WM9B7-15 Artificial Intelligence & Deep Learning

24/25

Department
> WMG

Level
> Taught Postgraduate Level

Module leader
> Awinder Kaur

Credit value
> 15

Module duration
> 4 weeks

Assessment
> Multiple

Study locations
> University of Warwick main campus, Coventry Primary
> Distance or Online Delivery

Description

Introductory description

In today's world, artificial intelligence and data science are powering innovation in virtually all industries and domains. The ability to build machines, and algorithms, that are able to reason and make decisions autonomously offers not only huge benefits to modern business, but to society as a whole. This module provides a hands-on exposure to the practice of developing AI/machine learning algorithms and implementing them in a variety of problem sets and datasets

Module aims

This module aims to enable participants to select, implement and evaluate deep learning algorithms in data science and artificial intelligence. In particular, the module highlights several of the most common, and in-demand, modern algorithms including recurrent, convolutional and other neural networks. Alongside technical knowledge, participants should develop an understanding of the applicability of different types of artificial intelligence & machine learning to common problems, and best practice for data science and artificial intelligence projects.

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.

Core concepts of Artificial Intelligence & Deep Learning; Data pre-processing & engineering; Optimisation algorithms (SGD, Adam, etc.); Artificial Neural Networks (ANN); autoencoders; Convolutional Neural Networks (CNN); Recurrent Neural Networks (RNN) & Long-Short Term Memory (LSTM); transformer models; Q-learning; Bayesian Neural Networks (BNN); Variational Autoencoders (VAE); Generative Adversarial Networks (GAN); transfer learning; Siamese networks; self-supervised learning; Model training and evaluation.

Learning outcomes

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

- Interpret and evaluate various use-cases and the applicability of artificial intelligence and deep learning.
- Adopt best practices for data processing and engineering for artificial intelligence and deep learning models.
- Implement, interpret and critique current, professional standard learning models.
- Automate deployment-ready deep learning pipelines and algorithms.
- Evaluate and interpret the results of deep learning models and tune them to optimise performance.

Interdisciplinary

In particular, combining computer science and mathematics/statistics

International

International demand remains high for graduates with the skills incorporated in this module

Subject specific skills

Artifical intelligence, deep learning, statistics, machine learning, software development, data analysis

Transferable skills

Programming, statistics and modelling, team work, critical analysis

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Study

Study time

Type	Required
Lectures	12 sessions of 1 hour (8%)
Seminars	6 sessions of 1 hour (4%)
Supervised practical classes	12 sessions of 1 hour (8%)
Online learning (independent)	60 sessions of 1 hour (40%)
Assessment	60 hours (40%)
Total	150 hours

Private study description

No private study requirements defined for this module.

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 A2

	Weighting	Study time	Eligible for self-certification
Algorithm Development	20%	10 hours	No
Students work on a real dataset to apply learning and present their results			
Assignment	80%	50 hours	Yes (extension)
Essay on artificial intelligence and deep learning topics (including original code creation)			

Assessment group R2

	Weighting	Study time	Eligible for self-certification
Assignment	100%		Yes (extension)
PMA on artificial intelligence and deep learning topics (including original code creation)			

Feedback on assessment

Verbal feedback for in-module components; written feedback and annotated scripts for post-

Availability

Pre-requisites

Pre-requisite to be added once that module has been approved (Data Engineering with Python)

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