

Dr. Dichter
2005
CS 580
Bridgeport

Spring
University of

Office: Tech Building 223
Office Hours: M, T 2:00 – 4:00
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Required Text:

David M. Skapura, Building Neural Networks, ISBN: 0-201-53921-7
Publisher: Addison Wesley Professional, 1996

References:

- Text** (available in the library)
- Web resources and papers** (to be determined)

The class covers the introduction to Artificial Neural Networks (ANNs). The class will focus on theory, but will also stress the practical side of implementation of the particular network architectures. We will use Java as the instructional language to implement the programming solutions. Students can use another language that has equal GUI capability.

Students will write several visual programs implementing the visualization of neurons as well as solving problems using ANNs..

The class grading will be determined as follows:

Programming Assignments	50%
Midterm Examination	20%
Final ANN Project	10%
Final Examination	20%

Note: Most projects will require demonstrations. In such a case, you must be sure that your project is ready to be demonstrated in lab in the Tech building. You need to run the project before it is to be demonstrated to be sure that all required system components are available and running successfully. ALL projects whether or not they require a demonstration, will need to be submitted with the following: all source code, all output files , all input files, representative screen shots of the system run, design documentation. Programs are expected to be very well documented. Programs documentation will carry a 20 percent value.

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Topics for ANNs

- **Visual Java Programming, GUI design, Event Handling**
- **Basics of Neural Nets, biological neurons and historical perspective**
- **Simple single layer Neural Networks, Perceptrons**
- **Vector and Matrix Notation and Manipulation**
- **Activation functions, linear, threshold, sigmoid and hyperbolic tangent functions. Backpropagation multiplayer Networks, Generalized Delta Rule**
- **Advanced Backpropagation, Momentum, Bias, and +/- Activation functions**
- **Sequential Networks**
- **Midterm**
- **Counter-propagation Networks. Kohonene-Grossberg Networks. Unsupervised learning.**
- **Hopfield Networks. Binary neurons, graded response neurons. NP hard problems and ANN applications.**
- **Advanced Hopfield Networks**
- **Bidirectional Associative Memories, BAM.**
- **Application Areas of ANNs**
- **Final Project Demos and Final Exam**