Module Specification

Introduction to Machine Vision

Version: 2025-26, v4.0, Approved

Contents

Part 1: Information

Module title: Introduction to Machine Vision

Module code: UFMFLQ-15-2

Level: Level 5

For implementation from: 2025-26

UWE credit rating: 15

ECTS credit rating: 7.5

College: College of Arts, Technology and Environment

School: CATE School of Engineering

Partner institutions: None

Field: Engineering, Design and Mathematics

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: This module provides an introduction to the state of the art and traditional machine vision techniques as well as exploring future directions. The course content is both industry- and research-led and aims to provide students with skills that meet the needs of industry.

Features: Not applicable

Educational aims: This module equips students with knowledge in machine vision concepts and applications as well as image processing techniques. It employs examples from industry and research to inform teaching and learning.

Outline syllabus: The syllabus will contain the following topics:

Machine vision concepts and introduction to machine vision applications.

Image formation (e.g. pinhole camera model) and representations (e.g. binary, greyscale and colour images):

Basic image processing and analysis techniques including histogram analysis, image segmentation and morphological operations.

3D Image analysis including laser triangulation, stereo triangulation and photometric stereo

Features descriptors

Introduction to machine learning methods such as artificial neural networks and deep learning

Machine vision in Robotics such as object recognition

Management appraisal

Generating machine vision code

Part 3: Teaching and learning methods

Teaching and learning methods: Scheduled Learning includes a weekly pattern of 2 hour laboratory sessions supported by 1 hour lectures.

Independent learning includes hours engaged with essential reading, coding and testing, assignment completion, etc.

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

MO1 Gain an understanding of the principles of machine vision and machine learning, including the capabilities, limitations, and hardware considerations of current machine vision systems in practical applications.

MO2 Apply a variety of algorithmic methods for image processing, feature extraction, and pattern recognition to design and implement software solutions for real-world problems, while critically evaluating their performance and effectiveness.

Hours to be allocated: 150

Contact hours:

Independent study/self-guided study = 114 hours

Face-to-face learning = 36 hours

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/CAA9E83A-D890-F928-96D0-DD9BC146509C.html

Part 4: Assessment

Assessment strategy: Three-hour exam (+2 for scan and upload) including 40% for questions based on pre-prepared programming tasks. This allows students to continually develop their skills in the area without burdening with multiple assessment points. The remaining 60% of the exam tests more general abilities beyond the set tasks from the tutorials.

Assessment tasks:

Examination (Online) (First Sit)
Description: Online exam: 3 hours (+ 2 for scanning and upload)

Weighting: 100 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO2

Examination (Online) (Resit)

Description: Online exam: 3 hours (+ 2 for scanning and upload)

Weighting: 100 %

Final assessment: No

Group work: No

Learning outcomes tested: MO1, MO2

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Robotics {Foundation} [Frenchay] BEng (Hons) 2023-24

Robotics [Frenchay] BEng (Hons) 2024-25

Robotics {Foundation} [Frenchay] BEng (Hons) 2023-24

Robotics [Frenchay] BEng (Hons) 2024-25

Robotics {Foundation} [Frenchay] BEng (Hons) 2023-24

Robotics [Frenchay] BEng (Hons) 2024-25

Robotics {Foundation} [Frenchay] BEng (Hons) 2023-24