Wheelchair-friendly map around Pfennigparade

by **YI ZHEN CHEW** and **ULRIKE HOLFELD**

Wheelchair users face many difficulties and uncertainties every day, especially when it comes to mobility. A chat with people from Stiftung Pfennigparade has emphasized several obstacles, such as the width of sidewalks, steps and barriers that can make their life challenging. Some of them use the bicycle route option from Google Maps as a general guideline of a wheelchair-friendly route. Since there is no existing navigation solution for mobility-impaired people, developing such an application can cater to the wheelchair community.

AIM

We aimed to present a solution in the form of a web application providing accessible and up-to-date routes in Munich, focusing on the neighbourhood of the rehabilitation center, Stiftung Pfennigparade.

DATA COLLECTION

It was logistically difficult to collect a variety of route data from the people at Pfennigparade through GPS tracking devices or interview to recall taken routes. We went to Pfennigparade and tried several route tracking mobile applications, such as QField, OSMTracker and myTracks. However, the GPS was not accurate enough to track the exact routes taken. The visit was useful to obtain information about accessible streets and destinations. Hence, we decided to build a web application (Figure. 1) that stores a network of routes around the area of Pfennigparade.

We used the network analysis tool in ArcGIS Pro to obtain the shortest route for 19 destinations from Pfennigparade. In addition, wheelmap.org [1] was used to gather data on accessibility of toilets for the selected destinations. We also included website and address information in the tooltip feature (Figure. 2) on the map.

VISUALIZATION

We decided to go with a dark mode design for our website and used the Dark Gray Canvas basemap from ESRI. The routes were divided into arbitrary street segments for three time periods. They are represented as layers each showing different route networks. The layers were then overlaid on top of each other with the newest routes as the top layer.

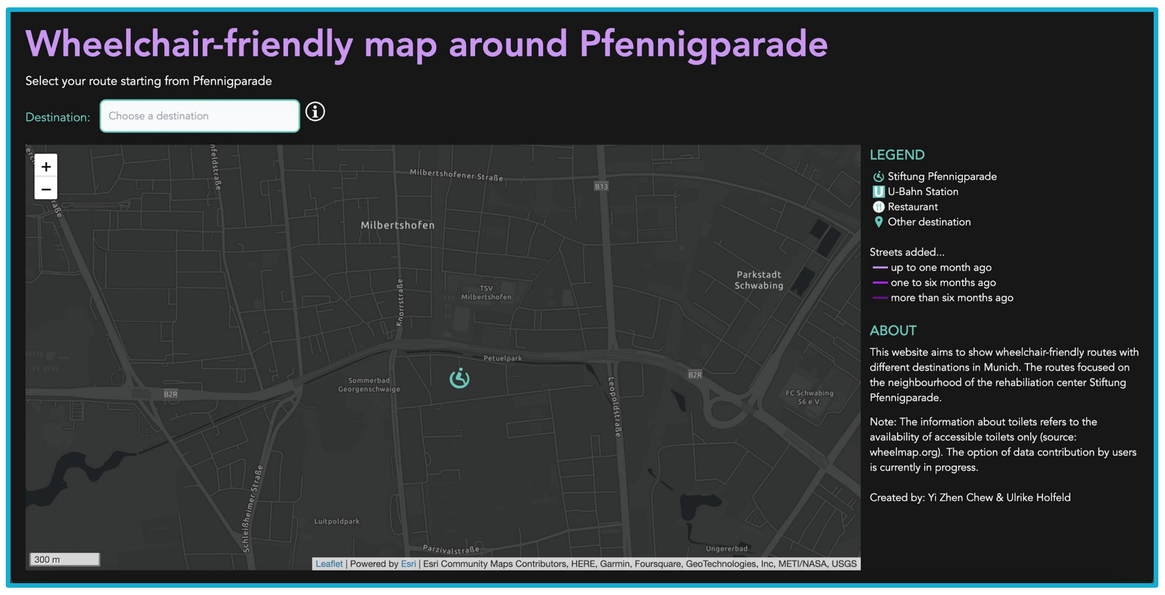

Figure. 1: Screenshot of the web application

Each segment was color-coded based on the time it was recorded. The most recent segment appears in light purple, while the oldest segment appears in dark purple. We chose three distinct time periods (one month, six months, more than six months). If the route is mainly made up of segments recorded within the past month, it is likely that the route is wheelchair-friendly and thus less likely to require detours due to obstacles. Minimal colors were used on the website, icon tooltips and routes were visualized in turquoise and purple respectively to keep it both visually pleasing and minimalistic.

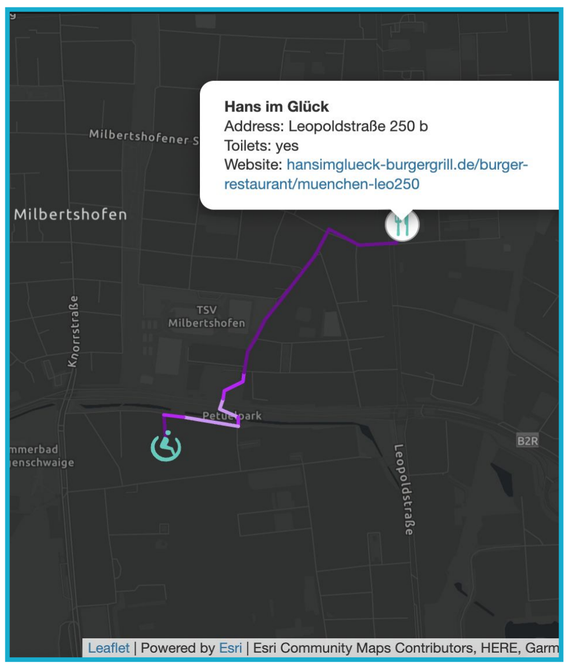

Figure.2: Exemplary route to "Hans im Glück"

IMPLEMENTATION

The web application was built using Vue Javascript. The routes and icons were converted into polyline and point GeoJSON files to be displayed on the map using Leaflet. A scale was also added to the map. The text editor, Atom, was used to edit the SVG icon files. A search text input and drop-down menu is provided for users to easily navigate to one of 19 destinations from Pfennigparade. There is an "information" button on how to use the web application. We also added a legend as well as further details about our project.

FUTURE WORK

The street labels and icons should have zoom level dependent scaling. This project can be further developed into a citizen science project involving the wheelchair community. Users can contribute voluntarily to gather more data, record new routes, and update existing routes. This growing network of routes can provide more start to end destinations. A database is required to store such data. It can also include the functionality to add comments and images about the destination.

IMPRINT

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Technical University of Munich

Yi Zhen Chew

Ulrike Holfeld

SUPERVISOR

Juliane Cron, M.Sc.

Chair of Cartography and Visual Analytics

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LINK

https://pfennigparade-navigation.web.app/

REFERENCES

[1] www.wheelmap.org (Retrieved 20.01.2023)

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