MONASH University
Information Technology

Unit Guide

FIT5186
Intelligent systems
Semester 1, 2018

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: 30 Jan 2018

Status: Approved

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Unit handbook information

Synopsis

This unit introduces main techniques widely used in intelligent software systems to students in the Master of Information Technology Systems course with the Network Computing major. Specifically, it focuses on the techniques in relation to network structures. Main topics covered include neural network models, supervised learning and classification, unsupervised learning and clustering, fuzzy logic, intelligent decision analysis, optimum network flow modelling, and recommender systems.

Mode of delivery

Suzhou (On-campus)

Workload requirements

Minimum total expected workload equals 12 hours per week comprising:

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

- Two hours of lectures
- One 2-hour laboratory

> (b.) Additional requirements (all students):

- A minimum of 8 hours independent study per week for completing lab and project work, private study and revision.

See also Unit timetable information

Unit relationships

Prerequisites

Fundamental mathematics

Prohibitions

None

Co-requisites

None

Chief Examiner

[Associate Professor Chung-Hsing Yeh](#)

Campus Lecturer(s)

Suzhou

Name: Associate Professor Chung-Hsing Yeh
Email: ChungHsing.Yeh@monash.edu
Consultation hours: Thursday - one hour before the lecture and one hour after the tutorial

Tutor(s)

Suzhou

Chung-Hsing Yeh

Academic overview

Learning outcomes

On completion of this unit, students will have a knowledge and understanding of:

1. the applications of intelligent software systems;
2. the principles and theoretical underpinning of intelligent software systems;
3. the models and approaches to building intelligent software systems;
4. the advantages and limitations of intelligent models and approaches for solving a wide range of practical problems;
5. different software toolkits and development environments;
6. current research trends in the field.

Teaching approach

Lecture and tutorials or problem classes

This teaching and learning approach helps students to initially encounter information at lectures, discuss and explore the information during tutorials, and practice in a hands-on lab environment.

Assessment summary

Examination (2 hours): 60%; In-semester assessment: 40%

Assessment task	Value	Due date
Assignment Proposal - Solving A Neural Network Problem	10%	27 April 2018
Assignment Paper - Solving A Neural Network Problem	30%	25 May 2018

Assessment task	Value	Due date
Examination 1	60%	To be advised

Unit schedule

For units with on-campus classes, teaching activities are normally scheduled to start on the hour (teaching will commence on the hour and conclude 10 minutes prior to the scheduled end time).

Week	Activities	Assessment
0		No formal assessment or activities are undertaken in week 0
1	Introduction to Intelligent Systems and Neural Networks	
2	Neuron Learning and Perceptrons	
3	Multilayered Networks	
4	Supervised Learning - Backpropagation Learning Rule	
5	Classification and Prediction with Case Studies	
6	Unsupervised Learning - Clustering with Self-Organisation	
7	Unsupervised Learning with Adaptive Resonance Theory	
8	Data Mining and Knowledge Discovery	Assignment proposal due 27 April 2018
9	Other Intelligent Techniques	
10	Fuzzy Logic	
11	Business Intelligence Modelling - Decision Analysis under Uncertainty	
12	Decision Trees, Decision Making Using Sample Information; Revision and Exam Preparation	Assignment paper due 25 May 2018
	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.

Assessment requirements

Faculty Unit Assessment Pass Policy

To pass a unit which includes an examination as part of the assessment, a student must obtain, unless otherwise approved and published:

- 40% or more in the unit's examination, and
- 40% or more in the unit's total non-examination assessment, and
- an overall unit mark of 50% or more.

If a student does not achieve 40% or more in the unit examination or the unit non-examination total assessment, and the total mark for the unit is:

- equal to or greater than 50%, then a mark of 49-N will be recorded for the unit.
- less than 50% then the actual mark for the unit will be recorded.

Assessment tasks

Assessment title: Assignment Proposal - Solving A Neural Network Problem

Learning outcomes: On completion of this assignment, students will be able to understand

1. the applications of neural network models;

2. how to investigate practical research problems addressed by intelligent systems especially neural network models;

3. how to identify a practical classification or prediction problem of a significant research nature;

4. how to collect data required for solving a specific neural network problem;

5. how to identify inputs and outputs required to build a neural network model;

6. the experiments to be conducted for solving a specific neural network problem.

Details of task: Choose a neural network problem of classification, prediction or forecasting which interests you. When you have identified your problem, you need to write a proposal which outlines your problem, where you will get your data set, what the data set is, what the inputs and outputs will be, the neural network techniques/models you will use, and the experiments or analysis you will do.

Your assignment proposal should be around 400-800 words (2-3 pages) and have a title and is expected to include the following 4 sections: Problem (the exact thing you try to predict or classify; a brief description of the context or motivation for the problem); Data (where will you get your data

set? what is the data set? what will be the inputs and outputs?); Method (what neural network or other techniques/models will be used or investigated?); Analysis (what kind of experiments or analysis will be conducted?).

Value: 10%

Hurdle requirements: N/A

Individual assessment in group tasks: N/A

Criteria for marking: The assessment will be based on both contents and presentation. You must get permission from your tutor/lecturer for the problem you choose to do.

Due date: 27 April 2018

Estimated return date: 10 May 2018

Additional information: N/A

Assessment title: Assignment Paper - Solving A Neural Network Problem

Learning outcomes: On completion of this assignment, students will be able to understand

1. the advantages and limitations of neural network models;

2. the development environments of neural network software;

3. how to build neural network models for solving a specific problem;

4. how to pre-process data for modelling purposes;

5. how to conduct experiments and analysis of results for better solving a problem;

6. how to write up a research work in the form of a conference or journal paper.

Details of task: In this assignment, you will be applying what you have learned about neural networks and the backpropagation learning algorithm to a classification, prediction or forecasting problem of your choice. You are required to write up your findings in the form of a short conference-type or journal-type paper with 1,500-2,500 words (5-8 pages).

Your assignment paper should have a title and is expected to include the following 8 sections: Abstract (using no more than 150 words to summarise what the paper is about clearly and specifically, including main findings of the study); Introduction (brief outline of your problem, review of related literature, and why neural networks are suited); Data Sets (where do you find the data? how are you using it? e.g. inputs and outputs? preprocessing?); Training Issues (choice of architecture, parameters, etc.); Results (presenting results with some analysis/comparisons); Limitations (e.g. data or conditions required; how useful are your results); Conclusion; References.

Value: 30%

Hurdle requirements: N/A

Individual assessment in group tasks: N/A

Criteria for marking: The assessment will be based on both contents and presentation. You must get permission from your tutor/lecturer for the problem you choose to do. You are expected to train your network and perform some sort of analysis of the results. The more analysis you do, the more insight you will gain into the problem and the technique and the more marks you will receive.

Due date: 25 May 2018

Estimated return date: 8 June 2018

Additional information: N/A

Examination(s)

Title : Examination 1
Value : 60%
Length : 2 hours
Type (open/closed book) : Closed book
Electronic devices allowed : Non-programmable calculators
Learning outcomes assessed :

1. Principles and theoretical underpinning of intelligent systems;

2. Key algorithms used in the models and approaches to building intelligent systems;

3. Advantages and limitations of intelligent models and approaches;

4. Analysis of results for solving a problem using intelligent systems.

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 lecturer via the in-semester special consideration process: http://www.monash.edu.au/exams/special-consideration.html

Penalties for late submission: 5% per day including weekends & public holidays.

Returning assignments

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

Referencing requirements

To build your skills in citing and referencing, and using different referencing styles, see the online tutorial Academic Integrity: Demystifying Citing and Referencing at http://www.lib.monash.edu/tutorials/citing/

Assignment submission

It is a University requirement (http://www.policy.monash.edu/policy-bank/academic/education /conduct/student-academic-integrity-managing-plagiarism-collusion-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 electronic submission).

Please note:

1. It is your responsibility to retain copies of your assessments.
2. Assessments submitted without an assignment coversheet will not be marked.

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.

Please keep a copy of tasks completed for your records.

Feedback to you

Informal feedback on progress in labs/tutes
Graded assignments with comments
Interviews
Solutions to tutes, labs and assignments

Learning resources

Recommended reading will be provided on the unit Moodle site.

Monash Library Unit Reading List (if applicable to the unit): http://monash.rl.talis.com/index.html
Research and Learning Online: www.monash.edu/rlo

Required resources

Students generally must be able to complete the requirements of their course without the imposition of fees that are additional to the student contribution amount or tuition fees. However, students may be charged certain incidental fees or be expected to make certain purchases to support their study. For more information about this, refer to the Higher Education Administrative Information for Providers, Chapter 18, Incidental Fees at http://education.gov.au/help-resources-providers.

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.

Examination material or equipment

Non-programmable calculators

Your feedback to us

One of the formal ways students have to provide feedback on teaching and their learning experience is through the Student Evaluation of Teaching and Units (SETU) survey. The feedback is anonymous and provides the Faculty with evidence of aspects that students are satisfied with and areas for improvement.

Previous student evaluations of this unit

In response to previous SETU results of this unit, the following changes have been made:

In its previous offerings at the SEU-Monash Joint Graduate School in Suzhou, this unit has achieved a student evaluation score of above 4.8 (out of 5) for the quality of the unit. Student feedback has shown that this unit is well structured and no changes are required for this semester. In particular, students are happy with the encouragement and helpful feedback they received from the lecturer for their active participation in this unit.

If you wish to view how previous students rated this unit, please go to;
http://www.monash.edu/ups/setu/setu-results/unit-evaluation-reports

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

Student Academic Integrity Policy

www.monash.edu/__data/assets/pdf_file/0004/801841/Student-Academic-Integrity-Policy.pdf

Special Consideration

For information on applying for special consideration, please visit: http://www.monash.edu/exams/changes/special-consideration

Graduate Attributes Policy

http://www.monash.edu/__data/assets/pdf_file/0009/786969/Course-Design-Policy.pdf

Student Charter

http://www.monash.edu/students/policies/student-charter.html

Student Services

The University provides many different kinds of services to help you gain the most from your studies. Contact your tutor if you need advice and see the range of services available at http://www.monash.edu/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 http://www.monash.edu/library 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 Support Services

Students who have a disability, ongoing medical or mental health condition are welcome to contact Disability Support Services.

Disability Support Services also support students who are carers of a person who is aged and frail or has a disability, medical condition or mental health condition.

Disability Advisers visit all Victorian campuses on a regular basis.

- Website: monash.edu/disability
- Telephone: 03 9905 5704 to book an appointment with an Adviser, or contact the Student Advisor, Student Community Services at 03 55146018 at Malaysia
- Email: disabilitysupportservices@monash.edu

- Drop In: Level 1, Western Annexe, 21 Chancellors Walk (Campus Centre) Clayton Campus, or Student Community Services Department, Level 2, Building 2, Monash University, Malaysia Campus