Michal Jakubík, 525062

Traffic accidents in Brno

Motivation

As I drive in Brno almost daily, I noticed some patterns in the bad driving habits of drivers in certain districts of Brno. The main motivation for this visualization thus lies in me wanting to see whether my observations are based on any statistical evidence.

Data sources & preprocessing

As a main source of data, I used the dataset of traffic accidents from the repository of open data data.brno.cz available here. This dataset is multivariate and contains many interesting and detailed information about the traffic accidents in the years 2010-2023.

As I wanted to display also a choropleth of the accidents, I also needed a dataset of district borders, which I acquired from gis.brno.cz available here.

Design choices

The main focus of the visualization was to confirm/reject my hypothesis about bad driving habits in the districts of Brno. To do that, we of course need a choropleth to visually display the number of accidents in each district. We also need a chart that will display the leading causes of accidents. Additionally, to see if accidents depend on the season of year or day of the week, a timeline is displayed that does just that.

The last component is a slider for year selection to see how accidents and their causes evolve over time. This slider thus serves as a filter. This is not the only filter that can be applied; Clicking on a district in the choropleth filters the accidents and their causes to only those in the chosen district. Moreover, clicking on a bar in the chart displaying the main causes of accidents filters accidents to only those whose cause is the one selected in the chart.

Filtering by a criterion can be removed by clicking on the corresponding button next to the charts. By default, all filters are disabled.

There is also some other interesting information displayed about each district when hovered over in the choropleth. As this information was not the main focus of the visualization, but is still interesting and important, it is not displayed unless hovered over (indicating user's interest in the district).

The language of the visualization was chosen to be Czech, as it is mainly designed to inform Brno residents (which are mostly Czech/Slovak) about the traffic accidents. Also, the dataset is in Czech and translating it would be a tedious task :).

Interesting observations

My experience is that people very often don't pay attention to the road, and they use their phones while driving. Another one is that people sometimes fail to yield to the oncoming vehicles when turning left. These observations are very visibly confirmed, as they comprise the two most frequent causes of accidents.

On the other hand, there is one intersection in Bohunice where people almost always fail to yield when turning left. I thought this would be reflected in the data, but failing to yield when turning left is overall in the fifth place of the accident causes in Bohunice.

Screenshots

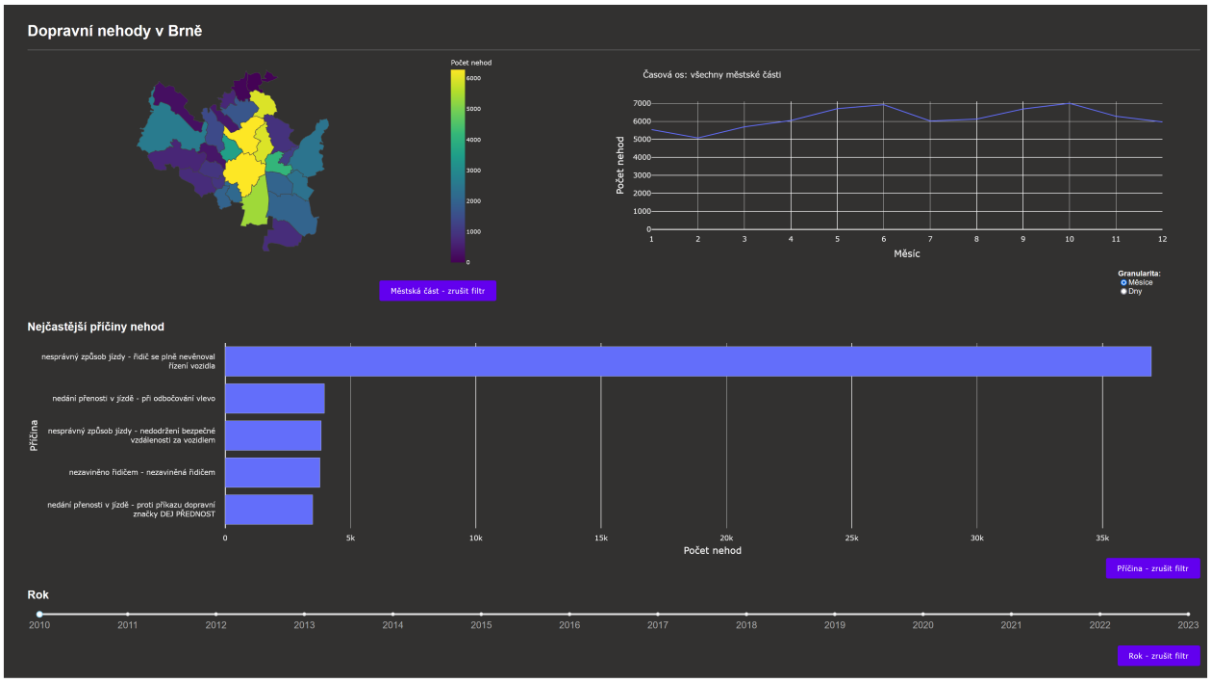

Figure 1 - Overall layout of the visualization – choropleth in the left top corner, timeline on the right, bar chart with most common accident causes under them and year slider on the bottom of the page

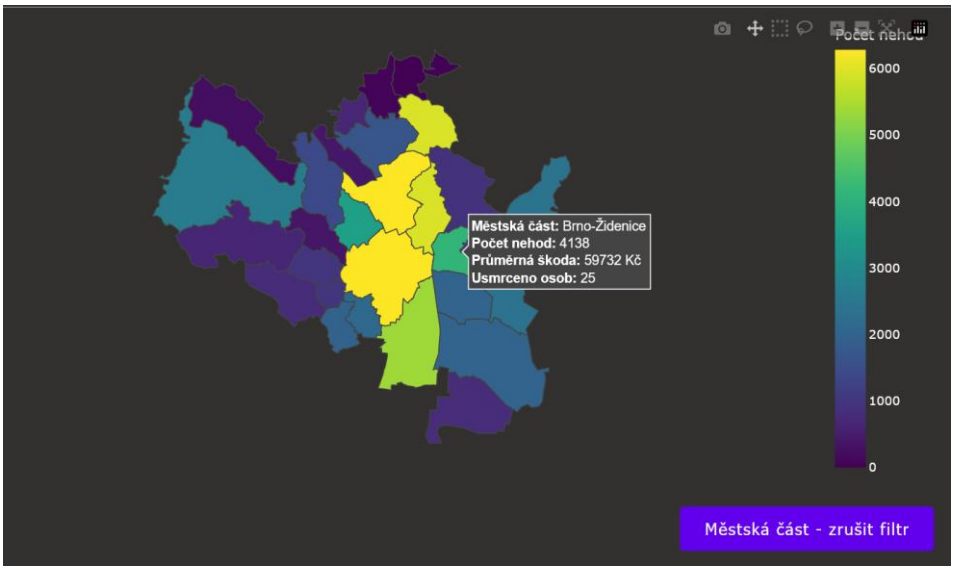

Figure 2 - Choropleth with more detailed information about a district

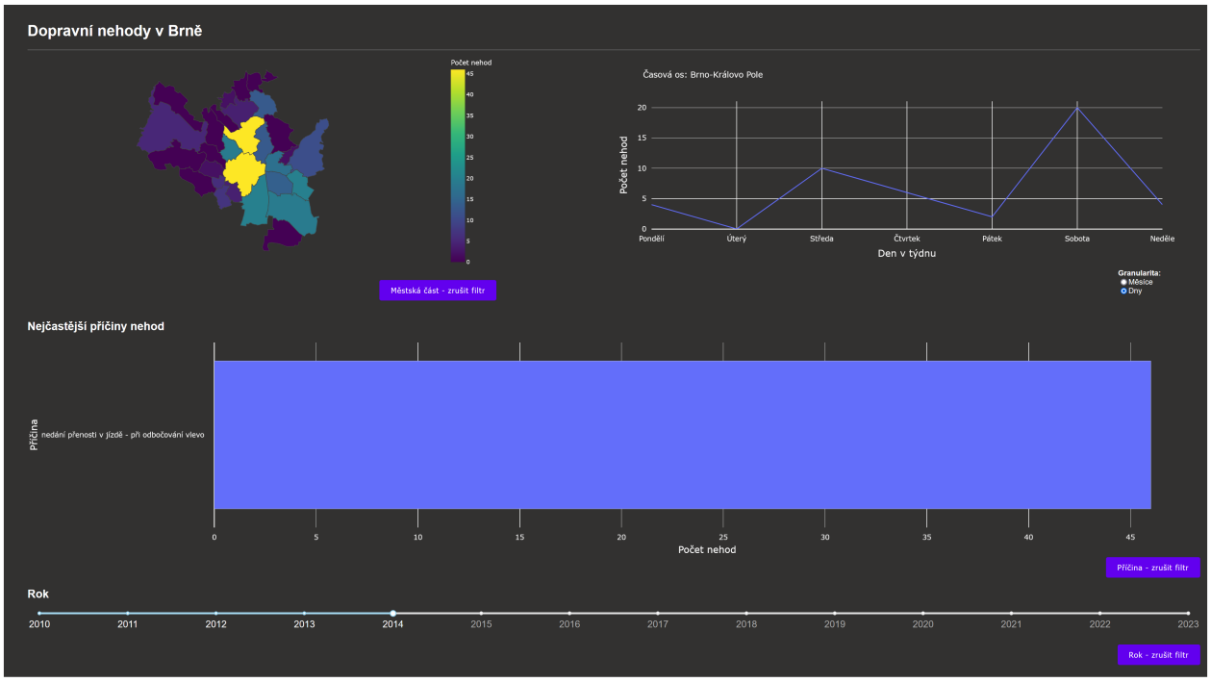

Figure 3 - Visualization when all filters are used (District - Brno-Královo pole, Reason - not yielding when turning left, Year - 2014) and timeline view by weekdays

Used technologies

I used Plotly with Dash, as I was already a bit familiar with them. I tested with a 27” and a 32” monitor, both with a resolution of 3840x2160. I also tested with a 14” monitor with a resolution of 2160x1440. I tested the visualization in the Mozilla Firefox browser.

Lessons learned

I learned that an interesting interacting visualization is a clever way to see data and allow users to not only see the precomputed results but also test his/her own hypotheses. From the programming standpoint I learned that it’s not the chart making that is problematic for me, but CSS styling and alignment :).