

ADVANCED SOFT COMPUTING TECHNIQUES FOR INSTRUMENTATION APPLICATIONS

Introduction – supervised learning - Back propagation – feed forward networks, Radial Basis neural network– Recurrent networks – unsupervised learning – Kohonen, Counter propagation and ART network. Reinforcement Learning algorithms. Implementation of above neural network concepts using MATLAB with simple applications.

Introduction – Sugeno –Takagi model - architecture – TSK model based Control – Design methodology – Comparison of TSK fuzzy techniques with Mamdani fuzzy techniques- Fuzzy clustering algorithms- Introduction – K means - C means. Implementation of above fuzzy logic using MATLAB with simple applications.

Basic concept of Genetic algorithm and detail algorithmic steps - Single objective and multi objective Genetic algorithm. Introduction to Evolutionary programming and artificial Immune system. Implementation of GA, EP and AIS using MATLAB with simple applications.

Adaptive Neuro –Fuzzy Inference systems(ANFIS) – Introduction – Architecture – Hybrid Learning Algorithm –Classification and Regression Trees(CART) – Introduction - Decision Trees –algorithm for Tree induction – Simulation examples and implementation using MATLAB.

Sensor modelling, calibration, linearization and compensation using different soft computing techniques -Applications to different temperature, pressure, flow, level and other special sensors.

TEXT BOOKS:

1. Laurene Pauselt, Fundamentals of Neural Networks, Pearson education.
2. John Yen and Reza Langari, Fuzzy Logic Intelligence, control and information , Pearson education.
3. J. S. Jang, C. T. Sun and E. Mizutani, Neuro – Fuzzy and Soft Computing, PHI,2006

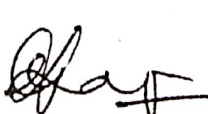
REFERENCES:

1. Klir G.'J and Folger T. A, Fuzzy sets, Uncertainty and Information, Prentice Hall of India, New Delhi 1994.
2. Simon Haykin, Neural Networks, ISA, Research Triangle Park, 1995.
3. Kosco B, Neural Networks and Fuzzy Systems: A Dynamic Approach to Machine Intelligence, Prentice Hall of India, New Delhi, 1992.
4. Jagdish Chandra Patra, Alex C. Kot, An Intelligent Pressure Sensor Using Neural Networks, IEEE Transactions on Instrumentation and Measurement, Vol. 49, No. 4, August 2000
5. Guo Li-Hui, Wang Wu ,Thermocouple Signal Conditioning with Genetic Optimizing RBF Neural Networks, IEEE Transactions on Instrumentation and Measurement,2011

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