CS3D2-30 Machine Learning and Data Mining (DA)

24/25

Department
> Computer Science

Level
> Undergraduate Level 3

Module leader
> Greg Watson

Credit value
> 30

Module duration
> 2 weeks

Assessment
> 50% coursework, 50% exam

Study location
> University of Warwick main campus, Coventry

Description

Introductory description

You cannot register for this module unless you are enrolled on the BSc Computer Science and Technology Solutions Degree Apprenticeship. It is not possible to request this module as an unusual option. If you are studying at Warwick as a visiting student from overseas it is not possible to register for this module.

This module will introduce students to the different Machine Learning tools available and how to apply them effectively. They will also learn how to interact with sources of data, such as those on the Internet, and produce full solutions for simple applications using Machine Learning.

Module aims

This module aims to provide an in-depth introduction to the foundations and techniques underlying Machine learning and Data Science. It covers a variety of learning algorithms and approaches for evaluating their performance.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

This module will cover:

- Linear Regression, Logistic Regression, and Probabilistic Inference
- Artificial Neural networks and Deep Learning
- Clustering Algorithms and Dimensionality Reduction
- Data pre-processing and basic data transformation

Learning outcomes

By the end of the module, students should be able to:

- Understand and apply basic concepts of regression.
- Understand and apply Bayesian Learning.
- Understand and apply Markov Chain Monte Carlo Sampling.
- Understand and apply selected topics on Artificial Neural Networks and Deep Learning.
- Understand and apply selected topics in advanced Machine Learning algorithms.
- Demonstrate practical skills in knowledge representation and data capture and analysis.

Indicative reading list

Tan, et al., "Introduction to Data Mining (2/e)", Pearson (2019)
Rogers et al., "A First Course in Machine Learning (2/e)", Chapman and Hall/CRC (2017)

Subject specific skills

- Identify organisational information requirements and model data solutions using conceptual data modelling techniques
- Able to manage data effectively and undertake data analysis
- Import, cleanse, transform, and validate data with the purpose of understanding or making conclusions from the data for business decision making purposes
- Perform routine statistical analyses and ad-hoc queries
- Use a range of analytical techniques such as data mining and modelling techniques to identify and predict trends and patterns in data
- Report on conclusions gained from analysing data using a range of statistical software tools
- Summarise and present results to a range of stakeholders making recommendations
- The quality issues that can arise with data and how to avoid and/or resolve these
- How to use and apply industry standard tools and methods for data analysis

Transferable skills

- Applies analytical and critical thinking skills to Technology Solutions development and to systematically analyse and apply structured problem solving techniques to complex systems and situations
- Have demonstrated that they have mastered basic business disciplines, ethics and courtesies, demonstrating timeliness and focus when faced with distractions and the ability

to complete tasks to a deadline with high quality.
- Flexible attitude
- Ability to perform under pressure
- A thorough approach to work

Study

Study time

Type	Required
Lectures	30 sessions of 1 hour (10%)
Seminars	44 sessions of 1 hour (15%)
Tutorials	14 sessions of 1 hour (5%)
Work-based learning	172 sessions of 1 hour (57%)
Other activity	40 hours (13%)
Total	300 hours

Private study description

No private study requirements defined for this module.

Other activity description

Self study

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group C3

	Weighting	Study time
Project	50%	

This assessment is worth more than 3 CATS and is, therefore, ineligible for self-certification.

	Weighting	Study time
Machine Learning and Data Mining exam	50%	

Feedback on assessment

Written feedback will be provided by the module organiser.

[Past exam papers for CS3D2](#)

Availability

There is currently no information about the courses for which this module is core or optional.