NEURAL NETWORKS AND FUZZY LOGIC CONTROL (ELECTIVE-II)

Course Code:13EC2116

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Course Outcomes:

Upon completion of the course, the student will be able to

CO1: Comprehend the concepts of feed forward neural networks

CO2: Analyze the various feedback networks.

CO3: Understand the concept of fuzziness involved in various systems and fuzzy set theory.

CO4: Comprehend the fuzzy logic control and adaptive fuzzy logic and to design the fuzzy control using genetic algorithm.

CO5: Analyze the application of fuzzy logic control to real time systems.

UNIT-I

ARCHITECTURES:

Introduction –Biological neuron-Artificial neuron-Neuron modeling, Learning rules, Single layer, Multi layer feed forward network-Back propagation, Learning factors.

UNIT-II

NEURAL NETWORKS FOR CONTROL:

Feedback networks-Discrete time hop field networks-Schemes of neuro – control, identification and control of dynamical systems-case studies (Inverted Pendulum, Articulation Control).

UNIT-III

FUZZY SYSTEMS:

Classical sets-Fuzzy, sets-Fuzzy relations-Fuzzification –Defuzzification-Fuzzy rules.

UNIT-IV

FUZZY LOGIC CONTROL:

Membership function – Knowledge base-Decision –making logic – Optimizations of membership function using neural networks. Adaptive fuzzy systems. Introduction to generate to genetic algorithm.

UNIT-V

APPLICATION OF FLC:

Fuzzy logic control, Inverted pendulum, Image processing, Home Heating system, Blood pressure during anesthesia, Introduction to neuro fuzzy controller.

TEXT BOOKS:

1. Kosko, B, "*Neural Networks and Fuzzy Systems: A Dynamical Approach to Machine Intelligence*", PrenticeHall, NewDelhi, 2004.

2. Timothy J Ross, "*Fuzzy Logic with Engineering Applications*", John Willey and Sons, West Sussex, England, 2005.

REFERENCE BOOKS:

1. Jack M. Zurada, "*Introduction to Artificial Neural Systems*", PWS Publishing Co., Boston, 2002.

2. Klir G.J. &Folger T.A., "*Fuzzy sets, Uncertainty and Information*", Prentice –Hall of India Pvt. Ltd., New Delhi, 2008.

3. Zimmerman H.J., "*Fuzzy set theory and its Applications*", Kluwer Academic Publishers Dordrecht, 2001.

4. Driankov,Hellendroonb, "*Introduction to fuzzy control*", Narosa Publishers,2001.

5. LauranceFausett, Englewood cliffs, N.J., "*Fundamentals of Neural Networks*", PearsonEducation, New Delhi, 2008.