Middle East Technical University
Department of Computer Engineering
CENG 583 – Computational Vision
2011-2012 Spring

Web: http://www.kovan.ceng.metu.edu.tr/~sinan/courses/ceng583/index.html

Emailing List: TBA

Instructor: Asst. Prof. Dr. Sinan Kalkan, B-207, skalkan@metu.edu.tr (Office hours: by appointment)

Lectures: Monday 13:40-16:30 (G-102)

Credits: METU: 3 Theoretical, 0 Laboratory; ECTS: 8.0

Objective: i. To introduce the field of computational vision ii. To introduce major problems and techniques and research directions

Content: Edge detection and contour extraction. Region segmentation. Perspective projection and camera calibration. Matching and stereo. Projective geometry. Three dimensional reconstruction. Dynamic scene analysis.

Textbook: We will mainly follow the state of the art with papers. However, the following might be handy:

- D. A. Forsyth, J. Ponce, Computer Vision: A Modern Approach, Pearson Education Inc., 2003.
- R. Szeliski, Computer Vision: Algorithms and Applications, Springer, 2010. http://szeliski.org/Book/
- D. Marr, Vision: A Computational Investigation into the Human Representation and Processing of Visual Information, W. H. Freeman, 1982.
- E. R. Davies, Machine Vision: Theory, Algorithm, Practicalities, Elsevier, 2005.
- B. K. P. Horn, Robot Vision, MIT Press, 1986.

Grading:

Quiz from papers	20%
Paper presentations	20%
Project presentations	25%
Project paper	35%

Tentative Schedule:

Week & Date		Topic
0	**20th of Feb.**	**No Lectures**
1	**27th of Feb.**	**Introduction to the Course & Vision.** What is vision? What are its goals and problems? What are the main processing stages?
2	**5th of March**	**Low-level Vision**. Cameras. Projective geometry. Calibration.
3	**12th of March**	**Early Vision**. Edges. Corners. Texture. Segmentation. Optic Flow.
4	**19th of March**	**3D Vision**. Monocular and binocular cues. 3D reconstruction.
5	**26th of March**	**Applications**. Video surveillance. Human behaviour understanding. Object recognition. Image/video retrieval. Image annotation.
6	**2nd of April**	**Paper presentations with theme**: Monocular depth estimation.
7	**9th of April**	**Paper presentations with theme**: Image annotation.
8	**16th of April**	**Paper presentations with theme**: Object/shape modelling. Object recognition.
9	**23rd of April**	**Paper presentations with theme**: Feature Descriptors.
10	**30th of April**	**Paper presentations with theme**: Context. Saliency. Attention.
11	**7th of May**	**Project Presentations**
12	**14th of May**	**Project presentations**
13	**21st of May**	**Project presentations**
14	**28th of May**	**Project presentations**