Visualization

Single subject and programme course

6 credits

Visualisering

732A98

Valid from: 2016 Autumn semester

Determined by
The Quality Board at the Faculty of Arts and Sciences

Date determined
2016-04-13

Main field of study
Statistics

Course level
Second cycle

Advancement level
A1N

Course offered for
- Master's Programme in Statistics and Machine Learning

Entry requirements
- Bachelor's degree equivalent to a Swedish Kandidatexamen of 180 ECTS credits in one of the following subjects:
    - statistics
    - mathematics
    - applied mathematics
    - computer science
    - engineering
- Passed courses in
    - calculus
    - linear algebra
    - statistics
    - programming
- English corresponding to the level of English in Swedish upper secondary education (Engelska 6/B)
(Exemption from Swedish)

Intended learning outcomes

After completion of the course the student should be able to:

- describe major principles for data visualization using static , interactive or dynamic graphs,
- select suitable static, interactive or dynamic visualization techniques for common problems in data visualization,
- produce simple graphs used for analysis and high-quality graphs used for publications,
- use up-to-date open-source and commercial visualization tools to describe the structure of a large and complex data sets, and also discover the hidden patterns and trends in the data,
- show knowledge of visualization methods present in recent research publications.

Course content

The course comprises:

- principles of correct data visualization and misleading graphs,
- static tools used for visualizing univariate and bivariate data sets: histograms, bar charts, scatter plots, time series plots,
- visualizing of textual information: word trees and word clouds,
- static tools used for multidimensional data: scatter plot matrices, treemaps, heatmaps, bubble plots, Chernoff faces, star charts, parallel coordinate plots,
- visualization by means of multidimenstional scaling,
- visualizing geographical information by using web applications and standalone software,
- creating animation by combining static graphs,
- animated bubble plots,
- interactive visualization tools: linked graphs, brushing, identification and guided tours,
- producing publication- and presentation-quality graphics from simple graphs.

Teaching and working methods

The teaching comprises lectures, seminars, and computer exercises complemented by self-studies. Lectures are devoted to presentations of theories, concepts and methods. Computer exercises provide practical experience of data visualization. The seminars comprise student presentations, discussions of the computer assignments and presentation of research papers related to visualization.
Language of instruction:
English.

Examination

Written reports on computer exercises. Active participation in the seminars. Presentation of a research article. One final written or oral examination. Detailed information about the examination can be found in the course's study guide.

If the LiU coordinator for students with disabilities has granted a student the right to an adapted examination for a written examination in an examination hall, the student has the right to it. If the coordinator has instead recommended for the student an adapted examination or alternative form of examination, the examiner may grant this if the examiner assesses that it is possible, based on consideration of the course objectives.

Students failing an exam covering either the entire course or part of the course twice are entitled to have a new examiner appointed for the reexamination.

Students who have passed an examination may not retake it in order to improve their grades.

Grades

ECTS, EC

Other information

Planning and implementation of a course must take its starting point in the wording of the syllabus. The course evaluation included in each course must therefore take up the question how well the course agrees with the syllabus.

The course is carried out in such a way that both men´s and women´s experience and knowledge is made visible and developed.

Department

Institutionen för datavetenskap