BUSA8001

Applied Predictive Analytics

Session 2, Special circumstance 2020

Department of Actuarial Studies and Business Analytics

Contents

Disclaimer

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Notice

As part of Phase 3 of our return to campus plan, most units will now run tutorials, seminars and other small group learning activities on campus for the second half-year, while keeping an online version available for those students unable to return or those who choose to continue their studies online.

To check the availability of face-to-face and online activities for your unit, please go to timetable viewer. To check detailed information on unit assessments visit your unit's iLearn space or consult your unit convenor.

General Information

Unit convenor and teaching staff
George Milunovich
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Credit points
10

Prerequisites
BUSA8000

Corequisites

Co-badged status

Unit description
This unit introduces modern machine learning methodology which is used in solving many business problems in the modern world. Topics will be chosen from a wide set of possible areas including data analytics principles such as training and test data and the bias-variance tradeoff, modern approaches to regression including shrinkage techniques, tree based models and neural networks, methods for classification and the predictive analytics workflow. Emphasis throughout the unit will be on business applications drawn from a variety of fields.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

> **ULO1:** Assess data requirements needed to generate good predictions.

> **ULO2:** Apply a number of predictive analytics techniques to a range of business problems.

> **ULO3:** Devise computer code required to implement predictive analytics.

> **ULO4:** Analyse business problems using data science methods.

General Assessment Information

Assessment Marks

- It is the responsibility of students to view their marks for each within session assessment on iLearn within 20 working days of posting. If there are any discrepancies, students must contact the unit convenor immediately. Failure to do so will mean that queries received after the release of final results regarding assessment marks (not including the final exam mark) will not be addressed.

Extensions and Penalties on Within Session Assessment Tasks

- **Tasks 10% or less** – No extensions will be granted. Students who have not submitted the task prior to the deadline will be awarded a mark of 0 for the task, except for cases in which an application for special consideration is made and approved.

- **Tasks above 10%** – No extensions will be granted. There will be a deduction of 10% of the total available marks made from the total awarded mark for each 24 hour period or part thereof that the submission is late (for example, 25 hours late in submission – 20% penalty). This penalty does not apply for cases in which an application for special consideration is made and approved. No submission will be accepted after solutions have been posted.

Assessment Tasks

Name	Weighting	Hurdle	Due
Online Test	30%	No	Week 7
Programming tasks	30%	No	Weeks 3, 5, 9
Group Assignment	40%	No	Week 13

Online Test

Assessment Type [1]: Quiz/Test
Indicative Time on Task [2]: 20 hours
Due: **Week 7**
Weighting: **30%**

An open book online test will be held.

On successful completion you will be able to:

- Assess data requirements needed to generate good predictions.

- Apply a number of predictive analytics techniques to a range of business problems.

- Devise computer code required to implement predictive analytics.

Programming tasks

Assessment Type [1]: Practice-based task
Indicative Time on Task [2]: 20 hours
Due: **Weeks 3, 5, 9**
Weighting: **30%**

A sequence of tutorial assessments implementing computer code and performing related analytics tasks.

On successful completion you will be able to:

- Assess data requirements needed to generate good predictions.

- Apply a number of predictive analytics techniques to a range of business problems.

- Devise computer code required to implement predictive analytics.

Group Assignment

Assessment Type [1]: Modelling task
Indicative Time on Task [2]: 30 hours
Due: **Week 13**
Weighting: **40%**

The group assignment is a hands-on project. Students will be required to develop a predictive model for a real-world dataset and implement it in computer script. Preliminary data analysis will be completed within a group (worth 20%). The follow-up analysis and write up will be completed individually (worth 20%).

On successful completion you will be able to:

- Assess data requirements needed to generate good predictions.

- Apply a number of predictive analytics techniques to a range of business problems.

- Devise computer code required to implement predictive analytics.

- Analyse business problems using data science methods.

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[1] If you need help with your assignment, please contact:

- the academic teaching staff in your unit for guidance in understanding or completing this type of assessment
- the Writing Centre for academic skills support.

[2] Indicative time-on-task is an estimate of the time required for completion of the assessment task and is subject to individual variation

Delivery and Resources

Classes

- 3 hours of teaching per week consisting of
  - One 2 hr lecture
  - One 1 hr tutorial/computer lab

- In addition, there will be 1 hr of live-streamed consultations per week

Textbooks

- Prescribed Textbook: The textbook for this unit is **Python Machine Learning** (Third Edition) by Sebastian Raschka and Vahid Mirjalili. Kindle and paperback versions are available from https://www.amazon.com.au/Python-Machine-Learning-Sebastian-Raschka/dp/1789955750/ . This book covers most but not all of the topics in the unit. The lecture and tutorial/computer lab notes will cover the additional material that you need to know. Further readings may be assigned for the various topics each week. This will either be journal articles, or other materials available on iLearn, web or available electronically e.g. via the Macquarie University Library.

Technology Used and Required

- You will need access to the internet to obtain course information, view recorded lectures and download teaching materials from the unit website.\
- It is your responsibility to check the unit website regularly to make sure that you are up-to-date with the information for the unit.

- Python 3.x and JupyterLab (both available in the free Anaconda Python distribution) and MS Excel will be used extensively throughout the unit, and will be assessed in the class test, assignments and final exam.

Required Unit Materials and/or Recommended Readings

- Recorded video lecture and computer labs will be posted on iLearn before the lectures.
- Lecture Notes are the required materials and will be posted on the website before the lectures.
- Relevant references will be provided in Lecture Notes as recommended materials. Some of them will be posted on the website.

Unit Schedule

Week	Lecture Topic/Book Chapter	Computer Lab/Tutorial	Assessment
1	Introduction / Ch 1	Yes	
2	Classification Algorithms - Part 1 / Ch 2	Yes	
3	Classification Algorithms - Part 2 / Ch 3	Yes	Programming Task 1 (10%)
4	Classification Algorithms - Part 3 / Ch 3	Yes	
5	Building Good Training Sets - Data Preprocessing / Ch 4	Yes	Programming Task 2 (10%)
6	Dimensionality Reduction / Ch 5	Yes	
7	Class Test	Yes	Class test (30%)
Recess			
8	Model Evaluation & Hyperparameter Tuning / Ch 6	Yes	
9	Regression Analysis - Part 1 / Ch 10	Yes	Programming Task 3 (10%)
10	Regression Analysis - Part 2 / Ch 10	Yes	
11	Combining Different Models - Ensemble Learning / Ch 7	Yes	
12	Text Analysis / Ch 8	Yes	
13	Clustering Analysis / Ch 11	Yes	Group Assignment (40%)

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy

- Academic Integrity Policy

- Academic Progression Policy

- Assessment Policy

- Fitness to Practice Procedure

- Grade Appeal Policy

- Complaint Management Procedure for Students and Members of the Public

- Special Consideration Policy *(**Note:** The Special Consideration Policy is effective from 4 December 2017 and replaces the Disruption to Studies Policy.)*

Students seeking more policy resources can visit the Student Policy Gateway (https://students.mq.edu.au/support/study/student-policy-gateway). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit Policy Central (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/study/getting-started/student-conduct

Results

Results published on platform other than eStudent, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au or if you are a Global MBA student contact globalmba.support@mq.edu.au

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to help you improve your marks and take control of your study.

- Getting help with your assignment

- Workshops

- StudyWise

- Academic Integrity Module

The Library provides online and face to face support to help you find and use relevant information resources.

- Subject and Research Guides

- Ask a Librarian

Student Services and Support

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.