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1MD110

Introduction to Image Analysis

- course presentation -

Course syllabus

<https://www.uu.se/en/admissions/master/selma/kursplan/?kpid=41724&type=1>

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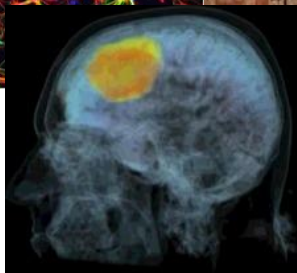
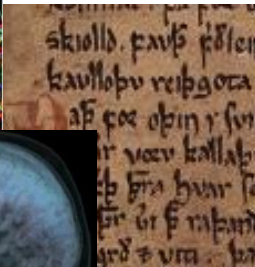
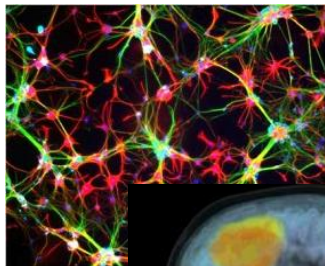
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Motivation and Content

Images are a very **rich source of information**.
Images are also appealing to our visual system.

We will learn about **methods and algorithms** which enable efficient **automated extraction and analysis of information from image data**.

We will discuss how these algorithms can be **applied in real scenarios**, in industry, healthcare, and research.



Topics



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We will discuss a number of relevant and interesting topics:

- Representation of images in a computer, sampling, interpolation, colour.
- Pointwise analysis, frequency analysis.
- Image enhancement and image restoration.
- Mathematical morphology, discrete geometry, combinatorial optimization.
- Image segmentation.
- Feature extraction, shape and texture analysis.
- Image registration and motion analysis.
- Computer vision, 3D geometry.
- Classification and decision theory.
- Experimental design and evaluation.



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During the course

10 credits

Period 1&2 (September – January)

Language of instruction: English

Entry requirements: 120 credits including 30 credits maths and 30 credits computer science. Introductory programming , statistics and probability theory, linear algebra, and calculus.

Instruction:

16 lectures

2 seminar sessions

5 computer labs (teams of 2) in MATLAB

1 mini-project (teams of 2)

Assessment:

Written exam: 5 credits.

Assignments (labs, mini-project, seminars): 5 credits.

Course literature:

Own material (lecture notes)

R.C. Gonzalez, R. E. Woods

”Digital Image Processing”, 4th Ed., 2018

[R. Szeliski “Computer Vision: Algorithms and Applications”, 2022](#)



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After the course

- you may want to top up with machine/deep learning

Year 1, Period 3 [Digital Imaging Systems, 7.5 credits \(1MD130\)](#)

Year 1, Period 4 [Deep Learning for Image Analysis, 7.5 credits \(1MD120\)](#)

Note: Important to take 1MD120 after 1MD110, if you want a complete picture of modern image analysis!

Employment in one of many companies interested in specialists in image and video analysis.

Doctoral studies (e.g., at our PhD programme *Computerized image Analysis*)