CSAI4SG Project Fall 2021: Analysis of traffic intensity and car park usage in Basel since 2019

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1 Introduction

In this project, our group will try to find connections between traffic counts and the car park usage rate in Basel since 2019. Our goal is to visualize both information as a heat map. By plotting traffic intensity and car park usage rate on a map on hourly basis, we can get a series of plots. Our intention is to put those individual plots together resulting in a video or a GIF of traffic development in Basel.

2 Methods

First, we need to map the traffic intensity on a certain street with the nearest car park. An example could be the traffic on 'Heuwaage-Viadukt' from 'Bahnhof SBB' and the car park 'Steinen'. Once the mappings are defined, timeline plots can be used to get a first impression of the connection between the data. We quantify this by calculating the correlation.

Our main goal is to visualize traffic intensity and car park usage. We try to create a kind of heat map for both by combining a map of Basel together with traffic counts and cars parked. Both can be located on the map as geographical information is provided.

Given the high frequency of the data, both are available on an hourly basis, we intend to create hourly plots and then put those together as a video or a GIF. For this to work, we need a map of Basel including the streets. Sadly, we were not able to find the maps used on Open Data BS. In case we can't get those at all, we are going to use OpenStreetMap for the visualization.

3 Data

3.1 Traffic counts for motorized private transport

- Source: Open Data BS
  https://data.bs.ch/explore/dataset/100006/information/?sort=datetimefrom
- Attributes:
  Number of vehicles (cars, buses, lorries) passing one of 32 counting points in an hour

  – Spatial: WGS84 coordinates of each counting point
  – Temporal dimension: Hourly data since 2019

3.2 Occupancy of public car parks

- Source: Open Data BS
  https://data.bs.ch/explore/dataset/100014/information/?sort=published

- Attributes:
  Number of free parking spaces and total number of spaces at the full hour
    - Spatial: WGS84 coordinates of each car park
    - Temporal dimension: Hourly data since 2019

It's worth mentioning, that we have different types of measurements. While the traffic count is flow size, the car park usage is stock size. However, we still match the data together, assuming that the traffic in a certain hour is connected with the car park usage at the end of that hour. The idea of calculating a rate of usage change from the data does not lead to any improvement, thus we abandoned that path and focus on the percentage of usages.

One of the challenges will be the influence of Covid. It is reasonable to assume that the full lockdown that started on March 19, 2020 had an impact on traffic counts. To include those data makes little sense. Therefore we restrict our data to a certain time period yet to be defined not including time spans with Covid countermeasures taken by the government.

4 Conclusion

We expect to see a certain correlation between the traffic counts and the car park usage rate. However, we assume that this will not be strong. The reason lies in the different types of measurements and the difficulty in connecting a car park to traffic counts at all.

The difficulties can be illustrated with a simple example. If the car park is full between 9 o'clock and 10 o'clock and assuming that no car left in that period. It will not be influenced by the traffic counts at all. In extreme cases, the car park remains full with no traffic at all.

Nevertheless, we think our planned visualization has enough added value by providing a fast and compressed overview of traffic development in Basel.