Module Code: CS7032  
Module Name: Artificial Intelligence  
Module Short Title: AI-IET  
ECTS Weighting: 5 ECTS  
Semester/term taught: Michaelmas (weeks 5 to 16)  
Contact Hours:  
- Lecture hours: 22  
- Lab hours: 11  
- Total hours: 33  
Module Personnel: Mr Andrei Marinescu  
Learning Outcomes: Students who complete this module should:  
1. Have a thorough understanding of the development of autonomous agents that are aware of their environment, can react to external stimuli, can behave according to sets of rules defined by a game designer, and learn automatically from interaction with the game environment.  
2. Be able to represent knowledge for the purposes of real-time simulations.  
3. Be able to define a machine learning problems and design algorithms that implement solutions for such problems.  
4. Be able to represent agent-environment interaction as Markov decision processes and design algorithms for learning optimal action policies for such processes.  
5. Have practical experience in implementing and evaluating agent-based systems that learn through interaction with the environment.  
Module Learning Aims: This module will present students with the state of the art in representing autonomous agents, decision making and learning. The students will develop a thorough understanding of the development of computer controlled characters that are aware of their environment, can react to external stimuli, behave according to sets of rules defined by a game designer and learn by interacting with the environment. The core of the module is reinforcement learning, presented
Module Content

1. Agents, definition and formal architectures
2. Deductive agents & Utility functions
3. Agents, Reasoning & Uncertainty
4. Reactive Agents & Simulation
5. Advanced path finding and optimisation problems
6. Learning in Agent Architectures: Supervised and reinforcement learning
7. Evaluative Feedback
8. Markov decision processes
9. Strategies for solving the Bellman Optimality Equation
10. Temporal difference methods
11. Case studies in Reinforcement learning
12. Embodied Conversational Agents (ECA)
13. (Human language) dialogue management

Recommended Reading List

- An Introduction to MultiAgent Systems, by Wooldridge, 2009
- Research papers TBA

Module Pre Requisite

N/A

Module Co Requisite

N/A
### Assessment Details

% Exam: 0
% Coursework: 100

Description of assessment & assessment regulations.

The course will be assessed solely on the basis of coursework: 30% will be allocated to weekly lab assignments and 70% to a larger-scale project to be handed in in January. If required to repeat a student will be assigned a coursework project which they will be required to pass. The passing grade in all cases is 50%.

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