Artificial Intelligence

Syllabus Information

CS 2910 - Symbolic Artificial Intelligence

Associated Term: 2022/23 Academic Session

Learning Outcomes:

By the end of the course students should be able to:

1. Use computational logic to model domains and reasoning tasks of an intelligent system

2. Understand the role of knowledge representation, problem solving and learning in building domain independent and domain dependent AI capabilities

3. Explain conceptual and computational trade-offs between the expressiveness of different representations and capabilities

4. Demonstrate how to develop and combine AI capabilities in a suitable programming language

Module Summary:

Artificial Intelligence (AI) is usually defined as the science of making computers do things that require intelligence when done by humans. AI has had some success in limited, or simplified, domains. However, more recently, successes with developments of AI systems such as game playing and robotics have regenerated optimism concerning the attainment of human-level intelligence in a variety of domains despite the profound difficulty of the problem.

The aim of this module is to introduce students to the basic principles, methods and techniques of the symbolic AI approach, where one develops an intelligent system using rules, knowledge and actions that are interpretable. The intention is to provide the foundations of the key principles of symbolic AI, so that these can be combined with non-symbolic AI courses in the area. The module will start by providing an overview of the approaches in the field by referring to the wider historical context in which the AI vision was set and will further motivate the content to be taught by presenting existing and potential applications. After the overview, the module will deliver a series of topics from first principles, including the role of first-order logic for knowledge representation, computational reasoning and problem solving systems, the use of search as a capability for

exploring alternative solutions, and how AI systems use symbolic knowledge to plan and learn from first principles.

Upon completion of the module, students should be able to develop intelligent systems by assembling capabilities to concrete computational problems; understand the role of knowledge representation, problem solving, and symbolic learning in intelligent-system engineering; and appreciate the role of problem solving, in wide applications that require a basic understanding of human intelligence from a computational perspective.

Required Materials:

Click here for the reading list system

Technical Requirements:

The total number of notional learning hours associated with the course are 150.

These will normally be broken down as follows:

Lectures - 1 hour twice a week - 11 weeks - 22 hours

Laboratory classes - 1 hour twice a week - 6 weeks - 12 hours

Formative Assessment:

In-class Test 60 minutes

Summative Assessment:

Examination (60%) 120 minutes

In-class Test (20%) 60 minutes

Project (20%) 3 weeks