MODULE DESCRIPTOR

Module Title

Computer Vision

Reference	CM4126	Version	2
Created	September 2023	SCQF Level	SCQF 10
Approved	June 2021	SCQF Points	15
Amended	April 2024	ECTS Points	7.5

Aims of Module

Computer vision aims at developing computational solutions to understand the content of images and video in a way similar to human perception.

Learning Outcomes for Module

On completion of this module, students are expected to be able to:

1	Communicate a range of image processing and image manipulation techniques.
2	Critique a range of image features extraction and features representation methods.
3	Question different machine learning and deep learning methods for image classification and object detection and recognition tasks.
4	Develop an end-to-end intelligent computer vision solution by applying underlying concepts and theories of modern computer vision.

Indicative Module Content

This module will cover image and video analysis, including image processing methods, classification, object recognition and detection, and object tracking. Core image processing tasks such as image enhancement, sampling, noise removal, filtering and morphological operations. Modern computer vision methods such as Convolutional Neural Networks, deep learning methods for handling images and videos. Object Detection, Localisation and Recognition. Object tracking and motion estimation. Deploying computer-vision solutions for real world problems. Working with relevant tools and technologies such as Python, OpenCV, and Tensorflow.

Module Delivery

Key concepts will be introduced and illustrated through the medium of lectures and lab sessions. Lab sessions will include introductory tutorials to help students in applying advanced computer vision methods and lab tasks will be given to help students reinforce their understanding and technical knowledge of the core subject and develop proficiency in applying it to various practical computer vision scenarios.

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Indicative Student Workload	Full Time	Part Time
Contact Hours	30	N/A
Non-Contact Hours	120	N/A
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	N/A
Actual Placement hours for professional, statutory or regulatory body		

ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

Component 1

Type:	Coursework	Weighting:	100%	Outcomes Assessed:	1, 2, 3, 4
Description:	The practical assessment will be based on applying computer vision techniques to a case study from the public domain.				

MODULE PERFORMANCE DESCRIPTOR

Explanatory Text

The calculation of the overall grade for this module is based on 100% weighing of C1. An overall minimum grade D is required to pass the module.

Module Grade	Minimum Requirements to achieve Module Grade:
A	The student needs to achieve an A in C1
B	The student needs to achieve a B in C1
C	The student needs to achieve a C in C1
D	The student needs to achieve a D in C1
E	The student needs to achieve an E in C1
F	The student needs to achieve an F in C1
NS	Non-submission of work by published deadline or non-attendance for examination

Module Requirements

Prerequisites for Module	CM3111 or equivalent
Corequisites for module	None.
Precluded Modules	None.

INDICATIVE BIBLIOGRAPHY

1. House, J. and Minichino, J. (2020) Learning OpenCV 4 Computer Vision with Python 3: Get to grips with tools, techniques, and algorithms for computer vision and machine learning, 3rd edn. Birmingham, UK: Packt Publishing.
2. Kar, K. (2020) Mastering Computer Vision with TensorFlow 2.x: Build Advanced Computer Vision Applications Using Machine Learning and Deep Learning Techniques. Birmingham, UK: Packt Publishing.
3. Geron, A. (2019) Hands-on Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems. 3rd edn. Sebastopol, CA: O'Reilly Media.