

# Introduction to OpenStreetMap

Spatial Data Analysis and Simulation modelling,  
2020, Dr. Zhiyong Wang



# Outline

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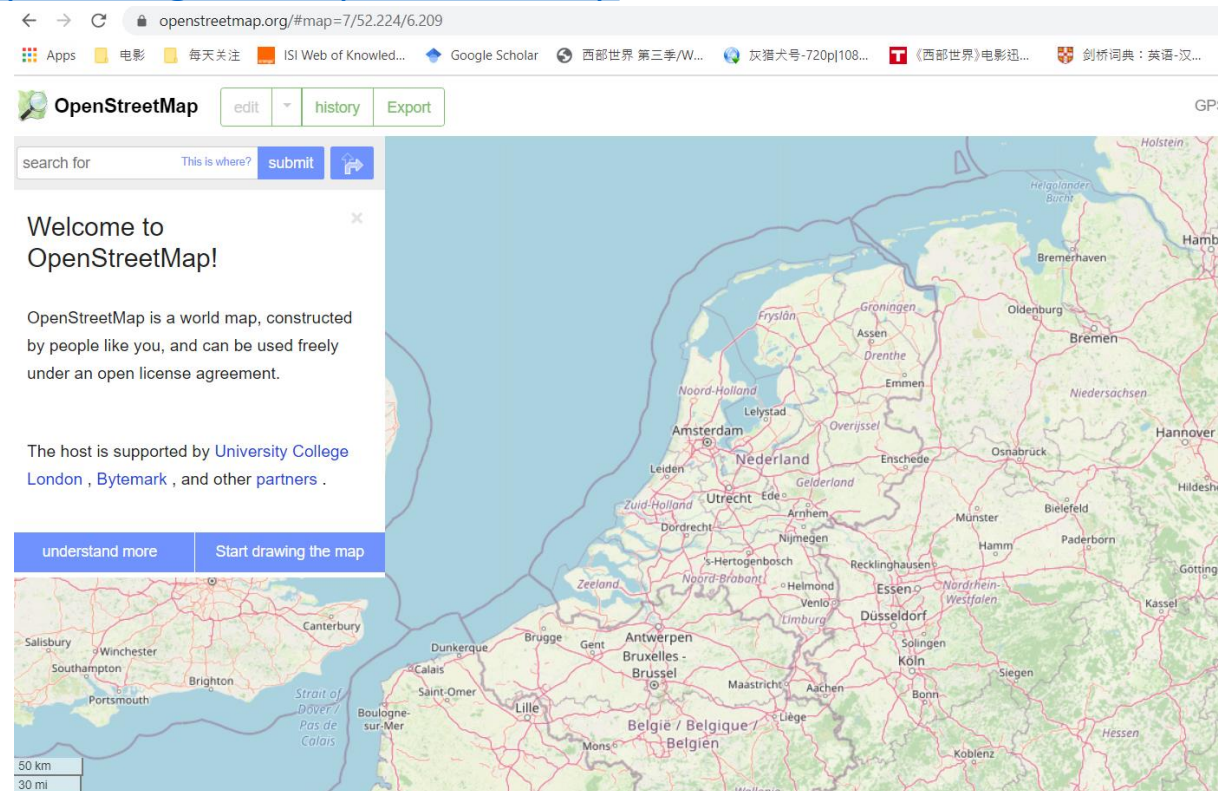
- Introduction
- OSM data model
- Applications of OSM



# What is OpenStreetMap?

OpenStreetMap (OSM) is a collaborative project to create a free editable map of the world. The geodata underlying the map is considered the primary output of the project.

from <https://en.wikipedia.org/wiki/OpenStreetMap>



# The idea behind OSM

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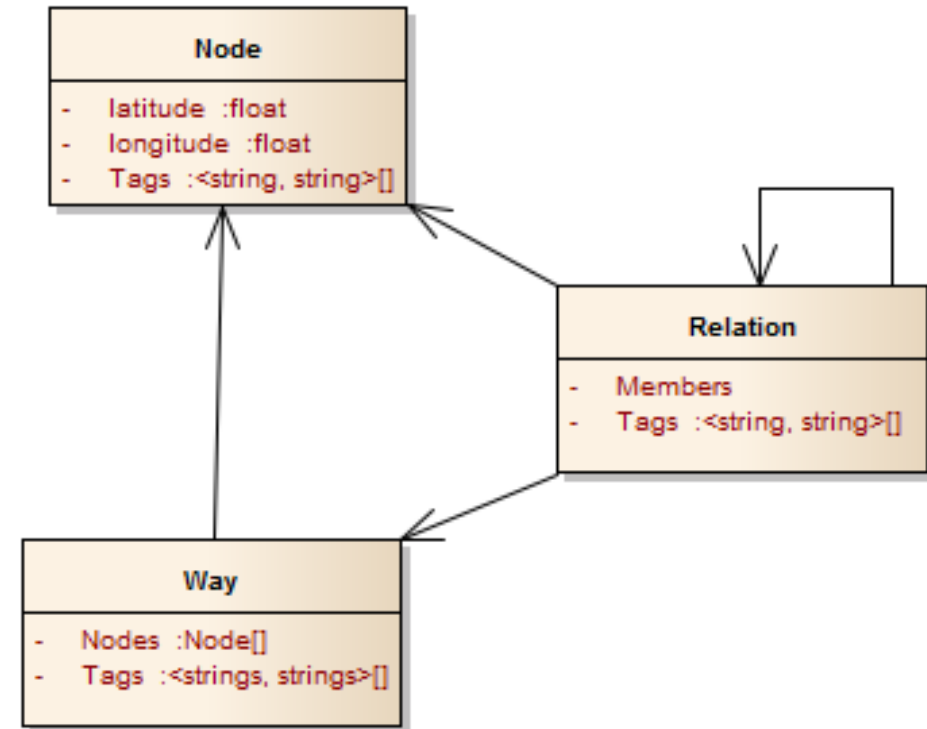
Idea (same as Wikipedia): A large number of individuals contributing together will tend to produce data with higher quality.



# OSM Data model

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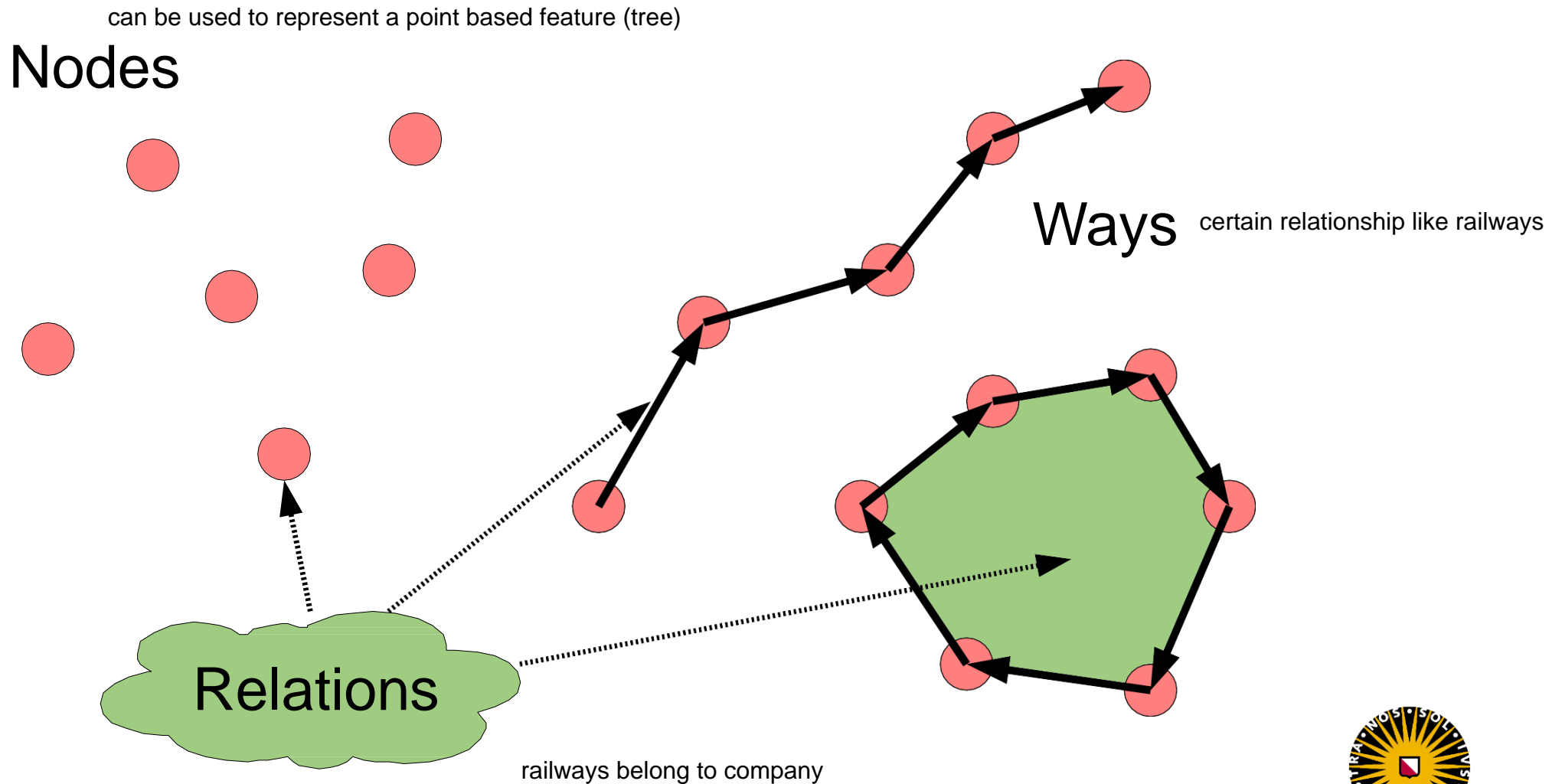
- Nodes
- Ways
- Relations
- Tags



can be nested =  
can be a member of  
another relation

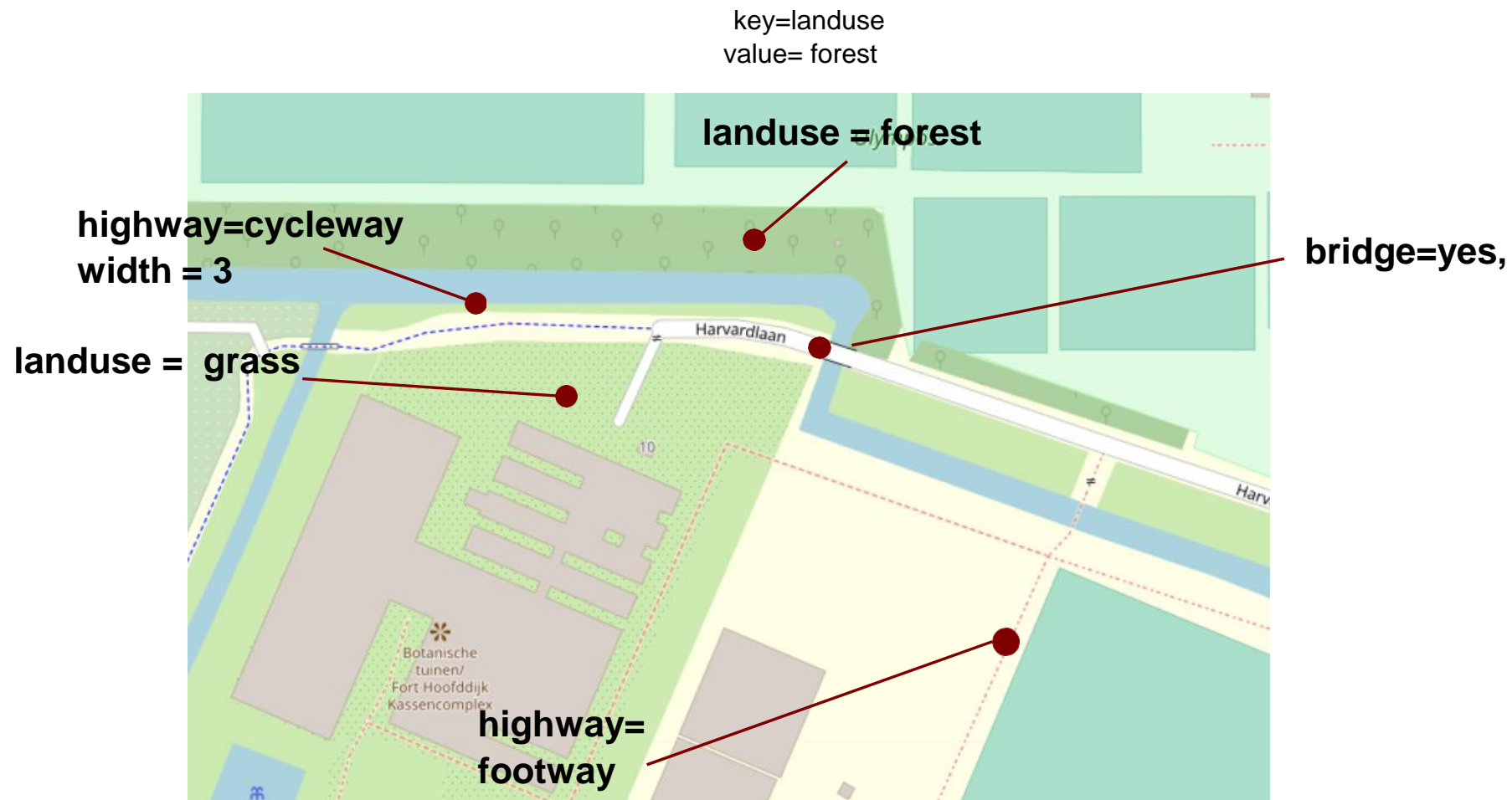


# OSM Data model - nodes, ways, and relations



# OSM Data model - tags

two elements: key and value



Reference: [https://wiki.openstreetmap.org/wiki/Map\\_Features](https://wiki.openstreetmap.org/wiki/Map_Features)





structured SML dataset

# An example of OSM data

```
<?xml version="1.0" encoding="UTF-8"?>
<osm version="0.6" generator="CGImap 0.8.3 (1876111 spike-06.openstreetmap.org)" copyright="OpenStreetMap and contributors" attribution="h
  <bounds minlat="52.1073900" minlon="5.1589700" maxlat="52.1076900" maxlon="5.1597000"/>
  <node id="3043054595" visible="true" timestamp="2014-08-26T09:54:05Z" user="rivw_BAG" uid="1989843" lat="52.1074380" lon="5.1591631"/>
  <node id="3043054598" visible="true" timestamp="2014-08-26T09:54:05Z" user="rivw_BAG" uid="1989843" lat="52.1074482" lon="5.1591565"/>
  <node id="3043054601" visible="true" timestamp="2014-08-26T09:54:05Z" user="rivw_BAG" uid="1989843" lat="52.1074603" lon="5.1592555"/>
  <node id="3043054606" visible="true" timestamp="2014-08-26T09:54:05Z" user="rivw_BAG" uid="1989843" lat="52.1074833" lon="5.1591339"/>
  <node id="3043054614" visible="true" timestamp="2014-08-26T09:54:05Z" user="rivw_BAG" uid="1989843" lat="52.1075057" lon="5.1592264"/>
  <way id="300209929" visible="true" timestamp="2014-08-26T09:56:33Z" user="rivw_BAG" uid="1989843">
    <nd ref="3043054598"/>
    <nd ref="3043054606"/>
    <nd ref="3043054614"/>
    <nd ref="3043054601"/>
    <nd ref="3043054595"/>
    <nd ref="3043054598"/>
    <tag k="building" v="bunker"/> feature represents building
    <tag k="historic:period" v="1939 - 1956"/>
    <tag k="material" v="concrete"/>
    <tag k="military:abandoned" v="shelter"/>
    <tag k="old_name" v="Groepsschuilplaats (NHW)"/>
    <tag k="operator" v="dutch"/>
    <tag k="ref:bag" v="344100000129143"/> tags
    <tag k="source" v="BAG"/>
    <tag k="source:date" v="2014-08-25"/>
    <tag k="start_date" v="1920"/>
    <tag k="type" v="P"/>
  </way>
</osm>
```

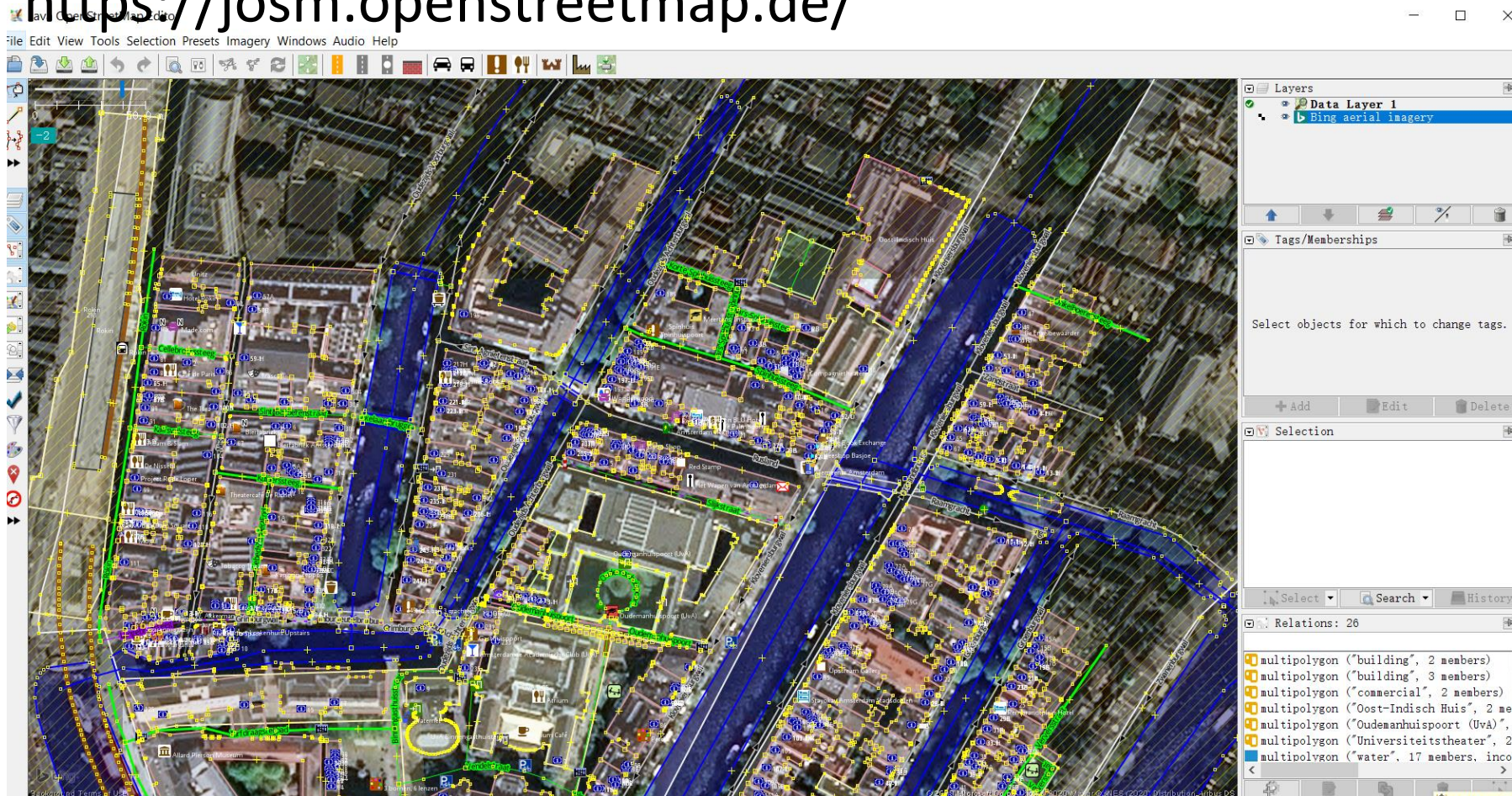




# OSM editor

Java Based OpenStreetMap Editor, available from  
<https://josm.openstreetmap.de/>

one can add to the street map  
data on top of the satellite image





# Applications

## Disaster management



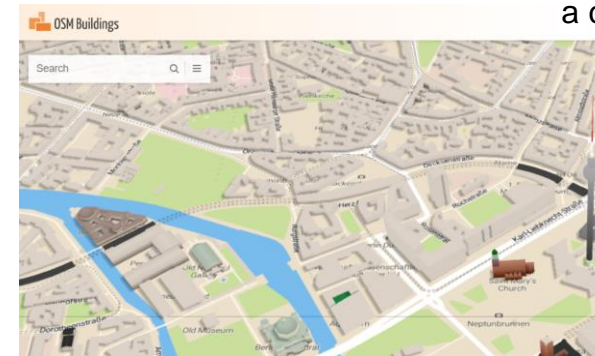
disaster mapping

## Map production



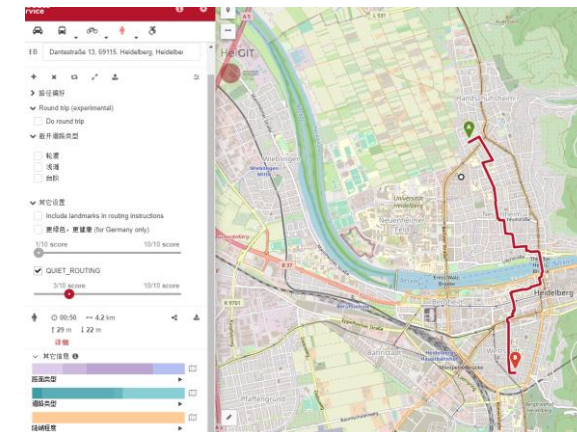
## City modeling

one can use 3D data to model a city and buildings better



## Routing

large amount of geodata on streetwork networks



# Reference

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- OSM wiki [https://wiki.openstreetmap.org/wiki/Main\\_Page](https://wiki.openstreetmap.org/wiki/Main_Page)
- List of OSM-based services  
[https://wiki.openstreetmap.org/wiki/List\\_of\\_OSM-based\\_services](https://wiki.openstreetmap.org/wiki/List_of_OSM-based_services)
- Goodchild MF. Citizens as sensors: the world of volunteered geography. GeoJournal. 2007 Aug 1;69(4):211-21.
- Map features [https://wiki.openstreetmap.org/wiki/Map\\_Features](https://wiki.openstreetmap.org/wiki/Map_Features)



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# Questions (Q&A session)

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