FIT3080
Intelligent systems

Unit Guide

Semester 2, 2012

Last updated: 18 Jun 2012

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FIT3080 Intelligent systems - Semester 2, 2012

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)
- Sunway (Day)

Contact Hours

2 hrs lectures/wk, 1 hr laboratory/wk

Workload

The expected weekly workload is 12 hours in total, including:

- 2 hour lecture
- 1 hour tutorial and
- 9 hours for personal study including programming, reading and revision.

Unit Relationships

Prohibitions

CSE2309, CSE3309, DGS3691

Prerequisites

FIT2004 or CSE2304

Chief Examiner

Professor Ingrid Zukerman

Campus Lecturer

Clayton

Reza Haffari

Ingrid Zukerman

Consultation hours: Wednesday 1-2 pm

Sunway

Simon Egerton

Academic Overview

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.

Graduate Attributes

Monash prepares its graduates to be:

1. responsible and effective global citizens who:

a. engage in an internationalised world
b. exhibit cross-cultural competence
c. demonstrate ethical values

critical and creative scholars who:

a. produce innovative solutions to problems
b. apply research skills to a range of challenges
c. communicate perceptively and effectively

Assessment Summary

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

Assessment Task	Value	Due Date
Assignment 1 - Problem solving: search	15%	27 August 2012

Assignment 2 - Knowledge representation and Bayesian networks	10%	10 September 2012
Assignment 3 - Machine learning and NLP	15%	15 October 2012
Examination 1	60%	To be advised

Teaching Approach

Lecture and tutorials or problem classes

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

Feedback

Our feedback to You

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

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 SETU, Student Evaluation of Teacher and Unit. 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, and on student evaluations, see:
http://www.monash.edu.au/about/monash-directions/directions.html
http://www.policy.monash.edu/policy-bank/academic/education/quality/student-evaluation-policy.html

Previous Student Evaluations of this unit

Previous feedback was generally very positive. There is room for improvement 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

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) Prentice Hall.

Unit Schedule

Week	Activities	Assessment
0		No formal assessment or activities are undertaken in week 0
1	Introduction	
2	Problem solving: search	
3	Problem solving and Game playing	
4	Knowledge representation: propositional and first-order logic	
5	Knowledge representation: propositional and first-order logic	
6	Planning, Introduction to probability	Assignment 1 due 27 August 2012
7	Bayesian networks	
8	Machine learning	Assignment 2 due 10 September 2012
9	Learning probabilistic models	
10	Reinforcement learning	
11	NLP1: text-based processing	
12	NLP2: NL for communication	Assignment 3 due 15 October 2012
	SWOT VAC	No formal assessment is undertaken 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 MUSO (Blackboard or Moodle) learning system.

Assessment Requirements

Assessment Policy

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

Academic Integrity - Please see the Demystifying Citing and Referencing tutorial at
http://lib.monash.edu/tutorials/citing/

Assessment Tasks

Participation

- **Assessment task 1**

  Title:
  > Assignment 1 - Problem solving: search

  Description:
  > Implement a search algorithm to solve a given problem.

  Weighting:
  > 15%

  Criteria for assessment:
  > Students must demonstrate knowledge of the A* algorithm and other search algorithms, and ability to implement them correctly.

  Due date:
  > 27 August 2012

- **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:
  > 10%

  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:
  > 10 September 2012

- **Assessment task 3**

  Title:
  > Assignment 3 - Machine learning and NLP

  Description:
  > Implement a program to apply a machine learning technique to an NLP problem.

  Weighting:
  > 15%

Criteria for assessment:
Performance of program. The specific tasks and marking criteria will be distributed at the appropriate time during the semester.
Due date:
15 October 2012

Examinations

- **Examination 1**

Weighting:
60%
Length:
3 hours
Type (open/closed book):
Closed book
Electronic devices allowed in the exam:
None

Assignment submission

It is a University requirement
(http://www.policy.monash.edu/policy-bank/academic/education/conduct/plagiarism-procedures.html) 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).

Online submission

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

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.infotech.monash.edu.au/resources/student/equity/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.

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:
http://policy.monash.edu.au/policy-bank/academic/education/index.html

Key educational policies include:

- Plagiarism
  (http://www.policy.monash.edu/policy-bank/academic/education/conduct/plagiarism-policy.html)
- Assessment
  (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.h
- 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/key-dates/);
- Orientation and Transition (http://www.infotech.monash.edu.au/resources/student/orientation/); and
- Academic and Administrative Complaints and Grievances Policy
  (http://www.policy.monash.edu/policy-bank/academic/education/management/complaints-grievance-policy.
- Codes of Practice for Teaching and Learning
  (http://www.policy.monash.edu/policy-bank/academic/education/conduct/suppdocs/code-of-practice-tea

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 www.monash.edu.au/students. For Sunway see http://www.monash.edu.my/Student-services, and for South Africa see http://www.monash.ac.za/current/

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

Academic support services may be available for students who have a disability or medical condition. Registration with the Disability Liaison Unit is required. Further information is available as follows:

- Website: http://monash.edu/equity-diversity/disability/index.html;
- Email: dlu@monash.edu
- Drop In: Equity and Diversity Centre, Level 1 Gallery Building (Building 55), Monash University, Clayton Campus, or Student Community Services Department, Level 2, Building 2, Monash University, Sunway Campus
- Telephone: 03 9905 5704, or contact the Student Advisor, Student Commuity Services at 03 55146018 at Sunway

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.