MONASH University
Information Technology

FIT3080
Intelligent systems

Unit Guide

Semester 2, 2014

Last updated: 14 Jul 2014

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FIT3080 Intelligent systems - Semester 2, 2014

This unit includes history and philosophy of artificial intelligence; intelligent agents; problem solving and search (problem representation, heuristic search, iterative improvement, game playing); knowledge representation and reasoning (extension of material on propositional and first-order logic for artificial intelligence applications, situation calculus, planning, frames and semantic networks); expert systems overview (production systems, certainty factors); reasoning under uncertainty (belief networks compared to other approaches such as fuzzy logic); machine learning (decision trees, neural networks, genetic algorithms).

Mode of Delivery

- Clayton (Day)
- Malaysia (Day)

Workload Requirements

Minimum total expected workload equals 12 hours per week comprising:

(a.) Contact hours for on-campus students:

- Two hours of lectures
- One 1-hour laboratory

(b.) Additional requirements (all students):

- A minimum of 9 hours independent study per week for completing lab and project work, private study and revision.

Unit Relationships

Prohibitions

CSE2309, CSE3309, DGS3691

Prerequisites

FIT2004 or CSE2304

Chief Examiner

Professor Ingrid Zukerman

Campus Lecturer

Clayton

Reza Haffari

Ingrid Zukerman

Malaysia

Simon Egerton

Tutors

Clayton

To be announced

Your feedback to Us

Monash is committed to excellence in education and regularly seeks feedback from students, employers and staff. One of the key formal ways students have to provide feedback is through the Student Evaluation of Teaching and Units (SETU) survey. The University's student evaluation policy requires that every unit is evaluated each year. Students are strongly encouraged to complete the surveys. The feedback is anonymous and provides the Faculty with evidence of aspects that students are satisfied and areas for improvement.

For more information on Monash's educational strategy, see:

www.monash.edu.au/about/monash-directions/ and on student evaluations, see:
www.policy.monash.edu/policy-bank/academic/education/quality/student-evaluation-policy.html

Previous Student Evaluations of this Unit

Previous student feedback has been generally very positive. Improvements will be made in the provision of feedback to students.

If you wish to view how previous students rated this unit, please go to
https://emuapps.monash.edu.au/unitevaluations/index.jsp

Academic Overview

Learning Outcomes

At the completion of this unit students will have -A knowledge and understanding of:

- the historical and conceptual development of AI;
- the goals of AI and the main paradigms for achieving them including logical inference, search, nonmonotonic logics, neural network methods and Bayesian inference;
- the social and economic roles of AI;
- heuristic AI for problem solving;
- basic knowledge representation and reasoning mechanisms;
- automated planning and decision-making systems;
- probabilistic inference for reasoning under uncertainty;
- machine learning techniques and their uses;
- foundational issues for AI, including the frame problem and the Turing test;
- AI programming techniques.

Developed attitudes that enable them to:

- appreciate the potential and limits of the main approaches to AI;
- be ready to reason critically about claims of the effectiveness of AI programs;
- analyse problems and determine where AI techniques are applicable;
- implement AI problem-solving techniques in Lisp;
- compare AI techniques in terms of complexity, soundness and completeness.

Unit Schedule

Week	Activities	Assessment
0		No formal assessment or activities are undertaken in week 0
1	Introduction	
2	Problem solving: search I	Quizzes at beginning of 10 tutorials between Weeks 2 and 12
3	Problem solving: search II	
4	Game playing and Knowledge representation: propositional logic	
5	Knowledge representation: first-order logic	
6	Reasoning under uncertainty	Assignment 1 due 5 September 2014
7	Reasoning under uncertainty - Utility Theory	
8	Markov Decision Processes (MDPs)	
9	Reinforcement Learning	Assignment 2 due 26 September 2014
10	Mathematical Principles of Machine Learning	
11	Supervised Learning: Classification and Regression	
12	Natural Language Processing	Assignment 3 due 24 October 2014
	SWOT VAC	No formal assessment is undertaken in SWOT VAC
	Examination period	LINK to Assessment Policy: http://policy.monash.edu.au/policy-bank/academic/education/assessment/assessment-in-coursework-policy.html

*Unit Schedule details will be maintained and communicated to you via your learning system.

Teaching Approach

Lecture and tutorials or problem classes

This teaching and learning approach provides facilitated learning, practical exploration and peer learning.

Assessment Summary

Examination (3 hours): 60%; In-semester assessment: 40%

Assessment Task	Value	Due Date
Assignment 1 - Problem solving: search	13%	5 September 2014
Assignment 2 - Knowledge representation and Bayesian networks	9%	26 September 2014
Assignment 3 - Machine learning and Markov Decision Processes	13%	24 October 2014
Quizzes	5%	

		Beginning of 10 tutorials during Weeks 2 to 12
Examination 1	60%	To be advised

Assessment Requirements

Assessment Policy

Faculty Policy - Unit Assessment Hurdles
(http://intranet.monash.edu.au/infotech/resources/staff/edgov/policies/assessment-examinations/assessment-hurd

Academic Integrity - Please see resources and tutorials at
http://www.monash.edu/library/skills/resources/tutorials/academic-integrity/

Assessment Tasks

Participation

- **Assessment task 1**

  Title:
  Assignment 1 - Problem solving: search
  Description:
  Implement a search algorithm to solve a given problem.
  Weighting:
  13%
  Criteria for assessment:
  Students must demonstrate knowledge of the A* algorithm and other search algorithms, and ability to implement them correctly.
  Due date:
  5 September 2014

- **Assessment task 2**

  Title:
  Assignment 2 - Knowledge representation and Bayesian networks
  Description:
  Pen and paper questions in knowledge representation and use of Netica for Bayesian networks.
  Weighting:
  9%
  Criteria for assessment:
  Knowledge of the requisite material. The specific tasks and marking criteria will be distributed at the appropriate time during the semester.
  Due date:
  26 September 2014

- **Assessment task 3**

  Title:
  Assignment 3 - Machine learning and Markov Decision Processes
  Description:
  Implement a program to apply machine learning techniques. The Markov Decision Process component may be pen and paper.
  Weighting:

13%

Criteria for assessment:

Performance of the program. The specific tasks and marking criteria will be distributed at the appropriate time during the semester.

Due date:

24 October 2014

- **Assessment task 4**

Title:

Quizzes

Description:

At the beginning of 10 tutorials starting from Week 2, there will be a quiz. Each quiz is worth 0.5 marks.

Weighting:

5%

Criteria for assessment:

Knowledge of the material.

Due date:

Beginning of 10 tutorials during Weeks 2 to 12

Examinations

- **Examination 1**

Weighting:

60%

Length:

3 hours

Type (open/closed book):

Closed book

Electronic devices allowed in the exam:

None

Learning resources

Reading list

Recommended texts:

• A Hodges (1992), Alan Turing: The Enigma. London: Vintage.

• P McCorduck (1979), Machines Who Think. Freeman.

• J Haugland (1985), Artificial Intelligence: The Very Idea. MIT.

• M Boden (Ed.) (1990), The Philosophy of AI. Oxford.

Monash Library Unit Reading List (if applicable to the unit)
http://readinglists.lib.monash.edu/index.html

Faculty of Information Technology Style Guide

Feedback to you

Examination/other end-of-semester assessment feedback may take the form of feedback classes, provision of sample answers or other group feedback after official results have been published. Please check with your lecturer on the feedback provided and take advantage of this prior to requesting individual consultations with staff. If your unit has an examination, you may request to view your examination script booklet, see http://intranet.monash.edu.au/infotech/resources/students/procedures/request-to-view-exam-scripts.html

Types of feedback you can expect to receive in this unit are:

- Informal feedback on progress in labs/tutes
- Graded assignments with comments
- Graded assignments without comments
- Solutions to tutes, labs and assignments

Extensions and penalties

Submission must be made by the due date otherwise penalties will be enforced.

You must negotiate any extensions formally with your campus unit leader via the in-semester special consideration process: http://www.monash.edu.au/exams/special-consideration.html

Returning assignments

Students can expect assignments to be returned within two weeks of the submission date or after receipt, whichever is later.

Assignment submission

It is a University requirement (http://www.policy.monash.edu/policy-bank/academic/education/conduct/student-academic-integrity-managing-pla for students to submit an assignment coversheet for each assessment item. Faculty Assignment coversheets can be found at http://www.infotech.monash.edu.au/resources/student/forms/. Please check with your Lecturer on the submission method for your assignment coversheet (e.g. attach a file to the online assignment submission, hand-in a hard copy, or use an online quiz). Please note that it is your responsibility to retain copies of your assessments.

Online submission

If Electronic Submission has been approved for your unit, please submit your work via the learning system for this unit, which you can access via links in the my.monash portal.

Required Resources

Please check with your lecturer before purchasing any Required Resources. Limited copies of prescribed texts are available for you to borrow in the library, and prescribed software is available in student labs.

Software: Netica, Weka

Prescribed text(s)

Limited copies of prescribed texts are available for you to borrow in the library.

R. Russell and P. Norvig. (2010). *Artificial Intelligence: A Modern Approach*. (3rd Edition) Prentice Hall.

Other Information

Policies

Monash has educational policies, procedures and guidelines, which are designed to ensure that staff and students are aware of the University's academic standards, and to provide advice on how they might uphold them. You can find Monash's Education Policies at: www.policy.monash.edu.au/policy-bank/academic/education/index.html

Key educational policies include:

- Student Academic Integrity Policy and Student Academic Integrity: Managing Plagiarism and Collusion Procedures ; http://www.policy.monash.edu/policy-bank/academic/education/conduct/student-academic-integrity-policy.h
- Assessment in Coursework Programs; http://www.policy.monash.edu/policy-bank/academic/education/assessment/assessment-in-coursework-po
- Special Consideration; http://www.policy.monash.edu/policy-bank/academic/education/assessment/special-consideration-policy.ht
- Grading Scale; http://www.policy.monash.edu/policy-bank/academic/education/assessment/grading-scale-policy.html
- Discipline: Student Policy; http://www.policy.monash.edu/policy-bank/academic/education/conduct/student-discipline-policy.html
- Academic Calendar and Semesters; http://www.monash.edu.au/students/dates/
- Orientation and Transition; http://intranet.monash.edu.au/infotech/resources/students/orientation/
- Academic and Administrative Complaints and Grievances Policy; http://www.policy.monash.edu/policy-bank/academic/education/management/complaints-grievance-policy.h

Faculty resources and policies

Important student resources including Faculty policies are located at http://intranet.monash.edu.au/infotech/resources/students/

Graduate Attributes Policy

http://www.policy.monash.edu/policy-bank/academic/education/management/monash-graduate-attributes-policy.ht

Student Charter

www.opq.monash.edu.au/ep/student-charter/monash-university-student-charter.html

Student services

The University provides many different kinds of support services for you. Contact your tutor if you need advice and see the range of services available at http://www.monash.edu.au/students. For Malaysia see http://www.monash.edu.my/Student-services, and for South Africa see http://www.monash.ac.za/current/.

Monash University Library

The Monash University Library provides a range of services, resources and programs that enable you to save time and be more effective in your learning and research. Go to www.lib.monash.edu.au or the library tab in my.monash portal for more information. At Malaysia, visit the Library and Learning Commons at http://www.lib.monash.edu.my/. At South Africa visit http://www.lib.monash.ac.za/.

Disability Liaison Unit

Students who have a disability or medical condition are welcome to contact the Disability Liaison Unit to discuss academic support services. Disability Liaison Officers (DLOs) visit all Victorian campuses on a regular basis.

- Website: http://www.monash.edu/equity-diversity/disability/index.html
- Telephone: 03 9905 5704 to book an appointment with a DLO; or contact the Student Advisor, Student Commuity Services at 03 55146018 at Malaysia
- Email: dlu@monash.edu
- Drop In: Equity and Diversity Centre, Level 1, Building 55, Clayton Campus, or Student Community Services Department, Level 2, Building 2, Monash University, Malaysia Campus