

CAP5615 Introduction to Neural Networks

Credits: 3 credits

Text book, title, author, and year: Simon Haykin, *Neural Networks: a comprehensive foundation*, Third Edition, **ISBN-10:** 0131471392, **ISBN-13:** 978-0131471399, Prentice-Hall, 2008.

Reference materials:

Christopher M. Bishop, *Pattern Recognition and Machine Learning*, Springer, 2007.

Tom M. Mitchell, *Machine Learning*, McGraw-Hill, ISBN: 0-07-042807-7, 1997.

Christopher M. Bishop, *Neural Network for Pattern Recognition*, **ISBN:** 0198538642, Oxford University Press, 1996.

Research papers

Specific course information

Catalog description: This is an entry level course for students to understand the principles of neural networks, how does a neural network work, and gain hands-on experiences in designing/implementing neural networks to solve real-world problems, such as digital character classification or face recognition

Prerequisites: Prerequisite or Corequisite: *CDA 3201C* (Introduction to Logic Design), Elementary computer programming skills (prefer java or C) is a must. The course will involve several course projects which require moderate level of programming work

Specific goals for the course:

1. Learn fundamental concepts of artificial neural networks, classification models, Bayes networks, and advanced learning framework, such as deep learning.
2. Develop abilities to analyze artificial neural networks.
3. Develop the basic understanding of Back Propagation for weight updating in neural networks.
4. Develop the ability to design basic learning systems.

Brief list of topics to be covered:

1. Introduction to Pattern Recognition
2. Decision Trees
3. Bayes Learning
4. Single Layer Perceptrons
5. Multilayer Perceptrons
6. Radial-Basis Function Networks
7. Support Vector Machines
8. Deep Learning