EEL-5840 : Elements of Machine Intelligence
FALL SEMESTER 2014

2014 Catalog Data: Elements of Machine Intelligence (3) Prereq: Senior or graduate standing. Engineering and hardware concepts pertaining to the design of intelligent computer systems.

Textbook(s): LISP, Winston & Horn, 3rd edition or later, 0-201-08319-1
Nilsson, Artificial Intelligence: A New Synthesis, Morgan-Kauffman, 1998, 1-55860-467-7

Optional References: Nilsson, Principles of Artificial Intelligence,Tioga, '80, 0-934613-10-9
Russell & Norvig, Artificial Intelligence:A Modern Approach, Prentice-Hall, '10, 0-13-604259-7

Coordinator(s): Instructors: Asoc. Prof. A. Antonio Arroyo. Machine intelligence, robotics, artificial intelligence, microcomputers, expert systems, human-machine interaction, computer software & hardware, pattern recognition, DSP, natural language processing. MAEB 338, 392-2639 AArroyo@ufl.edu.

Goals: An in-depth look at Machine Intelligence (e.g., Artificial Intelligence grounded in reality), both classical and modern, with a view toward grounding in reality. To implement Machine Learning Algorithms in autonomous robots. To provide an "engineering approach" to the emerging field of MI, to impart a conceptual foundation on the principles behind the current MI technology.

Prerequisites by Topic:

1. Data Representation
2. Engineering Programming
3. Digital computer principles

Topics: {Tentative}

1. Reactive Machines: Stimulus-Response Agents, Neural Nets, Machine Evolution, State Machines and Robot Vision.
2. Search in State-Spaces: Agents that Plan, Uninformed Search, Heuristic Search, Planning, Acting and Learning, Alternative Search, Adversarial Search
3. Problem Representation and Reasoning: Propositional Calculus, Resolution, Predicate Calculus, Knowledge-Based Systems, Representing Commonsense Knowledge
4. Rule-Based Deduction: forward & backward reasoning, rule-based systems, logic programming, expert systems.
5. AI Communication and Integration
6. AI Programming: LISP, Prolog (an overview).
7. An overview of animal learning and simulation.
8. Robot Learning and Q-Learning (time permitting)

Computer Usage:

Weekly programming assignments using PC/MAC-based LISP (shareware). One major / minor problem from the examples discussed in class might be assigned as a project. Homework and programs are worth 20% of the grade.

Laboratory Projects:

No formal labs required.

Grading

Two in-class exams (2 x 40%) 80%, homework assignments & programs (see above) 20%. Grading Scale is 93.67-100 A, 90-93.66 A-, 86.67-89.99 B+, 83.67-86.66 B, 80-83.66 B-, 76.67-79.99 C+, etc. NO MAKEUP EXAMS.

Attendance and Expectations

Class attendance is not required, but class attendance is essential in that not all of the in-class material is expounded on in the class textbook(s). Tardiness is unacceptable and all cell phones must to be turned off during class.