EEL 6682 Intelligent Control

Credits: 3 credits

Textbook, title, author, and year: Class Notes

Reference materials: N/A

Specific course information

Catalog description:
Recent trends related to learning and decision-making capabilities of intelligent control systems using neural networks and fuzzy logic. Emphasis on controller design for industrial applications.

Prerequisites: Graduate Standing or permission from instructor

Specific goals for the course:

This course aims at providing graduate students a comprehensive view of recent developments in computational intelligent design techniques using neural networks and Fuzzy logic. Various schemes are critically analyzed in order to provide a framework for students’ projects. Upon completion of this course, the student should be able to:
• Know the concept of Neural Network, Fuzzy Logic and Evolutionary Computation (EC).
• Learn about the application of NN, FL and EC to industrial process
• Design intelligent Systems.
• Evaluate the design according to the provided criterions

Brief list of topics to be covered:
1. Introduction and motivation.
2. Engineering System design: Conventional approaches.
4. Learning and decision making for intelligent systems
4. Neural Network and Intelligent Control.
5. Supervised and unsupervised learning.
7. Industrial applications of Intelligent Control using NN:
   * Temperature control system
   * Inverse pendulum balancer
   * Trailer truck Backer-upper
   * Manufacturing
   * Desalination technology
   * Computer Networking
   * Chemical processes
- Oil refinery processes
- Aircraft control
- Other industrial applications

8. Fuzzy Set and Fuzzy logic.
10. Industrial applications of Intelligent Control fuzzy Logic.
- Steam Engine: First Application of Fuzzy Control
- Washing Machine