Computer Vision
MAP-I Curricular Unit – 2010/11
Course Schedule and Program

Lectures

Block 1 – Computer Vision Fundamentals - UA

Date	Topics
12/10/10	- Definitions: Optics and image formation; digital image; colour models; medical imaging; noise
19/10/10	- Low-level feature extraction: colour; texture; shape.
26/10/10	- Student paper presentation - Image pre-processing: filtering; enhancement.

Block 2 – Segmentation - FCUP

Date	Topics
2/11/10	- Mini-Exam: Block 1 - Student paper presentation - Basic segmentation methods: thresholding; colour segmentation; region-based segmentation; mathematical morphology
9/11/10	- Student paper presentation - Segmentation by clustering: background subtraction; mean-shift; k-means; graph-theoretic clustering; normalised cuts.
16/11/10	- Student paper presentation - Segmentation by fitting: fitting lines; fitting curves; robust methods.

Block 3 – Pattern Recognition – FEUP

23/11/10	- Mini-Exam: Block 2 - Student paper presentation - Pattern recognition fundamentals: definitions; feature vectors; classes; principal component analysis.
30/11/10	- Student paper presentation - Generic pattern recognition techniques: statistical pattern recognition, soft-computing machines, neural networks, support vector machines.
7/12/10	- Student paper presentation - Pattern recognition for computer vision: hypothesize and test; template matching; relations between templates.

Block 4 – 3D Vision - UM

Date	Topics
14/12/10	- Mini-exam: Block 3 - Student paper presentation - Motion analysis: block matching; optical flow: motion as a low-level feature; visual tracking.
4/1/11	- Student paper presentation - Geometry and 3D reconstruction: geometry of multiple views; stereo vision; structure from motion.
11/1/11	- Mini-exam: Block 4 - Student paper presentation - Augmented reality - Active Vision

Evaluation

50%: Combined grade of the three mini-exams.
40%: Student paper presentation. This can be either an individual paper with a review on a specific computer vision topic, or a group paper (two students) which describes scientific results obtained by the students.
10%: Presentations of selected papers during lectures.

Location and Schedule

Location: DEI, UM
Room: A2
Time: 14h00-17h00