Hochschule Ulm

Masterproject

Geocoding and Routing with Pelias and Valhalla

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Chapter 1

Introduction

1 Introduction

The purpose if this paper is to document the progress of the "junior team" during the first half of the data science project in form of a technical report. Moreover, this report should allow readers to gain an understanding of the topics covered in the data science project as well as be able to reproduce and extend the developed and utilized solutions. The covered tasks during the first half of the project can be categorized into three main areas:

1. Infrastructure

   - Set up a virtual machine (Ubuntu Linux)
   - Install and configure Pelias and Elasticsearch
   - Install and evaluate different routing engines

2. Data acquisition and preparation

   - Gather postcode data of European countries from different sources
   - Merge postcode data into a single data source of Pelias and Elasticsearch

3. Geocodoing and Routing

   - Test geocoding with Pelias based on precalculated two-digit postcode centroids

- Test routing between two-digit postcode centroids wit a routing engine

The main requirements were to evaluate Pelias as an open source geocoding service and as an alternative to Nominatim as well as to realize routing from one two-digit postcode to another. In order to achieve this it was necessary to build a database of postcodes and create a map of Europe based on data provided by Openstreetmaps, Whosonfirst, Geonames and Postcode-info. Furthermore, routing engines as an alternative to Graphhopper had to be evaluated. Last but not least an adequate documentation on how these requirements can be fulfilled and the outcome reproduced had to be written.

Chapter 2

Routing Engines

1 Routing Engines

The Pelias API and Pelias services are only suited for the purpose of geocoding and reverse geocoding. Geocoding retrieves coordinates (latitude and longitude) for a given address or postode and reverse geocoding finds the nearest known address or postcode for a provided address. In order to find the shortest or fastest route between two given addresses Pelias has to be used in conjunction with a routing engine. The two addresses are fed into Pelias and Pelias provides coordinates for them which are then used as input values for finding a route from one coordinate to the other using a routing engine and the metrics inside the routing engine.

1.1 Comparison of Routing Engines

Part of this project was to research and evaluate possible routing engines for Pelias. Internet research conducted by the junior them revealed a comparison of open source routing engines which was done by one of the members of Openstreetmaps. The following two figure illustrate the required computing time (in ms) to calculate a route depending on the length of the route (in km)[1]:
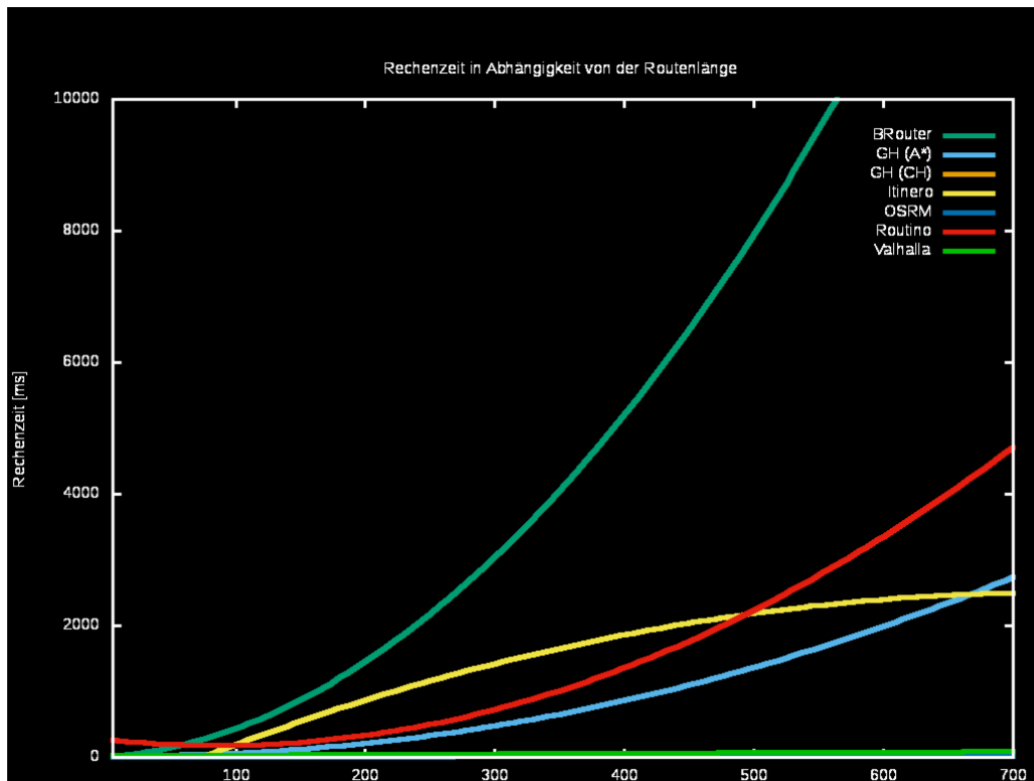
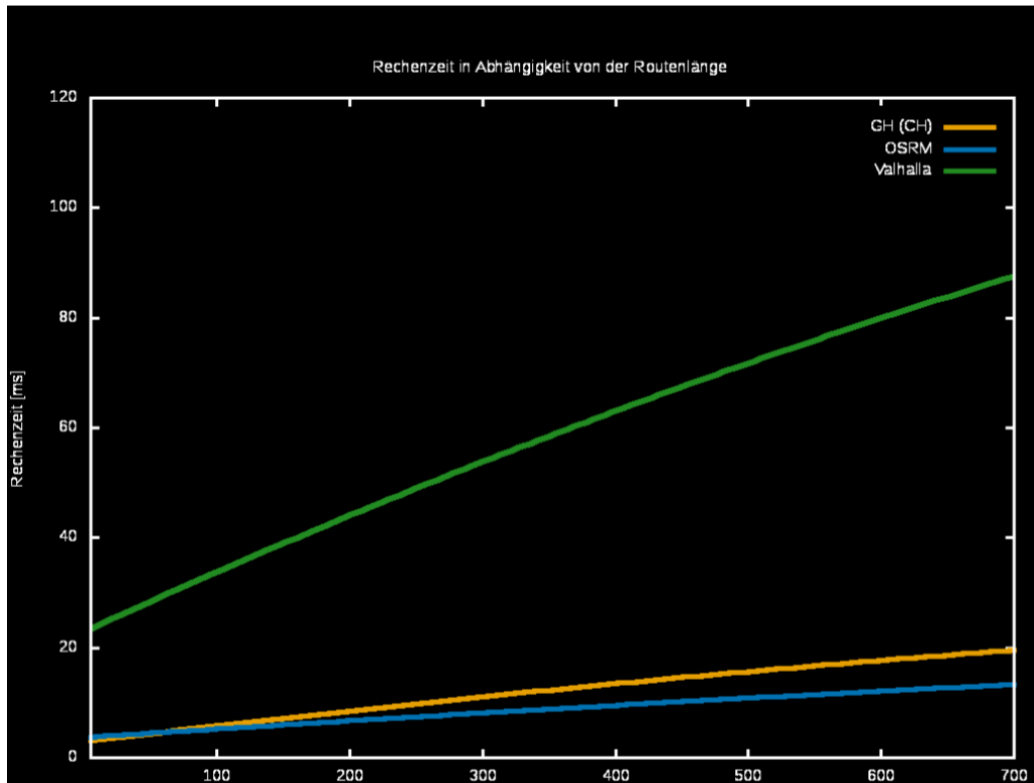Figure 1.1: Comparison of Routing Engines 1

Figure 1.2: Comparison of Routing Engines 1

Bibliography

[1] Frederik Ramm. Routing Engines für OpenStreetMap. Technical report, Geofabrik GmbH, Karlsruhe, Germany, 2017.

B Illustration Directory

C List of Abbreviations