

ENG6528 – Computer Vision. Research Report and Presentation

The major project for ENGN6528 is a research report and presentation on a topic of interest in the field of Computer Vision. As rough guide the following list of interest areas has been provided to give students an idea of possible topics, however, students are encouraged to look beyond the topics provided to areas of special interest to themselves.

Some possible research topics:

Detecting Human faces	Structure from Motion	Adaptive tracking
Template matching and principal component analysis (eigenfaces)	Hough transform	Wavelet transformations and Fourier transformations
Optic Flow	Particle filtering	Disparity and stereo vision techniques.
Support vector machines and character recognition.	Physical camera systems and image preprocessing. (Demosaicing etc.)	Image morphing techniques
Image classification algorithms and stochastic analysis	Representation of Texture in images	Analysis of colour and illumination in images.
MPEG coding	Visual Servo Control	Optic flow
Image rectification.		

Research project and presentation plan

Topic determination: (Finalised by Week 4)

Initially students join into groups of two members and do some initial research into suitable topics. These topics must be agreed to by the course convenor.

Initial Research: (Finalised by Week 8)

Each group should undertake background research to find a number of academic resources of interest, academic papers, text books, research monographs, web pages etc. The goal is to find one or two reference documents of particular interest that will be studied in detail as well as a wider range of background material that will contribute to the basic knowledge in the area.

The main material for the project and principal reference material should be finalised by week 8.

Simulations and experiments: (Finalised by week 13)

The level of practical experiment and simulation that should form a part of the project should be determined as soon as possible in the project. Most (if not all) projects will contain some practical simulations or experiments. Completing these simulations is a key part of the course work.

Presentation: (35-50 minute presentation) (To be presented during the exam period)

At the end of semester students will present a 30 minute seminar on the subject studied. The goal of this seminar will be to cover the key ideas and some feeling for the literature in the subject domain studied, provide an introduction to the particular techniques considered, present simulations and experimental data demonstrating the techniques investigated and provide some conclusions and ideas about future directions in the field.

Research report: (10-15 pages) (To be handed in during the exam period)

The research report is aimed at providing the same insights as the presentation but in a more formalised setting. It is possible in the research report to enter into more mathematical detail regarding the techniques considered. All material covered in the body of the course ENGN6528 may be assumed as prior knowledge for the research report, however, concepts beyond the scope of the course should be explained.

It is difficult to provide a uniform structure for all research reports, as the structure of individual reports will differ based on the nature of the material covered. All reports should have an abstract, introduction, conclusion and appendix. The appendix may contain a print out of the important parts of the code developed for the simulations undertaken or complex mathematical derivations if they are not central to the discussion in the body of the report. The main section of the report lie between the introduction and conclusion and may consist of sections such as 'problem formulation', 'applications in the real world', 'derivation of algorithm', 'analysis of algorithm', 'methodology', 'experimental results', 'discussion' etc. The particular nature of sections must be determined based on the nature of the topic studied and the work undertaken by the students. Full references should be given for all material (such as figures, etc) included in the report from an external source. Referencing should include all relevant information, including journal, number and page information. Web sites should be referenced with the full URL as well as information on when the site was visited to obtain the information.

To keep the report to a reasonable level I have set a page limit of 10-15 pages. It is certainly not necessary to produce a long report to get a good mark. It is important to keep your explanations short and to the point and write the report in a professional manner.