Comprehensive OpenStreetMap History Data Analyses
- for and with the OSM community

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1. OhSoMe: OpenStreetMap

2. OHsome: OpenStreetMap History (something)

3. Ohsome: sounds just „awesome“
Workshop NEXT SESSION!

Exploring OSM's history using the "ohsome" data analysis platform

14:00h    S.1.5
OSM History Data Analysis

• What can we learn from the History?
  • Development of the data
    → DATA QUALITY
  • Development of the users
    → COMMUNITY DYNAMICS
  • Development of spatial/thematic (sub-)communities
OSM History Data Analysis

• The Challenge?
  • Make the whole data treasure available to the public
    • Queries of arbitrary temporal and spatial resolution
    • No pre-filtering / no clean-up
  • BIG DATA
    • High performance (parallel and distributed)
    • Flexible (run it on local PC or on computing cluster)
    • Usability (Easy to use for different target groups)
      • Different API Levels
Towards Using the Potential of OpenStreetMap History for Disaster Activation Monitoring

Proceedings of the 15th ISCRAM Conference – Rochester, NY, USA May 2018
Examples: Data Quality

Auer et al. 2018
Examples: Data Quality

- **hwy=**
  - Length [m]:
    - 0.3302 to 1.2551

- **highway=road**
  - % of all hwys:
    - 2.79 to 12.90

- **hwy with name**
  - % of all hwys:
    - 5.92 to 18.77

Auer et al. 2018
Examples: Data Quality

Auer et al. 2018
Examples: Community Dynamics

Relative Size of Mapper Groups

- Italy
- NW
- Milan

maximum number of total mapping days

0% 15% 30% 45% 60% 75%
Examples: Community Dynamics

Normalized Mapping Days by Mapper Groups

- Italy
- NW
- Milan

maximum number of total mapping days

0% 4% 8% 12% 16%
Can I use it?

- ohsome API
- OSHDB API
- OSHDB*

* OSHDB = OpenStreetmap History Database
Can I use it?

• OSHDB API: Current version 0.4 available on Github
  https://github.com/giscience/oshdb

• ohsome API: https://api.ohsome.org
  (global coverage coming soon!)

• KLL Nepal Dashboard

Workshop NOW!
14:00h        S.1.5
OSHDBH2 db = new OSHDBH2("./data/oshdb/italy.oshdb");

SortedMap<OSHDBTimestamp, Number> result = OSMEntitySnapshotView.on(db)
    .areaOfInterest(new OSHDBBoundingBox(9.1308, 45.4239, 9.263, 45.5022))
    .osmTag("highway")
    .osmType(OSMType.WAY)
    .aggregateByTimestamp()
    .map(snapshot -> Geo.lengthOf(snapshot.getGeometry()))
    .sum();

result.forEach((timestamp, value) ->
    System.out.println(timestamp + "\t" + value));
https://api.ohsome.org

Web API documentation with example requests
Webapp using ohsome API: Nepal-Dashboard

https://ohsome.org/apps/kll-dashboard-preview/
Webapp using ohsome API: Nepal-Dashboard
Examples: Community Dynamics

Relative Size of Mapper Groups

- Italy
- NW
- Milan

maximum number of total edits

29.07.2018
Examples: Community Dynamics

Proportion of Edits by Mapper Groups

- Italy
- N/W
- Milan

Maximum number of total edits:
- 100
- 200
- 400
- 800
- 1600
- 3200
- 6400
- 12800
- 25600
- 51200
- 102400
- 204800
- 409600
- 819200
- >819200
Grid-Partitionierung der Welt in gleich große Zellen

OSHWayGridCell enthält OSHEntity Objekte in einem räumlichen Index

OSHEntity enthält OSMEntity Objekte

id = 1234 type = WAY

OSM
timestamp = n
version = 1
tags = [building=yes]
nodes = [3, 2, 1]

OSM
timestamp = n -1
version = 2
tags = [building=yes, addr:housenumber=42]
nodes = [3, 2, 1]

...
Grid-Partitionierung der Welt
in gleich große Zellen

OSHWayGridCell enthält
OSHEntity Objekte in einem räumlichen Index

OSHEntity enthält
OSMEntity Objekte

Keytables
0 = building
1 = highway
2 = addr:housenumber
...

Valuetables
(0, 0) = yes
(0, 1) = residential
(2, 0) = 2
...

OSH = OSM
id = 1234             type = WAY
timestamp = n - 1
version = 2
tags = [1, 5]
nodes = [3, 2, 1]

OSH = OSM
id = 1234             type = WAY
timestamp = n
version = 1
tags = [1]
nodes = [3, 2, 1]

member ids =
tag ids =

1 = [0, 6]
2 = [2, 4]

OSH = OSM
id = 1234             type = WAY
timestamp = n - 1
version = 2
tags = [1, 5]
nodes = [3, 2, 1]