ENGN8530: Computer Vision and Image Understanding: Theories and Research

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Acknowledgement: Some slides from Dr Antonio Robles-Kelly, Dr Tiberio Caetano, and Dr Rob Mahony
Course Introduction

- Course convenor: Chunhua Shen
- Co-lecturer: Roland Goecke
- Guest lecturers: Prof Richard Hartley, Dr Robby Tan
- Starts: 21 Feb 2007
- Ends: 4 April 2007
- Wed and Fri, 10am - 12.30pm
Course Introduction (2)

- Course website:
  - Slides will be put here after each lecture

- WebCT website:

- Contact email addresses:
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Course Details

- 6-credit course, expected workload about 12h / week
- 2 x 2.5h lectures / tutorials
- Read 2-3 papers per fortnight
- Write a paper review / summary of 500-800 words about one of these per fortnight
- Each worth 10% of final mark
- Final project worth 60% of final mark
- No final exam
- Grading: High distinction, Distinction, Credit, Pass, Fail
Final Project

- Proposals due in fourth week
- Original implementation of a new idea or recently published paper (TPAMI/IJCV/ICCV/CVPR/ECCV …)
- Detailed empirical evaluation of an existing implementation of one or more methods
- Paper comparing three or more papers not covered in class, or surveying recent literature in a particular area
- Reports, implementations due 30 April 2007
- Presentations after this date
Course Outline

- Please note there may be changes to this schedule!
- Introduction to Computer Vision and Image Understanding – 21 Feb 2007
- Image processing basics – 23 Feb 2007
  - Image representations
  - Colour spaces
  - Image filtering
  - Image statistics
- Image matching – 28 Feb 2007
- Image registration – 2 March 2007
Course Outline (2)

- Bayesian analysis for object recognition / detection – 7 March 2007
- Image / video segmentation – 9 & 14 March 2007
  - Clustering, normalised cuts, mean shift algorithm
- Eigen-analysis for object recognition / detection – 16 March
- Object tracking – 21 March 2007
  - Kalman filter
  - Particle filter
  - Mean shift tracking
- Multi-view geometry – 23 & 28 March 2007
Course Outline (3)

- Physics-based vision – 30 March 2007
- Overview of object recognition techniques – 4 April 2007
- After final project
  - Project presentations (May 2007)
Literature

Textbook:

Other books:
Literature (2)

- Web resources:
  - Computer Vision Homepage
    http://www.cs.cmu.edu/~cil/vision.html
  - Computer Vision Software http://www.cs.cmu.edu/~cil/v-source.html
  - CV Online http://homepages.inf.ed.ac.uk/rbf/CVonline/
  - Matlab file exchange
- Library!!! (Or at least online resources like IEEExplore.)
- Journals: TPAMI, CVIU, IJCV, TIP, …