Unit Outline

Computer Vision (CITS4240)

6 points / Semester 1
Location: UWA (Crawley)

Handbook Description

Computer vision is the science of automatically computing information and making decisions from an observed image, image set, or an image sequence. It combines concepts from 'image processing' (in the spatial and frequency domains) and 'pattern recognition'. Computer vision has a wide number of potential applications, including satellite imaging, control and measurement, industrial inspection, surveillance (e.g. face recognition) and medical applications. This unit covers topics such as binary image analysis, greyscale manipulation, mathematical morphology, linear and nonlinear filtering, feature extraction and image enhancement. It also covers camera calibration and projective geometry and how three-dimensional information can be reconstructed from single images, stereo pairs of images and motion sequences. In the future, it is anticipated that computer vision systems will become prevailing, and that vision technology will be more applied across a broad range of business and consumer products. This will result in a strong industry demand for computer vision engineers for people who understand vision technology and know how to apply it in real-world problems.

Prerequisites:

Corequisites:

Unit Aims

Students understand how images are digitally represented, processed and interpreted; apply knowledge from areas such as psychophysics, signal processing, projective geometry, linear algebra, calculus, set theory and information theory in order to develop computational techniques for image understanding; demonstrate skills in MATLAB programming, the use of MATLAB's image processing, statistics, and signal processing toolboxes; and develop the ability to communicate effectively through technical documentation.

Teaching Staff
**Unit Co-ordinator:** Dr Du Huynh

**Textbook**

**Contact Hours**

50 (lectures: 26 hrs; labs: 24 hrs)

**Assessment**

This comprises a submitted portfolio of practical work and final examination. The laboratory work tests competence in the application of knowledge in computer vision for tasks such as image enhancement, image understanding and three-dimensional reconstruction. Students are also required to demonstrate their ability to identify sub-tasks that form the solutions to image processing problems, and implement them. The portfolio of laboratory work is constructed as a web document and must demonstrate an ability to communicate technical information effectively. Code is assessed on the basis of its correctness, design and clarity, error trapping, and internal documentation. Supplementary assessment is not available in this unit except in the case of a bachelor's pass degree student who has obtained a mark of 45 to 49 and is currently enrolled in this unit, and it is the only remaining unit that the student must pass in order to complete the course.

**Unsatisfactory Progress**

Any student who does not demonstrate satisfactory progress in this unit, as defined in the FECM Policy on Assessment Practices and Procedures, may be refused admission to the final examinations. The final deadline for notification of unsatisfactory progress is the last day of Week 10.

**Penalties**

The School of Computer Science and Software Engineering has adopted a policy on minimum penalties for late items of assessment. This is the default policy of all units unless indicated otherwise, in writing, by the specific unit coordinator.

This policy shall apply to all items of continuous assessment, whether submitted either physically or electronically. Immediately after the submission deadline for an item of continuous assessment, a penalty of 20 percent will be applied PER DAY or PART THEREOF. The minimum mark possible for late submission is zero. The percentage is based on the item’s total contribution to the unit’s assessment. For example, a project contributing 40% to the unit’s assessment will incur a penalty of 8 marks for each day late.
until it is submitted or a mark of zero results.

A more detailed description is given in this School’s Policy on Late Submission. The Faculty does have an appeals procedure, the details of which can be found at the Policy for Appeals.

**Plagiarism**

Plagiarism is broadly defined to be when any portion of the work presented for assessment, can be attributed to another party. The student making the submission should acknowledge what aspects of the presented work is not directly derived by them. For the purposes of plagiarism it is irrelevant that you have been given permission by someone to copy their work and present it as your own.

You are directed to the School of Computer Science and Software Engineering Policy on Plagiarism and the Faculty of Engineering, Computing and Mathematics Policy on Plagiarism.

**Academic Conduct Essentials (ACE)**

All students who have not previously been enrolled at UWA are required to complete a short compulsory online module called Academic Conduct Essentials (ACE) within the first 10 weeks of semester. ACE introduces students to essential knowledge regarding ethical scholarship, helps prepare them for the expectations of their university career and informs them of correct academic conduct.

The unit can be accessed via WebCT. The final unit quiz must be completed with a mark of 80% or greater. Students may attempt the quiz as many times as they wish to gain the required pass mark. Completion of the unit will be recorded as an Ungraded Pass (UP) on students’ academic records. Non-completion (NC) within the required timeframe will also be documented on formal academic records. More information on ACE is available at ace.uwa.edu.au

**Special Consideration**

Applications for consideration, deferral of tests or exams or extensions of time for assignments on medical, personal or other grounds must be lodged with the faculty office no later than three working days after the due date for the assessment in question. This rule will apply to all students, except in exceptional circumstances.

**Faculty Marks Adjustment Policy**

Final assessment is subject to the Faculty Scaling Policy.

**Supplementary Examinations**
Supplementary examinations will be awarded in accordance with Faculty Policy on supplementary assessment.

**Student Rights**

The University’s charter of student rights is available at [http://www.secretariat.uwa.edu.au/home/policies/charter](http://www.secretariat.uwa.edu.au/home/policies/charter)

**Academic misconduct**

The University of Western Australia strongly supports teaching and learning that promotes academic literacy and ethical scholarship for all students. As part of this commitment, UWA has recently developed new guidelines relating to Academic Misconduct (including plagiarism). It is also developing a range of resources for students and staff to further strengthen academic literacy and ethical scholarship at UWA. Further details are available on the [Teaching and Learning website](http://web.csse.uwa.edu.au/page/64018).