Module Specification

Advanced AI, Computer Vision and Cyber Security

Version: 2023-24, v2.0, 20 Mar 2023

Contents

Part 1: Information

Module title: Advanced AI, Computer Vision and Cyber Security

Module code: UFCFFV-15-M

Level: Level 7

For implementation from: 2023-24

UWE credit rating: 15

ECTS credit rating: 7.5

Faculty: Faculty of Environment & Technology

Department: FET Dept of Computer Sci & Creative Tech

Partner institutions: None

Delivery locations: Not in use for Modules

Field: Computer Science and Creative Technologies

Module type: Module

Pre-requisites: None

Excluded combinations: None

Co-requisites: None

Continuing professional development: Yes

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: This module is an opportunity to learn state-of-the-art machine learning, including deep learning with application to big data and image analysis. With these advanced tools students will have the opportunity to design algorithms based on clinical studies that address the key chronic diseases such as neurodegeneration, cancer and metabolic disorders, to better diagnose patients, prescribe the right treatments and monitor the evolution of disease. The second part of the module will

detail advances in cyber security with a particular focus on General Data Protection Regulation (GDPR). This will be delivered through a series of lecture, tutorials and interactive practical classes. By the end of the module the students will be able to utilise state-of-art techniques, such as deep learning to extract useful information from complex and noisy data and to facilitate healthcare applications by, for example, solving localisation and classification problems.

Features: Not applicable

Educational aims: The aim of this module will be to build on the data analytics introduced in the compulsory module, "AI, Computer Vision and Robotics, Applications in Healthcare", which will allow advanced analysis of data from a qualitative and quantitative perspective.

Outline syllabus: •Advanced coding, programming and data analytics. This element will build on the basic programming and image data analytics developed in the AI, Computer Vision and Robotics Applications in Healthcare module.

•Deep Learning: AI and Deep Machine learning in real world projects.

•Image data processing, data fusion, pattern analysis. Use data from single or multiple sources and extract useful features from these data.

•Cyber Security: This aspect of the module will detail advanced concepts of cyber security with a particular focus on GDPR.

Part 3: Teaching and learning methods

Teaching and learning methods: Lectures: This module will be delivered in integrated topic sections, where each section will provide the tools that can be later applied to design algorithms and strategies in a case study approach.

Tutorials: As part of the lecture series, tutorials will be embedded in each time slot and are open to covering support material from research-based material to case studies.

Practical classes: Several classes will be included that are linked to the lecture series offering the students an applied understanding of each topic section.

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

MO1 Design innovative algorithms based on clinical studies that address the key chronic disease

MO2 Apply data fusion analysis to address key challenges in the Health Technology sector.

MO3 Critically appraise the application of technology in the area of Advanced AI, Computer Vision and Cyber Security.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

Total = 150

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/7F503814-85BB-B65E-8B53-23A92E2302D2.html?lang=en-GB&login=1

Part 4: Assessment

Assessment strategy: There are two assessment tasks: an exam and a portfolio.

The exam (2 hours) will test learned knowledge of core concepts delivered during lectures and tutorial classes.

The portfolio is designed to develop their understanding of how data fusion can be applied to improve Healthcare Technology, a key focus of the programme. The portfolio is a collection of works that students develop both individually and in small

groups (Sprint working) as they learn. The questions/tasks are set to be research informed and problem based. This portfolio will be able to showcase their ability to present their innovative approaches to real world issues as part of formative activities allowing student feedback.

Elements including coding, modelling and data analysis will be assessed in this piece of assessment. Within this assessment the students will develop a portfolio of work (1500 words). Throughout the development of the portfolio students will benefit from formative feedback, supported through tutorials. The nature of the portfolio will require engagement with original work.

Assessment components:

Portfolio (First Sit)

Description: The students will develop a portfolio of work (1500 words).

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2

Examination (Online) (First Sit)

Description: Online examination: this is a two-hour examination, with two extra hours for uploading electronics documents and materials.

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO2, MO3

Portfolio (Resit)

Description: The students will develop a portfolio of work (1500 words).

Weighting: 50 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2

Examination (Online) (Resit)

Description: Online examination: this is a two-hour examination, with two extra hours for uploading electronics documents and materials.

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO2, MO3

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Health Technology [Frenchay] MSc 2023-24

Health Technology [Frenchay] MSc 2022-23