COMP 7019 APPLIED MACHINE LEARNING

Credit Points 10

Legacy Code 301312

Coordinator Vernon Asuncion (https://directory.westernsydney.edu.au/search/name/Vernon Asuncion/)

Description This unit introduces the foundation and concepts underpinning Machine Learning (ML) at a more abstract level, and provides more focus on its practical applications in areas such as: the classification and extraction of text data from various documents and web pages, image processing, Google's PageRank algorithm and relational data mining (RDM). These learning objectives are achieved through various ML software and a series of practicals and projects. The unit covers the concepts and notions of supervised, unsupervised and reinforcement learning, perceptron, neural networks, support vector machines (SVM), knowledge representation (KR) based RDM, and a comprehensive introduction to the Scikit-learn ML Python libraries.

School Computer, Data & Math Sciences

Discipline Artificial Intelligence

Student Contribution Band HECS Band 2 10cp

Level Postgraduate Coursework Level 7 subject

Assumed Knowledge

Some probability and statistics knowledge would be advantageous.

Learning Outcomes

On successful completion of this subject, students should be able to:

1. Analyse the scope of current machine learning approaches and applications for both current and future use.
2. Determine the most appropriate tools to use for machine learning tasks using software applications including Python and R programming languages.
3. Explain the core principles behind machine learning algorithms.
4. Distinguish between supervised, unsupervised and reinforcement learning notions.
5. pply Machine Learning software to real-world problems.

Subject Content

1. Review of the fundamentals of probability theory, statistics and basic linear algebra notions.
2. Installation and introduction to common ML software, which includes the introduction on the use of R and Python as needed for this course.
3. Introduction to linear, multiple and logistic regression.
4. Model selection, regularization and cross-validation:
Applications I: Introduction to NLP and classifying text data using logistic regression and naive Bayes.
5. Introduction to support vector machines (SVM):
Applications II: Classifying text data using SVM classifiers.
6. Introduction to neural networks (NN):
Applications III: Classifying text data and image data using recurrent and convolutional NN.
7. Unsupervised learning: K-Means Clustering and Hierarchical Clustering:
Applications IV: Google?fs PageRank algorithm.
8. Introduc

Assessment

The following table summarises the standard assessment tasks for this subject. Please note this is a guide only. Assessment tasks are regularly updated, where there is a difference your Learning Guide takes precedence.

Item	Length	Percent	Threshold	Individual/ Group Task
Quiz	1 hour(per Quiz)	40	N	Individual
Practical	2 hours	20	N	Individual
Numerical Problem Solving	1,500 words	40	N	Individual

Teaching Periods

Autumn

Parramatta - Victoria Rd
Day
Subject Contact Vernon Asuncion (https://directory.westernsydney.edu.au/search/name/Vernon Asuncion/)

View timetable (https://classregistration.westernsydney.edu.au/even/timetable/?subject_code=COMP7019_22-AUT_PS_D#subjects)