**Week 1 and 2:**

September 24th – October 7th

Martin’s work:

Urban digital twins @ Singapore

Urban energy systems

Short term project South Korea

N1 country in Asia with open data

Bsm data not available for indoor locations

Acquired all starting datasets from Martin:

* Footprints (original files + Martin’s cleaned dateset)
* Climate station
* Response data
* Terrain (DEM + Mountain area)

Visualized Terrain data in QGIS

Visualized Martin’s footprint data in QGIS.

Tried to acquire ECOSTRESS data (unsure about coverage)

Generally explored Korean Geoportals

Tried to find 3D building data

**Data Sources:**

* Geoportals [map.vworld.kr](https://map.vworld.kr/) and [www.nsdi.go.kr](http://www.nsdi.go.kr/) are down (VPN?)
* 3D model map of Seoul: can be explored on [S-MAP (seoul.go.kr)](https://smap.seoul.go.kr/) and accessed online on [S-Map 오픈랩 (eseoul.go.kr)](https://openlab.eseoul.go.kr/)
  + Emailed them to ask if 3D buildings data can be downloaded. (no reply yet)
  + there is a QGIS plugin for S-Map, but unclear if it includes 3D geometries.
* [data.seoul.go.kr/](https://data.seoul.go.kr/) has Seoul specific datasets (tree, water data)
* [Earthdata Search | Earthdata Search (nasa.gov)](https://search.earthdata.nasa.gov/search?q=ecostress&ac=true) for ECOSTRESS data
* [sgis.kostat.go.kr](https://sgis.kostat.go.kr), geospatial statistical office (extents + potentially more data)
  + Needs an I-PIN, seems like a sort of Government ID

Useful wording to find geodata: **위치정보**

**Response data:**

* Time interval: 04.10.2023 – 24.11.2023
* Clean up by Martin seems good for the purpose of navigation

**ECOSTRESS:**

* Found data for time interval of the responses (15 images)
* Available only on certain days and certain hours (not constant)
* Coverage varies (depending on cloud coverage and orbit according to website)
* Coverage not very good on most cases (9/15 have half or less of Seoul mapped)
* Most measurements done outside of responses’ time frame (9-18)

**Questions:**

* ECOSTRESS coverage – enough using data from a few measurements? Or maybe from a larger timeframe and then averaged?
* General questions about finding geodata. What platforms were used, etc.
* First supervisor from Geomatics

**Next goals:**

* Understand if 3D data can be used (wait for response)
* Look at building footprint and weather station data
* Map responses locations
* Look into regression models (LSPM, Transformer)
  + Best resources to start with?
* Start to define Mobility

Meeting 3rd of October

Landsat data

Relative temp comparison

How to measure relativity?

Temporally Spatially

Standardize values of weather stations (interpolation)

LST / Air Temp relation

Living Atlas Portal ArcGIS

Google Maps API for 3D buildings

**Medium / Toward Data Science** for regressions tutorials

QrowdQC+:

**Week 3 and 4:**

October 7th – October 18th

Visualize path data

Check additional data sources:

* + Korean VPN for [map.vworld.kr](https://map.vworld.kr/) and [www.nsdi.go.kr](http://www.nsdi.go.kr/)
  + Martin’s data sources
  + Landsat
  + Living Atlas Portal

Interpolation of weather station data

* Get a corresponding value for each survey response’s time and location
* Jackknife / cross-validation of different interpolation methods
  + Kriging
    - Account for closer stations, mountain position?
  + IDW
  + Natural Neighbours

Start implementation of regression on data

* Medium / Toward Data Science for learning

Questions

* Why dropping the response with Weather(short) as their wss\_title

Meeting

Space/time cube interpolation

Individual days for path data

Retricting spatially

Universiting

Google Earth Engine

For next week:

* Define main research questions (and how you want to answer them)
  + 3-5 subquestions
  + Github Repository

Google Earth Engine

* + Geopandas for visualization

**Week 5 and 6:**

October 19th – November 4th

Meeting with Singapore:

Urban Data Science Lab

Ben Gottkehaskamp and Wolfgang Kessling @ Transsolar KlimaEngineering, Stuttgard

Felix Rehmann – PhD @ TU Berlin

Wissenplattform

* + Presented about my Thesis
    - Research questions:
      * **MAIN:** What patterns can be found between the *mobility of participants* and *climate parameters*?
      * How do these observations compare to participants’ *self-reported thermal comfort*?
      * How do we *define mobility* and how has this affected the results of the project?
* Comments:
* Does interpolating make sense for a ground level, people-oriented reading climate?
  + People as sensors – more accurately and realistically give “data” on comfort

Updated Research Questions:

**MAIN**

* + How does urban climate factors impact people’s mobility choices in the urban landscape of Seoul?

**SECONDARY**

* + Are mobility pattern more indicating than user reported thermal preference levels in assessing human comfort?
  + How do user reported thermal preference levels differ from the expected comfort levels from weather parameters?
  + How is mobility defined for the purposes of this research and how does this impact and potentially limit its findings?
  + To what extent can graph NN be use to automatically detection of mobility patterns?

November 5th Meeting:

Message Clara about P2 registration

Refine questions to tell a story

Define Theoretical Framework – graph, relations between elements, data

**Week 7 and 8:** P1!

November 5th – November 19th

Original Topic Title:

Urban Form, Climate and Personal Comfort in a Highly Dense Urban Environment

Title for Singapore presentation:

The Effect of Climate on Urban Mobility: The Seoul Case Study

Main Research Question:

How do urban climate factors impact people’s mobility choices in the urban landscape of Seoul

**P1 Title:**

The Impact of Urban Climate on Personal Mobility Choices: A Case Study of Seoul’s High-Density Environment

**P1 Description:**

The project aims to explore patterns between the mobility data of 22 participants and climate parameters over a 7-week period in Seoul, South Korea. The project will analyze spatial data of the participant’s locations, using Graph Neural Networks (GNNs) to identify quantifiable mobility patterns. It will then examine potential correlations between the identified mobility patterns and external climate parameters, gathered from weather stations in the city and remote sensing datasets. Secondary objectives include evaluating the effectiveness of GNNs in detecting mobility patterns and comparing the project’s findings with participants’ self-reported climate preferences and climate comfort models. This latter comparison will help determine whether mobility patterns can offer insight on human climate comfort levels.

**Reworked and reordered research questions:**

**MAIN**

* + How do urban climate factors impact people’s mobility choices in the urban landscape of Seoul?

**SECONDARY**

* + To what extent can GNNs be used to automatically detect mobility patterns?
  + How is mobility defined using GNNs and how does this impact and potentially limit this project’s findings?
  + How do user-reported thermal preference levels differ from the expected comfort levels from urban climate factors?
  + Are mobility patterns more indicating than user-reported thermal preference levels in assessing human comfort?

After meeting:

**MAIN**

* + How do urban climate factors impact people’s mobility choices in the urban landscape of Seoul?

**SECONDARY**

* + How is mobility defined using GNNs and how does this impact and potentially limit this project’s findings?
  + To what extent can GNNs be used to automatically detect mobility patterns?
  + How do user-reported thermal preference levels differ from the expected comfort levels as estimated from urban climate factors?
  + Are mobility patterns more indicating than human comfort models in assessing thermal preference levels?

**Week 9 and 10:**

November 20th – December 3rd

* Meeting schedule while I’m in Australia
  + <https://www.timeanddate.com/worldclock/converter.html?iso=20241202T090000&p1=4672&p2=240>
  + Possible to move to 9:00 Delft time? (ok if not)

**THEORETICAL FRAMEWORK V2:**

* Changes in Theoretical Framework from Martin and Azarakhsh:
  + Move impact of climate on mobility in last phase (main rq)
  + Differentiate KPIs
  + Improve on connections (directions, annotations, relating to rqs)
  + Integrate hypotheses for rqs into the framework
  + Kpis shouldn’t be the result of the steps, but part of the process
  + Divide phase 1 into 2 different ones (think about each phase workload)
* Additional changes
  + Better define each phase (give them a name too?)
  + Add a data acquisition phase
  + Include RQs in the framework

**LITERATURE REVIEW:**

Created categories, to ease the writing of the Related Work section of the P2 Doc

* GNN
* Mobility
* Climate Comfort
  + Climate Models
* Wearable Data Studies
* Machine Learning
* General Writing (maybe not part of bibliography)

**GNN LIBRARIES**

* PyTorch (PyG)
* DGL

**NEXT STEPS**

* Continue with Literature Review
* Continue with using GNN libraries
* Implement Theoretical Framework into *Schedule* and *Methodology* sections
* Write out P2 document
* GitHub