MADE Project: Analyzing Bicycle Accidents and Rainy Weather in German Cities

By Jean-Philipp Schaller

Contents

Image source: Alejandro Lopez https://unsplash.com/de/fotos/schwarzes-mountainbike-in-der-nahe-der-strasse-geparkt-AoSAOV2Vtro

Introductions

- Motivation for the project:
  - Understand the impact of rainy weather and slippery roads on the frequency of bicycle accidents
  - This data can be used to investigate if slip-resistant roads or improved visibility through light indicators at road intersections
  - Can potentially reduce the number of bicycle crashes with personal injuries during rainy weather conditions
- Scope of the project:
  - Focus is on major German cities
  - The location provides a rich dataset of frequent bicycle accident reports
  - Accurate weather data

Methods Dataset GOVDATA

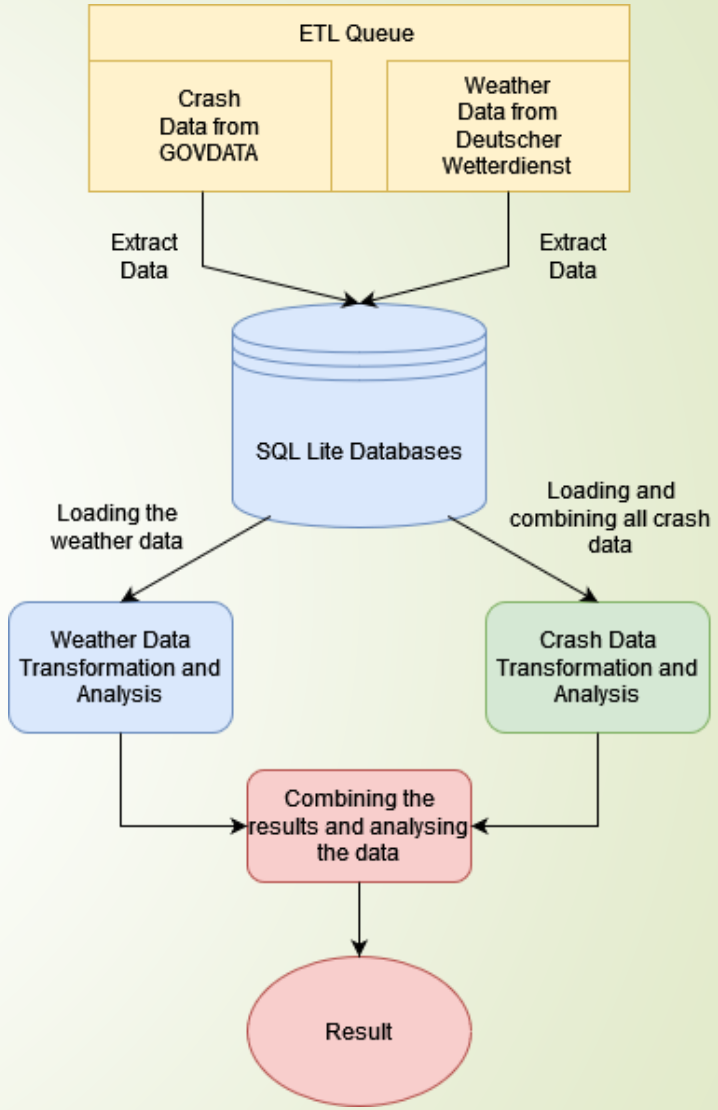
- **Dataset GOVDATA**
  - Data reaches from 2016 until 2022
  - URI: Unfallatlas
  - License: dl-de/by-2-0
- The datasets contain a detailed report of every accident with personal injuries in Germany
- Each year is a different database
- Accidents involving bicycles are distinguishable
- Problem: The dataset only contains the day of the week not the day of the month

Methods Dataset Deutscher Wetterdienst

- **Dataset Deutscher Wetterdienst**
  - Data reaches from 1998 until 2022
  - License: DWD License
  - Data Type: Database File as a TXT.
- The dataset contains the hourly rain fall from a weather station
- A lot of weather stations are available with accurate weather data

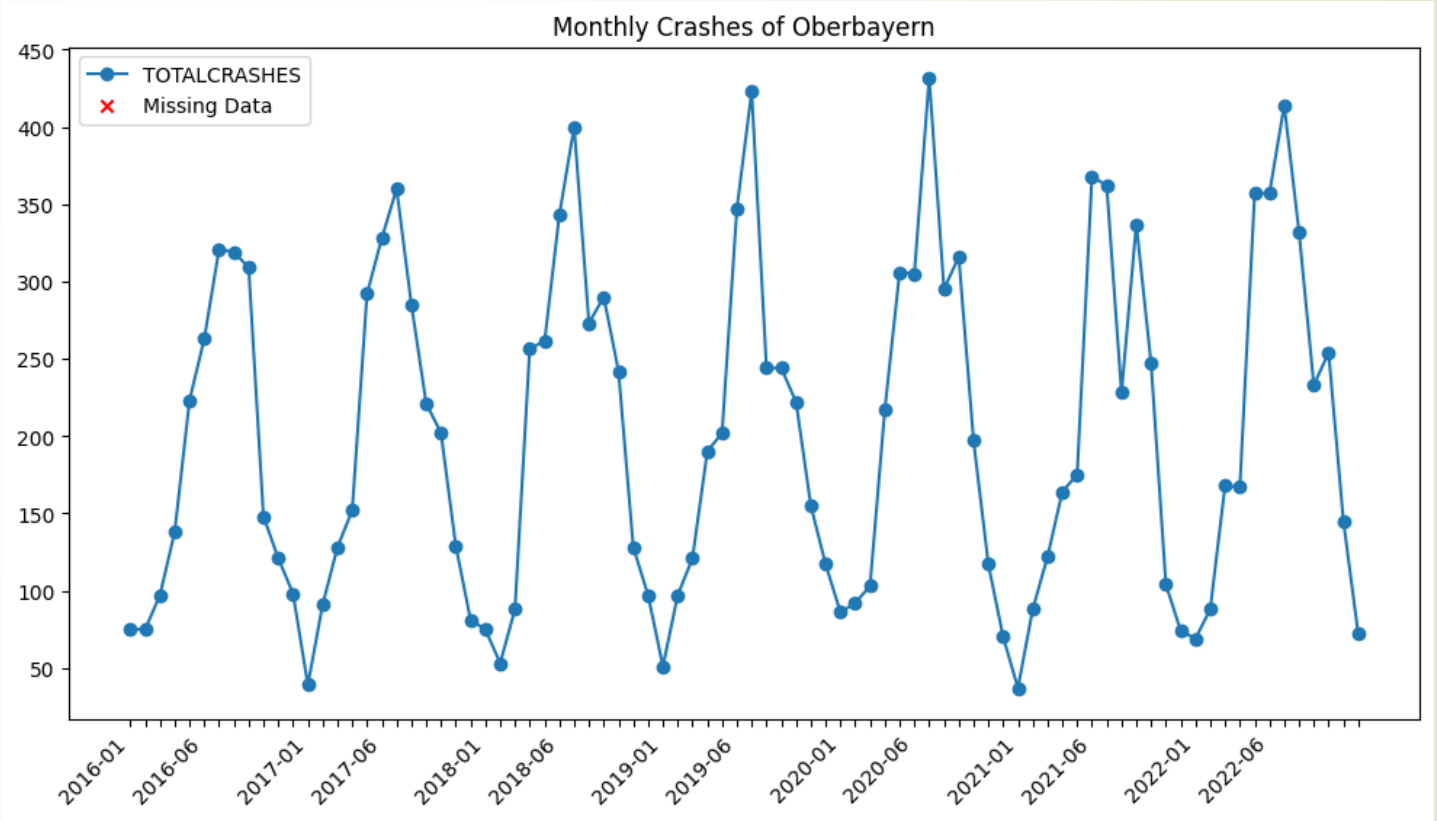
Building the pipeline

- Data is extracted from the two sources and stored in SQL Lite databases in the data folder
- The weather data is aggregated to a monthly rain fall and the crashes are also counted for each month.
- Results are combined to draw conclusions and analyze the data



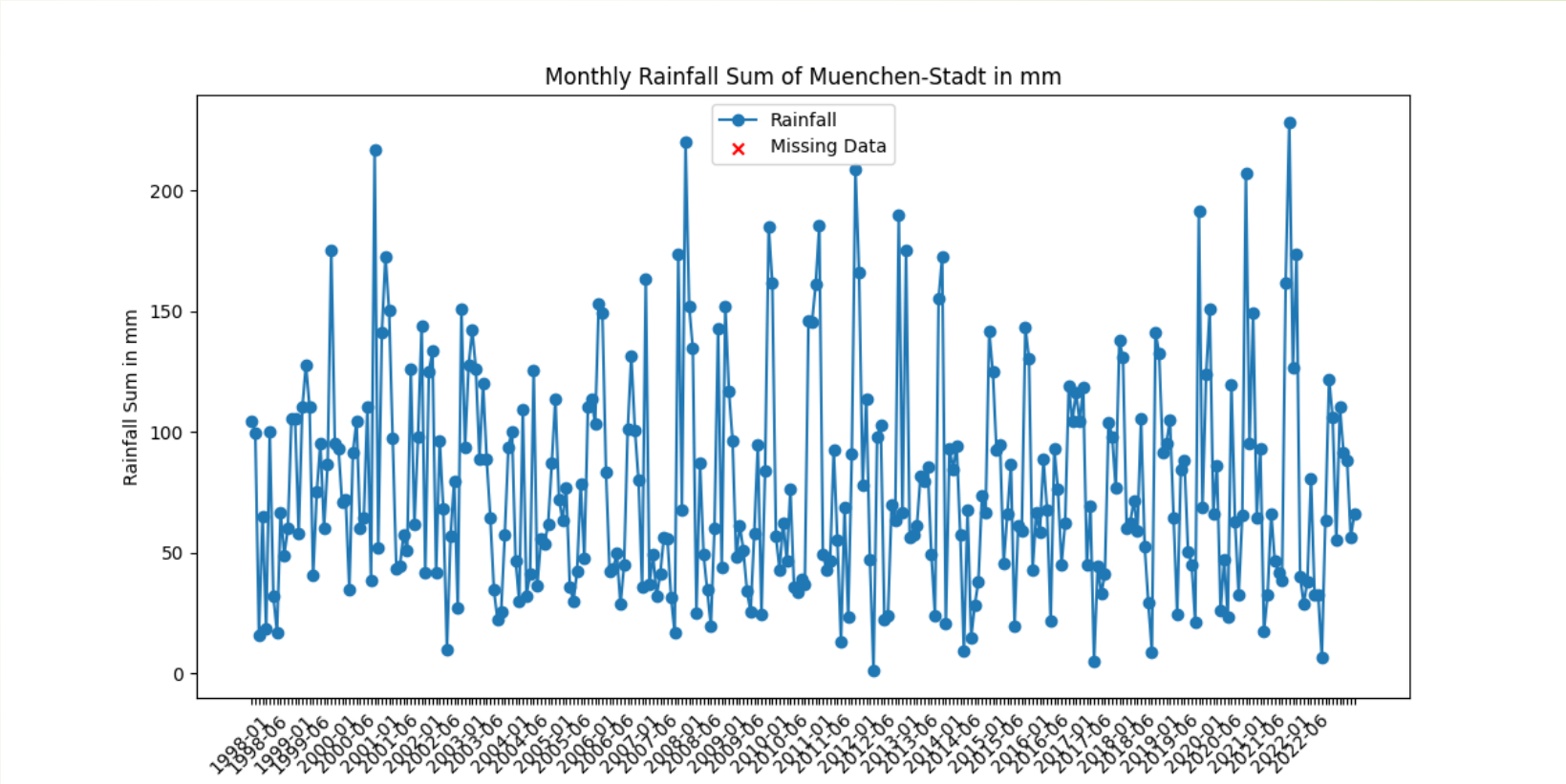
Results crashes

- The monthly crashes of Oberbayern
- Datapoints reach from 2016 until 2022

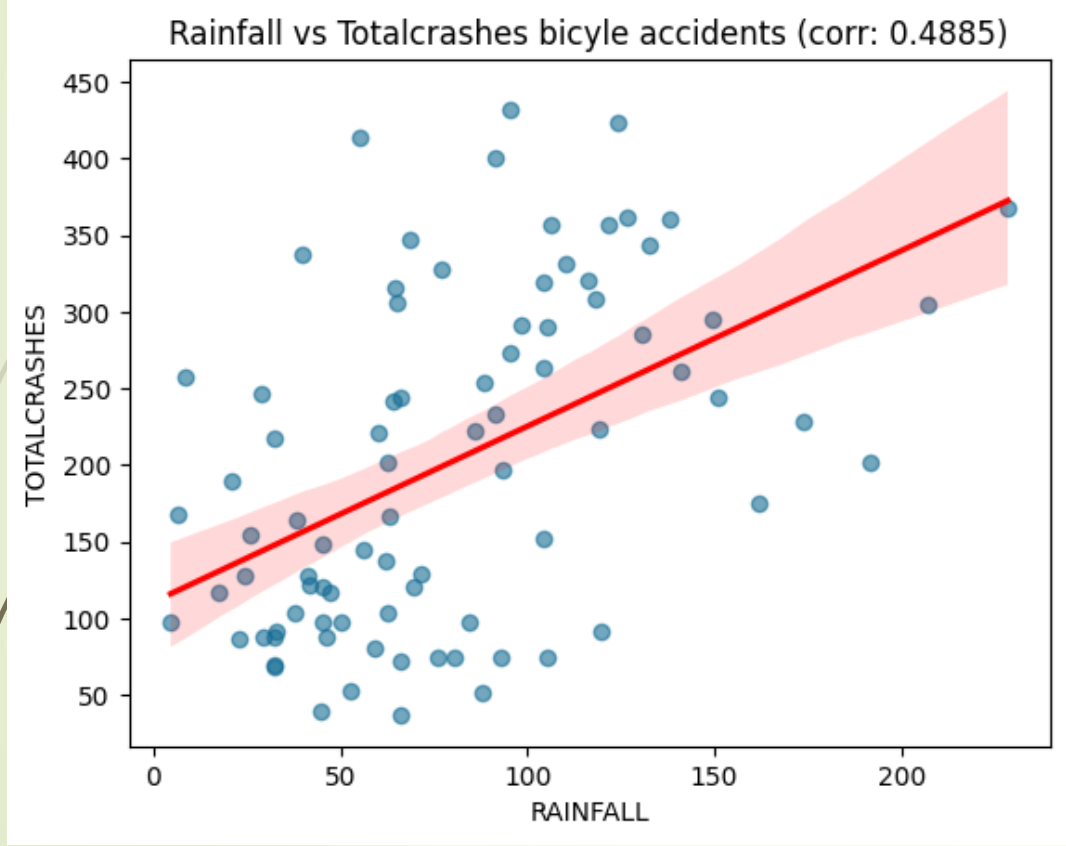


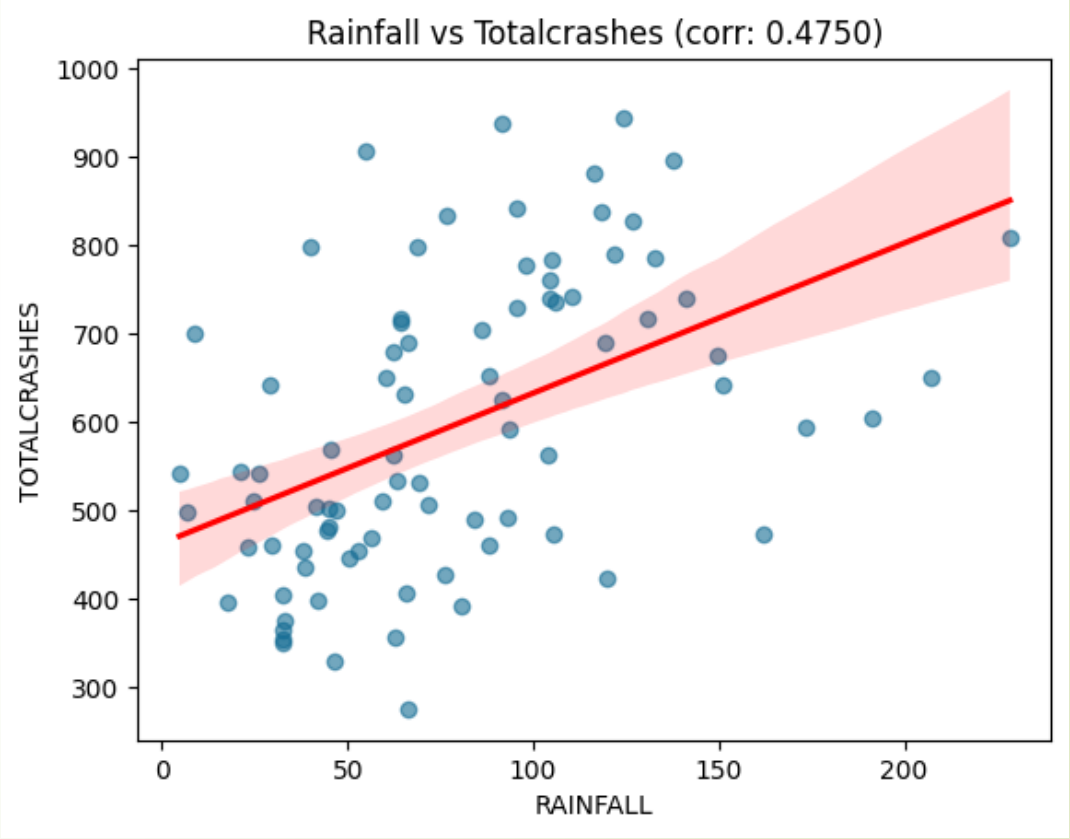
Results rainfall

- The monthly rainfall of Muenchen-Stadt
- Datapoints reach from 1998 until 2022

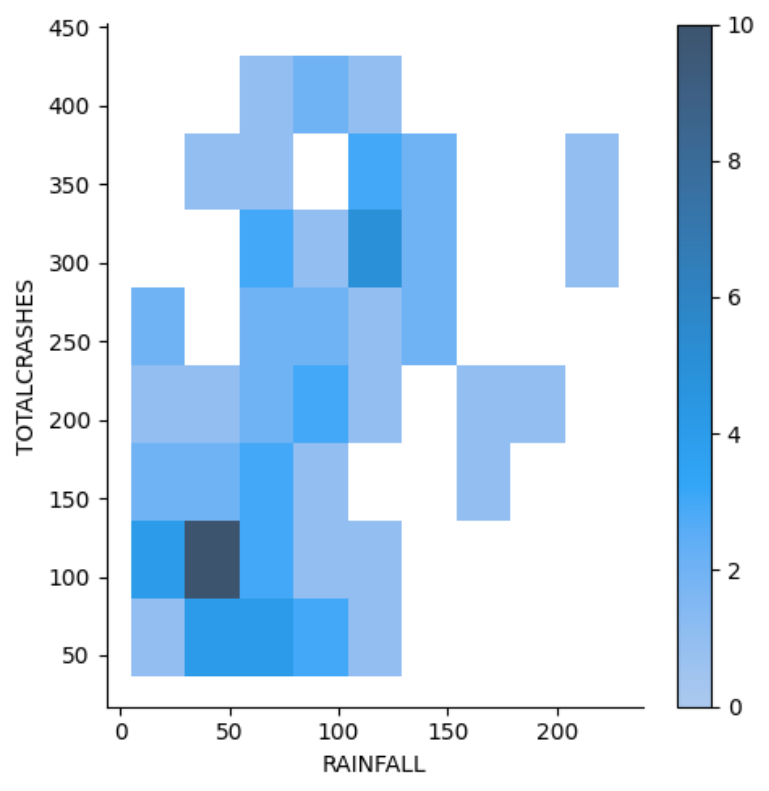


Results correlation





Heatmap rainfall and bicycle crashes



- The heat map of bicycle incidents shows that we have a lot of different data points with sunny and rainy months
- It also emphasizes the correlation by showing less data points in the north-west and south-east part of the heat map.

Conclusions

- Positive correlation between rainy weather and bicycle accidents is stronger than overall accident rates
- The project suggests the need for targeted interventions, especially for cyclists, during rainy weather conditions

Limitations

- Certain limitations of this project that needs to be acknowledged:
- The project used monthly data aggregation and not hourly precision
  - Leads to false links of accidents involving rainy weather to a point in time where it did not rain
- Geographical variability of weather is strong
  - Leads to false conclusion if there is a geographical variance in weather between accident location and weather station

Future scope

- Using hourly precision instead of monthly to draw more accurate conclusions