

Fachpraktikum/LabCourse

Algorithms for OpenStreetMap Data

FMI/Algorithmics

Goal

The goal of this Fapra is to get acquainted with the data of OpenStreetMap (OSM) and to implement some fundamental algorithms. Understanding the structure of the OSM data is the first step to create systems like route planners, geographic information systems, or other location based services.

Typical Tasks

- Learn about the OSM data format, especially nodes, ways, relations
- extract the necessary data from osm.pbf files
- represent large amounts of data efficiently in memory
- implement algorithms that work on massive data sets
- learn how to debug, benchmark, profile your code

This Term's Task

In this term, the task is to implement a GeoCoder/Reverse GeoCoder¹ based on OpenStreet-Map data. This involves the design and implementation of an efficient substring search data structure as well as fast ranking strategies. You are expected to provide your own implementations of the core algorithms. Your implementation must be able to deal with continent-sized data.

Requirements

- Knowledge of a programming language suitable for dealing with massive data sets (preferably but not necessarily Go, Rust, C/C++ or Java)
- Interest in geo data and graph algorithms
- Knowledge/Interest in performance optimization

¹https://en.wikipedia.org/wiki/Address_geocoding