

Public train usage

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December 2024

Introduction

In 2022, public transportation usage in Denmark was approaching pre-COVID-19 levels. But in 2024 the trend has turned, since more and more Danes are now switching from public transportation to cars. Politicians aim to make it easier for Danes to choose public transport, but as more people abandon it, prices must rise to keep the system financially viable. There are currently no comparison options that highlights the differences in public transportation usage or availability across different regions, municipalities and stations in Denmark.

What

Data

Our data largely stems from two data sources. One originates from Rejseplanen Labs, while the other comes from passagertal.dk. The two data sources are different in the way they are made and what purpose they serve. Data from Rejseplanen Labs is a collection of data from all Danish public transit companies (busses, ferries, trains, commuter rail, light rail, and metro services). Data from passagertal.dk is largely based on data collected through observations and manual counting of passengers during their travels.

Working with the data

During our project, we realized that both datasets that formed the basis for our visualization, requires extensive processing to be meaningfully used in the visualization. This was a key reason that we decided to focus on trains operating on the Danish mainlines and S-Trains.

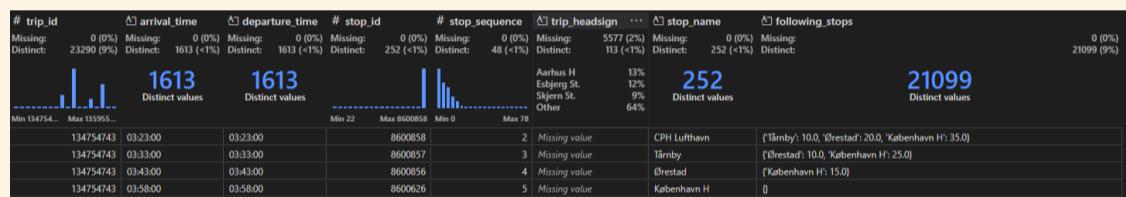


Figure 1: CSV-file with originating stations and stations that a train will visit.

Limitations

Regarding data, we observed a lack of standardization when it came to information about public transit usage. The missing standardization creates a situation where regions are looking less served by public transport, but in reality could have an excellent bus network or be served by private rail providers.

How

The encoding of the dashboard is based on some selected marks and channels and an assessment of how the available data should be arranged - as a visualization and in the dashboard. Since the available data consists of tables and spatial data, this is what the dashboard is based on. The tables are used for the bar charts, the bubble chart and to define the color scale in the choropleth map. It is also used to define the size of the bubbles in the scatter map. Future development of the dashboard might include networks; e.g. visualize the flow of trains or passengers between stations.

Marks

The choropleth map uses area as marks, the bar charts use lines and the scatter map and bubble chart use points as marks.

Channels

In the choropleth map, color luminance is used as the magnitude channel, whereas in the different levels of the bar charts, the area/length of the bars is used as the magnitude channel. On a station level, the area of the bubbles is used in both the scatter map and the bubble chart as the magnitude channel.

Conclusion

The aim of this project was to enable interested users to visually compare train usage in Denmark across regions, municipalities, and stations. The app allows the user to make an overall comparison between regions and municipalities but lacks a deeper level of comparison between stations.

The final step of The Information Seeking Mantra, "Details on demand", is not optimally implemented in the app, since it is not possible to retrieve additional information about the chosen station - apart from the hovertext.

Why

The dashboard allows the user to **compare** the use of trains across the five regions, the municipalities and stations. The choice of color scale in the map, allows the user to **discover extreme values** within a region or municipality. The darker the color, the higher use of trains. On a station level, the user is able to **explore** the accessibility from the selected station to the rest of Denmark. The more "Destination Stations" displayed in the bubble chart, the more stations can be accessed directly. A few examples of what the user might learn from the dashboard are:

- **Explore distributions:** How is the use of trains distributed across the five Danish regions?
- **Browse features:** Is it possible to drive directly by train from Esbjerg to Nyborg?
- **Discover extreme values:** Is it true that the use of trains is much higher in Region Hovedstaden than in the rest of Denmark?
- **Compare features:** Is my nearest station one of the busiest stations in the municipality?

Future Work

It would be relevant to:

- Examine the progression in the number of journeys over the years
- Include other transport options
- Add connections in the scatter map
- Incorporate a Sankey diagram to visualize connections between stations
- Improve the "Details on demand" part of the app and increase the possibility for comparison by letting the user choose what to compare.

