

Visualization and Analysis of GPX-Tracks in a web-based Application

The goal of the project “Mobile GIS and Location Based Services” was to gather geospatial data for example manually or with an API, visualize it in a web-based application and implement some sort of analysis, animation or a special design.

Introduction and Goals

The datasets gathered for this project are GPX-Tracks. GPS Exchange Format (GPX) is an XML schema for storing GPS data for software applications that describes waypoints, tracks and routes.

The goal for the web-based application was to visualize GPX-Tracks in a leaflet map and differentiate between different means of transport like pedestrian, bike, train and car. Furthermore, the distance and average speed of each track should be viewable in a popup and the track should be visualized in different colors for different speeds.

Realization

To realize those goals, the first step was to record GPX-Tracks for different means of transport. The GPX-Tracks were recorded with the smartphone apps *GPS Logger* and *OsmAnd*.

Afterwards, the GPX-Tracks were imported into a leaflet map using the plugin *Leaflet GPX*. The differentiation between the different means of transport is visualized by using different start and end icons (Figure 1).



Figure 1: Icons for the different means of transport

To start the analysis of the tracks, the distance and average speed per track were calculated using the plugin. The calculated distance and average speed can be viewed on the map in a popup like it is shown in figure 2.

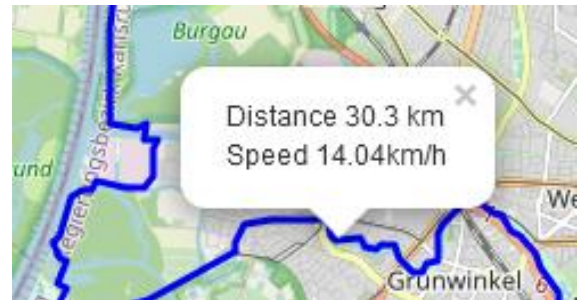


Figure 2: Popup in the leaflet map showing the distance and average speed per track

To visualize the speed with different colors, the GPX-Tracks were converted into XML to get an easier access to the data. The different colors are achieved by using the plugin *Leaflet hotline*. *Leaflet hotline* is a plugin for drawing colored gradients along polylines to visualize values along a track. Only one track can be shown at once.

Result

The result for a recorded walk can be seen in figure 3.



Figure 3: Example of a pedestrian track where the speed is visualized in different colors and the distance and average speed can be viewed in a popup

Used Plugins

Iosphere GmbH 2021: Leaflet hotline

Petazzoni, M. 2021: Leaflet-GPX

Useful tool for teamwork: <https://replit.com/>