MONASH University
Information Technology

FIT4009
Advanced topics in intelligent systems

Unit Guide

Semester 1, 2015

The information contained in this unit guide is correct at time of publication. The University has the right to change any of the elements contained in this document at any time.

Last updated: 19 Feb 2015

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FIT4009 Advanced topics in intelligent systems - Semester 1, 2015

Methods from Artificial Intelligence (AI) form the basis for many advanced information systems. These techniques address problems that are difficult to solve or not efficiently solvable with conventional techniques. Building on the undergraduate curriculum this unit introduces the student to advanced AI methods and their applications in information systems.

Mode of Delivery

Clayton (Day)

Workload Requirements

Minimum total expected workload equals 12 hours per week comprising:

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

- Two hours of lectures

(b.) Additional requirements (all students):

- A minimum of 10 hours independent study per week for completing assignment and project work, private study and revision.

See also Unit timetable information

Unit Relationships

Prerequisites

Completion of the Bachelor of Computer Science or equivalent to the entry requirements for the Honours program. Students must also have enrolment approval from the Honours Coordinator.

Chief Examiner

Professor Ingrid Zukerman

Campus Lecturer

Clayton

Ingrid Zukerman

Consultation hours: Wed 3-4

Lachlan Andrew

Consultation hours: Tue 3-4

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

Students have appreciated the variety of topics and the introduction to Minimum Message Length (MML) and Machine Learning.

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

On completion of this unit students, should be able to:

- describe an overview of different technologies that form the basis of intelligent information systems;
- explain the capabilities of these methods;
- recognise tasks that can be solved with these methods;
- judge the limitations of these methods;
- apply several standard techniques in the chosen sub-fields of intelligent information systems to the construction and design of such systems;
- critically evaluate the performance of these approaches;
- compare these techniques to alternative approaches;
- explain the practical relevance of intelligent information systems.

Unit Schedule

Week	Activities	Assessment
0		No formal assessment or activities are undertaken in week 0
1	Introduction to Language Technology and User Modeling	
2	Revision: Probability and Machine learning	
3	Document retrieval	Assignment 1 handed out
4	Recommender systems	
5	Dialogue systems I	Assignment 1 due and Assignment 2 handed out
6	Dialogue systems II (POMDPs)	
7	Hidden Markov models	Assignment 2 due
8	Dynamic programming	Assignment 3 handed out
9	Clustering	
10	Challenges of clustering	Assignment 3 due and Assignment 4 handed out
11	Feature selection	
12	Putting it all together -- identifying electric loads	Assignment 4 due
	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

Problem-based learning

Students are encouraged to take responsibility for organising and directing their learning with support from their lecturers.

Assessment Summary

Assignment and Examination, relative weight depending on topic composition. When no exam is given students will be expected to demonstrate their knowledge by solving practical problems and maybe required to give an oral report.

Assessment Task	Value	Due Date
Assignment 1 - Document retrieval and recommender systems	15%	Week 5
Assignment 2 - Dialogue systems	15%	Week 7

Unit Schedule

Assignment 3 - Hidden Markov models	15%	Week 10
Assignment 4 - Clustering	15%	Week 12
Examination 1	40%	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 - Document retrieval and recommender systems
    Description:
    This assignment will involve written questions, and possibly a programming question,
    relating to the document retrieval and recommender systems material.

    Further details will be provided in the assignment handout.
    Weighting:
    15%
    Criteria for assessment:

    - ♦ How well solutions are explained.
    - ♦ Quality of code demonstrated, where applicable

    Further details will be provided in the assignment handout.
    Due date:
    Week 5

- **Assessment task 2**

    Title:
    Assignment 2 - Dialogue systems
    Description:
    This assignment will involve developing a chatbot in AIML.

    Further details will be provided in the assignment handout.
    Weighting:
    15%
    Criteria for assessment:

    - ♦ How well solutions are explained.
    - ♦ Quality of code demonstrated, where applicable.

    Further details will be provided in the assignment handout.
    Due date:
    Week 7

- **Assessment task 3**

Title:
　　Assignment 3 - Hidden Markov models
Description:
　　This assignment will involve pen/paper and simple programming questions on Hidden Markov models.
Weighting:
　　15%
Criteria for assessment:

　　　　♦How well solutions are explained.
　　　　♦Quality of code demonstrated, where applicable

　　Further details will be provided in the assignment handout.
Due date:
　　Week 10

- **Assessment task 4**

Title:
　　Assignment 4 - Clustering
Description:
　　This assignment will involve pen/paper and simple programming questions on clustering.
Weighting:
　　15%
Criteria for assessment:

　　　　♦How well solutions are explained.
　　　　♦Quality of code demonstrated, where applicable

　　Further details will be provided in the assignment handout.
Due date:
　　Week 12

Examinations

- **Examination 1**

Weighting:
　　40%
Length:
　　3 hours
Type (open/closed book):
　　Open book
Electronic devices allowed in the exam:
　　Possibly calculators, but nothing else.

Learning resources

Reading list

Additional reading:

Natural Language Processing for Online Applications (2nd Edition), Peter Jackson and Isabelle Moulinier, John Benjamins Publishing 2007

Speech and Language Processing, Daniel Jurafsky and James H. Martin, Prentice Hall 2009

Introduction to Machine Learning (3rd Edition), Ethem Alpaydin, MIT Press 2014

Artificial Intelligence: A Modern Approach (3rd Edition), StuartRussell and Peter Norvig, Prentice Hall 2010

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

Feedback to you

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

- Graded assignments without comments
- Interviews

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.

Resubmission of assignments

Resubmission is not possible.

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 electronic submission). 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.

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

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.h

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