IV Year B.Tech. CSE II - Semester   **L   T   P   To   C**

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CS428 NEURAL NETWORKS
(ELECTIVE VI)

Course Description & Objective

Understand the role of neural networks in engineering, artificial intelligence, and cognitive modeling. Provide knowledge of supervised learning in neural networks. ? Provide knowledge of computation and dynamical systems using neural networks. ? Provide knowledge of reinforcement learning using neural networks.

Course outcomes

- The role of neural networks in engineering, artificial intelligence, and cognitive modeling.
- Have an understanding of the concepts and techniques of neural networks through the study of the most important neural network models.
- Have a knowledge of sufficient theoretical background to be able to reason about the behavior of neural networks.
- To be able to evaluate whether neural networks are appropriate to a particular application.

UNIT – I Introduction to Artificial Neural Networks

Introduction, Artificial Neural Networks, Historical Development of Neural Networks, Biological Neural Networks, Comparison Between them and the Computer, Comparison Between Artificial and Biological Neural Network Basic Building Blocks of Artificial Neural Networks, Artificial Neural Network (ANN) terminologies.

UNIT – II Fundamental Models of Artificial Neural Networks

McCulloch-Pitts Neuron Model, Learning Rules, Hebbian Learning Rule Perceptron Learning Rule, Delta Learning Rule (Widrow-Hoff Rule or Least Mean Square(LMS) Rule, Competitive Learning Rule, Out Star Learning, Boltzmann Based Learning, Hebb Net. Perceptron Networks : Introduction, Single Layer Perceptron, Brief Introduction to Multilayer Perceptron Networks. Adaline and Madaline Networks : Introduction, Adaline, Madaline.

UNIT – III Associative Memory Networks

Introduction, Algorithms for Pattern Association, Hetero Associative Memory, Neural Networks, Auto Associative Memory Network, Bi-directional Associative Memory.

UNIT- IV Feedback & Feed Forward Networks

Feedback Networks : Introduction, Discrete Hopfiled Net, Continuous Hopfiled Net, Relation between BAM and Hopfiled Nets. Feed Forward Networks : Introduction, Back Propagation Network (BPN), Radial Basis Function Network (RBFN).

UNIT – V Self Organizing Neural Architectures

Self Organizing Feature Map: Introduction, Methods Used for Determining the Winner, Kohonen Self Organizing Feature Maps, Learning Vector Quantization (LVQ), Max Net, Maxican Hat, Hamming Net. Applications of Neural Networks: Applications in Bioinformatics, Knowledge extraction, Image processing, forecasting, Medical domain.

TEXT BOOK :

1. Sivanandam, S Sumathi, S N Deepa; "Introduction to Neural Networks", 2nd ed.,TATA McGraw HILL; 2005.

REFERENCES BOOKS :

1. Simon Hhaykin, "Neural networks A comprehensive foundations", 2nd ed., Pearson Education, 2004.
2. B Yegnanarayana, "Artificial neural networks", 1st ed., Prentice Hall of India P Ltd, 2005.
3. Li Min Fu, "Neural networks in Computer intelligence", 1st ed., TMH, 2003