

Proposal Foot & Bike Traffic in Zurich

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What is the general topic ?

Information about the traffic situation plays an important role in our day to day lives. Such information is also important for public administration and businesses, e.g. for planning public transport or bike hire places. Renting public bikes has become more and more popular these past few years and to approach the rising demand one would want to discover the pattern of bike renting to better fit the offer to the demand. The general idea is to assess and predict the bike and pedestrian traffic situation based on weather, season, etc.

What data will be used

Traffic Data - City of Zurich

Data (Source): [Daten der automatischen Fussgänger- und Velozählung - Viertelstundenwerte](#)

The data were collected by the civil engineering office of the city of Zürich and recense the foot and bike traffic at different geographic points throughout the city. The data set contains the following variables :

- **zählgerät** : ID
- **Frendschlüssel Zählstelle** : ID of the location where the measurement was taken
- **Datum** : Date in the format YYYY-MM-DD
- **Velo_in** : Number of bikes arriving in the station
- **Velo_out** : Number of bikes getting out of the station
- **Fuss_in** : Number of pedestrians arriving in the station
- **Fuss_out** : Number of pedestrians getting out of the station
- **Koordinate_Ost** : West coordinates (longitude)
- **Koordinate_Nord** : North coordinates (latitude)

More readings about how this data collection is being conducted:

[Automatische Zählungen des Fussverkehrs](#)

[Automatische Zählungen des Veloverkehrs](#)

Weather Data - City of Zurich

- [Hourly meteodata](#)

The data set includes hourly values from 1992, divided into annual files. The variables are :

- **Datum** : Date
- **Standort** : Location
- **Parameter** : Parameter
- **Intervall** : Interval
- **Einheit** : Unit
- **Wert** : Value
- **Status** : Status

It is a long table holding following measurements (**Unit**):

Unit
air pressure
precipitation duration
global radiation
temperature
relative humidity
wind direction

For example after successful import `weather.head()` gives you following export:

Datum	Standort	Parameter	Intervall	Einheit	Wert	Status
2023-01-01T00:00+0100	Zch_Stampfenbachstrasse	T	h1	°C	11.57	provisorisch
2023-01-01T00:00+0100	Zch_Stampfenbachstrasse	Hr	h1	%Hr	72.29	provisorisch
2023-01-01T00:00+0100	Zch_Stampfenbachstrasse	p	h1	hPa	971.62	provisorisch
2023-01-01T00:00+0100	Zch_Stampfenbachstrasse	RainDur	h1	min	0.00	provisorisch
2023-01-01T00:00+0100	Zch_Stampfenbachstrasse	StrGlo	h1	W/m2	0.01	provisorisch

Population Data - City of Zurich

- <https://opendata.swiss/de/dataset/bevolkerung-seit-1901>

The data set contains the variation of population of the city of Zürich (Wirtschaftliche Wohnbevölkerung der Stadt Zürich nach Jahr, seit 1901.). The latest update is from the 8th of February 2024.

The dataset holds following attributes:

- **StichtagDatJahr** : Year
- **AnzBestWir** : Economic resident population of the city of Zurich by year

How will the data be processed ?

The different data sets will be aggregated based on date and exploratory analysis will be done to have an overview of foot and bike traffic during different periods of the year and in different weather conditions.

The number of bikes (maybe also pedestrians) at a given time of the day (or during a whole day) will be set as the outcome variables and the weather as well as the population will be set as the predictor variables.

What questions will we try to answer with the project?

1. **Main Question** : How does weather, season and population affect foot and bike traffic in Zurich City and is it possible to make predictions?
Why does it matters : This could help public transport planners, city planners, street food vendors or for example city bike rental companies to improve their ressource allocation problem.
2. When do city bike rental locations need to be ready with high capacity depending on conditions (weather, season, ...)?

What techniques will be used?

- Exploratory analysis
- Correlation-analysis
- Lasso Regression for variable selection and variable analysis
- Visualization of geo data (if possible)
- Model for prediction of traffic (GLM, random forest, ...)
- Maybe pose as classification problem