

One of TIL6022's main goals is to prepare you to apply data pipelines to real-world TIL tasks, and to leave you well-qualified to work as a team to tackle quantitative research questions in TIL. The final project is intended to start you in these directions.

There are different types of projects you can choose from. Below we listed three types of projects with examples to give you some inspiration.

Project Types

- Application Project
 - o E.g., impact of COVID on travel behavior, accessibility of public transport
- Algorithmic Project
 - o E.g., optimization or prediction algorithms.
- Theoretical Project
 - o E.g., car-following model, individual mobility generation model

Groups:

The project is done in groups of **3-5** people; teams are formed by students. Please self-enroll to a group in Brightspace.

Project Deliverables

There are three required deliverables at different phases of your group projects, including the proposal, midterm notebook, and the final report.

The project is evaluated based on the final report according to the grading rubric. The final project report should be submitted in a Jupyter notebook (**.ipynb**) format, along with **PDF or HTML** exports.

In addition to the final project report submission, we also require two intermediate deliverables of the same notebook and respective PDF or HTML exports. These two deliverables are referred to as proposal and midterm notebook here. Although these two are not graded, they allow us to give you formative feedback on your progress. The contents of each deliverable are explained below.

Contents:

All deliverables of the notebook should include a title with authors and author contribution statement, introduction, and necessary references. In addition, below should be included for each deliverable:

- **Proposal** - including objectives, questions that you are trying to answer, intended data pipeline, datasets. **Formative feedback** on submissions.
- **Midterm notebook**– updated proposal and any results (visuals, concept data story). **Formative feedback** during project hours.
- **Final report notebook** builds on top of the midterm notebook, including motivation, data story (provide good examples), analysis of results, insights, and discussion. **Summative feedback**.

Submission:

We will use Github for the submission of all three parts of the final project. The deadline for each deliverable will be communicated through Brightspace. You should submit on Github and Brightspace as a group: that is, for each part, please make one submission for your entire project group and mention your team members. Provide a link to the Github repository as the submission for the 3 deliverables in Brightspace. Look at Project_template.ipynb file for the template of the main notebook.

Evaluation:

- Research question – requires data modeling and quantitative research in TIL & data check (10%)
- Coding/Logic - [code blocks] written logic, code description (30%)
- Narrative - [whole project] - (30%)
- Code Readability (20%)
- Technical quality & Significance (10%)

Please refer to the TIL Python Project Rubric document for more details.

Proposal submission

- Research questions (RQ) should include data processing, quantitative analysis, and visualization. If it is an application project type, it can be a societal problem or an exploratory analysis.

For example, Revealing the relationship between COVID and mobility activity patterns in the Netherlands is an exploratory RQ
- Provide the data source you need for answering the RQ, and provide links to the data where applicable
- Provide information about the time scale and spatial scale you are looking at. Provide the geographical boundary of your study

Potential data sources

Here are sample data sets

- EUROPE data - <https://ec.europa.eu/eurostat/web/transport/data/main-tables>
- CBS data - https://opendata.cbs.nl/statline/portal.html?_la=en&_catalog=CBS
- Dutch open data - <https://data.overheid.nl>
- Google mobility report - <https://www.google.com/covid19/mobility/>
- COVID data - <https://ourworldindata.org/coronavirus>, <https://data.rivm.nl/covid-19/>
- Flight data - <https://opensky-network.org>
- Public transport data - https://travica.app/?z=12&x=260915.3&y=6251439.5&l=osm_standard&ol=
- Emission data - <https://map.carbonspace.tech>

- Freight data - [2021 Amazon Last Mile Routing Research Challenge Dataset - Registry of Open Data on AWS](#)

Example Projects

2022 group projects

- Influence of COVID on mobility of different groups in the Netherlands
(<https://github.com/zfengyan/python-data-analysis/blob/main/report/report.ipynb>)
- Influence of COVID on travel purposes within the different regions of The Netherlands
(https://github.com/AikvanSeters/TIL-Project/blob/main/TIL6022-Groupproject/Final_Project.ipynb)
- Effect of COVID on different transport sectors in terms of CO2 emissions
(https://github.com/woutersouge/TIL6022/blob/main/Final_Report.ipynb)
- Effect of government regulations on air traffic at Dutch Airports in last ten years
- Modeling, calibrating, and validating a car following model using an intelligent driver model
- Emission behavior in passenger cars and road freight vehicles
- Effect of Brexit on road freight logistics