Module Specification

Intelligent systems [TSI]

Version: 2023-24, v2.0, 09 Aug 2023

Contents

Part 1: Information

Module title: Intelligent systems [TSI]

Module code: UFCE4V-18-2

Level: Level 5

For implementation from: 2023-24

UWE credit rating: 18

ECTS credit rating: 9

College: College of Arts, Technology and Environment

School: CATE School of Computing and Creative Technologies

Partner institutions: Transport and Telecommunication Institute

Field: Computer Science and Creative Technologies

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Not applicable

Features: Not applicable

Educational aims: This module aims at providing opportunities to, expand your knowledge on Artificial Intelligence techniques; explore their suitability to solving a range of complex problems; and experiment with applying your choices to real world challenges. You will have the opportunity to reflect on the usefulness of the solutions

that you've developed and to consider the ethical impact of such solutions on life and society.

Outline syllabus: 1.Optimisation

Search spaces and problem types (NP, non-stationary, multi-objective, etc), and local search therein, eg, random hill-climbing, simulated annealing, tabu search; Population-based search - simulated evolution (EAs);

Knowledge representations in EAs (linear, trees, graphs) and associated search operators (recombination, mutation, inversion);

Other population-based search techniques - artificial swarms' Comparing and contrasting examples such as ant colony and particle swarm with evolutionary algorithms both in terms of search mechanisms and appropriate application domains;

Hybridising local and population-based search;

2.Modelling

Training and testing – stopping, imbalance, missing variables, bias in data sets, features, pre-processing, etc. That is, the realities of handling data and formulating questions from it.

Supervised Learning :

    Instance-based learning – kNN;

    Decision Trees – C4.5;

    Probabilistic Methods – Bayes/ Fuzzy;

    Neural Networks - MLPs and backprop;

    Deep networks – autoencoding and convolutional;

Reinforcement Learning - Tabular Q learning

Unsupervised Learning   – K means, including some aspects of visualisation

Part 3: Teaching and learning methods

Teaching and learning methods: Lectures will provide the theoretical underpinning to allow students to explore the potential of AI techniques to solve complex

problems. From time to time and where appropriate, industry speakers will illustrate the concepts from their perspective.

Practical sessions and tutorials will facilitate deeper understanding via activities working through the process of applying the techniques covered in the lectures to solve concrete problems. Some such activities may be undertaken as a group, others will be undertaken individually.

These will provide students the opportunity to work independently and learn with the support of the tutors and peers.

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Compare and contrast modern Artificial Intelligence techniques, and with those traditionally associated with complex problems

MO2 Identify the issues associated with the application of modern Artificial Intelligence techniques, including any ethical issues, and evaluate challenges presented

MO3 Demonstrate the ability to select appropriate paradigms and solve one or more problems with Artificial Intelligence techniques

Hours to be allocated: 180

Contact hours:

Independent study/self-guided study = 144 hours

Face-to-face learning = 96 hours

Total = 240

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://rl.talis.com/3/uwe/lists/29F6432F-7ADC-17EE-9FAA-981FC8C7C805.html?lang=en&login=1

Part 4: Assessment

Assessment strategy: The assessment strategy for this module is a combination of written examination and coursework assignment.

The written examination is of two hours duration and comprises questions mapping to the module's learning outcomes. Questions examine cognate and practical skills via a range of essay, multi-choice questions (MCQs), and appropriate problem solving exercises.

The written coursework assignment requires the production of a report, and program code. Tutorials will include the opportunity for one-to-one demonstrations of students' assignment software to tutors, enabling rich formative feedback in addition to the summative feedback element.

The resit will follow the same format, with different tasks used for the practical assignment.

Assessment tasks:

Examination (First Sit)
Description: Examination - Mix of Multiple Choice Questions (MCQ) and short answers, (2 Hours)
Weighting: 50 %
Final assessment: Yes
Group work: No
Learning outcomes tested: MO1, MO2

Practical Skills Assessment (First Sit)
Description: Practical Assignment requiring the production of report and program code. (max 2750 words)
Weighting: 50 %
Final assessment: No
Group work: No
Learning outcomes tested: MO1, MO2, MO3

Examination (Resit)

Description: Examination - Mix of Multiple Choice Questions (MCQ) and short answers. (2 hours)

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2

Practical Skills Assessment (Resit)

Description: Practical Assignment requiring the production of report and program code. (Max 2750 words)

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2, MO3

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Computer Science and Software Development {Double Degree} [Oct][FT][TSI][4yrs] BSc (Hons) 2021-22

Computer Science and Software Development {Double Degree} [Feb][FT][TSI][4yrs] BSc (Hons) 2021-22

Computer Science and Software Development {Double Degree} [Oct][PT][TSI][5yrs] BSc (Hons) 2020-21

Computer Science and Software Development {Double Degree} [Feb][PT][TSI][5yrs] BSc (Hons) 2020-21