



The
University
Of
Sheffield.

Electronic &
Electrical
Engineering.

EEE6219 COMPUTER VISION

Credits: 15

Course Description including Aims

This unit focuses on introducing current approaches for computer vision with the main emphasis on a layered approach to image and video analysis problems and associated probabilistic modelling. These methods are exploited in simple detection and recognition tasks. The outline syllabus includes motion estimation and picture rate conversion, image feature detection, description and representation, early vision, mid-level vision and high-level vision. The coursework component of this unit aims to provide an understanding of using hardware/software tools in solving practical computer vision problems.

The unit aims to...

1. introduce current approaches to computer vision
2. emphasise a layered approach to image and video analysis problems
3. explore true motion estimation and its applications to picture rate conversion
4. introduce image modelling and representation techniques
5. exploit methods in simple object and action recognition tasks

Outline Syllabus

Motion estimation and picture rate conversion, Image feature detection, description and representation, early vision, mid-level vision and high-level vision

Time Allocation

30 lectures, 4 seminars and 2 programming sessions.

Recommended Previous Knowledge

UG level 3 (or equivalent) understanding of basic signal processing, computing and/or applied mathematics.

Assessment

Two hour examination.
Coursework.

Objectives

On successful completion of this module students will be able to

1. Describe the key elements and functionality of a visual recognition system.
2. Demonstrate an understanding of how true motion estimation works and its differences to motion estimation for video compression.
3. Demonstrate an understanding of popular feature extraction and representation techniques for both images and video sequences.

4. Describe the key components of simple object detection and recognition algorithms.
5. Describe the key components and procedure of face detection and recognition algorithms.
6. Identify the differences between object recognition and action recognition.
7. Describe how an action recognition algorithm works and the differences between global and local representations for action recognition.
8. Design a simple visual recognition algorithm and implement it using a programming language such as Matlab.