ELEG 5653 ARTIFICIAL NEURAL NETWORKS

Summer 2006

Catalog Data: ELEG 5653 Artificial Neural Networks. Credit 3. Fundamentals of artificial neural networks, both theory and practice. Teaches basic concepts of both supervised and unsupervised learning, and how they are implemented using artificial neural networks. Topics include the perceptron, back propagation, effective generalization, unsupervised learning, self organizing feature maps, Hopfield networks, associative memories, temporal pattern recognition, reinforcement learning, etc. Prerequisite: MATH 3404.

Textbook: Neural Network Design, by Martin T. Hagan, Howard B. Demuth, and Mark Beale.

Coordinator: R. L. Brown, Associate Professor

Goals: This course teaches students how to design and train artificial neural networks. The students learn the popular networks and training algorithms, and why they work. They also learn factors that determine whether a network performs well or poorly for a particular task.

Prerequisite by Topics: Calculus and differential equations.

Topics:

1. Natural Biological Neural Networks
2. Artificial Neuron Models
3. Some Concepts from Linear Algebra
4. The Perceptron Learning Rule & Linearly Separable Problems
5. Backpropagation & Steepest Descent Training of Multilayer Networks
6. Factors Effecting the Ability of a Network to Generalize
7. Unsupervised Learning Using Competitive Networks
8. Hebbian Learning
9. Hopfield Networks & Associative Memories
10. Approximating Back Propagation using Hebbian Learning
11. Temporal Pattern Recognition
12. Reinforcement Learning

Laboratory Projects:

None

Computer Usage:

C programming on PC's.

Estimated Content:

Engineering Science: 2 credits
Engineering Design: 1 credit

*Three 50 minute classes per week

Prepared By:_____ Date: _____