COMPSCI367 Artificial Intelligence

Course Information

Semester 2, 2019

Prerequisites and restrictions

Prerequisites:

COMPSCI 220, 225

Restriction:

COMPSCI 365, 366

Course Description

In this course, you will cover the representation and utilisation 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 solve that problem. Utilising this knowledge is done by search. The basics of search and its use in problem solving will be covered.

Staff involved in the course

Lecturers

- **Mike Barley**, Room 303-488, barley@cs.auckland.ac.nz (Course Coordinator)
- **Pat Riddle**, Room 303-490, pat@cs.auckland.ac.nz
- **Ian Watson**, Room 303-493, dr.i.watson@gmail.com

Tutors

- **James Garner**, Room 303-476, jgar569@aucklanduni.ac.nz
- **Alex Peng**, Room 303-476, ypen260@aucklanduni.ac.nz

Correspondence with Lecturers & Tutors

All email to staff MUST have the *course number* at the beginning of the subject line of the email, e.g., *CompSci 367*. If the subject line then does not have this, then the likelihood that your email will be read is close to zero. We all get innumerable emails each day, much of which is spam or unimportant, and which often get deleted automatically by spam filters or just ignored. So, we can't guarantee that your email will NOT be read, but there is a very good chance that it won't be read. YOU ARE RESPONSIBLE FOR ENSURING THAT THE COURSE NUMBER IS AT THE BEGINNING OF THE SUBJECT LINE.

Timetable

Lectures

Tues 2:00PM - 3:00PM, 301-G050 (Science Chem, Room G050)
Wed 2:00PM - 3:00PM, 301-G050 (Science Chem, Room G050)
Fri 2:00PM - 3:00PM, 301-G050 (Science Chem, Room G050)

Tutorials

Wed 11:00AM - 12:00PM, 301-G050 (Science Chem, Room G050)

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.

Assessments

Requirements for passing

You have to pass both the theory [the exam and test] and the practical [i.e., assignments] components to pass this course. The exam is worth 60% of the total marks, mid-term test is worth 10% of the total marks, and the assignments are worth 30%.

Component	Percentage	Assessment
Practical	30%	Assignments
Theory	10%	Test
	60%	Exam

Assignments

There will be 5 assignments. The topics of the assignments are shown in the table below:

Available	*Due*	*Value*	*Topic*
26/7	13/8	5%	Predicate Calculus & Prolog
2/8	27/8	5%	Uniform Cost Blind Search
20/8	16/9	5%	Uniform Cost Heuristic Search
27/8	30/9	5%	Planning
30/9	21/10	10%	CLIPS

The assignments will be submitted via Canvas.

Test

The term test is worth 10% of your final mark. The provisional date for the test is Wednesday 28 August, 2019 from 6:30pm -7:30pm (Please note that this is subjected to possible change. You will be notified of any changes through Canvas). The test is closed book, calculators, and cell phones are not permitted. Results will be emailed to you. If you have a test timetable clash, please contact the course coordinator, Mike Barley, as soon as possible.

Exam

The final exam is worth 60% 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.

Lecture Schedule (Tentative)

*** = Invited lectures given by Prof. Borrajo of University of Carlos III of Madrid**

Lecture Topics

Week 1

- Introduction
- Problem Spaces*****
- Search

Week 2

- Logical Representation
- Representing Problem Spaces*****
- First Order Logic (FOL)

Week 3

- Inference
- Prolog
- Local Search

Week 4

- Genetic Algorithms
- Adversarial Search (Game Playing)

Week 5

- Informed Search

Week 6

- Planning

Week 7

- Constraint Satisfaction

Week 8

- TBA

Week 9

- Symbolic Reasoning
- Knowledge Elicitation
- Knowledge Representation

Week 10

- Rule-based Reasoning
- Knowledge Engineering
- Knowledge Level Modelling

Week 11

- Expert Systems with CLIPS
- Ontologies
- Case-based Reasoning

Week 12

- Fuzzy Logic
- The Ethics of AI

Assistance

There are a number of places where you can seek assistance with your learning. The best place to start is by asking questions on Piazza. If you have any questions about the lectures or about the assignments, those questions belong on Piazza so that everyone can benefit. However, assignment code should not be posted on Piazza.

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)
- Pat Riddle: TBA
- Ian Watson: By arrangement (send email to arrange meetings and/or drop by)
- James Garner: TBA
- Alex Peng: TBA

Lecture Recordings

All lectures are recorded. They may be a delay of 1 or 2 days before the lecture recordings are distributed through Canvas. You can find the lecture recordings on the Lecture Recordings.

Note: 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.

Piazza Policy

- We use Piazza as a forum where you can ask questions and get help. Also in Piazza, we want to encourage and support the graduate capabilities of solution seeking and independence and integrity.
- To achieve this, we will not answer any questions on Piazza in the first 24 hours and give other students and yourself a chance to find the answer on your own.
- After the initial 24 hour period, we will try to answer all questions before another 24 has passed (i.e. within 48 hours of the initial question being posted), excluding weekends and public holidays.

- Please plan ahead and take this into account, especially towards the assignment deadlines. If there are any urgent issues that need to be resolved before 48 hours (for example technical problems in Canvas), additionally contact us via email to make sure this is not missed.
- 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 tutors or 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.).

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://uoa.custhelp.com/app/answers/detail/a_id/11028/~/aegrotat-or-compassionate-consideration-assessment-process`

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.

For information on the University's Policy on Cheating, please refer to the web page:

`https://www.auckland.ac.nz/en/students/forms-policies-and-guidelines/student-policies-and-guidelines/academic-integrity-copyright/about-academic-integrity.html`