FAI3304 Spatial Data Analysis: an Introduction 7.5 credits

Rumslig dataanalys:en introduktion

This is a translation of the Swedish, legally binding, course syllabus.

If the course is discontinued, students may request to be examined during the following two academic years

Establishment

Course syllabus for FAI3304 valid from Spring 2014

Grading scale

Education cycle

Third cycle

Specific prerequisites

Admission to postgraduate studies.

This course is forstudentsat the PhD levelin a relevant field(eg.UrbanandRegionalPlanning,Economy,RealEstate, Geography,Demography,Criminology, Environmental).Previous knowledge ofGeographical InformationSystemsand /orbasic knowledgeinstatisticsis an advantage.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

The course intends to provide an accounting of the diversity of current approaches and applications using spatial data analysis. The course relies heavily on examples from demography, economic geography, epidemiology, sociology and urban criminology. The course will be based on lectures, lab exercises and readings. The course will cover the three main important areas in spatial data analysis: visualization, exploration and modeling. These topics are chosen because they constitute the core of spatial data analysis and represent the state of the art in this research field.

It is expected that after completing the course the students should be able to:

- Identify appropriate techniques for spatial analysis.
- Using the relevant knowledge to solve spatial problems by using real-life databases and spatial statistical tools such as visualization , interpolation, pattern recognition and modeling (spatial regression).
- Develop technical and social skills by working in groups to solve real-life problems by statistical software.
- Analyzing the results of practical exercises and be able to explain the difficulties and advantages of the tested techniques.
- Develop, interpret and critically reflect on the results of a case study in which one (or more) spatial analysis techniques included in the rate used.
- Using spatial analysis techniques and communicate them to an audience (in written, graphic and verbal).
- Recognize and express the value of including different phenomena and social processes spatial dimension.
- Have some knowledge of the main methods and systems for spatial data analysis to run their own analysis.

Course contents

All events have space and time co-ordinates attached to them–they happen some where at some time. In many areas, recording the place and time of individual events in the database is important. Social sciences study processes in different times and places–'the structure of places and spaces may influence unfolding of social and economic processes; social and economic processes may in turn shape the structure of places and spaces'(Haining, 2004:15-16). Spatial data analysis has a role to play in guiding the search for general problem solving because observations in geographic space are dependent, other words, observations that are close together in space tend to be alike, and are more alike than those which are further apart. This is a property of geographical information that can be exploited using spatial analysis. But what is spatial analysis? It is"a set of methods whose results change when the locations of the objects being analysed change"…."it includes all of the transformations, manipulations and methods that can be applied to geographic data to add value to them, to support decisions, and to reveal patterns…it turns raw data into useful information (Longley et al., 2005:316).

Disposition

The course is roughly divided in three parts. First we discuss about the nature of the geographical data followed by exploratory spatial data analysis, then the second part deals with identification of spatial patterns (e.g., spatial autocorrelation, spatial clustering) and the third section refers to examples of spatial modeling.

Part 1–The nature of spatial data and Spatial Data Analysis (SDA).

Part 2–Exploring spatial data: Spatial statistics and Geostatistics.

Part 3–Modelling spatial data: Spatial'econometrics.

During the first week, the student will have an introductionto the courseand tools.A collection ofintroductorypractical trainingwill be offered tostudentswho are new toArcGIS,Geodataand ScanStat.

Course literature

The compulsoryliteratureis a bookofHaining, 2003 "Spatialdataanalysis:theory and practice",acollection of articlesandexcerptsfrombooks.Alllecturesrequirethe student tohaveread the literaturein advance.
The course bookandarticlecollectionto be readatevery opportunityawarded in conjunctionwiththe course.

Examination

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

Other requirements for final grade

To pass requires that the student:

- Participating in lectures and conducting practical exercises.
- Participating in discussions during the lectures ("forum-time" and submit assignments on time).
- Participation in and contribution to the group project (maximum 2 persons) in the case study is to develop, interpret and critically reflect over their own performance through the use of spatial data techniques taught during the course. The use of proprietary data is encouraged.
- Present the group's case study in a poster session at the department (written, graphic and oral). The department's staff (researchers, phd students) and the other phd students will evaluate each group's performance and the information presented in the poster session. The written report submitted to the responsible teacher.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.