

GEOSPATIAL DATA ANALYSIS – QUO VADIS?

CODE-Jahrestagung, München

Anita Graser

 @underdarkGIS



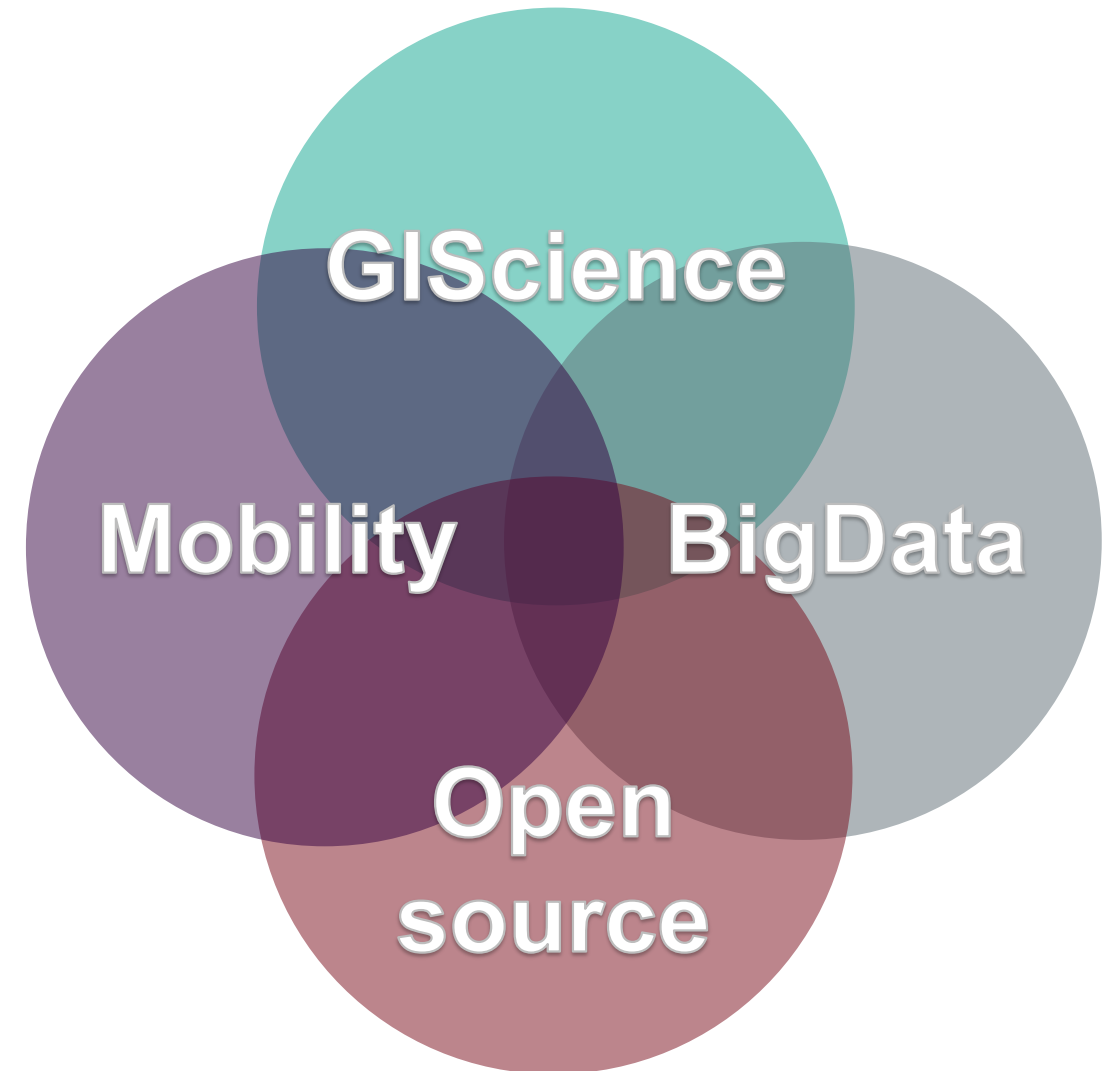
ABOUT

Anita Graser

Scientist @ AIT Austrian Institute of Technology

- QGIS user since 2008
- MSc in Geomatics 2010
- QGIS Project Steering Committee since 2013
- OSGeo Director 2015-17
- Moderator on GIS.StackExchange.com
- Author of „Learning QGIS“ (1st ed 2013), „QGIS Map Design“ (1st ed 2016) & „QGIS 2 Cookbook“ (2016)

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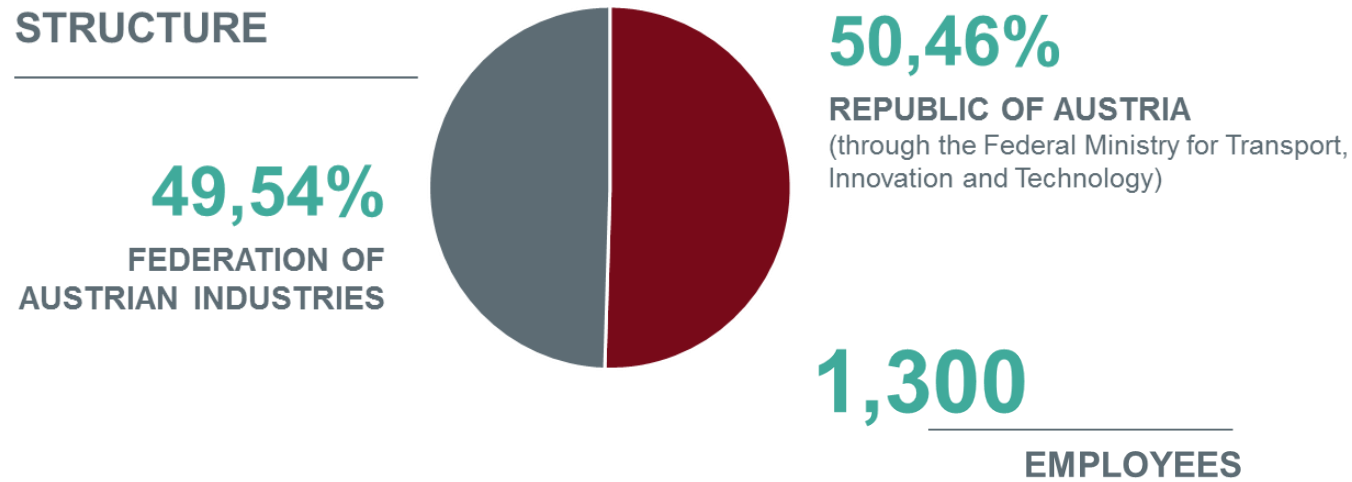


SELECTED TALKS 2018/19...

- Keynote at FOSSGIS 2019, Dresden, Germany.
- Keynote at QGIS User Group Meeting Mexico (remote).
- Keynote at FOSS4G Korea, Seoul, South Korea.
- Invited talk at Vienna Data Science Group, Knowledgefeed, Vienna, Austria.
- Invited talk at Open Government Plattform Wien, Vienna, Austria.
- Invited talk at GI-Forum, University of Muenster, Germany.
- Invited talk at New York GIS Association (webinar).
- Workshop at Netzwerktreffen des DFG-Forschungsnetzwerks “Digitale Geographien”, TU Wien, Vienna, Austria.

ABOUT – AIT

OWNERSHIP STRUCTURE

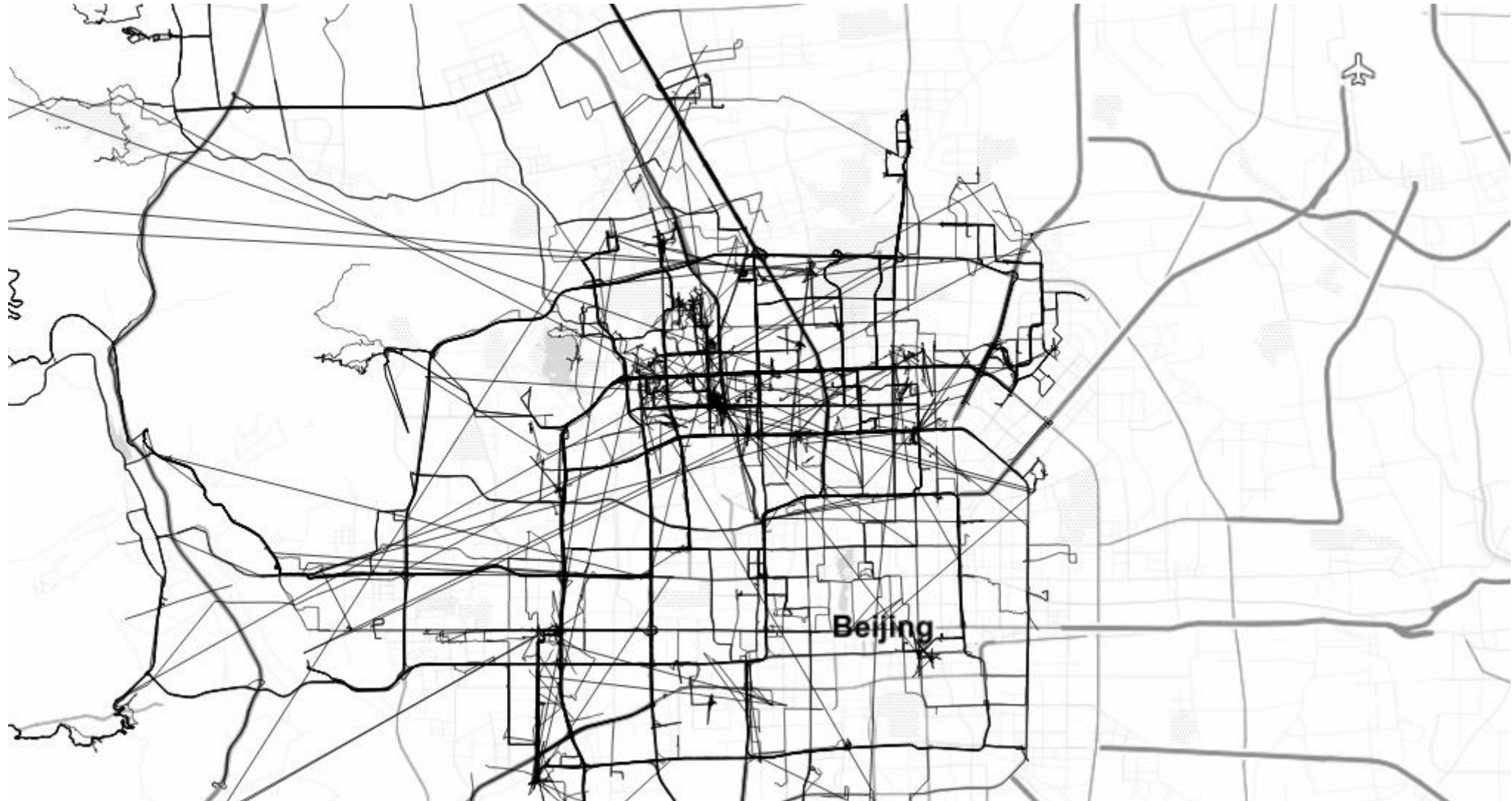


Energy	Health & Bioresources	Digital Safety & Security	Vision, Automation & Control
Mobility Systems	Low-Emission Transport	Technology Experience	Innovation Systems & Policy

MOBILITY SYSTEMS



MOVEMENT DATA ANALYSIS



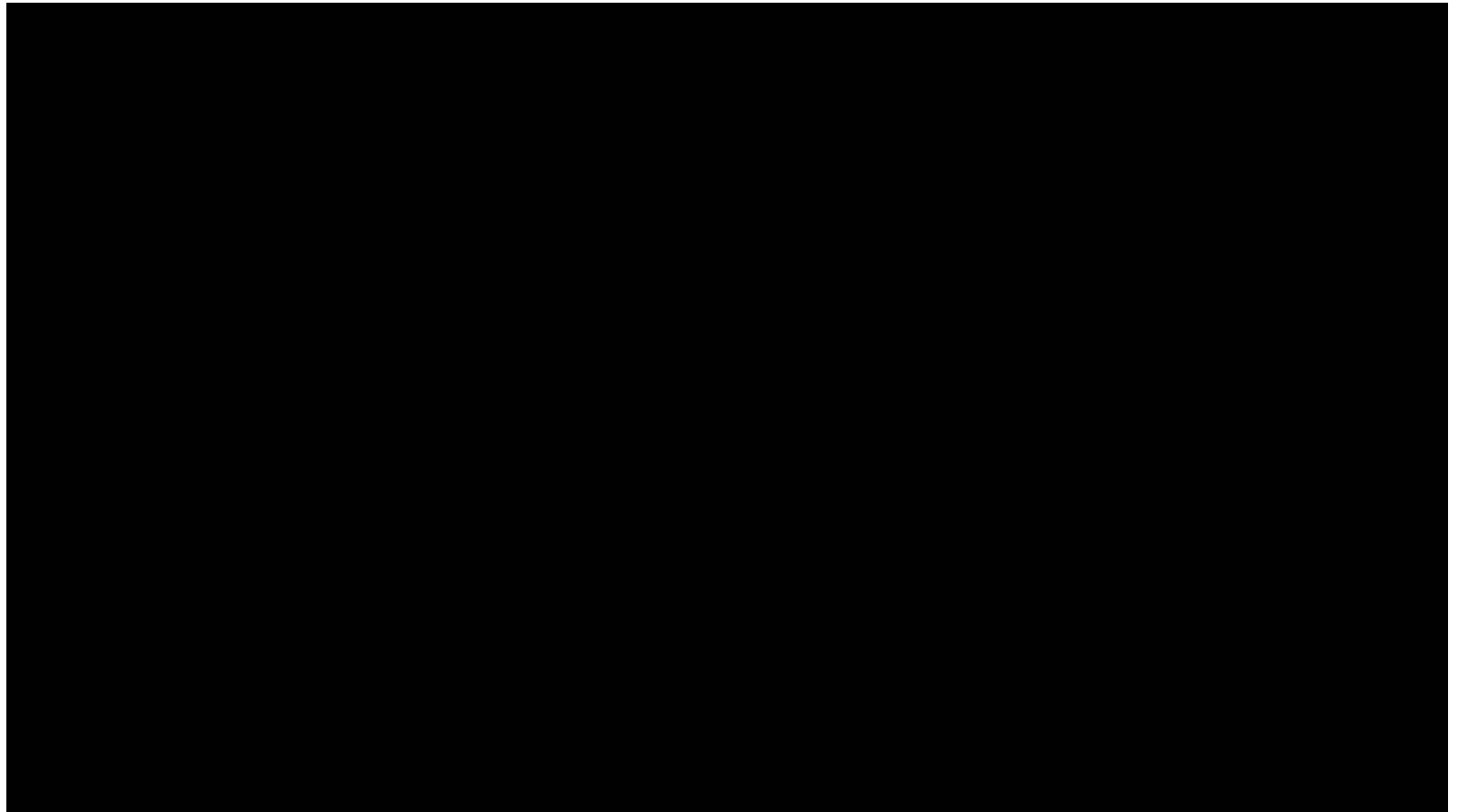
MASSIVE HISTORIC MOVEMENT DATA

#1 Taxis in Vienna

~ 3000 vehicles

~ 1 million GPS positions
per day, starting in 2005

➔ Over **3.5 billion** records



ANALYZING MASSIVE MOVEMENT DATA

#2 Automatic Identification System (AIS) Data

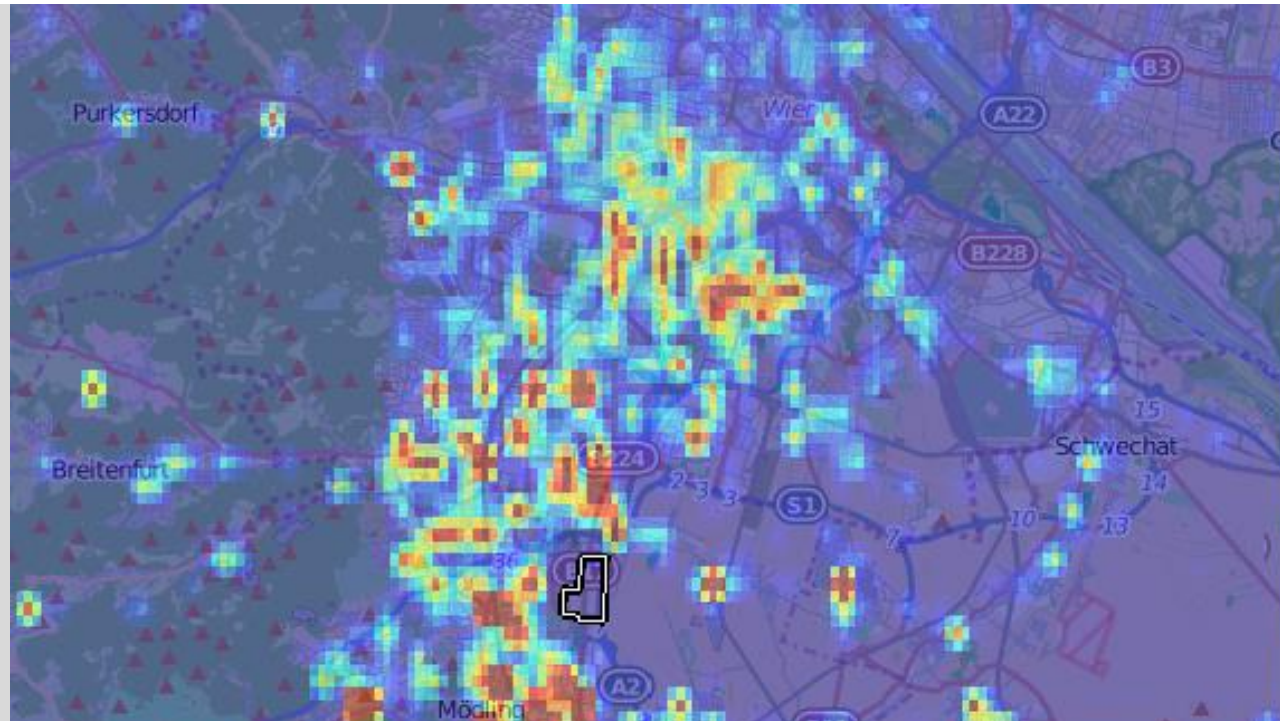
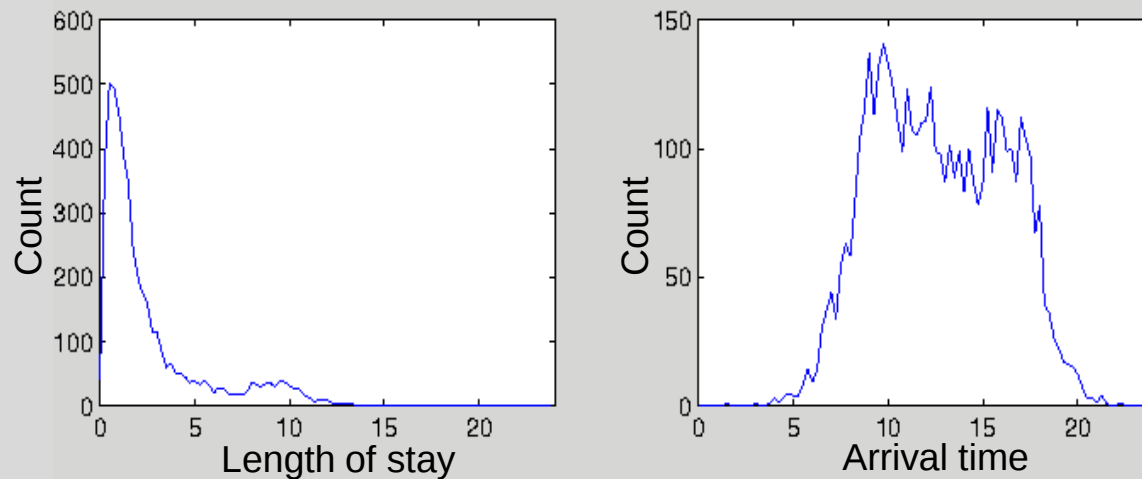
Global & mandatory

500 million records per day

ANALYZING MASSIVE MOVEMENT DATA

#3 Mobile phone network data

~ 3 billion records per day (one big Austrian provider)



LOOKING FOR SCALABLE SOLUTIONS



GeoSpark

<https://github.com/DataSystemsLab/GeoSpark>

**STARK - Spatio-
Temporal Data
Analytics on Spark**
<https://github.com/dbis-ilm/stark>

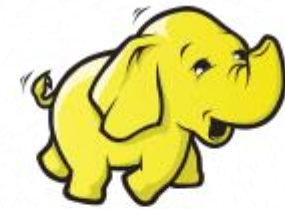
LocationSpark

<https://github.com/merlintang/SpatialSpark>

SpatialSpark

<https://github.com/syoumer/SpatialSpark>

PySpark & Geopandas
<https://github.com/sabman/PySparkGeoAnalysis>

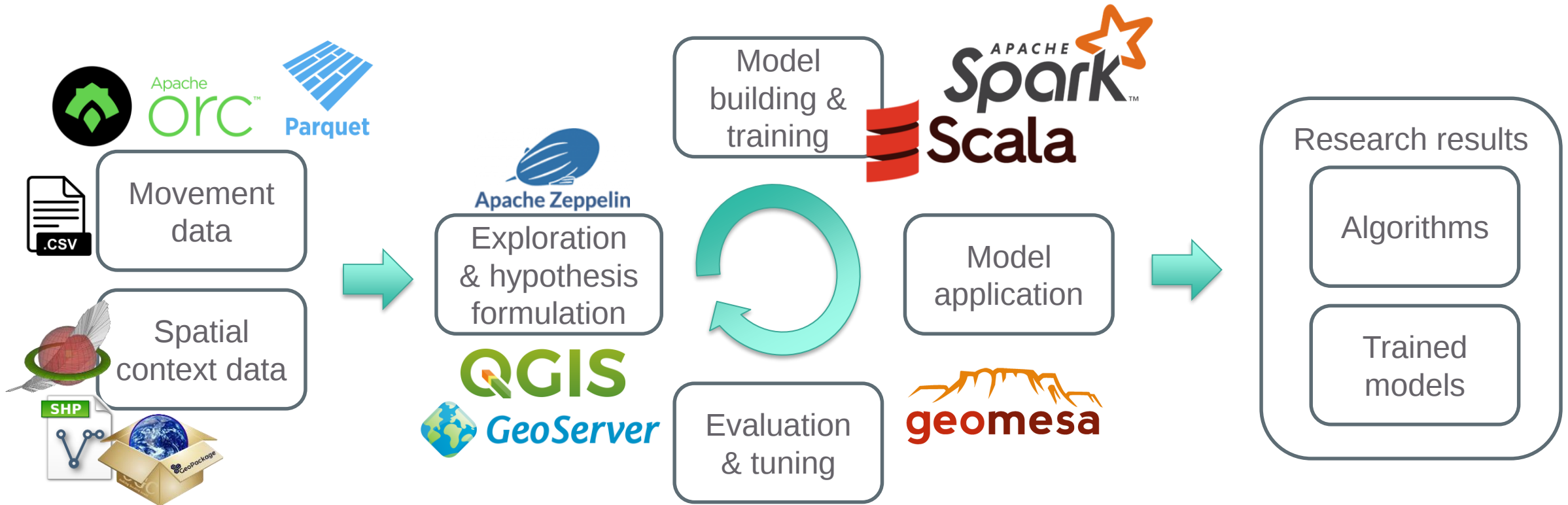


**ESRI GIS Tools
for Hadoop**
<https://github.com/Esri/gis-tools-for-hadoop>

OPENSOURCE & MATURE



BIG DATA ANALYSIS @ AIT MOBILITY



BIG DATA ANALYSIS @ AIT MOBILITY

For example:

Detection of unusual ship movements

OLD: CSV → JAVA → PostGIS

2 weeks over night

NEW: GeoMesa → Spark → GeoMesa

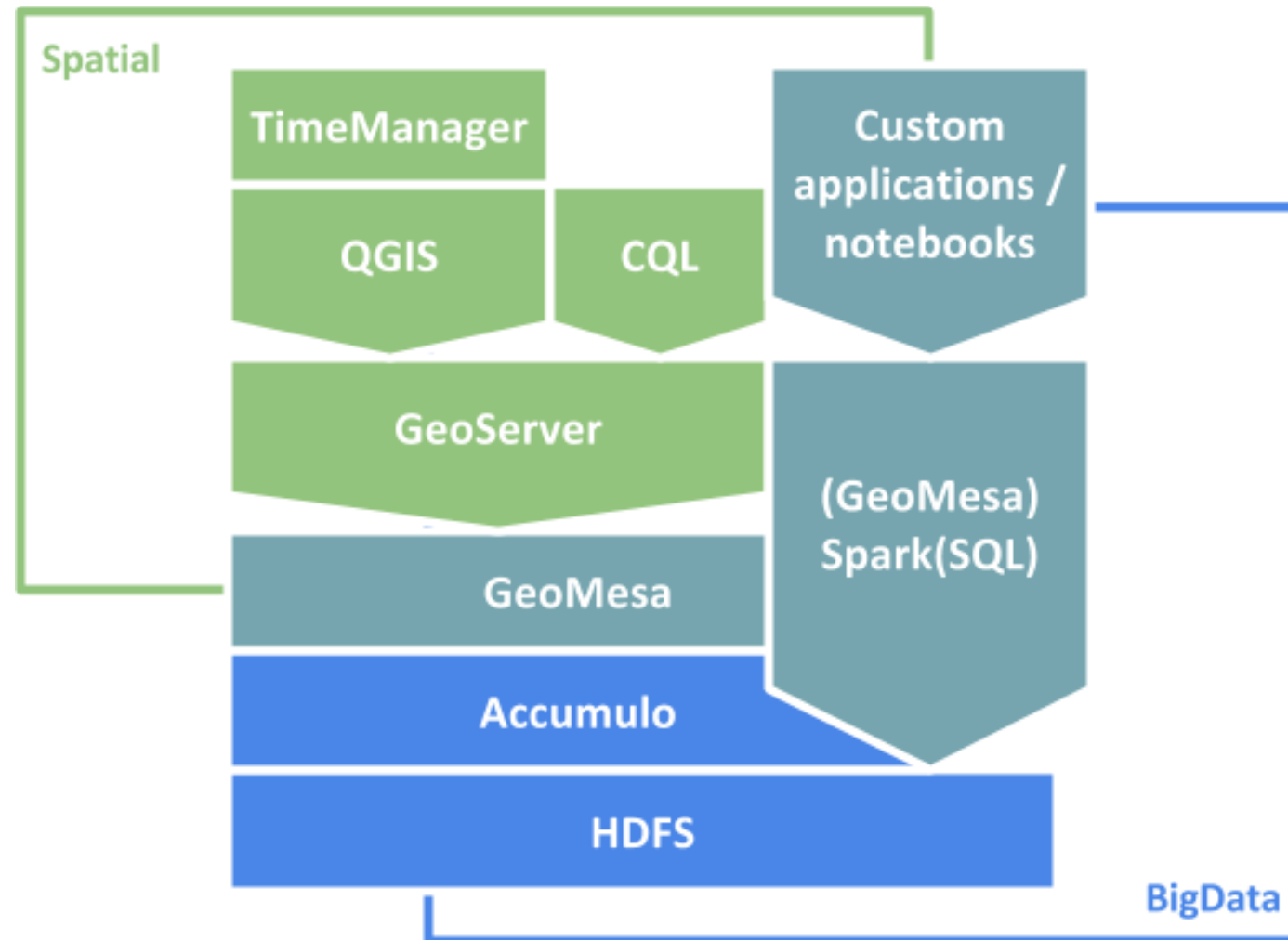
4 weeks in 30 min

Research results

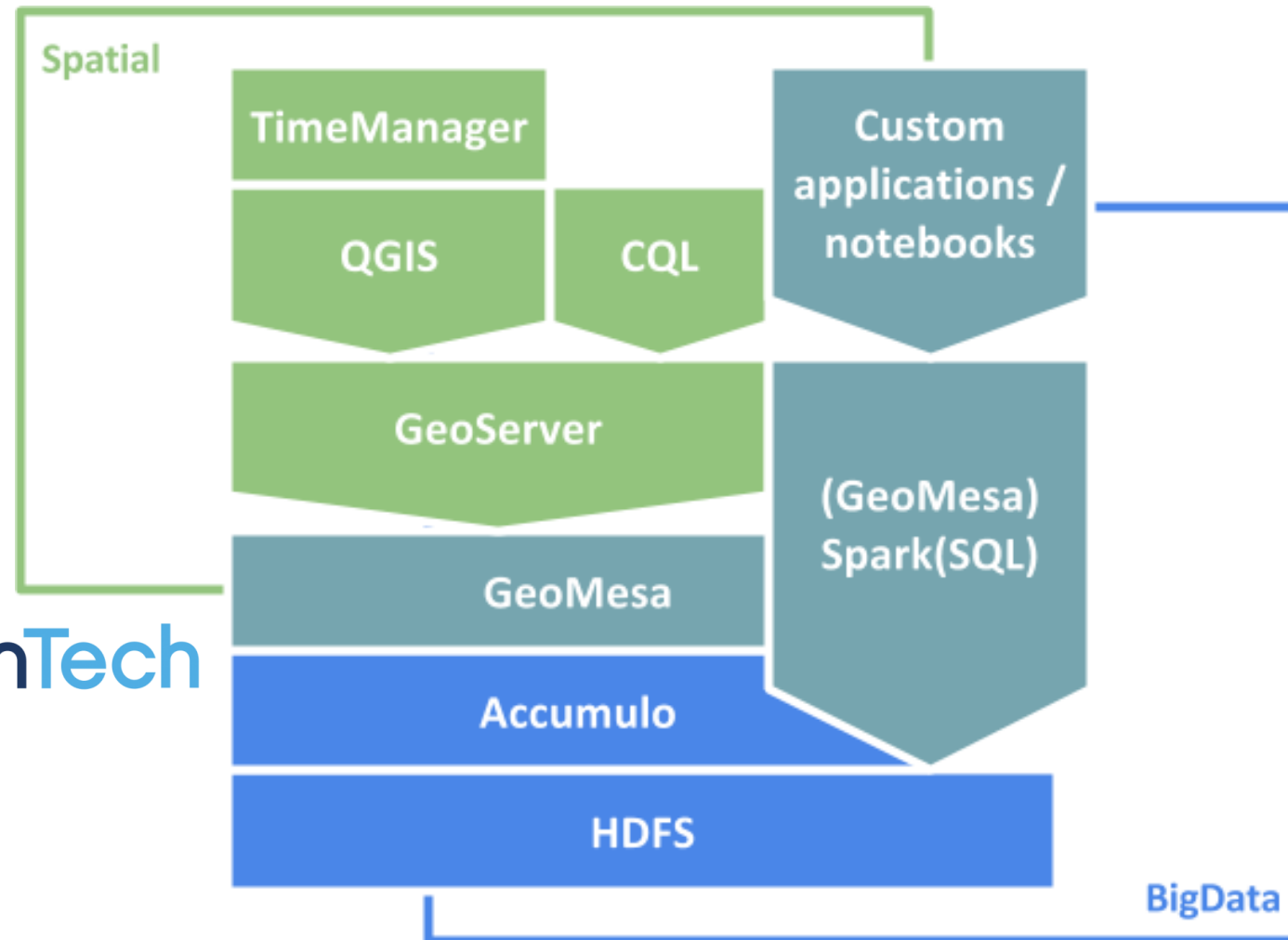
Algorithms

Trained
models

BIG DATA STACK @ AIT MOBILITY



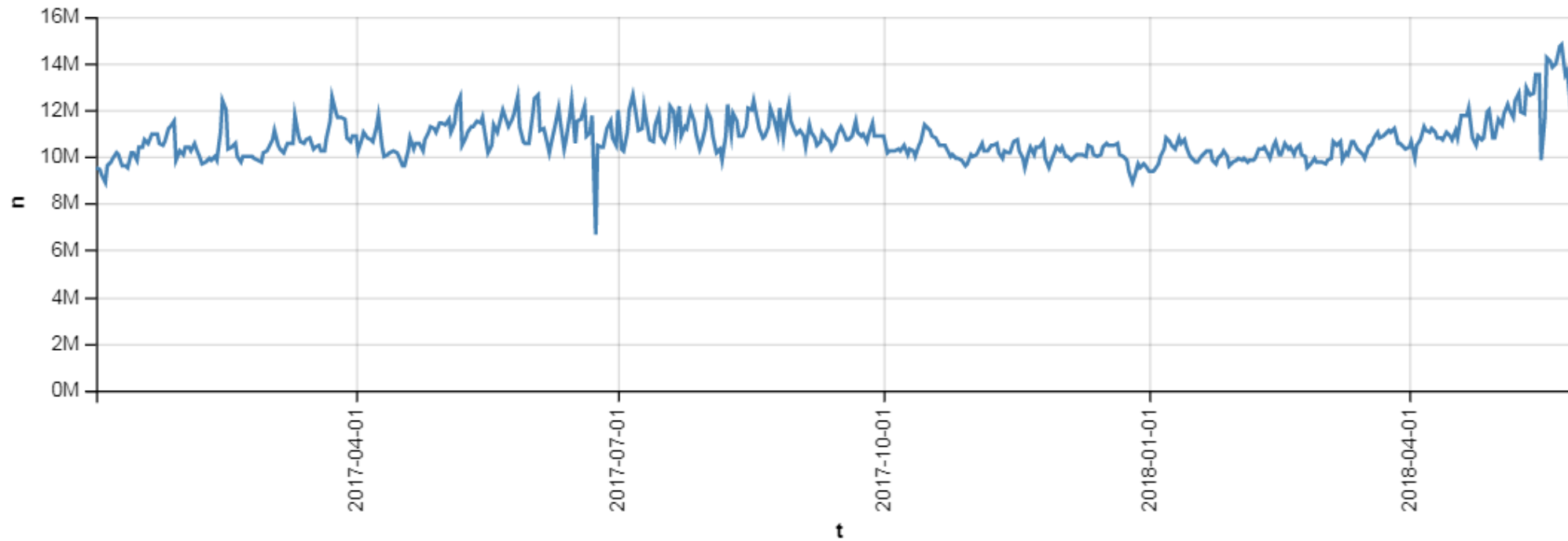
BIG DATA STACK @ AIT MOBILITY



BigData



BIG DATA STORAGE & ACCESS EXAMPLE



geomesa2_0_1.aisdk_aisdk_id_v3

ONLINE

243

0

7

geomesa2_0_1.aisdk_aisdk_z2_v4

ONLINE

458

0

6.75B

geomesa2_0_1.aisdk_aisdk_z3_v5

ONLINE

567

0

6.89B

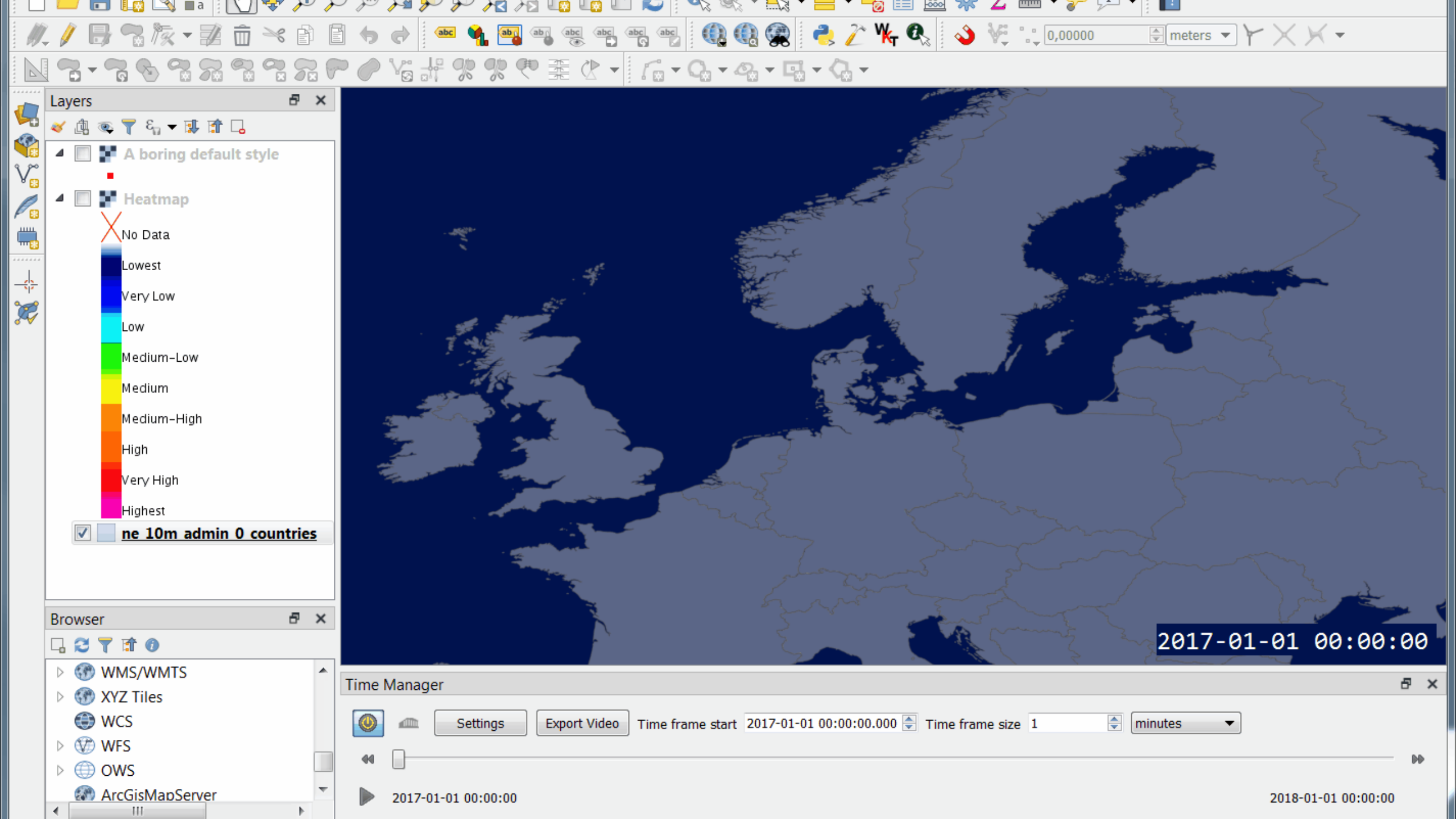
geomesa2_0_1.aisdk_queries

ONLINE

1

0

1.59M



QUO VADIS?

GIS needs to become better at
exploration & modeling
of
time / movement / processes
using
large datasets

OPEN SOURCE!

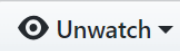
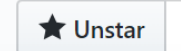


[Pull requests](#)
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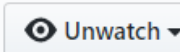
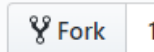


[dts-ait / qgis-edge-bundling](#)

 4
  40
  6

[Code](#)
[Issues](#)

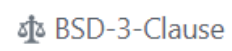
[anitagraser / movingpandas](#)

 6
  42
  1

[Code](#)
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Implementation of Trajectory classes and functions built on top of GeoPandas

[Manage topics](#)

 86 commits
  1 branch
  0 releases
  3 contributors
  BSD-3-Clause

Branch: master ▼

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anitagraser Merge pull request #19 from JaviBecerra/master

Latest commit 305d673 3 hours ago

demo	move ipynb	3 months ago
sandbox	Update predict_samples_sts.py	4 months ago
tests	Refactor split function	22 days ago

Branch: master ▼

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