

(PHDEC-104) NEURAL NETWORK AND FUZZY LOGIC

Neural Networks

Introductions to neurons, Classification of neurons, Introduction to neural networks, Modeling of neural networks based on soft and hard neurons, Different network configuration, Feed forward and recurrent network, Training algorithms, Learning-supervised and unsupervised, Neural network application in control, Identification, Pattern recognition system, Modeling and state estimation, Decision based on training of neurons.

Fuzzy Logic

Fuzzy logic concepts, Fuzzy sets, Fuzzy relations and membership functions, Fuzzy network, Defuzzification, Fuzzy controllers.

Genetic Algorithm

Introduction, Gene, Mutation, Genetic algorithm concepts.

Approval
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8.7.14
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MODULE I

Low Power CMOS Logic Circuits: Introduction, Overview of Power Consumption, Low - Power Design through voltage scaling, Estimation and Optimization of switching activity, Reduction of Switched Capacitance and Adiabatic Logic Circuits.
Design for Testability: Introduction, Fault Types and Models, Controllability and Observability, Ad Hoc Testable Design Techniques, Scan Based and BIST Techniques.
RTL Design with VHDL: Basic structures of VHDL, Combinational circuits, Sequential circuits, Writing Test benches, Synthesis issues, VHDL Essential Terminologies

MODULE II

Digital Signal Processing: Signal Processing, transforms and statistical signal processing
Simulating of discrete time signals and FIR filters.
Image Segmentation: Introduction, point, line and edge detection, thresholding, region based segmentation, use of motion in segmentation.
Image Representation and Description: Image representation, boundary descriptors, regional descriptors, principal components for description, relational descriptors Image Analysis Patterns and pattern classes, scene segmentation and labeling, counting objects, perimeter measurements, boundary following, projection, Hough transform, least squares and Eigenvector line fitting, shapes of regions, morphological operations, Fourier transforms, color.

MODULE III

Wireless Communication: Introduction to wireless communications systems, comparisons & trends. Cellular concepts frequency reuse, strategies, interference & system capacity, trucking & grade of service, improving coverage & capacity in cellular systems.
Multiple Access Techniques for Wireless Communication:
FDMA, TDMA, SSMA (FHMA/CDMA/Hybrid techniques) SDMA technique (AS applicable to wireless communications). Packet radio access protocols, CSMA protocols, reservation protocols capture effect in packet radio, capacity of cellular systems

References:

1. Programming in MATLAB for Engineers, Stephen J. Chapman, Cengage Learning.
2. Digital Image Processing using MATLAB, Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, Pearson
3. Digital Signal Processing: A MATLAB Based Approach, Vinay K. Ingale, John G. Prokis, Cengage Learning.
4. Digital Image Processing, Rafael C. Gonzalez, Richard E. Woods, Pearson Education
5. Wireless Communication and Networking William Stallings, PHI, 2003.
6. Wireless Communications, Principles, Practice Theodore. S. Rappaport, PHI, 2nd Edn.
7. Douglas Perry, "VHDL- Programming by examples", MGH
8. "Principle of CMOS VLSI design", Neil Weste, Kamran Esharghian, Addison Wesley.
9. S. M. Sze, "VLSI Technology", 2nd Edition, McGraw -Hill Publication.
10. J. D. Plummer, M. D. Deal and Peter B. Griffin, "Silicon VLSI Technology: Fundamentals, practice and modelling", Pearson Education.

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