

Prof. Nikhil R. Pal, Ph.D., FIETE, FNASc., FNAE,
FNA, FIFSA, FTWAS, FIEEE

President, IEEE Computational Intelligence Society (2018-2019)
Vice-President for Publications, IEEE Computational Intelligence Society (2013-2016)
INAE Chair Professor (2015-2016)



Electronics and Communication Sciences Unit (ECSU)
Indian Statistical Institute
203 B T Road, Calcutta - 700108
Telephones : 25752906, 25752910
Fax : + 91-33-2577-6680, 2577-3035
E-mail : nikhil@isical.ac.in

To know more about me:

- [A tribute to my "teachers" who mattered the most \(in The Mind of an Engineer\)](#)
- [5 Minutes with Prof. Nikhil R. Pal \(IEEE CIS Newsletter Interview\)](#)



List of publications of Dr. Nikhil R. Pal

Books

1. **Evolutionary and Swarm Intelligence Algorithms**, *Springer Verlag*, (Co-editors J. Bansal and P. Singh), 2018.
2. **Advanced Techniques in Data mining and Knowledge discovery**, *Springer Verlag*, (co-editor L. C. Jain), 2005.
3. **Neural Information Processing- ICONIP 2004**, *Springer Verlag*, LNCS 3316, (Co-editor N. Kasabov, R. Mudi, S. Pal and S. Parui), 2004.
4. **Advances in Soft Computing - AFSS 2002**, *Springer Verlag*, LNAI 2275, 2002 (Co-editor M. Sugeno)
5. **Pattern Recognition in Soft Computing Paradigm**, *World Scientific*, FLSI Vol. 2, 2001 (Editor)
6. **Fuzzy Models and Algorithms for Pattern Recognition and Image Processing**, *Kluwer Academic Publisher*, 1999, (co-authored with J. C. Bezdek, J. M. Keller and R. Krishnapuram)
7. **Advances in Pattern Recognition and Digital Techniques- ICAPRDT'99**, *Narosa Publishing Co., India*, 1999 (Co-editors A. K. De and J. Das)

Journal publications:

1. Huaqin Zhang, Jian Wang, Zhanquan Sun, Jacek M. Zurada, and Nikhil R. Pal, Feature Selection for Neural Networks Using Group Lasso Regularization, *IEEE Transactions on Knowledge and Data Engineering*, 2019, to appear
2. Hao Zhang, Nikhil R. Pal, Yin Sheng, and Zhigang Zeng, Distributed Adaptive Tracking Synchronization for Coupled Reaction-Diffusion Neural Network *IEEE Transactions on Neural Networks and Learning Systems* Accepted.
3. Jian Wang, Qingquan Chang, Qin Chang, Yusong Liu and Nikhil R. Pal, Weight noise injection-based MLPs with group lasso penalty: Asymptotic Convergence and application to node pruning, *IEEE Transactions on Cybernetics*, 2018, to appear.
4. Tao Gao, Jian Wang, Bingjie Zhang, Huaqing Zhang, Peng Ren, and Nikhil R. Pal, A Polak-Ribière-Polyak conjugate gradient-based neuro-fuzzy network and its convergence, *IEEE Access*, Vol. 7, pp 41551 - 41565, 2018, DOI: 10.1109/ACCESS.2018.2848117.
5. Kaustuv Nag, Tandra Pal, Rajani K. Mudi, and Nikhil R. Pal, Robust Multiobjective Optimization with Robust Consensus, *IEEE Trans. on Fuzzy Systems*, 2018, DOI: 10.1109/TFUZZ.2018.2848261.
6. Ignacio Montes, Nikhil R. Pal, and Susana Montes, Entropy Measures for Atanassov intuitionistic fuzzy sets based on divergence, *Soft Computing*, August 2018, Volume 22, Issue 15, pp 50515071, DOI <https://doi.org/10.1007/s00500-018-3318-3>
7. Bikram Karmakar, Nikhil R Pal, How to make a neural network say Dont know. *Information Sciences*. Vol 430-431, pp 444-466, March 2018
8. R. Panja and N. R. Pal, MS-SVM: Minimally Spanned Support Vector Machine, *Applied soft Computing*, DOI 10.1016/j.asoc.2017.12.017, Vol 64; pp 356-365 March 2018.
9. C-T Lin, T-Y Hsieh, Y-T Liu, Y-Y Lin, C-N Fang, Y-K Wang, G Yen, N. R. Pal, C-H Chuang, Minority Oversampling in Kernel Adaptive Subspaces for Class Imbalanced Datasets, *IEEE Trans. on Knowledge and Data Engineering*, DOI 10.1109/TKDE.2017.2779849, Nov 2017.
10. Liu, Yu-Ting, Nikhil R. Pal, Amar R. Marathe, Yu-Kai Wang, and Chin-Teng Lin. "Fuzzy Decision-Making Fuser (FDMF) for Integrating Human-Machine Autonomous (HMA) Systems with Adaptive Evidence Sources." *Frontiers in neuroscience*, 11 (332), DOI: <https://doi.org/10.3389/fnins.2017.00332> 2017.

11. G. Ochoa, I. Lizasoain, D. Paternain, H. Bustince, and Nikhil R Pal, From quantitative to qualitative orness for Lattice OWA operators, *International Journal of General Systems*, doi:10.1080/03081079.2017.1319366, Vol. 46(6), pp 640-669, 2017.
12. Chung, I-Fang, Yi-Cheng Chen, and Nikhil Pal. "Feature selection with controlled redundancy in a fuzzy rule based framework." *IEEE Transactions on Fuzzy Systems*, 10.1109/TFUZZ.2017.2688358, March 2017.
13. P. Dey, K. Nag, T. Pal, and Nikhil R. Pal, Regularizing Multi-Layer Perceptron for Robustness, *IEEE Trans. on Systems, Man, and Cybernetics: Systems*, 10.1109/TSMC.2017.2664143, February 2017.
14. Yu-Ting Liu, Nikhil R. Pal, Shang-Lin Wu, Amar Marathe and Chin-Teng Lin, Weighted Fuzzy Dempster-Shafer Framework for Multi-Modal Information Integration, *IEEE Transactions on Fuzzy Systems*, DOI 10.1109/TFUZZ.2017.2659764, January 2017.
15. Prantik Chatterjee and Nikhil R. Pal, Construction of synergy networks from gene expression data related to disease, *GENE*, May 21, 2016. doi: 10.1016/j.gene.2016.05.029.
16. A. Pathak and Nikhil R. Pal, Clustering of mixed data by integrating fuzzy, probabilistic and collaborative clustering framework, *International Journal of Fuzzy Systems*, 2016, 10.1007/s40815-016-0168-y
17. Prantik Chatterjee, and Nikhil R. Pal, Discovery of synergistic genetic network: a minimum spanning tree-based approach. *Journal of bioinformatics and computational biology*, Vol. 14 (1), 2016, pp 1650003-19, DOI: 10.1142/S0219720016500037.
18. K. Sarkar, P. Chatterjee and Nikhil R. Pal, Finding synergy networks from gene expression data: a fuzzy rule based approach, *IEEE Transactions on Fuzzy systems*, DOI 10.1109/TFUZZ.2016.2540062, 2016
19. P. Singh, Nikhil R. Pal, S Verma, and O P Vyas, Fuzzy Rule-Based Approach for Software Fault Prediction, *IEEE Transactions on Systems, Man and Cybernetics: Systems*, 2DOI 10.1109/TSMC.2016.2521840, 2015
20. C-S Huang, Nikhil R. Pal, C-H Chuang, and C-T Lin, Identifying Changes in EEG Information Transfer during Drowsy Driving by Transfer Entropy, *Frontiers in Human Neuroscience*, 2015, DOI: 10.3389/fnhum.2015.00570; October 2015, .
21. Monami Banerjee and Nikhil R Pal, Unsupervised Feature Selection with Controlled Redundancy (UFESCoR), *IEEE TRANSACTIONS ON KNOWLEDGE AND DATA ENGINEERING*, doi:10.1109/TKDE.2015.2455509, Vol. 27 (12) pp 3390-3403; 2015.
22. Ignacio Montes, Vladimir Janis, Nikhil R. Pal, and Susana Montes, Local Divergences for Intuitionistic Fuzzy Sets, *IEEE Transactions on Fuzzy systems*, DOI 10.1109/TFUZZ.2015.2457447, 2015
23. Swapna Agarwal, Pradip Ghanty, Nikhil R. Pal, Identification of a small set of plasma signalling proteins using neural network for prediction of Alzheimer's disease, *Bioinformatics*, 31(15), 2015, pp 25052513, doi: 10.1093/bioinformatics/btv173
24. Kaustuv Nag and Nikhil R Pal, A Multiobjective Genetic Programming based Ensemble for Simultaneous Feature Selection and Classification, *IEEE Transactions on Cybernetics*, DOI 10.1109/TCYB.2015.2404806, Vol. 46 (2), PP 499-510; 2016.
25. Hsei-Wei Wang, Hsing-Jen Sun, Ting-Yu Chang, Hung-Hao Lo, Wei-Chung Cheng, George C Tseng, Chin-Teng Lin, Shing-Jyh Chang, Nikhil Ranjan Pal and I-Fang Chung, Discovering monotonic stemness marker genes from time-series stem cell microarray data, *BMC Genomics*, January 2015, 16 (Suppl 2):S2 doi:10.1186/1471-2164-16-S2-S2v
26. Kaustuv Nag, Tandra Pal, Nikhil R Pal, ASMiGA: An Archive-Based Steady-State Micro Genetic Algorithm, *IEEE Transactions on Cybernetics*, vol.45, no.1, pp.40,52, Jan. 2015, doi: 10.1109/TCYB.2014.2317693
27. Santiago Garcia-Jimenez, Humberto Bustince, Eyke Hüllermeier, Radko Mesiar, Nikhil R. Pal, and Ana Pradera, Overlap indices: construction of and application to interpolative fuzzy systems, *IEEE Transactions on Fuzzy systems*, DOI: 10.1109/TFUZZ.2014.2349535, Vol 23(4); PP 1259-1273, 2015.

28. Yang-Yin Lin, Nikhil R. Pal, and Chin-Teng Lin, An Interval Type-2 Neural Fuzzy System for Online System Identification and Feature Elimination (IT2NFS-SIFE), *IEEE Transactions on Neural Networks and Learning Systems*, DOI: 10.1109/TNNLS.2014.2346537, Vol 26 (7), PP 1442-1455, 2015.
29. Sen Bong Gee, Kay Chen Tan, Vui Ann Shim, and Nikhil R. Pal, Online Diversity Assessment in Evolutionary Multiobjective Optimization: A Geometrical Perspective, *IEEE Transactions on Evolutionary Computation*, DOI: 10.1109/TEVC.2014.2353672, pp 542 - 559, VOL. 19, NO. 4, AUGUST 2015.
30. Amit Singh, Amar Kishore, and Nikhil R. Pal, Stancu OWA Operator, *IEEE Transactions on Fuzzy systems*, Vol 23 (4), PP 1306-1313, DOI 10.1109/TFUZZ.2014.2336696, 2015.
31. Rudrasis Chakraborty and Nikhil R Pal, Sensor (Feature-Group) Selection with Controlled Redundancy in a Connectionist Framework, *International Journal of Neural Systems*, Vol. 24(6):1450021. doi: 10.1142/S012906571450021X ,2014.
32. Pulak Purkait, Nikhil R Pal, and Bhabatosh Chanda A Fuzzy-Rule Based Approach for Single Frame Super Resolution, *IEEE Transactions on Image Processing*, VOL. 23, NO. 5, MAY 2014, pp 2277-2290, 2014.
33. Ignacio Montes, Nikhil R. Pal, Vladimir Janis, and Susana Montes, Divergence Measures for Intuitionistic Fuzzy Sets, *IEEE Transactions on Fuzzy systems*, VOL. 23, NO. 2, pp 444-456, APRIL 2015, DOI:10.1109/TFUZZ.2014.2315654.
34. S Chakraborty, A Konar, A Ralescu and N R Pal, A Fast Algorithm to Compute Precise Type-2 Centroids for Real-Time Control Applications, *IEEE Transactions on Cybernetics*, VOL. 45, NO. 2, FEBRUARY 2015, pp 340-353, DOI: 10.1109/TCYB.2014.2308631.
35. Rudrasis Chakraborty and Nikhil R. Pal, Feature Selection Using a Neural Framework with Controlled Redundancy, *IEEE Transactions on Neural Networks and Learning Systems*, Vol. 26, No. 1, January 2015, pp 35-50, DOI 10.1109/TNNLS.2014.2308902.
36. Monami Banerjee and Nikhil R Pal, Feature Selection with SVD Entropy: some modification and extension, *Information Science*, Volume 264, 20 April 2014, Pages 118-134, DOI: <http://dx.doi.org/10.1016/j.ins.2013.12.029>
37. Amar Kishore, Amit Singh and Nikhil R. Pal, Orness Measure of OWA Operators: A New Approach, *IEEE Transactions on Fuzzy Systems*, Vol 22, No. 4, pp 1039-1045, 2014, DOI: 10.1109/TFUZZ.2013.2282299
38. P. Ghanty, Nikhil R. Pal and R. K. Mudi, PREDICTION OF PROTEIN SECONDARY STRUCTURE USING PROBABILITY BASED FEATURES AND A HYBRID SYSTEM, *Journal of Bioinformatics and Computational Biology*, Vol 11, Issue 5: 1350012-1:25, October 2013, DOI: 10.1142/S0219720013500121
39. Nikhil R. Pal and Kaushik Sarkar, What and when can we gain from the kernel versions of c-means algorithm?, *IEEE Transactions on Fuzzy systems*, VOL. 22, NO. 2, pp 363-379, APRIL 2014, DOI 10.1109/TFUZZ.2013.2255612.
40. Yang-Yin Lin, Jyh-Yeong Chang, Nikhil R. Pal, Chin-Teng Lin. A Mutually Recurrent Interval Type-2 Neural Fuzzy System (MRIT2NFS) with Self-evolving Structure and Parameters, *IEEE Transactions on Fuzzy systems*, Volume: 21 , Issue: 3, Page(s): 492 - 509, 2013, DOI: 10.1109/TFUZZ.2013.2255613. .
41. A. Chakraborty, A. Konar, Nikhil R. Pal and L. C. Jain, Extending the Contraposition Property of Propositional Logic for Fuzzy Abduction, *IEEE Transactions on Fuzzy Systems*, Vol 21, No 4, pp 719-734, DOI 10.1109/TFUZZ.2012.2230006, August 2013.
42. A. Halder, A. Konar, R. Mandal, A. Chakraborty, P. Bhowmik¹, Nikhil R. Pal, and A. K. Nagar, General and Interval Type-2 Fuzzy Face-Space Approach to Emotion Recognition, *IEEE Transactions on Systems, Man & Cybern. - Part A*, Vol. 43 , Issue: 3, Page(s): 587 - 605, May 2013.
43. N. R Pal, H Bustince, M Pagola, U K Mukherjee, D P Goswami, G Beliakov, Uncertainties with Atanassovs intuitionistic fuzzy sets: Fuzziness and lack of knowledge, *Information Science*, Volume 228, 10 April 2013, Pages 61V74, DOI 10.1016/j.ins.2012.11.016

44. Nikhil R. Pal and R. Panja, Finding Short Structural motifs for Re-Construction of Proteins 3D Structure, *Applied Soft Computing*, Vol. 13, pp 1214 - 1221, 2013.
45. D. P. Muni and Nikhil R. Pal, Evolution of Fuzzy Classifiers Using Genetic Programming, *Fuzzy Information Engineering*, Vol. 4, No. 1, pp 29-50, 2012, DOI 10.1007/s12543-012-0099-8.
46. Chun-Hung Su, Nikhil R. Pal, Ken-Li Lin, I-Fang Chung, Identification of Amino Acid Propensities That Are Strong Determinants of Linear B-cell Epitope Using Neural Networks, *PLoS ONE* 7(2): e30617. doi:10.1371/journal.pone.0030617, 2012.
47. Rajesh Kumar, Nikhil R. Pal, Bhabatosh Chanda and J. D. Sharma, Forensic Detection of Fraudulent Alteration in Ball-Point Pen Strokes, *IEEE Transactions on Information Forensics & Security*, DOI 10.1109/TIFS.2011.2176119, Vol. 7(2), PP 809-820,2012.
48. Yi-Cheng Chen, Nikhil R. Pal, and I-Fang Chung, Integrated mechanism for feature selection and fuzzy rule extraction for classification, *IEEE Transactions on Fuzzy Systems*, Volume: 20 , Issue: 4 Page(s): 683 - 698, 2012, DOI 10.1109/TFUZZ.2011.2181852.
49. Tsai Y-S, Aguan K, Pal NR, Chung I-F (2011), Identification of Single- and Multiple-Class Specific Signature Genes from Gene Expression Profiles by Group Marker Index, *PLoS ONE* 6(9): e24259. doi:10.1371/journal.pone.0024259
50. Y-C Chen , K Aguan, C-W Yang, Y-T Wang, N R Pal, Discovery of Protein Phosphorylation Motifs through Exploratory Data Analysis. *PLoS ONE* 6(5): e20025. doi:10.1371/ journal.pone.0020025, 2011.
51. G. Beliakov; Humberto Bustince; D. P. Goswami; U. K. Mukherjee; Nikhil R. Pal, On Averaging Operators for Atanassov's Intuitionistic Fuzzy Sets, *Information Sciences*, 181, 6, pp 1116-1124, March, 2011, doi:10.1016/j.ins.2010.11.024
52. K-L. Lin, C-T. Lin, and Nikhil R. Pal Incremental Mountain Clustering Method to Find Building Blocks for Constructing Structures of Proteins, *IEEE Transactions on NanoBioscience*, Vol. 9, No. 4 , pp 278-288, December 2010.
53. A. Saxena, Nikhil R. Pal and M. Vora, Evolutionary Methods for Unsupervised Feature Selection Using Sammons Stress Function, *Fuzzy Information and Engineering - An International Journal*, Vol. 2, 3, pp 229-247, 2010, DOI 10.1007/s12543-010-0047-4.
54. P. Ghanty and Nikhil R. Pal, Prediction of Protein Folds : Extraction of New Features, Dimensionality Reduction, and Fusion of Heterogeneous Classifiers, *IEEE Transactions on NanoBioscience*, 2009 Vol. 8(1, pp 100-110, D.O.I 10.1109/TNB.2009.2016488
55. P. Ghanty, S. Paul and Nikhil R. Pal, NEUROSVN: An Architecture to Reduce the Effect of the Choice of Kernel on the Performance of SVM, *Jour of Machine Learning Research*, 10, 2009, pp 591-622.
56. Yu-Shuen Tsai, Chin-Teng Lin, I-Fang Chung, Nikhil R. Pal and George C. Tseng, Discovery of Dominant and Dormant Genes from Expression Data Using a Novel Generalization of SNR for Multi-class Problems, *BMC Bioinformatics*, 2008, 9:425doi:10.1186/1471-2105-9-425
57. Nikhil R. Pal and S. Saha, Simultaneous structure identification and fuzzy rule generation for Takagi-Sugeno models, *IEEE Trans. Syst., Man and Cybern. -B*, Volume: 38, Issue: 6, pp: 1626-1638, 2008, DOI : 10.1109/TSMCB.2008.2006367 .
58. Nikhil R. Pal, C. Y. Chuang, L. W. Ko, C. F. Chao, T. P. Jung, S. F. Liang, and C. T. Lin, EEG-based Subject- and Session-independent Drowsiness Detection: An Unsupervised Approach, *EURASIP Journal on Advances in Signal Processing*, Vol. 2008 (2008), Article ID 519480, doi:10.1155/2008/519480
59. K. Lin, C. T. Lin, Nikhil R. Pal, and S. Ojha, Construction of Protein 3-D Structures Using a Structural Variant of Mountain Clustering Method, *IEEE Engineering and Medicine in Biology Magazine*, JULY/AUGUST 2009, pp 38-44, 2009.
60. Nikhil R. Pal, A. Sharma and S. Sanadhya, Deriving meaningful rules from gene expression data for classification, *Journal of Intelligent & Fuzzy Systems*, Vol. 19, No. 3, pp 171-180, 2008

61. P. Ghanty, M. Vasudevan, D.P. Mukherjee¹, Nikhil R. Pal, N. Chandrasekhar, V. Maduraimuthu, A.K. Bhaduri, P. Barat, and Baldev Raj, An Artificial Neural Network Approach for Estimating Weld Bead Width and Depth of Penetration from Infrared Thermal Image of Weld Pool, *Science and Technology of Welding and Joining*, Vol. 13(4) pp 395-401, 2008.
62. P. Ghanty, S. Paul, A. Roy, D. P. Mukherjee, Nikhil R. Pal, M. Vasudevan, H. Kumar, and A.K. Bhaduri, A Fuzzy Rule Based Approach for Predicting Weld Bead Geometry in Gas Tungsten Arc Welding, *Science and Technology of Welding and Joining*, VOL 13, NO 2, pp 167-175, 2008.
63. D. Chakraborty and Nikhil R. Pal, Selecting Useful Groups of Features in a Connectionist Framework, *IEEE Transactions on Neural Networks*, vol 19, no 3, pp. 381-396, 2008.
64. Nikhil R. Pal, B. Bhowmick, S. K. Patel, S. Pal and J. Das, A Multi-Stage Neural Network Aided System for Detection of Microcalcifications in Digitized Mammograms, *Neurocomputing*, Vol. 71, pp 2625-2634, 2008, DOI 10.1016/j.neucom.2007.06.015
65. P. Ghanty, S. Paul, D. P. Mukherjee, M. Vasudevan, Nikhil R. Pal and A.K. Bhaduri, Modelling Weld Bead Geometry Using Neural Networks for GTAW of an Austenitic Stainless Steel, *Science and Technology of Welding and Joining*, vol. 12, no. 7, pp. 649-658, Oct 2007.
66. A. Laha, B. Chanda and Nikhil R. Pal, Fast codebook searching in a SOM-based vector quantizer for image compression, *Signal Image and Video Processing*, (DOI 10.1007/s11760-007-0034-3) Vol. 2, No. 1, pp 39-49, 2007
67. S. S. Bagui, S. C. Bagui, Nikhil R. Pal and M. A. Matin, Comparison between k-NN and k-RNN classification rules: A monte carlo simulation study, *Journal of Statistical Research*, 41(1), 69-79, 2007.
68. Nikhil R. Pal, S. Sanadhya and A. Sharma, Computation of consensus hydrophobicity scales with self-organizing maps and fuzzy clustering along with applications to protein fold prediction, *Journal of Neural, Parallel and Scientific Computation*, Vol. 15, No. 1, pp 75-90, 2007
69. Nikhil R. Pal, K. Aguan, A. Sharma and S. Amari, Discovering biomarkers from gene expression data for predicting cancer subgroups using neural networks and relational fuzzy clustering, *BMC Bioinformatics*, 8:5, 2007.
70. J. M. Keller, J C. Bezdek, M Popescu, N R Pal, J A. Mitchell, and J Huband, Gene ontology similarity measures based on linear order statistics, *International Journal of Uncertainty, Fuzziness and Knowledge-based Systems* Vol. 14, No. 6 (2006), pp. 639 - 661.
71. Nikhil R. Pal, A. K. Mandal, Srimanta Pal, J. Das, and V. Lakshmanan, Fuzzy Rule Based Approach for Detection of Bounded Weak Echo Regions in Radar Images, *Journal of Applied Meteorology and Climatology*, Vol. 45, No. 9, pp 1304-1312, 2006.
72. A. Laha, Nikhil R. Pal and J. Das, Land cover classification using fuzzy rules and aggregation of contextual information through evidence theory, *IEEE Trans. Geoscience and Remote Sensing*, Vol. 24, No. 6, pp 1633-1641, 2006.
73. Nikhil R. Pal, A. Sharma, S. Sanadhya and Karmeshu, Identifying Marker Genes from Gene Expression Data in a Neural Framework through Online Feature Analysis, *International Journal of Intelligent Systems*, Volume 21, Issue 4, April 2006, Pp: 453-467
74. A. Ghosh, Nikhil R. Pal and J. Das, A fuzzy rule based approach to cloud cover estimation, *Remote Sensing of Environment* Volume 100, Issue 4, 28 February 2006, Pages 531-549.
75. S. Pal, S. Bhattacharya, and N R. Pal, A novel connectionist framework for computation of an approximate convex hull of a set of planer points, circles and ellipses *International Journal of Neural Systems*, Vol. 16, No. 1, pp 15-28, 2006.
76. N R Pal, James M. Keller, M Popescu, J C. Bezdek, J A. Mitchell, and J Huband, Gene Ontology-based Knowledge Discovery Through Fuzzy Cluster Analysis, *Neural, Parallel and Scientific Computations*, pp 337-362, vol 13, 2005.
77. D. Muni, Nikhil R. Pal and J. Das, Genetic Programming for Simultaneous Feature Selection and Classifier Design, *IEEE Trans. Systems, Man and Cybern - B*, Vol. 36, pp 106-117, Feb. 2006.

78. Nikhil R. Pal, K. Pal, J. Keller and J. Bezdek, A Possibilistic Fuzzy c- Means Clustering Algorithm, *IEEE Transactions on Fuzzy Systems*, Vol. 13, No. 4, pp 517-530, 2005.
79. Nikhil R. Pal, A. Laha and J. Das, Designing fuzzy rule based classifier using self-organizing feature map for analysis of multispectral satellite images, *International Journal of Remote Sensing*, Vol. 26, No. 10, 2219-240, May 2005,
80. K. Pal, Nikhil R. Pal, J. Keller and J. Bezdek, Relational Mountain (Density) clustering method and web log analysis, *International Journal of Intelligent Systems*, Vol 20, No. 3, pp 375-392, 2005
81. S. Pal, Nikhil R. Pal and A. Dutta, A multilayer Dynamic Neural Network for Convex-Hull Computation, *Neural, Parallel and Scientific Computations*, Vol. 12, pp 505-520, 2004.
82. A. Laha, Nikhil R. Pal and B. Chanda, Design of vector quantizer for image processing using self-organizing feature map and surface fitting, *IEEE Trans. Image Processing*, Vol. 13, No. 10, pp 1291-1303, 2004
83. Nikhil R. Pal, R. Mudi, K. Pal, and D. Patranabish, Rule extraction to exploratory data analysis for self-tuning fuzzy controllers, *Int. Jour. Fuzzy Systems*, Vol 6, No. 2, pp 71-80, 2004
84. D. Muni, Nikhil R. Pal and J. Das, A novel approach to design classifiers using genetic programming, *IEEE Trans. on Evolutionary Computation*, Vol 8, No. 2, pp 183- 196, 2004
85. N R Pal, S Pal, J Das and K. Majumder, SOFM-MLP : A Hybrid Neural Network for Atmospheric Temperature Prediction, *IEEE Trans. Geoscience and Remote Sensing*, Vol. 41, No. 12, 2783-2791, 2003
86. D. Chakraborty and Nikhil R. Pal, A neuro-fuzzy scheme for simultaneous feature selection and fuzzy rule-based classification, *IEEE Trans. Neural Networks*, Vol. 15, No. 1, pp 110-123, 2004.
87. C. D. Huang, C. T. Lin and Nikhil R. Pal, Hierarchical learning architecture with automatic feature selection for multiclass protein fold classification, *IEEE Trans. on Nanobioscience*, Vol. 2, No. 4, pp 221- 232, 2003.
88. S. Pal and N. R. Pal, Connectionist models for approximate solutions of non-linear equations in one variable, *Neural, Parallel and Scientific Computation*, Vol. 11, pp 185-206, 2003.
89. T. Pal and N. R. Pal, SOGARG : A self-organized genetic algorithm based rule generation scheme for fuzzy controllers, *IEEE Trans. Evolutionary Computation*, Vol. 7, No. 4, pp 397-415, 2003.
90. Nikhil R. Pal and R. K. Mudi, Computational intelligence for decision-making systems., *Int. Jour. Intell. Systems*, Vol. 18, No. 5, 483-486, 2003.
91. T. Pal, Nikhil R. Pal and M. Pal, Learning Fuzzy Rules for Controllers with Genetic Algorithms *Int. Jour. Intell. Systems*, Vol. 18, No. 5, 2003, 569-592.
92. D. Chakraborty and Nikhil R. Pal, A novel training scheme for multilayered perceptrons to realize proper generalization and incremental learning , *IEEE Trans. Neural Networks*, Vol. 14, No. 1, pp 1-14, 2003.
93. S. Bagui, S. Bagui, K. Pal, and Nikhil R. Pal, Breast cancer detection using rank-nearest classification rules, *Pattern recognition*, Vol. 36, pp 25-34, 2003.
94. Nikhil R. Pal and Srimanta Pal, Computational Intelligence for Pattern Recognition, *Int. Jour. Patt. Recogn. Artificial Intell.*, Vol. 16, No. 7, 773-779, 2002.
95. S. Raha, Nikhil R. Pal and K. S. Ray, Similarity based approximate reasoning : methodology and application, *IEEE Trans. Systems, Man and Cybern - A*, Vol 32, No. 4, pp 541-547, 2002.
96. Nikhil R. Pal and J. C. Bezdek, Complexity reduction for large image processing, *IEEE Trans. on Sys., Man and Cybern.- B*, Vol 32, No. 5, pp 598-611, 2002.
97. K. Pal, R. Mudi and Nikhil R. Pal, A new scheme for fuzzy rule based system identification and its application to self-tuning fuzzy controllers, *IEEE Trans. Systems Man and Cybern - B*, Volume 32, No. 4, pp 470-482, 2002.

98. Nikhil R. Pal, E. Vijay Kumar and G. Mandal, Fuzzy logic approaches to structure preserving dimensionality reduction, *IEEE Trans. Fuzzy Systems* Vol 10, No. 3, pp 277 -286, 2002.
99. S. Chakraborty, K. Pal and Nikhil R. Pal, A neuro-fuzzy framework for inferencing, *Neural Networks*, Vol. 15, pp 247-261, 2002.
100. S. Pal, A. Dutta and Nikhil R. Pal, A multilayer self-organizing model for convex hull computation, *IEEE Trans. Neural Networks*, Vol. 12 (6), pp 1341-1347, 2001.
101. A. Laha and Nikhil R. Pal, Some Novel Classifiers Designed Using Prototypes Extracted by a New Scheme Based on Self-Organizing Feature Map, *IEEE Trans. on Sys., Man and Cybern.-B*, Vol. 31, No. 6, pp 881-890, 2001
102. K. Pal and Nikhil R. Pal, Connectionist models in material science : characterization of sorption properties of hydrogen storage materials, *Neural Computing & Applications*, Vol. 10, No. 4, pp 195-205, 2001.
103. Nikhil R. Pal, T. Cahoon, J. C. Bezdek, and K. Pal, A New Approach To Target Recognition for LADAR Data, *IEEE Trans. Fuzzy Systems*, Vol. 9, No. 1, pp 44-52, 2001.
104. Nikhil R. Pal and S. Ghosh, Some Classification Algorithms Integrating Dempster-Shafer Theory of Evidence with the Rank Nearest Neighbor Rules, *IEEE Trans. Syst., Man & Cybern.- A*, Vol. 31, No. 1, pp 59-66, 2001.
105. D. Chakraborty and Nikhil R. Pal, Integrated feature analysis and fuzzy rule based system identification in a neuro-fuzzy paradigm, *IEEE Trans. Systems Man and Cybern - B*, Vol. 31, No. 3, 391-400, 2001
106. R. Mudi and Nikhil R. Pal, A note on fuzzy PI-type controller with resetting action, *Fuzzy Sets and Systems*, Vol 121, No 1, pp 149-159, 2001.
107. Nikhil R. Pal and S. Chakraborty, Fuzzy Rule Extraction from ID3 type Decision Trees for Real Data, *IEEE Trans. Systems, Man and Cybern - Part B*, Vol. 31, No. 5, pp 745-754, 2001
108. Nikhil R. Pal and A. Laha, A multi-prototype classifier and its application to remotely sensed image analysis, *Australian Jour. Intell. Infor Processing Systems*, Vol. 6, No. 2, pp 110-118, 2000.
109. R. Mudi and Nikhil R. Pal, A self-tuning fuzzy PI controller, *Fuzzy Sets and Systems*, Vol. 115, No. 2, pp 327-338, 2000.
110. Nikhil R. Pal and D. Chakraborty, Mountain and Subtractive clustering methods : Improvements and Generalizations, *Int. Jour. Intell. Systems*, Vol. 15, No. 4, pp 329-341, 2000.
111. S. Biswas and Nikhil R. Pal, On hierarchical segmentation for image compression, *Pattern Recognition Letter*, Vol. 21, No. 2, pp 131 - 144, 2000.
112. A. Dutta, S. Pal and Nikhil R. Pal, A connectionist model for convex hull, *Neural Networks*, Vol. 13, No. 3, pp 377-384, 2000.
113. A. Laha and Nikhil R. Pal, Dynamic generation of Prototypes with Self-Organizing Feature Maps for classifier design, *Pattern Recognition*, Vol. 34:2, pp. 315-321, 2001.
114. R. Mudi and Nikhil R. Pal, A robust self-tuning scheme for PI and PD type fuzzy controllers, *IEEE Trans. Fuzzy Systems*, Vol. 7, No. 1, pp 2-16, 1999.
115. Nikhil R. Pal, Soft Computing for Pattern Recognition, *Fuzzy Sets and Systems*, Vol. 103, pp 197-200, 1999.
116. Nikhil R. Pal, Soft Computing for Feature Analysis, *Fuzzy Sets and Systems*, Vol. 103, pp 201-221, 1999.
117. Nikhil R. Pal, On quantification of different facets of uncertainty, *Fuzzy Sets and Systems*, Vol. 107, No. 1, pp 81-91, 1999.
118. Nikhil R. Pal and T. Pal, On rule pruning using fuzzy neural networks, *Fuzzy Sets and Systems*, Vol. 106, No. 3, pp 335-347, 1999.

119. Nikhil R. Pal and K. Pal, Handling of inconsistent rules with an extended model of fuzzy controller, *Jour. Intell. and Fuzzy Sys.*, Vol. 7, pp 55-73, 1999.
120. Nikhil R. Pal, G. Mandal and E. Vijay Kumar, A note on the fuzzy neural network of Kwan and Cai, *IEEE Trans. Fuzzy Systems*, Vol. 7, No. 4, pp 479-480, 1999.
121. Nikhil R. Pal and C. Bose, Context sensitive inferencing and reinforcement type learning algorithms for fuzzy logic controllers, *Jour. Knowledge Based Intell. Engg. Sys.*, Vol. 3, No. 4, , pp 230-239, 1999
122. J. C. Bezdek, J. M. Keller, R. Krishnapuram, L. I. Kuncheva, and Nikhil R. Pal, Will the real Iris data please stand up?, *IEEE Trans. Fuzzy Systems*, Vol. 7, No. 3, pp 368-369, 1999.
123. K. Pal and Nikhil R. Pal, A neuro-fuzzy system for inferencing, *Int. Journal of Intell. Systems*, Vol. 14, no. 11, pp 1155-1182, 1999.
124. J. C. Bezdek and Nikhil R. Pal, Some new indices of cluster validity, *IEEE Trans. Syst., Man and Cybern.*, Vol. 28, No. 3, pp 301-315, 1998.
125. Nikhil R. Pal, S. Nandi and M. K. Kundu, Self-crossover : a new genetic operator and its application to feature selection, *Int. Jour. of Syst. Science* , Vol. 29, No. 2, pp 207-212, 1998.
126. Nikhil R. Pal and K. Chintalapudi, A simple scheme for pruning a multilayer perceptron network, *Jour Knowledge Based Intell. Engg. Sys.*, Vol. 2, No. 3, pp 145-163, 1998.
127. K. Pal, Nikhil R. Pal and J. M. Keller, Some neural net realizations of fuzzy reasoning, *Int. Journal of Intell. Systems*, Vol. 13, pp 859-886, 1998.
128. Nikhil R. Pal and E. Vijay Kumar, Two efficient connectionist schemes for structure preserving dimensionality reduction, *IEEE Trans. Neural Networks* Vo. 9, No. 6, pp 1142-1153, 1998.
129. R. Mudi and Nikhil R. Pal, A self-tuning fuzzy PD controller, *Journal of IETE*, Vol. 44, No. 4-5, pp 177-189, 1998.
130. K. Pal and Nikhil R. Pal, Learning of rule importance for fuzzy controllers to deal with inconsistent rules and for rule selection, *Journal of Control and Cybernetics*, Vol. 27, No. 4, pp 521-543, 1998.
131. Nikhil R. Pal, S. Chakraborty and A. Bagchi, RID3 : An ID3 like algorithm for real data, *Information Sciences - applications*, Vol. 96, pp 271-290, 1997.
132. Nikhil R. Pal and T. George, Metric structures on possibility distributions, *Int. Jour. Gen. Systems*, Vol. 25, No. 4, pp 389-398, 1997.
133. Nikhil R. Pal and J. Biswas, Cluster validation using graph theoretic concepts, *Pattern Recognition*, Vol. 30(6), pp 847-857, 1997.
134. R. Hemasinha, Nikhil R. Pal and J. C. Bezdek, The determinant of a fuzzy matrix with respect to T- and and co T-norms, *Fuzzy Sets and Systems*, Vol. 87, pp 297-306, 1997.
135. N. R. Pal and K. Chintalapudi, A connectionist system for feature selection, *Neural, Parallel and Scientific Computation*, Vol. 5, No. 3, pp 359-381, 1997.
136. R. De, Nikhil R. Pal and S. K. Pal, Feature analysis : Neural network and fuzzy set theoretic approaches, *Pattern Recognition* Vol. 30, No. 10, pp 1579-1590, 1997.
137. T. George and Nikhil R. Pal, Quantification of Conflict in Dempster-Shafer framework : a new approach, *Int. Jour. Gen. Systems*, Vol. 24, No. 4, pp 407-423, 1996.
138. S. Biswas, Nikhil R. Pal and S. K. Pal, Smoothing of Digital Images Using the Concept of Diffusion Process, *Pattern Recognition* , Vol. 29, No. 3, pp 497-510, 1996.
139. Nikhil R. Pal, On minimum cross entropy thresholding, *Pattern Recognition*, Vol. 29, No. 4 , pp 575-580, 1996.
140. Nikhil R. Pal, J. C. Bezdek and R. J. Hathaway, Sequential competitive learning and the fuzzy c-means clustering algorithms, *Neural Networks* , Vol. 9, No. 5, pp 787-796, 1996.
141. N. Karayiannis, J. C. Bezdek, Nikhil R. Pal, R. J. Hathaway and P. I. Pai, Repairs to GLVQ : a new family of competitive learning Schemes, *IEEE Trans. Neural Networks*, Vol. 7, No. 5, pp 1062-1071, 1996.

142. J. Basak, Nikhil R. Pal and P. S. Patel, Thinning in binary and gray images, *Journal of IETE* Vol. 42, No. 4-5, pp 305-313, 1996.
143. S. K. Pal and Nikhil R. Pal, Soft Computing : Goals, Tools and Feasibility, *Journal of IETE* Vol. 42, No. 4-5, pp 195-204, 1996.
144. J. C. Bezdek and Nikhil R. Pal, An index of topological preservation for feature extraction, *Pattern Recognition*, Vol. 28, No. 3, pp 381-391, 1995.
145. J. Basak, Nikhil R. Pal and S. K. Pal, A connectionist system for learning and recognition of structures : application to handwritten characters, *Neural Networks*, Vol. 8, No. 4, pp 643-657, 1995.
146. A. Ghosh, Nikhil R. Pal and S. K. Pal, Modeling of component failure in neural networks for robustness evaluation : an application to object extraction, *IEEE Trans. Neural Nets.*, Vol. 6, pp 648-656, 1995.
147. S. Bagui and Nikhil R. Pal, A multistage generalization of the rank nearest neighbor classification rule, *Pattern Recognition Letter* , Vol. 16, pp 601-614, 1995.
148. J. C. Bezdek and Nikhil R. Pal, A note on self-organizing semantic maps, *IEEE Trans. neural networks* Vol. 6, No. 5, pp 1029-1036, 1995.
149. Nikhil R. Pal and J. C. Bezdek, On cluster validity for the fuzzy c-means model, *IEEE Trans. Fuzzy Sys.* , Vol. 3, No 3, pp 370-379, 1995.
150. J. C. Bezdek and Nikhil R. Pal, Two relatives of learning vector Quantization, *Neural Networks*, Vol. 8, No. 5, pp 729-743, 1995.
151. J. C. Bezdek, R. J. Hathaway and Nikhil R. Pal, Norm-induced shell-prototypes (NISP) clustering, *Neural, Parallel and Scientific Computations* , Vol. 3, pp 431-450, 1995.
152. Nikhil R. Pal and J. C. Bezdek, Measuring Fuzzy Uncertainty , *IEEE Trans. Fuzzy Syst.*, Vol. 2, No. 2, pp 107-118, 1994.
153. A. Ghosh, Nikhil R. Pal and S.K. Pal, Neural Computing: An Introduction and Some Applications , *J. Inst. Electron. Telecom. Engg.*, 35, pp 105-125, 1994.
154. D. Bhandari, Nikhil R. Pal and S. K. Pal, Directed mutation in genetic algorithms, *Information Sciences*, Vol. 79, pp 251-270, 1994.
155. Nikhil R. Pal, J. C. Bezdek and R. Hemasinha, Uncertainty measure for evidential reasoning - II : A new measure , *Inter. Jour. Approximate Reasoning*, Vol. 8, No. 1, pp 1-16, 1993.
156. A. Ghosh, Nikhil R. Pal and S.K. Pal, Self-organization for Object Extraction using a Multilayer Neural Network and Fuzziness Measures , *IEEE Trans. Fuzzy Systems*, Vol. 1, No. 1, pp 54-68, 1993.
157. D. Bhandari and Nikhil R. Pal, Some new information measures for fuzzy sets , *Information Sciences*, Vol. 67, No. 3, pp 209-228, 1993.
158. Nikhil R. Pal and S. K. Pal, A review on image segmentation, *Pattern Recognition*, Vol. 26, No. 9, pp 1277-1294, 1993.
159. Nikhil R. Pal and D. Bhandari, Image thresholding : some new techniques , *Signal Processing*, Vol. 33, No. 2, pp 139-158, 1993.
160. Nikhil R. Pal, P. Pal and A. K. Basu, A new shape representation scheme and its application to shape discrimination using a neural network , *Pattern Recognition*, Vol. 26, No. 4, pp 543-551, 1993.
161. Nikhil R. Pal, J. C. Bezdek and E. C. Tsao, Generalized clustering networks and Kohonen's Self-organizing scheme , *IEEE Trans. Neural Nets.* , Vol. 4, No. 4, pp 549-557, 1993.
162. R. Hemasinha, Nikhil R. Pal and J. C. Bezdek, Iterates of fuzzy circulant matrices , *Fuzzy Sets and Systems*, Vol. 60, pp 199-206, 1993.
163. Nikhil R. Pal and S.K. Pal, Higher order fuzzy entropy and hybrid entropy of a set , *Information Sciences*, Vol. 61, No. 3, pp 211-231, 1992.

164. Nikhil R. Pal and S.K. Pal, Some properties of the Exponential entropy , *Information Sciences*, Vol. 66, No.1-2, pp 119-137, 1992.
165. A. Ghosh, Nikhil R. Pal and S.K. Pal, Object background classification using hopfield type neural network , *Int. J. Patt. Recog. and Artificial Intell.*, Vol. 6, No. 5, pp 989-1008, 1992.
166. D. Bhandari, Nikhil R. Pal and D. Dutta Majumder, Fuzzy divergence, probability measure of fuzzy events and image thresholding , *Pattern Recognition Letters*, Vol. 13, pp 857-867, 1992.
167. Nikhil R. Pal and D. Bhandari, On object - background classification , *Int. Jour. of Systems Sciences*, Vol. 23, No. 11, pp 1903-1920, 1992.
168. Nikhil R. Pal, J. C. Bezdek and R. Hemasinha, Uncertainty measure for evidential reasoning - I : A review , *Inter. Jour. Approximate Reasoning*, Vol. 7, No. 3,4, pp 165-183, 1992.
169. Nikhil R. Pal and S.K. Pal, Image model, Poisson distribution and object extraction , *Int. J. Patt. Recog. and Artificial Intell.*, Vol. 5, No. 3, pp 459-483, 1991.
170. Nikhil R. Pal and S.K. Pal, Entropy: a new definition and its applications , *IEEE Trans. Syst, Man and Cyberns.*, Vol. SMC-21, No. 5, pp 1260-1270, 1991.
171. A. Ghosh, Nikhil R. Pal and S.K. Pal, Image segmentation using a neural network , *Biological Cybernetics*, Vol. 66, No. 2, pp 151-158, 1991.
172. Nikhil R. Pal and S.K. Pal, Entropic thresholding , *Signal Processing*, Vol. 16, No. 2, pp 97-108, 1989.
173. Nikhil R. Pal and S.K. Pal, Object-background segmentation using new definitions of entropy , *IEE Proceedings-E*, Vol. 136, No. 4, pp 284-295, 1989.
174. S.K. Pal and Nikhil R. Pal, Segmentation using contrast and homogeneity measures , *Pattern Recognition Letters*, Vol. 5, No. 4, pp 293-304, 1987.
175. S.K. Pal and Nikhil R. Pal, Segmentation based on measures of contrast, homogeneity, and region Size , *IEEE Trans. Syst. Man and Cyberns.*, Vol. 17, No. 5, pp 857-868, 1987.

Articles Published in Books/Edited Volumes/Referred Conference Proceedings

176. Qin Chang, Junze Wang, Huaqing Zhang, Lina Shi, Jian Wang and Nikhil R. Pal, Structure Optimization of Neural Networks with L1 Regularization on Gates, *IEEE International Symposium Series on Computational Intelligence, SSCI 2018*, November 18-21, Bangalore, accepted.
177. Kaustuv Nag and Nikhil R. Pal. "Genetic Programming for Classification and Feature Selection." In *Evolutionary and Swarm Intelligence Algorithms*, pp. 119-141. Springer, Cham, 2018.
178. Montes, Ignacio, Susana Montes, and Nikhil Pal. "On the Use of Divergences for Defining Entropies for Atanassov Intuitionistic Fuzzy Sets." In *Advances in Fuzzy Logic and Technology 2017*, pp. 554-565. Springer, Cham, August 2017.
179. Liu, Yu-Ting, Nikhil R. Pal, Shang-Lin Wu, Tsung-Yu Hsieh, and Chin-Teng Lin. "Adaptive subspace sampling for class imbalance processing." In *Fuzzy Theory and Its Applications (iFuzzy)*, 2016 International Conference on, pp. 1-5. IEEE, 2016.
180. A. Guillon, M. J. Lesot, C. Marsala, and Nikhil R. Pal, Proximal Optimization for Fuzzy Subspace Clustering. *International Conference on Information Processing and Management of Uncertainty in Knowledge-Based Systems*, pp. 675-686, Springer International Publishing, 2016.
181. Lu, C.L., Tang, W.C., Tsai, Y.S., Pal, N.R. and Chung, I.F., 2016, October. Feature Selection with Non-Linear Dependence Based on Multi-objective Strategy. In *IEEE 16th International Conference on Bioinformatics and Bioengineering (BIBE)*, 2016, pp. 346-349, 2016
182. Nikhil R. Pal, Fuzzy Rule Based Approaches to Dimensionality reduction, *Perception and Machine Intelligence*, PerMin 2012, LNCS 7143, 2012., Eds. M. K. Kundu, S. Mitra, D. Mazumdar and S. K. Pal

183. Yu-Shuen Tsai, I-Fang Chung, Chin-Teng Lin, and Nikhil R. Pal, Identification of Different Sets of Biomarkers for Diagnostic Classification of Cancers, *Neural Information Processing/ICONIP 2007*, Eds. M. Ishikawa, K. Doya, H. Miyamoto and T. Yamakawa, Vol. 4985/2008, pp 866-875, 2008.
184. D. Chakraborty and Nikhil R. Pal, "Strict Generalization in Multilayered Perceptron Networks", *Foundations of Fuzzy Logic and Soft Computing, Proceedings of IFSA 2007, Lecture Notes in Artificial Intelligence (LNAI) 4529*, pp. 722-731, 2007
185. Nikhil R. Pal and D. Chakraborty, Some new features for protein fold prediction, in *Artificial Neural Networks and Neural Information Processing - ICANN/ICONIP 2003*, Eds. Kaynak, O., Alpaydin, E., Oja, E., Xu, L. (Eds.) , *Lecture Notes in Computer Science*. Vol.. 2714 , Springer, pp. 1176 - 1183, 2003.
186. C.-D. Huang, I-F. Chung, Nikhil R. Pal, and C. T. Lin, Machine Learning for Multi-class Protein Fold Classification Based on Neural Networks with Feature Gating, *Artificial Neural Networks and Neural Information Processing - ICANN/ICONIP 2003*, Eds. Kaynak, O., Alpaydin, E., Oja, E., Xu, L. (Eds.) , *Lecture Notes in Computer Science*. Vol.. 2714 , Springer, pp 1168 - 1175, 2003
187. Karmeshu and Nikhil R. Pal, Uncertainty, Entropy and Maximum Entropy Principle – An Overview, In *Entropy Measures, Maximum Entropy Principle and Emerging Applications*, Ed. Karmeshu, Springer-Verlag, 1-53, 2003
188. D. P. Mandal and Nikhil R. Pal, On the utility of different entropy measures in image thresholding, In *Entropy Measures, Maximum Entropy Principle and Emerging Applications*, Ed. Karmeshu, Springer-Verlag, pp 177-198, 2003
189. J. C. Bezdek, Nikhil R. Pal, T. Runkler, and K. Pal, Should tendency assessment precede rule extraction by clustering? (No!), in *Advances in Computational Intelligence and Learning: Methods and Applications*, eds. H. Zimmermann, G. Tsentis, M. V. Someren and G. Dounias, Kluwer, Norwell, MA, 17-41, 2002.
190. Nikhil R. Pal and A. Sarkar, Extraction of fuzzy rules from numerical data for classifiers, *Pattern Recognition in Soft Computing Paradigm*, World Scientific, Ed. Nikhil R. Pal, pp 249-274, 2001.
191. D. P. Mandal and Nikhil R. Pal, Non-Shannon entropies for image thresholding, *Current Trends in Information theory, statistics and O. R.*, Ed. Om Prakash, Guru Nanak Dev University, India, pp 32-46, 2001
192. K. Pal and Nikhil R. Pal, Fuzzy rule extraction for classifier design, *Current Trends in Information theory, statistics and O. R.*, Ed. Om Prakash, Guru Nanak Dev University, India, pp 47-59, 2001
193. Nikhil R. Pal and J. C. Bezdek, Quantifying different facets of fuzzy uncertainty, *Handbook of Fuzzy Sets* , *Kluwer Academic Publishers*, Eds. D. Dubois & H. Prade, pp 459-480, 2000.
194. Nikhil R. Pal and D. Chakraborty, Simultaneous feature analysis and system identification in a neuro-fuzzy framework, *Neuro-fuzzy Pattern Recognition*, Eds. H. Bunke and A. Kandel, World Scientific, pp 3-22, 2000.
195. Nikhil R. Pal, Connectionist approaches for feature analysis, *Neuro-Fuzzy Tools and Techniques*, Physica-Verlag, Heidelberg, pp 147-167, 1999 Eds. N. Kasabov and R. Kozma
196. M. K. Kundu and Nikhil R. Pal, Self-crossover and its application to the travelling salesman problem, *Lecture Notes in Artificial Intelligence 1611* Eds. I. Imam, Y. Kodratoff, A. El-Dessouki, and M. Ali, pp 326-332, 1999.
197. Nikhil R. Pal and E. Vijay Kumar, Neural networks for dimensionality reduction, *Progress in Connectionist-Based Information Systems, Proc. Fourth Int. Conf. Neural Info. Processing, ICONIP'97*, Ed. Kasabov et al. , Springer, New Zealand, Vol. 1, pp 221-224, 1997
198. Nikhil R. Pal Neural networks for feature selection (invited) *Progress in Connectionist-Based Information Systems, Proc. Fourth Int. Conf. Neural Info. Processing, ICONIP'97*, Ed. Kasabov et al., Springer, New Zealand, pp 1121-1124, Vol. 2, 1997

199. Nikhil R. Pal and S. Chakraborty, A hierarchical algorithm for classification and its tuning by genetic algorithm, *Proc. Fourth Int. Conf. Neural Info. Processing, ICONIP'97*, Ed. Kasabov et al., Springer, New Zealand, Vol. 1, pp 404-407, 1997
200. Nikhil R. Pal and C. Bose, Adaptive fuzzy controllers with rule dependent inferencing, *Methodologies for the conception, design, and applications of intelligent systems - 4th Int. Conf. Soft Computing, IIZUKA'96*, Eds. T. Yamakawa and G. Matsumoto, World Scientific, pp 350-353, 1996
201. K. Pal and Nikhil R. Pal, A flexible fuzzy controller with relative importance of rules, *Methodologies for the conception, design, and applications of intelligent systems - 4th Int. Conf. Soft Computing, IIZUKA'96*, Eds. T. Yamakawa and G. Matsumoto, World Scientific, pp 398-401, 1996
202. Nikhil R. Pal and S. Mukhopadhyay, A psychovisual fuzzy reasoning edge detector, *Methodologies for the conception, design, and applications of intelligent systems - 4th Int. Conf. Soft Computing, IIZUKA'96*, Eds. T. Yamakawa and G. Matsumoto, World Scientific, pp 201-204, 1996
203. J. C. Bezdek, Nikhil R. Pal, Cluster validity with generalized Dunn's indices, *Proc. 1995 2nd NZ Int. Two-Stream Conf. on ANNES, 1995*, Eds. N. Kasabov and G. Coghill, IEEE Press, Piscataway, NJ, pp 190-193, 1995
204. Nikhil R. Pal and J. C. Bezdek, Measures of fuzziness : a review and several new classes, *Fuzzy sets, Neural nets and Soft computing*, Eds. R. R. Yager and L. A. Zadeh, ITP - Van Nostrand Reinhold, NY, pp 194-212, 1994.
205. A. Ghosh, Nikhil R. Pal and S.K. Pal, Neural Network, Gibbs Distribution and Object Extraction , *Intelligent Robotics - Int. Symp. on Intell. Robotics (ISIR)*, Eds. M. Vidyasagar and M. Trivedi, Tata McGraw Hill, India, pp 95-106, 1991.
206. A. Ghosh, Nikhil R. Pal and S.K. Pal, Object Extraction Using a Self-Organizing Neural Network , *Intelligent Robotics - Int. Symp. on Intell. Robotics (ISIR)*, Eds. M. Vidyasagar and M. Trivedi, Tata McGraw Hill, India, pp 686-697, 1991.
207. S.K. Pal and Nikhil R. Pal, Higher Order Entropy, Hybrid Entropy and Their Applications , in *Spectrum Analysis in One or Two Dimensions* (eds. S. Prasad and R.L. Kashyap), Oxford & IBH Pub. Co., New Delhi, pp 285-300, 1990.
208. G. Ochoa, I. Lizasoain, D. Paternain, H. Bustince, and Nikhil R. Pal, Some properties of lattice OWA operators and their importance in image processing, *Proceedings of World Congress of the International Fuzzy Systems Association and Conference of the European Society for Fuzzy Logic and Technology, IFSA-EUSFLAT 2015*, doi:10.2991/ifsa-eusflat-15.2015.178, pp 1261-1265, 2015, Atlantis Press.
209. Kaustuv Nag, Tandra Pal, Nikhil R. Pal, Robust Consensus: A New Measure for Multicriteria Robust Group Decision Making Problems Using Evolutionary Approach, The 13th International Conference on Artificial Intelligence and Soft Computing (ICAISC 2014), June 1-5, 2014, Poland, *Artificial Intelligence and Soft Computing Lecture Notes in Computer Science*, Volume 8467, pp 384-394.
210. Shang-Lin Wu, Chun-Wei Wu, Nikhil R. Pal, Chih-Yu Chen, Shi-An Chen, and Chin-Teng Lin, Common Spatial Pattern and Linear Discriminant Analysis for Motor Imagery Classification, *Proceedings of the 2013 IEEE Symposium on Computational Intelligence, Cognitive Algorithms, Mind, and Brain (CCMB)*, 978-1-4673-5871-2/13/, SSCI April 16-19, Singapore, 2013.
211. N R. Pal and M. Malpani, Redundancy-Constrained Feature Selection with Radial Basis Function Networks, *Prof. WCCI 2012 IEEE World Congress on Computational Intelligence* June, 10-15, 2012 - Brisbane, Australia, DIO: 10.1109/IJCNN.2012.6252638
212. Ching-Yi Chen, Chun-Hung Su, I-Fang Chung, and Nikhil R. Pal, Prediction of Mammalian MicroRNA Binding Sites Using Random Forests, *Proc. 2012 International Conference on System Science and Engineering* June 30-July 2, 2012, Dalian, China, pp 91-95, 2012 **received the Best Paper Award**

213. K. Sarkar and Nikhil R. Pal, Is it rational to partition a data set using Kernel-clustering?, *2011 IEEE International Conference on Fuzzy Systems*, Fuzz-IEEE 2011, Taipei, Taiwan, June 27-30, 2011.
214. Nishchal K. Verma and Nikhil R. Pal, Prediction of Satellite Images using Fuzzy Rule based Gaussian Regression, *2010 IEEE Applied Imagery Pattern Recognition Workshop (AIPR)*, DOI 10.1109/AIPR.2010.5759679, pp.1-8, Oct. 2010.
215. Yu-Kai Wang, Nikhil R. Pal, Chin-Teng Lin and Shi-An Chen, Analyzing Effect of Distraction Caused by Dual-Tasks on Sharing of Brain Resources Using SOM, *2010 IEEE World Congress on Computational Intelligence, WCCI 2010, Proc. IJCNN 2010*, IEEE, Barcelona, pp 927-932.
216. A. Anand, Nikhil R. Pal and Ponnuthurai Suganthan, Integration of Functional Information of Genes in Fuzzy Clustering of Short Time Series Gene Expression Data, *2010 IEEE World Congress on Computational Intelligence, WCCI 2010, Proc. IEEE CEC 2010*, Barcelona, pp 3002-3009.
217. R.Kumar, Nikhil R. Pal, J.D. Sharma, and B. Chanda, A Novel Approach for Detection of Alteration in Ball Pen Writings, *PReMi 2009*, LNCS 5909, pp. 400-405, 2009.
218. Hwa-Shan Huang, Nikhil R. Pal, Li-Wei Ko and Chin-Teng Lin, Automatic Identification of Useful Independent Components with a View to Removing Artifacts from EEG Signal, *2009 Int. Joint Conf. Neural Networks*, IJCNN 2009, June 14-19, 2009, Atlanta, USA
219. Chin-Teng Lin, Nikhil R. Pal, Chien-Yao Chuang, Tzzy-Ping Jung, Li-Wei Ko, Sheng-Fu Liang, "An EEG-based Subject- and Session-independent Drowsiness Detection" *Proceedings of International Joint Conference on Neural Networks(IJCNN)*, *World Congress on Computational Intelligence*, pp. 3448-3454, June 1-6, 2008.
220. Nikhil R. Pal, A fuzzy rule based approach to identify biomarkers for diagnostic classification of cancers, *IEEE Int. Conf. Fuzzy Systems*, Fuzz-IEEE 2007, pp 1-6, DOI 10.1109/FUZZY.2007.4295533
221. D. P. Muni, Nikhil R. Pal and J. Das, Texture Generation For Fashion Design Using Genetic Programming, *Proc. the 9th International Conference on Control, Automation, Robotics and Vision*, ICARCV-2006, IEEE, Singapore, December 5 - 8, pp 1940-1944, 2006.
222. A. Laha, B. Chanda, and Nikhil R. Pal, Accelerated codebook searching in a SOM-based Vector Quantizer, *2006 International Joint Conference on Neural Networks*, WCCI 2006, Vancouver, Canada, July 16-21, pp 5945-5950, 2006.
223. B. Saha, A. Mazumdar and Nikhil R. Pal, Bidirectional Fuzzy-Regression Model for Road-lines Detection, *IEEE International Conference on Engineering of Intelligent Systems*, ICEIS'2006, Islamabad, Pakistan, 22-23 April, 2006.
224. B. Bhowmick, Nikhil R. Pal, S. Pal, S. K. Patel & J. Das, Detection of Microcalcification with Neural Networks, *IEEE International Conference on Engineering of Intelligent Systems*, ICEIS'2006, Islamabad, Pakistan, 22-23 April, 2006.
225. Nikhil R. Pal, K. Pal, J. Keller and J. Bezdek, A New Hybrid c-Means Clustering Model, *Proc. 2004 IEEE International Conference on Fuzzy Systems*, FuzzIEEE2004, Budapest, Hungary, pp. 179-184, 2004.
226. D. Chakraborty and Nikhil R. Pal, Expanding the training set for better generalization, *Proc. International Conference on Communications, Devices and Intelligent Systems, CODIS 2004*, 8 - 10 January, 2004, Calcutta, Eds. A.K. Mandal, A.K. Bandyopadhyay, B. Gupta, S.K. Choudhary and S.K. Sarkar, Jadavpur University, Calcutta, pp 454 - 457.
227. S. K. Patel, Nikhil R. Pal and S. Pal, Fuzzy edge detection with human psychovisual facts, *Proc. International Conference on Communications, Devices and Intelligent Systems, CODIS 2004*, 8 - 10 January, 2004, Calcutta, Eds. A.K. Mandal, A.K. Bandyopadhyay, B. Gupta, S.K. Choudhary and S.K. Sarkar, Jadavpur University, Calcutta, pp 496 - 499
228. D. P. Muni, Nikhil R. Pal and J. Das, Multicategory classifier design using genetic programming, *Proc. International Conference on Communications, Devices and Intelligent Systems, CODIS 2004*, 8 - 10 January, 2004, Calcutta, Eds. A.K. Mandal, A.K. Bandyopadhyay, B. Gupta, S.K. Choudhary and S.K. Sarkar, Jadavpur University, Calcutta, pp 597 - 599

229. S. Chakraborty and N. R. Pal, Selection of Structure Preserving Features with Neural Networks, *Proc. 2003 IEEE Int. Conf. Fuzzy Systems, Fuzz-IEEE'03*, pp 822-827, 2003
230. D. Chakraborty and Nikhil R. Pal, Two Connectionist Schemes for Selecting Groups of Features (Sensors) *Proc. 2003 IEEE Int. Conf. Fuzzy Systems, Fuzz-IEEE'03*, pp 161-166, 2003
231. D. Chakraborty and Nikhil R. Pal, Making a multilayer perceptron say "Don't Know" when it should, *Proc. International Conference on Neural Information Processing, ICONIP 2002*, Vol. 1, pp 45-49, Dec. 18-22, 2002, Singapore.
232. A. Laha, Nikhil R. Pal and J. Das, Satellite image analysis with fuzzy rules and theory of evidence, *Proc. Conference on Fuzzy set theory and its mathematical aspects and applications*, Allied Publishers Pvt. Ltd., pp 33-39, 2002, Benaras, India
233. J. C. Bezdek and Nikhil R. Pal, Blind detection of targets from LADAR data, *Joint 9th IFSA World Congress and 20th NAFIPS International Conference: Fuzziness and Soft Computing in the New Millenium*, Vancouver, Canada, July 25-28, 2001, IEEE Press, Piscataway, NJ, 1127-1133.
234. Nikhil R. Pal and S. Chakraborty, IRID3 : An improved version or RID3 for classification, *Asian Fuzzy Systems Symposium, 2000*, Vol. 2, 987-992
235. S. Chakraborty and Nikhil R. Pal , Generation of fuzzy rules from a decision tree, *Asian Fuzzy Systems Symposium, 2000*, Vol. 2, 993-997.
236. A. Laha and Nikhil R. Pal, and J. Das, Designing prototype-based classifiers and their application to multispectral satellite images, *Proc. 6th Int. conference on Soft Computing, IIZUKA2000*, Japan, 2000, CDRom ISBN 4-938717-04-2.
237. Pal, K., Bezdek, J. C., Pal, N. R. and Runkler, T., Some notes on fuzzy rule extraction by clustering, *Proc. 5th Iberoamerican Symp. on Patt. Recog.*, eds. F. Muge, R. C. Pinto and M. Piedade, ISBN 972-97711-1-1, 19-27.
238. Pal, K., Pal, N. R., Runkler, T. and Bezdek, J. C., Fuzzy rule extraction by clustering : the role of tendency assessment, *Proc. COIL 2000, Evolutionary computing, fuzzy logic, machine learning, neural networks*, 22-23 June 2000, Greece, pp 1-13
239. T. Pal, Nikhil R. Pal and S. Dev Roy, A self organized rule generation scheme for fuzzy logic controllers, *Proc. 9th Int. Conf. Fuzzy Systems, FUZZIEEE-2000*, Vol 1, 13-18.
240. A. Laha and Nikhil R. Pal, Design of a Nearest-Prototype Classifier with Dynamically Generated Prototypes using Self-Organizing Feature Maps, *Proc. 1999 Int. Conf. on Neural Information Processing, ICONIP'99*, pp 746-751, Vol. 2, November 1999, Australia.
241. A. Laha and Nikhil R. Pal, On different variants of self-organizing feature map and their properties, *Proc. 1999 IEEE Hong Kong Symp. on Robotics & Control*, Vol. I, pp 344-349, 1999.
242. N. R. Pal, G. Mandal and E. Vijay Kumar, Structure Preserving Dimensionality Reduction : A Fuzzy Logic Approach, *Asian Fuzzy Syztems Symposium, 1998*, Korea, pp 426-431.
243. S. Raha, Nikhil R. Pal and K. S. Ray, Some new similarity based approaches in approximate reasoning and their applications to pattern recognition, *Asian Fuzzy Syztems Symposium, 1998*, Korea, pp 719-724.
244. K. Pal and Nikhil R. Pal, Modeling Dehydriding Behavior of Hydrogen Storage Materials with Neural Networks, *Fifth Int. Conf. Neural Information Processing, ICONIP,98*, Japan, 703-706, 1998.
245. Nikhil R. Pal, K. Banerjee and Y. Hayashi, SUM-PI NETWORK : a new multilayered feed-forward network, *Fifth Int. Conf. Neural Information Processing, ICONIP,98*, Japan, 687-690, 1998.
246. P. N. Suganthan and Nikhil R. Pal, Pattern classification using multiple SOMs, *Fifth Int. Conf. Neural Information Processing, ICONIP,98*, Japan, 1065-1068, 1998.
247. K. Pal, R. Mudi and Nikhil R. Pal, Rule extraction and reduction through exploratory data analysis for designing a self-tuning fuzzy controller, *Proc. of the Japan-Vietnam Bilateral Symposium on Fuzzy Systems and Applications, VJFUZZY'98*, Sept. 30 - Oct. 2, 1998, pp 607-613, Ha-Long Bay, Vietnam

248. Nikhil R. Pal and Y. Hayashi, A proposal for direct fuzzy rule generation from numerical data *Proc. Fifth Int. Conf. Fuzzy Logic, Neural Nets and Soft Computing*, IIZUKA'98, Japan, pp 971-974, 1998.
249. K. Pal and Nikhil R. Pal, Using fuzzy rules with importance factors for time series prediction and rule selection, *Proc. Fifth Int. Conf. Fuzzy Logic, Neural Nets and Soft Computing*, IIZUKA'98, Japan, 1998, 418-421.
250. K. Chintalapudi and Nikhil R. Pal, A novel scheme to determine the architecture of a multi-layer perceptron, *IEEE Int. Conf. on Syst. Man and Cybern.*, USA, 1998, pp 2297-2303.
251. Nikhil R. Pal, K. Pal, J. C. Bezdek and T. Runkler, Some issues in system identification using clustering, *Int. Joint Conf. on Neural Networks*, ICNN 1997, IEEE Press, Piscataway, NJ, 2524-2529, 1997.
252. Nikhil R. Pal, K. Pal and J. C. Bezdek, A mixed c-means clustering model, *1997 IEEE Int. Conf. on Fuzzy Systems*, Spain, 11-21, 1997.
253. R. Mudi and Nikhil R. Pal, A robust self-tuning scheme for PI-type controllers, *EUFIT - 1997*, Germany.
254. Nikhil R. Pal and T. George, A new conflict measure for Dempster-Shafer framework, *Sixth Int. World Congress of the Int. Fuzzy syst. Asso.*, IFSA-1995, Sao-Paulo, Brazil, 353-356.
255. J. C. Bezdek, R. Hathaway and Nikhil R. Pal, Shell prototype clustering models, *Proc. ICNN*, 4, IEEE Press, Piscataway, NJ, 1617-1621, 1995
256. J. Basak, Nikhil R. Pal and P. S. Patel, A connectionist model for graytone thinning, *Proc. ICNN*, 4, IEEE Press, Piscataway, NJ, 1460-1465, 1995
257. J. C. Bezdek, Nikhil R. Pal, R. J. Hathaway and N. B. Karayiannis, Some new competitive learning schemes, *Proc. SPIE*, 1995.
258. B. Umashankar and Nikhil R. Pal, FFCM : An effective approach for large data sets, *Proc. Third Int. Conf. Fuzzy Logic, Neural Nets and Soft Computing*, IIZUKA, Japan, pp 331-332, 1994.
259. S. Biswas, Nikhil R. Pal and S. K. Pal, A Quantitative Index for Termination of Iterative Image Smoothing Algorithms. *Proc. Third International Conference on Automation, Robotics and Computer Vision*, 1107-1111, Nov 9-11, 1994.
260. Nikhil R. Pal and J. C. Bezdek, Several new classes of measures of fuzziness , *Proc. IEEE Int. Conf. on Fuzzy Syst.*, 928-933, Mar. 1993.
261. J. C. Bezdek and Nikhil R. Pal, Prototype generating clustering algorithms, *Proc. Fifth IFSA World Congress*, Soel, Korea, Vol. 1, pp XXXVI-XLIII, 1993.
262. J. C. Bezdek and Nikhil R. Pal, An index of topological preservation and its application to self-organizing feature maps, *Int. Joint Conf. Neural Nets.*, 1993, Nagyo, Japan, pp 2435-2440.
263. J. Basak, Nikhil R. Pal and S. K. Pal, A connectionist system for handwritten character recognition, *Proc. Symposium on Intelligent Systems*, Bangalore, India, 1993, pp 21-27.
264. Nikhil R. Pal and J. C. Bezdek, Extensions of self-organizing feature maps for improved visual displays, *Int. Joint Conf. Neural Nets.*, 1993, Nagyo, Japan, pp 2441-2447.
265. D. Bhandari, Nikhil R. Pal and S. K. Pal, Directed mutation : a new concept to expedite search in genetic algorithms, *Proc. Symposium on Intelligent Systems*, Bangalore, India, 1993, pp 1-7.
266. Nikhil R. Pal and J. C. Bezdek, Assessment of clustering tendency and cluster validity : some fuzzy methods, *Proc. First Asian Fuzzy Syst. Symp.*, Singapore, Nov 23-26, 1993, pp 444-449.
267. J. Basak, Nikhil R. Pal and S. K. Pal, A connectionist implementation of Hough transform, *Int. Conf. on Advances in Pattern Recogn. and Digital Techniques*, Dec 28-31, 1993, India.
268. J. C. Bezdek and Nikhil R. Pal, Fuzzification of self-organizing feature map : will it work?, *Proc. Application of Fuzzy Logic Technology*, SPIE Vol. 2061, 142-162, Boston, USA, 1993.
269. J. Basak, N.R. Pal, and S.K. Pal, A novel connectionist approach for automatic peak selection in Hough space, *Proc. Indo-US workshop*, Pune, India, 1993.

270. J. C. Bezdek, E. C. Tsao and Nikhil R. Pal, Fuzzy Kohonen clustering networks , *Proc. IEEE Int. Conf. of Fuzzy Syst.*, March 1992, San Diego, USA, pp 1035-1043.
271. D. Bhandari, Nikhil R. Pal and D. Dutta Majumder, Measures of discrimination and ambiguity for fuzzy sets , *Proc. IEEE Int. Conf. of Fuzzy Systems*, March 1992, San Diego, USA, pp 145-152.
272. E. C. Tsao, W. C. Lin, J. C. Bezdek and Nikhil R. Pal, A neural network system for medical image understanding , *Proc. Fifth Florida AI Research Symposium*, Florida, April 7-10, 1992, pp 24-28.
273. Nikhil R. Pal, J. C. Bezdek and E. C. Tsao, Improving convergence and performance of Kohonen's Self-organizing Scheme , *SPIE Proc., Science of Artificial Neural Networks*, Orlando, Vol. 1710, pp 500-509, 1992.
274. Nikhil R. Pal, J. C. Bezdek, Average total uncertainty : A new measure and its properties , *Proc. 2nd Int. Conf. on Fuzzy Logic and Neural Networks*, July 1992, Iizuka, Japan, pp 583-586.
275. D. Bhandari, Nikhil R. Pal and D. Dutta Majumder. Fuzzy divergence : A new measure for image segmentation , *Proc. Int. Conf. on Fuzzy Logic and Neural Networks*, July 1992, Iizuka, Japan, pp 645-648.
276. E. C. Tsao, J. C. Bezdek and Nikhil R. Pal, Image segmentation using LVQ clustering networks , *Proc. North American Fuzzy Info. Proc. Soc. (NAFIPS-92)*, Mexico, pp 98-107.
277. J. C. Bezdek, Nikhil R. Pal and E. C. Tsao, Two generalizations of Kohonen clustering networks , *Proc. Third Int. Workshop on Neural Networks and Fuzzy Logic-92*, Jun. 1-3, 1992, NASA Huston, Pub # 10111, VII, pp 199-226.
278. Nikhil R. Pal and S.K. Pal, Some Information Measures on Fuzzy Set and Their Application to Image Processing , *Proc. NACONECS-89*, Roorkee, India, Tata McGraw-Hill, New Delhi, pp 94-96, 1989.
279. S.K. Pal and Nikhil R. Pal, Object-Background Classification Using A New Definition of Entropy , *Proc. IEEE. Int. Conf. Syst., Man and Cyberns.*, Shenyang, China, pp 773-776, 1988.
280. S.K. Pal and Nikhil R. Pal, Object Extraction Using Higher Order Entropy , *Proc. 9th Int. Conf. Patt. Recog.*, Rome, Italy, pp pp 348-350, 1988.
281. Nikhil R. Pal and S.K. Pal, New Entropic Thresholding , *Proc. Seminar on Parallel Process. Syst. and Their Appl.*, Calcutta, pp 120-123, 1988.
282. S.K. Pal and Nikhil R. Pal, Two Stage Segmentation Algorithm Incorporating Psychovisual Phenomena in Contrast Homogeneity Measure , *Proc. Platinum Jubilee Conf. Syst. and Sig. Process.*, Indian Institute of Science, Bangalore, India, pp 366-369, 1986.