CompSci 367 Artificial Intelligence

2017 Semester 2

15 Points

Prerequisites and restrictions

Prerequisites:

CompSci 220, 225

Restriction:

CompSci 365, 366

Course Description

In this course, you will cover the representation, utilisation, and acquisition of knowledge. These are the cornerstones of AI. You will investigate how to take a real world problem and represent it in a computer, so that the computer can undertake inference. Utilising this knowledge, or acquiring new knowledge, is done by search. The basics of search and its use in planning will be covered. Machine learning will be covered, including the difference between induction and deduction and the similarities between machine learning and optimisation.

Staff involved in the course

Course Coordinator

- Mike Barley, room 303-488, barley@cs.auckland.ac.nz

Lecturers

- Jiamou Liu, room 303-487, jiamou.liu@auckland.ac.nz
- Ian Watson, room 303-493, dr.i.watson@gmail.com

Tutors

- Jordan Douglas, room 303-461, jdou557@aucklanduni.ac.nz

Timetable

Lectures

- Monday, 13-14:00, 303-G23
- Wednesday, 13-14:00, 301-G050
- Friday, 13-14:00, OGG 260-073

Tutorials

- Wednesday, 9-10:00, OGG 260-073

Course Outcomes

A student who successfully completes this course should be able to:

- Students can represent, in a declarative way, what it means for something to be a solution to a given problem.
- Students understand and can implement the main heuristic-search-based approaches to problem solving and their pro's and con's.
- Students can elicit knowledge and represent it in intermediate knowledge representations.
- Students understand data driven and goal driven inference and can program a declarative rule-based system.
- Students can represent knowledge in predicate calculus and prolog formats.
- Students understand machine learning bias and how that allows programs to learn

Lecture Schedule

Lecture Topics

Week 1

- 367 Introduction
- The History & Philosophy of AI
- Symbolic Reasoning

Week 2

- Knowledge Elicitation
- Knowledge Representation

Week 3

- Knowledge Engineering
- Ontologies

Week 4

- Fuzzy Logic
- Case-Based Reasoning
- The Ethics of AI

Week 5

- Introduction to Machine learning, instance based learning

Week 6

- Decision tree learning, Naive Baysian classification

Week 7

- Linear regression, Perceptron learning

Week 8

- Neural networks, model evaluations and selections

Week 9

- Logic/Prolog

Week 10

- Search & Constraint Satisfaction

Week 11

- Planning

Week 12

- Adversarial Planning & Review

Assessment

Requirements for passing

You have to pass both the theory [the exam] and the practical [i.e., assignments] components to pass this course. The exam is worth 70% of the total marks and the assignments are worth 30%.

Assignments

There will be 3 assignments, each worth 10%. The topics of the assignments are:

- Knowledge Engineering: due 20 August
- Machine Learning: due 1 October
- Search: due 22 October

The assignments will be submitted via the ADB (assignment drop box).

Exam

The final exam is worth 70% of your final mark. Please check Student Services Online for the exam time and date. The exam is closed book, and calculators are not permitted. Provisional exam results can be obtained from Student Services Online.

Assistance

There are a number of places where you can seek assistance with your learning.

Office Hours

All staff have office hours when they are available to students. You are encouraged to come and discuss any matters arising from the course during those hours. Staff are also frequently available at other times.

- Mike Barley: By arrangement (send email to arrange meetings and/or drop by)

- Jiamou Liu: To be decided
- Ian Watson: Wednesday: 12 - 1pm (at least for first half of course)

Lecture Recordings

All lectures are recorded. They may be a delay of 1-2 days before the lecture recordings are distributed through Canvas. You can find the lecture recordings on the Lecture Recordings page COMPSCI 367 > Pages > Lecture Recordings). Note that although the lectures are recorded, some learning activities conducted in class do not translate well to the recordings. To maximise your learning opportunities, you are encouraged to attend the class in person.

Discussion Forums

The discussion forums within Canvas are regularly monitored by teaching staff. Please make use of the forums to ask any questions that you think might be of interest to other students. If your question is of a personal nature, or relates to a unique situation that will be of little interest to others, then please contact the teaching staff directly.

Textbook

Artificial Intelligence: A Modern Approach by Stuart J. Russell, Peter Norvig, 3rd Ed.

Tutorials

The tutorials will review the topics of the previous week's lectures. While the tutor may prepare slides, the primary purpose of the tutorial is to answer questions about the course material (e.g., the lectures, assignments, etc.).

Help with Canvas

For help with Canvas see:

https://www.auckland.ac.nz/en/about/learning-and-teaching/CanvasHomepage/canvas-help---support.html.

Handling illness or absence

If you must leave for family emergencies etc., PLEASE talk to the lecturer, or somehow get a message to the department. Very few problems are so urgent that we cannot be told quite quickly.

For problems affecting assignments or tests, see the lecturer, as soon as reasonably possible.

For illness during exams (or other problems that affect exam performance) students MUST contact the University within **one week** of the last affected examination, to apply for an aegrotat pass (for illness) or compassionate pass (other problems). **The one week limit is strictly enforced.**

Refer to the University information about Aegrotat and Compassionate Considerations:

https://www.auckland.ac.nz/en/for/current-students/cs-academic-information/cs-examiation-information/cs-aegrotat-and-compassionate-consideration.html

Academic Integrity

The University of Auckland will not tolerate cheating, or assisting others to cheat, and views cheating in coursework as a serious academic offence. The work that a student submits for grading must be the student's own work, reflecting his or her learning. Where work from other sources is used, it must be properly acknowledged and referenced. This requirement also applies to sources on the world-wide web. A student's assessed work may be reviewed against electronic source material using computerised detection mechanisms. Upon reasonable request, students may be required to provide an electronic version of their work for computerised review.

Please refer to http://www.auckland.ac.nz/uoa/home/about/teaching-learning/honesty.