Mukherjee, J., Bhattacharya, S., Chatterji, B.N. and Das P.P., A Methodology for Characterizing Planer, Cylindrical and Spherical Surface Patches in Range Images, Journal of the Institution of Electronics and Telecom. Engineers, vol. 38, No. 4, 1992, pp. 2 19-224.
59. Biswas, P.K., Mukherjee, J., Chatterji, B.N. and Chakraborty, PP., Qualitative Description of Three Dimensional Scenes, mt. Journal of Pattern Recognition and Artificial Intelligence, vol. 6, no. 4, 1992, pp. 65 1 -674.
60. Parthasarathy, G. and Chatterji B.N., A Quadratic Classifier for High Dimensional/Periodic Measurement PR Problems, Information Science, vol. 63, no. 1, Jan 1992, pp. 113-137.
61. Ramamohan, T,R. and Chatterji B.N., Spatial Sigma Filter for Contrast Enhancement of Monochrome Digital Images, Indian Journal of Engineers, vol. 21, no. 3, July 1991, pp. 9-13.
62. Chatterji B.N., Finger Print Image Processing using Neural Network, NCRB Gazette, vol. III, No. 6, June 1991, pp. 12-16.
63. Das, P.P., Chakraborty, P.P. and Chatterji B.N., The t-cost-m-neighbour Distance in Digital Geometry, Journal of Geometry, vol. 42, 1991, pp. 42 -58.
64. Dash, L. and Chatterji B.N., Adaptive Contrast Enhancement and Deenhancement, Pattern Recognition, vol. 24, no.4, April 1991, pp. 289 -302.
65. Das, P.P., Mukherjee J. and Chatterji, B.N., The t-cost Distance in Digital Geometry, Information Sciences, 1991, vol. 59, no. 1, pp. 1 -20.
66. Mukherjee, J., Das, PP. and Chatterji, B.N., An Algorithm for Extraction of the Wire Frame Structure of a Three Dimensional Object, Pattern Recognition, 1990, vol. 23, no. 9, pp. 999-1010.

67. Mukherjee, J., Das, P.P. and Chatterji, B.N., On Connectivity Issue of ESPTA, Pattern Recognition Letters, vol. 11, no. 9, 1990, pp. 493-498.

68. Das, P.P. and Chatterji, B.N., Hyperspheres in Digital Geometry, Information Sciences, vol. 50(1), 1990, pp. 73-91.

69. Mukherjee, J., Das P.P. and Chatterji B.N., From Range to Frame Extraction of 3-D Information for 2-D Data, Pattern Recognition Letters, vol. 11, July 1990, pp. 493-498.

70. Balasubramanian, A., Parthasarathy, G. and Chatterji B.N., Knowledge Based Approach for Cluster Algorithm Selection, Pattern Recognition Letters, vol. 11, Oct. 1990, pp. 651-661.

71 Parthasarathy G. and Chatterji B.N., A Class of New KNN Methods for Low Sample Problems, IEEE Trans. Systems Man and Cybernet, vol. 20, no. 3, May 1990, pp. 715-718.

72. Mukherjee, J., Das P.P. and Chatterji B.N., Segmentation of Three Dimensional Surfaces, Pattern Recognition Letters, vol. 11, 1990, pp. 215 -223.

73. Das P.P. and Chatterji B.N., Octagonal Distances for Digital Pictures, Information Sciences, vol. 50(20), 1990, pp. 123-141.

74. Mukherjee, J., Das, P.P. and Chatterji B.N., Thinning of 3-D Image using Safe Point Thinning Algorithm (SPTA), Pattern Recognition Letters, vol. 10, 1989, PP. 167-173.

75. Das P.P. and Chatterji B.N., Estimation of Errors between Euclidian and m - Neighbour Distance, Information Sciences, vol. 48, 1989, pp. 1-26.

76. Das, P.P. and Chatterji B.N., Distance Transformation in Arbitrary Dimensions, Computer Vision Graphics and Image Processing, vol. 43(3), 1988, pp. 368-385.

77 Das, P.P. and Chatterji B.N., Knight's Distance in Digital Geometry, Pattern Recognition Letters, vol. 7(4), 1988, pp. 215-226.

78. De, T.K. and Chatterji B.N., An Approach to Generalized Technique for Image Contrast Enhancement using the concept of Fuzzy Set, International Journal of Fuzzy Sets and Systems, vol. 25, 1988, pp. 145-158.

79. Balabrahmanandam, M. and Chatterji B.N., A Pattern Recognition Approach to Model Characterization of Distributed Systems, IEEE Trans. System, Man and Cybernatics, vol., 17, No. 3, May 1987, pp. 488-495.

80. Das, P.P., Chakraborty, PP. and Chatterji B.N., Distance Functions in Digital Geometry, Information Sciences, vol. 42, 1987, pp. 113 -136.
81. Das, P.P., Chakraborty, P.P. and Chatterji, B.N., Generalized Distances in Digital Geometry, Information Sciences, vol. 42, 1987, pp. 51 -67.
82. Chatterji B.N. and Gopalkrishna B., Digital Image Restoration using Viterbi Algorithm — An Efficient Trellis Diagram in Burkhardt and Schorb's Method, Journal of The Institution of Electronics & Telecommunication Engineers, vol. 33, no. 1, 1987, pp. 8-11.
83. Das, P.P. and Chatterji B.N., A Note on Prediction of Entropy of Bengali Prose, Journal of the Institution of Electronics & Telecommunication Engineers, vol. 32(6), 1986, pp. 441 -445.
84. Das, P.P. and Chatterji B.N., Self Synchronizing Huffman Code and Bounds in Text Reduction for Bengali Prose, Computer Science and Informatics, vol. 16, no. 1, 1986, pp. 13-19.
85. Chatterji, B.N., Feature Extraction Method for Character Recognition, I.E.T.E. Technical Review, vol. 3, no. 1, 1986, pp. 9 -22.
86. Parthasarathy, G. and Chatterji B.N., The Use of Data Windows in Feature Extraction for High Dimensional PR Problems, Pattern Recognition Letters, vol. 4, no. 2, 1986, pp. 25-30.
87. Chatterji B.N., Use of Fuzzy Set Theory and Spline Techniques for Pattern Recognition and Scene Analysis, Photogrammetria, vol. 39, 1984, pp. 241 -262.
88. De, T.K. and Chatterji B.N., Concept of Deenhancement in Digital Image Processing, Pattern Recognition Letters, vol. 2, 1984, pp. 329 -332.
89. Rammohan T.R. and Chatterji B.N., Recognition of Distorted Kanada Characters, Journal of the Institution of Electronics & Telecommunication Engineers, vol. 30, no. 6, Nov. 1984, pp. 223 -225.
90. Permer K.K., Chatterji B.N. and Khandelwal D.C., Decentralized Control and Stabilization of Large Scale Systems, Journal of the Institution of Engineers, vol. 65, ELI, Aug, 1984, PP. 1-5.
91. Patki, V.B. and Chatterji B.N., Reliability Modelling of Computer Systems, Journal of Electronics Engineering, vol. 24, 1983, pp. 683 -694.
92. Patki V.B., Patki A.B. and Chatterji B.N., Reliability and Maintainability Considerations in Computer Performance Evaluation, IEEE Trans. On Reliability, vol. R-32, no. 5, Dec. 1983, pp. 433-436.

93. Pal D. and Chatterji B.N., A Linear Array Scanner System, Journal of the Institution of Electronics and Telecommunication Engineers, vol. 28, no. 4, April 1982, pp. 129-132.
94. Chatterji B.N., Roy A.K. and Ghosh A.K., On the Development of A Microprocessor Based Scanner System, Journal of the Institution of Engineers(India), vol. 63, pt. ETI, Aug. 1982, pp. 33-36.
95. Ganapati, M. and Chatterji B.N., Interconnection Hardware for Computer Communication Journal of the Institution of Electronics & Telecommunication Engineers, vol. 29, no. 2, Feb. 1982, pp. 62-68.
96. Balabrahmanandam, M. and Chatterji B.N., Lumped Model of a Nonlinear Distributed System by Finite Element Method, International Journal of System Science, vol. 13, no. 10, 1982, pp. 1117 - 1123.
97. Bhuyan L. and Chatterji B.N., Very Low Sensitivity Recursive Digital Filter Structures, Electronics Letters (London), vol 17, No. 10, 14th May, 1981, pp. 318-350.
98. Chatterji B.N., A Multistage Decision Method for Two Dimensional Data Reduction, Journal of the Institution of Electronics and Telecommunication Engineers., vol.27, no. 9, Sept. 1981, pp. 200-202.
99. Chatterji B.N., Log-Antilog Squaring/Squareroot Circuits with Applications in the Simulation of Ventilation Networks, Journal of the Institution of Electronics and Telecommunication Engineers., vol. 25, no. 7, July 1979, pp. 311-313.
100. Balabrahmanandan M. and Chatterji B.N., Identification of Parabolic Distributed Parameter System by a Pattern Recognition Approach, Journal of the Institution of Electronics and Telecom. Engineers, vol. 25, no. 9, Sept. 1979, pp. 369-372.
101. Ganapathi, M. and Chatterji B.N., A Linear Gate for Sampling, Students Journal of the Institution of Electronics and Telecommunication Engg. vol. 18, no.4, Oct. 1977, pp. 157-164.
102. Asthana, R.G.S. and Chatterji B.N., Feature Extraction (Pattern Detection) Methods in Pattern Recognition, Journal of the Electronics and Telecommunication Engineers 1973, vol. 19, no. 10, pp. 549-554.
103. Chatterji B.N., On Application of Monte-Carlo Method in Testing Plant Transfer Function in Presence of Noise-Special issue of the Journal of the Institution of Engineers in Electronics Instrumentation in Research and Industries, 1971.

104. Chatterji B.N. and Chatterjee B., Performance Optimization of Control Systems in presence of Inherent Couplings, Automatica, U.S.A. vol. 7, 1971, pp. 599-605.

105. Chatterji B.N. and Chatterjee B., Sensitivity of performance of Control System to Unintentional Coupling Signals- International Journal of Control, London, vol. 12, no. 2, 1969, pp. 265-272,

106. Chatterji B.N. and Sikdar S., A Simple Digital Simulation of Control System, Journal of the Instn. of Telecom. Engrs., vol. 14, no. 10, 1968, pp. 433 -446.

107. Chatterji B.N. and Chatterjee B., Effects of Inherent Complings on Control System — A Computer Study, Journal of the Institution of Telecom. Engrs., 1968, vol. 14, no. 8, pp. 374-380.

108. Chatterji B.N. and Chatterjee B., Transistorized Control System Analyzer, Journal of the Instn. Of Telecom. Engrs., vol. 14, no.4, 1968, pp. 177 -184.

109. Chatterji B.N. and Chatterjee B., Amplitude Stabilized Transistorized Low Frequency Oscillator/Internat. J. of Electronics, London vol. 22, 1967, pp.413 -425.

110. Chatterji B.N., Drift Compensation in Transistorized Differential Amplifier (D.C.), Journal of the Inst. Of Telecom. Engrs., vol. 13, no. 4, 1967 pp. 149 -157.

## **B) PUBLICATION IN REFEREED CONFERENCE PROCEEDINGS**

1. Ambar Dutta, Avijit Kar and B.N.Chatterji, 'A Novel Approach to Corner Matching Using Fuzzy Similarity Measure', International Conference on Advances in Pattern Recognition (ICAPR-2009), ISI Kolkata, February 4-6, 2009.

2. Sandip Dutta, Avijit Kar, N.C.Mohanti and B.N.Chatterji, 'Network Security Using Biometric and Cryptograph', Advanced Concepts for Intelligence Vission Systems, Springer Verlag LNCS5 259, pp 38-44, Berlin, Hydelberg 2008.

3. Ambar Dutta, Avijit Kar and B.N.Chatterji, 'A Novel window Based Corner Detection Algorithm for Gray Scale Images', 6<sup>th</sup> Indian Conference on computer Vision, Graphics and Image Processing (ICVGIP -2008) at Bhubaneswar, December 16-19, 2008.

4. B. N. Chatterji, 'Wavelet Based CBIR using Colour, Texture and Shape as Features', National Conference on Recent Advances in Control and Instrumentation, RACICON-2008, November 8-9, 2008.

5. B. N. Chatterji, 'Wavelet Based Rotation Invariant Content Based Texture Image Retrieval', National Workshop on Advances in Signal and Image Processing, JNTU, Kakinada, AP, October 20 -21, 2008.
6. Ambar Dutta, Animesh Mondal, B.N.Chatterji and Avijit Kar, 'Bit Plane Extension to a Class of Intensity Based Corner Detection Algorithm', 15<sup>th</sup> European signal Processing Conference 2007, (EUSIPCO -2007), at Poznan, Poland, September 3-7, 2007.
7. S. Srinivas Kumar, B. Chandra Mohan, B. N. Chatterji, 'An Oblivious Image Watermarking Scheme Using Singular Value Decomposition', Proc. Ninth IASTED International Conference on Signal and Image Processing, at Hawaii, USA, pp. 19-24, August 20-22, 2007.
8. Ambar Dutta, B.N.Chatterji and Avijit Kar, 'Comparison of a Dozen Intensity Based Spatial Domain Methods for Corner Detection', 2<sup>nd</sup> International Conference on Information Processing (ICIP -2008), pp. 124-134, at Bangalore August 8-10, 2008.
9. B. N. Chatterji, 'Content Based Image Retrieval for Synthetic Vision in Aircraft Movement Control', Workshop on Enhanced and Synthetic Vision for Transport Aircraft, National Aerospace Lab, Bangalore, April 25 -26, 2008.
10. B. N. Chatterji, 'Watermarking and Biometric for Information Security', National Conference on Information Security Issues and Challenges NC ISIC-08, GIET, Gunupur, Orissa, January 19 -20, 2008.
11. B. N. Chatterji, 'Postal Pin Code Sorting', Indian Conference on Technologies for Postal Automotion at Bagalkot, Karnataka, 5 -6 October, 2007.
12. B. N. Chatterji, 'Watermarking for Network Security ', Golden Jubilee Annual Technical Convention, IETE, ATC07, at Hyderabad 29 -30 September, 2007.
13. B.N. Chatterji, 'Watermarking and Datamining', Proc. National Seminar on Datamining and Waterhousing: Trends and Applications, at Balasore, March 2, 2007.
14. B.N. Chatterji, 'Watermarking of Digital Images', Proc. National Workshop on Image Analysis and recognition, at Guntur, Jan. 5 -6, 2007.
15. Abhijit Kar, Rohit Kamal Chatterjee, Ambar Dutta and B. N. Chatterji, 'Diffusion to Refusion: A New Approach to Edge Detection', Proc. National Conference on Range Technology 2006, NACORT 2006, Chandipur, Orissa, Nov. 28-30, 2006.

16. K. Veeraswamy, S. Srinivas Kumar and B.N. Chatterji, 'Lossless Image Compression using Topological Pixel re-ordering', Proc. International Conference on Visual Information Engineering, VIE, 2006, IET UK, pp. 218 -222, at Bangalore, Sept.26-28, 2006.
17. B. Chandra Mohan, S. Srinivas Kumar and B.N. Chatterji, 'Digital Image Watermarking in Dual Domains', Proc. International Conference on Visual Image Engineering, VIE, 2006, pp. 411 -415 at Bangalore, Sept.26-28, 2006.
18. B.N. Chatterji, 'Digital Image Watermarking Technique', Proc. Conference on Emerging Trends in Electrical Engineering. ETET -2006, Kolkata, Sept. 2, 2006.
19. B.N. Chatterji, 'Content Based Image Retrieval', Proc. National Workshop on The Frontier Research Issues in Pattern Recognition and Image Processing, Bangalore, March. 24-25, 2006.
20. B.N. Chatterji, 'New Development in Content -Based Image Retrieval', Proc. The Frontier research Issues in Pattern Recognition & Image Processing, New Horizon College of Engineering, Bangalore, March -24-25, 2006.
21. B.N. Chatterji, 'Recent Trends in Digital Watermarking', Proc. National Workshop on Advances in Signal & Image Processing (ASIP 2006), Kakinada, Feb. 27-28, 2006.
22. Ms. Ivy Majumder, Dr. B.N Chatterjee, 'Content -Based Image Retrieval Using Colour, Texture & Shape Pattern', Recent Trend Emerging Technology, Kolkata Feb-25, 2006, P64-66.
23. S Banerjee, A Dutta ,M Abedin , S Bhattacharya, S Majimder , Prof(Dr)B.N Chatterjee, 'Human Recognition by Iris Image Processing', Proceeding of Conference on Recent Trends in Emerging Technologies, Kolkata Feb -25, 2006, P73-75.
24. B Kummer Jha, P.K. Biswas & B.N. Chatterji, 'Stochastic Resonance Based Visualisation of Dark Images', Proceeding of Conference on Recent Trend Emerging Technology, Kolkata Feb-25, 2006, P60-63.
25. B Kummer Jha, P.K. Biswas & B.N. Chatterji, 'Stochastic Resonance Based Enhancement of Dark Images', Proc. Workshop on Computer Vision, Graphics & Image Processing, WCVGIP 2006, Hyderabad, Jan. 12 -13 2006.
26. B Kummer Jha, P.K. Biswas and B.N. Chatterji, 'Enhancement of Digital Image using Stochastic Resonance', Proc Tencon'05 - IEEE Region 10 Conference, Australia, Nov.2005.

27. Rajib Kummer Jha, P.K. Biswas and B.N. Chatterji, 'Image Denoising using Stochastic Resonance', Proc. International Conference Cognition & Recognition, Mysore Dec.22-23, 2005.
28. B.N. Chatterji, 'Content Based Image Retrieval', Proc. Workshop on Image Processing & Image Analysis, John F.Welch Technology Centre GE -Bangalore, Oct-7 2005
29. B.N. Chatterji, 'Content Based Image Retrieval', Proc. Workshop on Image Processing, Computer society of India, Kolkata. Sep -7 2005.
30. B.N. Chatterji, 'Content Based Image Retrieval', Proc. Workshop on Emerging Trend In Communication Future Institute of Engineering &Management, Kolkata, 1<sup>st</sup> & 2<sup>nd</sup> August 2005.
31. Manesh Kokare, P.K. Biswas and B.N. Chatterji, 'Rotated Complex Wavelet Based Texture Features for Content Based Image Retrieval', Proc. International Conference on Pattern Recognition, Cambridge, U.K., p. 204 -208, Aug 20-24, 2004.
32. A. Adhipathi Reddy & B.N.Chatterji, 'Wavelet Packet Based Digital Image Watermarking', Proc. Fourth Indian Conference on Computer Vision, Graphics and Image Processing, Kolkata, p. 364 -369, Dec. 16-18, 2004.
33. Gunjan and B.N. Chatterji,' Fuzzy Compactness Based Adaptive Window Approach for Image Matching in Stereo Vision', Proc. I 1' International Conf. ICONIP 2004 Kolkata, p 935-940 Nov 2004, in Neural Information Processing, Springer, Berlin 2004.
34. A. Adhipathi Reddy & B.N. Chatterji,'Wavelet Based Watermarking Technique for Copyright Protection of Multimedia Data', Proc. Second mt. Conference on Mobile Multimedia, Bali, Indonesia, Sept. 22 -24, 2004.
35. A. Adhipathi Reddy & B.N. Chatterji, 'A Wavelet Based Logo Watermarking Scheme for Colour Images', Proc. Twelfth mt. Conf. on Advanced Computing and Communications, Ahmedabad, Dec 15 -18, 2004.
36. A. Adhipathi Reddy & B.N. Chatterji, 'Wavelet Domain Digital Signature for Image Authentication', Proc. National Communication Conf. ,Kharagpur, Jan 29 - 30, 2005.
37. Manesh Kokare, B.N. Chatterji and P.K. Biswas, 'Compression Similarity Metrics for Texture Image Retrival', Proc. IEEE TENCON Conference, Bangalore, pp 571-575, 15-17 Oct, 2003.

38. Manesh Kokare, B.N. Chatterji and P.K. Biswas, 'Rotated Wavelet Based Texture Features for Content Based Image Retrieval', Proc. 5th International Conference on Advances in Pattern Recognition (ICAPR 2003), Kolkata, pp. 243 - 247, 10-13 Dec. 2003.
39. A. Adhipathi Reddy & B.N. Chatterji, 'Wavelet Based Robust Logo Watermarking Scheme', Proc. 5th International Conference on Advances in Pattern Recognition (ICAPR 2003), Kolkata, pp. 359-362, 10-13 Dec. 2003.
40. Ramchandra Manthalkar, P.K. Biswas and B.N. Chatterji, 'Rotation Invariant Texture Classification using Wavelet Features', Proc. National Systems Conference, NSC 2003, Kharagpur, pp. 282-285, 17-19 Dec., 2003.
41. B.N. Chatterji, Manesh Kokare, A. Adhipathi Reddy and Rajib Kumar Jha, 'Wavelets for Content Based Image Retrieval and Digital Watermarking for Multimedia Applications', Fourth IEEE Pacific—RIM Conference on Multimedia, Singapore, pp. 2A.4.1 — 2A.4.5, 15-18 Dec. 2003.
42. A. Adhipathi Reddy and B.N. Chatterji, 'Hiding a Seal into Region of Interest in Digital Images', Proc. Second National Conference on Document Analysis and Recognition, NCDAR 2003, Mandya, pp. 20-25, 11-12 July, 2003.
43. Rajib Kumar Jha and B.N. Chatterji, 'Wavelet Based Approach for Watermarking of Digital Images', Proc. Second National Conference on Document Analysis and Recognition, NCDAR 2003, Mandya, pp. 26-30, 11-12 July 2003.
44. Manesh Kokare, B.N. Chatterji and P.K. Biswas, Wavelet Transform Based Texture Features for Content Based Image Retrieval, Proc. **9th** National Conference on Communications (NCC 2003), pp. 443-447, Jan-Feb 2003, Chennai(INDIA).
45. Manesh Kokare, B.N. Chatterji and P.K. Biswas, M-Band Wavelet Based Texture Features for Content Based Image Retrieval, Proc. Indian Conference on Vision, Graphics and Image Processing (ICVGIP 2002), pp. 173-178, Dec 2002, Ahmedabad(INDIA).
46. Manesh Kokare, B.N. Chatterji and P.K. Biswas, Dimensionality Reduction of Tree Structure Wavelet Transform Texture Features for Content Based Image Retrieval, Proc. Seventh International Conference on Control, Automation, Robotics and Vision (ICARCV 2002), pp. 1647 - 1652, Dec 2002, Singapore.
47. Ramchandra Manthalkar, P.K. Biswas and B.N. Chatterji, Rotation Invariant Colour Texture Classification in Perceptually Uniform Colour Spaces, Indian Conference on Computer Vision, Graphics and Image Processing, ICVGIP, pp. 220-226, Dec 2002, Ahmedabad.

48. S. Kulkarni, B.N. Chatterji, S.A. Joshi and A.K. Ray, Edgeless Active Contours for Natural Colour Images Based on Angular Mapping and Level Sets, Indian Conference on Computer Vision, Graphics and Image Processing, pp. 52 - 58, Dec 2002, Ahmedabad.
49. S.S. Kumar and B.N. Chatterji, Stereo Correspondence using Fuzzy Approach, Proc. of AFSS International Conference on Fuzzy Systems, pp. 367 - 374, 2002, Calcutta.
50. B.N. Chatterji, Ramchandra Manthalkar and P.K. Biswas, Rotation and Scale Invariant Texture Classification using Gabor Wavelet, Proc. Proc. Second Intl. Workshop on Texture Analysis and Synthesis, Texture -2002, pp. 87-91, June 2002, Copenhagen.
51. B.N. Chatterji and S. Kulkarni, Shape Segmentation Based on Curve Evolution Using Level Sets, Proc. 8th National Conference on Communication, pp. 100-104, Jan 2002, Mumbai.
52. B.N. Chatterji and S. Kulkarni, Region Based Image Segmentation : An Adaptive Level Set Approach, Proc. Intl. Conf. Imaging Science, System and Technology., pp. 322-328, Sept. 2001, Las Vegas, USA.
53. B.N. Chatterji and S. Kulkarni, Nonlinear Diffusion in Image Processing using Constrained Curvature Flows, Proc. Intl. Conf. Energy, Automation and Inf. Tech., pp. 100-104, Dec. 2001, Kharagpur.
54. B.N. Chatterji , R. Panda and L. Samantaray, Fast Recursive Algorithms for Efficient Multiscale Edge Detection, Proc. Indian Conference on Computer Vision, Graphics and Image Processing, pp. 33 -37, Dec 2000, Bangalore.
55. B.N. Chatterji, S. Srinivaskumar and V. Rabindranath, Comparative Performance of Rank Correlation Techniques for Stereo Correspondence, Proc. Intl. Conf. On Recent Trends in Mathematical Science, pp. 311 -318, Dec 2000, Kharagpur.
56. Kulkarni, S. and Chatterji, B. N., Scale Selection for Edge Detection in Scale — Space: A novel Approach, Proc. Intl. conf. On Communications Computer and Devices, Kharagpur, Dec. 2000, pp. 433-436.
57. Mukherjee, J., Aswatha Kumar, M., Das, P.P. and Chatterji, B. N., Computation of Normals at the Boundaries of Two Dimensional Objects From Their Medial Axis Transforms, Proc. Intl. Conf. On Communications, Computers and Devices, Kharagpur, Dec. 2000, pp. 437 - 440.

58. Chatterji, B.N., FFT & Fourier-Mellin Transform Based Image Matching Algorithms, Proceedings International Conference on Pattern Recognition and Digital Techniques, Calcutta, Dec. 27-29, 1999, p 98.
59. Chatterji, B.N. and Panda, R., B-spline Image Statistics, Proceedings of the Interantional Conference on Information Technology, Bhubaneswar, Dec 21 -23, 1998, pp. 211-215.
60. Panda, R. and Chatterji, B.N., Improved Image Pyramids using Fast Recursive Basis Filters, Proceedings of the Indian Conference on Computer Vision, Graphics and Image Proceesing,, New Delhi, Dec. 2 1 -23, 1998, p. 225-230.
61. Mukherjee, J., Aswathakumar, M., Das, PP. and Chatterji, B.N., Discrete Shading Algorithm for 3-D Object from Medial Sphere Representation, Proceedings of the Indian Conference on Computer Vision, Graphics and Image Proceesing, New Delhi, Dec. 21 -23, 1998, p. 185-190.
62. Mukherjee, J., Aswathakumar, M., Das, PP. and Chatterji, B .N., Cross Connecting of Three Dimensional Objects Through Medial Spheres Representation, Proceeding of the Indian Conference on Computer Vision, Graphics and Image Processing, New Delhi, Dec. 21 -23, 1998, p. 408-4 13.
63. Chatterji, B.N., Recognition of Printed Characters by Topological Feature Extraction and Multilevel Decesion, International Conference on Computational Linguistics, Speech and Document Processing, Calcutta, Feb. 18 -20, 1998, pp. 19-25.
64. Chatterji, B.N. and Narashima Murthy, R, Adaptive Contrast Enhancement for Color Image, International Conference on Information, Communication and Signal Proceesing, Singapore, Sept. 9 -12, 1997, pp. 1537-1542.
65. Patra, J.C., Pal, R.N. and Chatterji, B.N., FLANN —based Identification of Nonlinear Systems, **5th** European Congress on Intelligence Techniques and Soft Computing, EUFIT '97, Aachen, Germany, vol. 1, Sept. 1997, pp. 454 -458.
66. Panda, R. and Chatterji, B.N., A Family of Fast Recursive Filters for Low Level Vision, International Conference on Cognetive Systems, ICCS-96, New Delhi, Dec. 13-15, 1996.
67. Mandal, S.K., Ramachandra Rao, P. and Chatterji, B.N., Special Applications of Image Processing Techniques in the Field of Material Science and Technology, Proceedings of the Workshop of Image Proceesing Analysis WIPRA-96, Visakhapatnam, Dec. 27 -28, 1996.

68. Das, B.K., Mahapatra, R.N. and Chatterji, B.N., Modelling of Wavelet Transform on Multistage Interconnection Network, Second Australian Conference on Parallel and Real-Time Systems, Perth, Sept. 1995.
69. Ramagopal, G.S.B.N. and Chatterji, B.N., Shape Recognition of Colour Image using Principal Component Analysis, Indian Conference on Pattern Recognition, Image Processing and Computer Vision, Kharagpur, Dec. 1995, pp. 23-28.
70. Aswatha Kumar M., Mukherjee, J., Chatterji, B.N. and Das, P.P., Image Compression using Medial Circles and Medial Spheres, Indian Conference of Pattern Recognition, Image Processing and Computer Vision, Kharagpur, Dec. 1995, pp. 74-79.
71. Das, B.K., Mahapatra, R.N., and Chatterji, B.N., Modelling of Wavelet Transform on Multiprocessor Systems, Proc. of 30th Annual Convention of Computer Society of India, CSI95, Hyderabad, 9 -12, Nov. 1995, pp. 335-346.
72. Aswatha Kumar M., Mukherjee, J., Chatterji, B.N., and Das, P.P., Medial Circle and Sphere Representation using Octagonal Distance, Proc. SPIE, vol. 2356, Vision Geometry, 1994, pp. 284-294.
73. Chatterji, B.N., Introduction to Biological Image Analysis and Image Reconstruction for Projection, Proc. of National Seminar on Medical Image Processing, Calcutta, Nov. 20, 1993.
74. Venkateswarlu, R., Chatterji, B.N. and Biswas, Anindya, Mathematical Analysis of Recognition Algorithm for Infrared Image, Proc. SPIE vol. 1950, Orlando, USA, April 12-16, 1993.
75. Aswatha Kumar, M, Mukherjee, J, and Chatterji, B.N., Medical Sphere Representation for 3-D Rendering, Proc. of International Conference of CAD, CAM, Robotics and Autonomous Factories, New Delhi, Dec., 1993. pp. 25 -33.
76. Chatterji, B.N. and Dash, L., Image Enhancement with Emphasis on Adaptive Enhancement and Deenhancement, Proc. Indo-US workshop of Parallel and Distributed Signal and Image Integration Problems, Pune, Dec. 16 -18, 1993.
77. Das, S., Mukherjee, J and Chatterji, B.N., Motion Analysis form Dynamic Stereo Image, Proc. Of the Workshop on Signal Processing and Communication, SPCOM-93, Bangalore, 18-20 Jan, 1993, pp. 53-58.
78. Mahapatra, R.N., Kumar A, and Chatterji, B.N., Vector Hartley Transform Employing Multiprocessors, International Symposium on Parallel Processing (IPPS) April 1992, pp. 250 - 253.

79. Venkateswarlu, R. and Chatterji, B.N., Analysis of Image Registration Algorithms for Infrared Images, Proc. SPIE vol. 1699, Signal Processing, Sensor Fusion and Target Recognition, pp. 442 -451, 1992.
80. Chatterji, B.N., Curriculum of Undergraduate Electronic Engineering Course, All India Seminar on Human Resource Development in Electronics, New Delhi, Mar 2-3, 1991.
81. Chatterji, B.N., Biswas, P.K. and Mukherjee, J., Segmentation of Range Image, National Workshop of Signal Processing, Communication and Networking, Bangalore, 1990, pp. 242 - 260.
82. Mahapatra, R.N. and Chatterji, B.N., Computing 2 -D Fast Cosine Transform Algorithm in Mesh Connected Processors, National Conference on Parallel Processing, Bombay, Feb. 1990.
83. Mahapatra, R.N., Kumar, A., Das, B.K. and Chatterji, B.N., Performance Analysis of Parallel FFT Algorithm on Multiprocessors, International Conference on Parallel Processing (ICPP), vol. III, August 1990, pp. 368 -369.
84. Mahapatra, R.N. and Chatterji, B.N., Performance Analysis of Fast Hartley Transform Algorithm on Multiprocessor Systems, International Conference on Computer Architecture and Digital Signal Processing, Hong Kong, Oct. 1989.
85. Dasgupta, A., Bhattacharya, S., Biswas, P.K., Mukherjee, J. and Chatterji, B.N., A Method of Generation of Synthetic Range Image, National Symposium on Recent Advances in Digital Signal Processing and its Impact on the Development of Electronic Instrumentation, Bombay, 10 -12 Jan., 1990.
86. Mukherjee, J, Das, P.P. Biswas, P.K., Das, S. Biswas, S.S., Bhattacharya, S., Gupta, A. and Chatterji, B.N., Wire-Framing of Range Images, Indo-US Workshop on High Speed Signal Processing, New Delhi, Nov. 27 -29, 1989, pp. 327-339.
87. De, T.K. and Chatterji, B.N., Fuzzy Set Theoretic Approach to Enhancement Technique Based on Logarithmic Response of Vision, Indo -US Workshop of High Speed Signal Processing, New Delhi, Nov. 27 -29, 1989, pp. 357-365.
88. Chatterji, B.N., and De. T.K., Forced Enhancement and Deenhancement of Digital Images, Indo-US Workshop on Systems and Signal Processing, Bangalore, Dec. 1988, pp. 471 -486.
89. De, T.K. and Chatterji, B.N., An Ingenious Approach to Deenhancement Technique, Proc. mt. Symp. On Electronic Devices, Circuits and Systems, Kharagpur, 1987, pp. 266-268.

90. Mukherjee, J., Das, PP. and Chatterji, B.N., Fuzzy Recognition of 3 -D Objects, Proc. IAPR Workshop on Computer Vision, Tokyo, 1989.
91. Mukherjee, J. and Chatterji, B.N, A New Wire -frame Object Modelling Technique, Proc. mt. Symp. On Electronic Devices, Circuits and Systems, Kharagpur, 1987, pp. 375-377.
92. Das, PP. and Chatterji, B.N., On Champher -Computability of Distance, Proc. mt. Symp. On Electronics Devices, Circuits and Systems, Kharagpur, 1987, pp. 184-186.
93. Nag, S., Das, PP. and Chatterji, B.N., Generalized in Champher Algorithm for m-Neighbour Distance Transformation n-D Digital Pictures, Proc. Of the mt. Symp. on Electronic Device Circuits and Systems, Kharagpur, 1987, PP. 181 - 183.
94. De, T.K. and Chatterji, B.N., Human Visual System and Robotic Vision Proc. First Engineering Congress, Calcutta, Jan. 9 -13, 1987, pp. III B-05-01 to B-05-12.
95. Balabrahmanandam, M. and Chatterji, B.N., Characterization of Underground Water Resource Systems Using Pattern Recognition Techniques, Proc. National Systems Conference NSC -84, Bombay, Dec. 1984, pp. 38-45.
96. De, T.K. and Chatterji, B.N., Edge Crispening with Enhancement and Improvement of the Visual Response of Image Quality, Proc. International Conference on Computer Systems and Signal Processing, Bangalore, 1984, pp. 33-35.
97. Gopalkrishna, D. and Chatterji, B.N., Image Restoration -An Application of Viterbi Algorithm to Image Motion Blur, Proc. International Conference on Computer Systems and Signal Processing, Bangalore, 1984, pp. 452-455.
98. Balabrahmanandam, M. and Chatterji, B.N., Feature Extraction for the Modelling of Distributed Parameter Systems, Proc. International Conference on Computer Systems and Signal Processing, Bangalore, 1984, pp. 77-84.
99. Parthasarathy, G. and Chatterji, B.N., A KNN Method for Low Sample Problems, Proc. International Conference on Computer, Systems and Signals Processing, Bangalore, Dec. 1984. Pp. 33-35.
100. Chatterji, B.N., Dynamic Scene Analysis Using A Difference Image Concept, Proc. National Workshop on Image Signal Processing, Madras, Jan. 9 -12, 1984.
101. De. T.K., and Chatterji, B.N., An Approach to a Generalized Technique for Image Enhancement. Proc. Seventh International Conference on Pattern Recognition, Montreal, July 30—August 2, 1984, pp. 604-606.

102. De, T.K. and Chatterji, B.N., A Spatial Domain Technique for Image Contrast Enhancement Proc. International Conference on Instrument Scientists and Technologists, Calcutta, 1984.
103. Rammohan, T.R. and Chatterji, B.N., A Novel Spatial Filtering Technique for Enhancement of Noisy Digital Images, Proc. World Instrumentation Symposium, Delhi, Jan. 1984 pp. 11-14.
104. De, T.K. and Chatterji, B.N., Digital Image Data Compression Using Bicubic Spline Interpolation, Proc. International Week of the Electronic Image, Biarritz, France, May 21-25, 1984.
105. Chatterji, B.N., Use of Fuzzy Set Theory and Spline Techniques for Pattern Recognition and Scene Analysis, Proc. International Workshop on Pattern Recognition in Photogrammetry, Sept. 27-29, 1983, pp. 241-262.
106. Rammohan, T.R. and Chatterji, B.N., Spatial Contrast Enhancement using Local Statistics, Proc. National Systems Conference, Trivandrum Sept. 6-8, 1983.
107. Rammohan, T.R. and Chatterji, B.N., Real Time Digital Image Enhancement using Local Statistics, Proc. National Conference on Digital Signal Processing, Sambalpur, April 9-10, 1983, pp. 82-87.
108. Rath, G.S. and Chatterji, B.N., A New Method for Interpolation of Band Limited Signal by Higher Degree Polynomial Spline, Proc. National Conference on Digital Signal Processing, Sambalpur, April 9-10, 1983, pp. 95-101.
109. Chatterji, B.N., A Combined Fuzzy Set Theoretic and Heuristic Method for Character Recognition, Proc. IFAC Symposium of Fuzzy Information, Knowledge Representation and Decision Analysis, Pergamon Press, 1983.
110. Chatterji, B.N., A Fuzzy Set Theoretic Approach for Handwritten English Character Recognition, Proc. **6th** International Conference on Pattern Recognition, Oct. 1982, Munich.
111. Chatterji, B.N. and Sarkar, D., Towards a Feature Extraction Scheme for ECG Recognition, Proceedings of the **6th** International Conference on Pattern Recognition, Oct. 1982, Munich West Germany, pp. 988-990.
112. Chatterji, B.N., Recognition of Handwritten Characters by Fuzzy Set Theoretic Approach, Proc. International Conference on Advances in Information Sciences and Technology, Calcutta, Jan. 1982.

113. Sundersan, N. and Chatterji, B.N., Fuzzy Similarity Relations for Recognition of Handwritten English Characters, Proc. IFAC International Symposium on Theory and Applications of Digital Control, Jan. 1982.
114. Chatterji, B.N., Two Dimensional Data Reduction using Splines Proc. 6th International Conference on Pattern Recognition Oct. 1982, Munich pp. 1182.
115. Pal, D., and Chatterji, B.N., Regular Grammar for Recognition of Picture Patterns, Proc. International Symposium on Microwave and Communication, Kharagpur, 1981, pp. 404-408.
116. Rath, G.S. and Chatterji, B.N., A Novel B-Spline Interpolation Technique for Band Limited Signal, Proc. International Symposium on Microwave and Communication, Kharagpur, 1981.
117. Patki, yB. and Chatterji, B.N., Terminal Response Time of Computer Systems, Proc. International Conference on Communication Circuits and Systems, Calcutta, 1981.
118. Chatterji, B.N., A Microprocessor Based Data Acquisition System for Automatic Analysis of ECG Signals, Proc. Internat. Conference on Microcomputer Application to Industrial Control, Calcutta, Feb. 1981, pp. 87 -94.
119. Parthasarathy, G. and Chatterji. B.N., A Comparative Study of the Two - Stage Karhunen Loeve and Some other FeatureExtraction Techniques, Proc. 1980, Conference on Pattern Recognition, Oxford, Jan. 9 -11, 1980.
120. Chatterji, B.N., Data Reduction by Bilin ear Interpolation Techniques — Proceeding of the Computer Society of India CSI -79, January, 1979.
121. Chatterji, B.N., Digital Simulation of Block Diagram Systems having Multiple Inputs and Multiple Outputs. Proceedings of the Fifth National Systems Conference, Sept. 1978, pp. 228 - 232.
122. Singh, V. and Chatterji, B.N., Hybrid Techniques for Measurements of Probability Density Functions, Proceedings of the International Symposium on Instrumentation, 1978.
123. Chatterji, B.N., Two Stage Reinforcement Learning Automata, Proceeding of the Second Conference of the Forum for Interdisciplinary Mathematics, Jaipur, July 1978.
124. Chatterji, B.N., and Chaterjee, B., A proposal for a Post Graduate Course in System Engineering Education in Developing Nations, New Delhi, 1974.

### **C) BOOKS PUBLISHED**

1. B.N. Chatterji, Image Analysis for Environmental Science, SAKET ENVIRONMENT HANDBOOK, 2001, PP. 275 -291.
2. Das, P.P. and Chatterji, B.N., Pattern Recognition, Image Processing and Computer Vision Recent Advances, Narosa Publishing House, 1996.
3. Das, B.K., Mahapatra, R.N. and Chatterji, B.N., Modelling of Wavelet Transform of Multiprocessor Systems in IT: Challenges and Opportunities, Tata McGraw Hill, 1995, pp. 332-339.
4. Chatterji, B.N., Permer, K.K., System Identification Techniques, Oxford IBH Publishing Co., 1988.
5. Chatterji, B.N., Digital Computer Technology, Khanna Publishers, New Delhi, 1980, 2' Edition 1986, 3rd Edition 1988, 4th Edition 1992.
6. Chatterji, B.N., Character Recognition -International Encyclopedia on System and Control, Pergamon Press, 1986.
7. Chatterji, B.N., Fuzzy Set Theoretic Approach for Scene Analysis in 'Approximate Reasoning in Expert System' Ed. Gupta M.M., Kandel Al. Blander. W. and Kiszka. J.B., North -Holland, Amsterdam 1985, pp. 637-654.
8. Chatterji, B.N., Character Recognition using Fuzzy Similarity Relations Approximation Reasoning in Decision Analysis North -Holland Publishing Co., pp. 131-137, 1982.
9. Chatterji, B.N., An Algorithm for Economical Storage in Dynamic Programming Approach to Patterns Recognition, Arbeitsberichte Des Institute fer Mathematische Mascinece und Datenverarbeitung, Erlangen, West -Germany, vol. 6, No. 8, 1973.
10. Chatterji, B.N., Two Stage Reinforcement Learning System Arbeitsberichte Des Institute fer Mathematische Mascinece und Datenverarbeitung, Erlangen, West-Germany, vol. 6, No. 8, 1973.

## ANNEXURE-II

### SPONSORED / CONSULTANCY PROJECTS COMPLETED BY

#### PROF. BISWA NATH CHATTERJI

1 Technology for Engineering Critical Assessment — Planning Commission Project Costing Rupees 15 Crores by ten organizations in network mode namely National Metallurgical Laboratory Jamshedpur, Central Glass and Ceramic Research Institute Kolkata, Central Mechanical Engineering Research Institute Durgapur, Regional Research Laboratory Bhopal, Central Building Research Institute Roorkee, Central Road Research Institute Delhi, Structural Engineering Research Centre Chennai, I.I.T. Kharagpur (B.N. Chatterji) and IGCAR Kalpakkam (2004-2009).

2 Digital Watermarked Based Cryptography, Bharat Electronics Limited Bangalore (2004-2005). Project Cost Rs 2.2 lakhs.

3 Development of Speaker verification software for single to three registered users, Indian Space Research Organization, Bangalore (2003 to 2006) — Project cost 10.833 lakhs.

4 Digital Watermarking for Wavelet Based Compressed Images, Bharat Electronics Limited Bangalore (2003-2004) — Project cost Rs. 2.8 lakhs.

5 Wavelet Based Image Compression for Multimedia Applications, Bharat Electronics Limited, Bangalore (2001-2002) — Project Cost Rs. 3.6 lakhs.

6 Development of Video Data Analysis System sponsored by Interim Test Range, Chandipur (1998-2000). — Project cost Rs. 24.7 lakhs.

7 Design and Development of Fuzzy Analysis System Sponsored by Intel Corp. U.S.A. (1998-2004). Project Cost US \$ 50000.

8 Development of Video Codec using Model - Based Techniques Sponsored by Intel Corp. U.S.A. (1998-2000). Project Cost US \$ 59300.

9 Development of Video Codec using Wavelet Transform Techniques Sponsored by Intel Corp. U.S.A. (1998-2000). Project Cost US \$ 60000.

10 Feasibility Studies for Indigenization of Electro optical Tracking System at ITR Chandipur. (1996-98)— Project cost Rs. 9.5 lakhs.

11. Scene Correlation Area Navigation (Feature Based Real Time Image Matching) sponsored by Research Centre Imarat Hyderabad (1993 -96). — Project Cost Rs. 20 lakhs.

12. Finger Print Classification and Recognition Computer Maintenance Corporation Hyderabad (1992-93)

13. Automatic Control of Steel Sheet Flatness / Bowness on Continuous Electroplating Line — The Tinplate Co. of India Ltd. Jamshedpur(1990 -91).

14. Interpretation of Industrial Scenes sponsored by DRDO New Delhi. Project Cost — Rs. 40 lakhs. (1987-90)

15. Digital Picture Processing Phase II (Analysis of 3D images) sopsored by DRDO New Delhi. Project Cost Rs. 20 lakhs (1987 -89).

16. Digital Picture Processing Phase I (Analysis of Static and Dynamic scenes) sponsored by DRDO New Delhi. Project Cost Rs. 25 lakhs (1984-87).

17. Path and Distance in Digital Geometry sponsored by C SIR New Delhi 1986-89. Project cost Rs 2 lakhs.

18. 3D Object Recognition sponsored by CSIR New Delhi 1987 -90 Project Cost Rs 2 lakhs.

19. Dynamic Scene Analysis sponsored by CSIR New Delhi 1989 -92. Project Cost Rs 2 lakhs.

20. Magnetic Anomaly Detection sponsored by DRDO New Delhi 1978-83. Project cost Rs. 10 lakhs.

21. Manpower Training and Research in the Area of Digital Image Processing sponsored by Department of Electronics New Delhi 1977 -80. Project Cost Rs 8 lakhs.

22. Pattern Recognition and Image Processing sponsored by Department of Science and Technology New Delhi 1977 -1980 — Project cost Rs. 8 lakhs.

23. Data Reduction Sponsored by Department of Electronics New Delhi 1975 -76. Project cost Rs. 1.5 lakhs.

24. Block Diagram Simulation Language sponsored by Department of Electronics New Delhi 1974-76. Project cost Rs. 2 lakhs.