

ARTIFICIAL NEURAL NETWORK

Unit 1

ANN Definition, Taxonomy of neural net classifiers for fixed patterns, Mc-Culloch & Pitts Model, structure and working of human brain & comparison with basic ANN model, single layer network. Perceptron training algorithm, linear separability, Hebb's learning rule, Widrow & Holf's learning rule / Delta rule, ADALINE, MADALINE, Comparison of ANN with human brain and AI characteristics and application of ANN.

Unit II

Multilayer perception, problem with linear activation function, different activation functions like sigmoidal/squashing function, linear threshold function, hyperbolic tangent and Gaussian function. Rumelhart's error back propagation algorithm (EBPA) with proof, momentum, limitations, characteristics and Application of EBPA, case study : NETTALK, two dimensional pattern recognition etc.

Unit III

Fast training of MLP : EBP using direct solution methods (EBPVDS) , DR symmetric Gaussian Elimination Method (DRSGE) , Random MBD (Minimum Bit distance) Gram- Schmidt methods (RMGS), case study: Function approximations, Pattern recognition and vowel recognition. Counter Propagation Network: Network Structure, functioning in Normal & Training mode, characteristics of CPN.

Unit IV

Deterministic v/s statistical training, Boltzman training, Cauchy training, Artificial specification methods. Hopfield /recurrent network, configuration, stability constraints, Associative memory characteristics, limitations and applications Hopfield v/s boltzman machine. Competitive learning : concepts, weight change, example 7 characteristics, lateral inhibition : concepts & examples.

Unit V

Kohonen self-organizing feature map resemblance with human brain, feature map algorithm- how alpha and d changes with time, examples and properties. Adaptive Resonance Theory(ART): Architecture, classification, implementation & training. Optical neural network, Cognitron and Neocognitron.