Project Work Instructions

GIS-E4020 Advanced Spatial Analytics 2019

The project work will be made in groups of 3(-4) students. Each team should have at least one Finnish speaking member.

In short, the idea of the project work is to identify problems in some selected scenario or a gap in knowledge (and a dataset) in decision making that we need to know more about, and to apply methods learnt during the course to describe and uncover new information about the phenomenon in question. Project work includes also a literature study.

**The first session of the project work takes place on the 28th of February at 14.15**

The project work steps is as follows:

1. Form groups and discuss a scenario and datasets you’d like to work on. Ideally, you will first identify an interesting research question, and then see if you can find datasets with which you can answer the problem. Finding a dataset can be challenging and, together with preprocessing for the analysis, it can take most of the time invested in an analysis.  
   Some example data repositories, mostly from Finland, can be found in the end of the document. If you need help, contact Jaakko Madetoja ([jaakko.madetoja@gtk.fi](mailto:jaakko.madetoja@gtk.fi)) and/or Marko Kallio ([marko.**k**.kallio@aalto.fi](mailto:marko.k.kallio@aalto.fi)).

In addition, start searching for articles that relate to your topic and problem from the International Conference on Geoinformatics from years 2015-2018 (see <https://ieeexplore.ieee.org/xpl/conhome.jsp?punumber=1002915>).  
**The checkpoint session (and the deadline) for forming groups and identifying a problem is on the 7th of March at 14.15**

1. After you’ve identified a scenario and a dataset, start exploring it and identify **three** problems /decision making situations which could be supported by the analysis methods that you have learns in the past course(s). The idea is that you first identify the problems/decision making situations and then identify the methods that could be used for the problems.

For the literature part, find, read and discuss from 5 to 8 articles (per team) from the conference above. For each article, report the topic and problem and the methods they used to solve it.

**Checkpoint session for the chosen data set and preliminary discussion on problems and analysis methods is on the 21st of March starting at 14.15 .** This is also the deadline for the report on the literature study.

1. Perform analysis with the selected methods.

**Presentations of your project work will be held on the 11th of April, 2019, starting at 12.15**.

1. The last step is to write a report and return it before the deadline on the 12th of April, 2019. Submissions to Mycourses.

Checkpoint sessions

At least one member from each group should participate in the checkpoint sessions, so that we can give you some feedback on the problem and dataset, and answer any questions you may have. In addition to being present, each group has to have a (short) description for each step, and return it in MyCourses before the checkpoint sessions.

For questions and help, contact Jaakko ([jaakko.madetoja@gtk.fi](mailto:jaakko.madetoja@gtk.fi), or [marko.k.kallio@aalto.fi](mailto:marko.k.kallio@aalto.fi) ).

Final Project Presentation

Each group will have time for about 30 minute presentation, with 10 minutes for discussion. The presentation should include

* Description of the scenario, problem or phenomenon you were investigating
* Description of the datasets used
* What analysis methods you used, and what kind of preprocessing of the data was needed
* Results and their interpretation

Project Report

The project report should include the same content as your project presentation.

Schedule

**28. February at 14.15 – Start forming groups and begin identifying a problem; search for articles relating to the problem**

**7. March at 14.15 – Checkpoint 1 session: Groups have been formed and topic chosen**

**21. March at 14.15 – Checkpoint 2 session: Dataset has been chosen and three analysis methods relevant to the problem have been preliminarily discussed; also literature study has been performed for 5 to 8 articles.**

**11. April at 12.15 – Presentations**

Datasets

There are countless datasets available. If you need help in finding suitable data for your needs, contact Jaakko and/or Marko. Here are some examples about Finnish data:

Free and open data in Paikkatietoikkuna (<http://www.paikkatietoikkuna.fi/web/en/open-spatial-data>)

PaiTuli (<https://research.csc.fi/paituli>) – Datasets from:

* Geological Survey of Finland (GTK)
* Meteorological Institute (IL)
* Finnish Transport Agency (Liikennevirasto)
* National Land Survey (MML)
* Finnish Environment Institute (SYKE)
* Statistics Finland (Tilastokeskus)

NASA Worldview (<https://worldview.earthdata.nasa.gov/>) – Imagery from

* Landsat-8
* MODIS
* Sentinel-2

Statistics Finland (<http://www.stat.fi/tup/tilastotietokannat/index_en.html>)

* Eurostat data
* Statistical data organized to postal codes

Global datasets you may want to look at:

* NASA
* USGS
* FAO
* World Bank
* EU open data
* Etc….

Some addition datasets available during the course:

* Seutu-CD including buildings in capital city area
* PRONTO data including fire and rescue missions in capital city area

Analysis tools

You can use any analysis tool, or a mixture of analysis tools that you feel comfortable with. E.g.

* ArcGIS/QGIS
* R/Matlab
* GWR 4.0
* Etc…

Support will be available at least for the software mentioned above.