

# *Image Analysis*

## LP1 2014

### **Lecturer:**

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### **Lectures:**

Tuesday 8-10 in MA:04 (There is no lecture during week 2, i.e. on September 9th.)

Thursday 10-12 in (M:A week 1 and then MH:A weeks 2-7)

Friday 13-15 in E:C (only weeks 2 and 5)

### **Exercise supervision:**

Wednesday 8-10 in E:1144 (Fangyuan Jiang)

Wednesday 10-12 in E:1408 (Fangyuan Jiang)

Friday 13-15 in MH:362C (Zhayida Simayajiang)

Friday 15-17 in MH:362C (Zhayida Simayajiang)

### **Additional Exercise supervision in the computer rooms:**

Times to be determined later, study weeks 2, 3, 4 and 6.

### **Hand-in assignments:**

There are five hand-in assignments. These are due 18/9, 25/9, 2/10, 9/10 and 16/10.

### **Preliminary plan of lectures:**

- w1 Introduction
  - Basics, images, gray-level transformations, digital geometry, interpolation, sub-pixel sampling.
  - Linear algebra, image bases, Fourier transform.
- w2 Image filtering, convolution.
  - Scale space theory, smoothing, edge and corner detection.
- w3 Machine learning, clustering, classification part I. PCA, MDS.
  - Multispectral images (Stefan Andersson-Engels).
- w4 Segmentation: Fitting, Hough transform, robust estimators.
  - Machine learning, clustering, classification part II, ANN, SVM.
- w5 Segmentation: Graph cuts, clustering
  - Texture, segmentation
- w6 Statistical image analysis (Johan Lindström).
  - Segmentation: Active contours.
- w7 Applications, construction of image systems.
  - Computer vision

**Literature:**

(opt.) Szeliski: Computer Vision and Applications, Springer. <http://szeliski.org/Book> (opt.)  
Forsyth – Ponce: Computer Vision - A Modern Approach, Pearson Education  
Lecture notes, Centre for mathematical sciences, Lund University.

**Project:**

There is an optional project course in study period 2. More information on the project is handed out during the lectures.

**Exam:**

If you pass on the five assignments sheets you will pass the course with grade 3. Some exercises can be done with paper and pencil. Others require you to develop and test image analysis scripts for working on real image data. We provide supervision to the exercises both in classrooms and in computer rooms. To get one of the higher grades you will also have to do a written take-home-exam as well as an oral exam at the end of the course.

**Home page:** <http://www.ctr.maths.lu.se/course/newimagean/2014/>

**Study office:** Patricia Felix Poma de Kos, room 540, open 10.00-12.15, 14.00-16.30.