



Near real-time vario-scale maps with history

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Accomplishments of the current STW project

More insights in:

- Improved automated map generalization for obtaining vario-scale data — *processing*
 - Linear networks (Road areas → lines)
 - Large datasets as input (Fieldtree approach)
 - Client-server communication (progressive data retrieval)
 - Line and building simplification
- From tGAP structure (2D space + scale) to first steps with explicit 3D encoding (space scale cube) — *storage*
- Viewer (using graphic hardware, OpenGL) + initial user tests – *dissemination*

Idea for a follow up project

Problem description

- However, . . . world is not static
- Push: With more sensors and cheaper surveying technology higher frequency of updates possible than ever before
- Pull: Demand for more up-to-date topographic information
- So, changes need to be reflected in geographic vario-scale database: update, store, disseminate
 - Change in base data means change in derived levels of detail (partial re-generalization)
 - Changes need to be stored (and be accessible): We want to keep historic data available
 - Visualize and analyze: Not only current version, but also: history with arbitrary level of detail

Idea for a follow up project

Use cases

- Update vario-scale data and generate near real-time current and historic maps
- Visualize/analyze how city changes over time
- ...

Idea for a follow up project

Focus

Conceptual/Logical/Physical data models (including Spatial/Temporal indexing)

How to store this information: **4 initial data models**

Partition of vector objects that represent space-time-scale dimensions:

- 2D geometry (space) + separate ranges for scale (s_{min} and s_{max}) and time (t_{min} and t_{max})
- 3D geometry
 - (space-scale) + separate range for time (t_{min} and t_{max})
 - (space-time) + separate range for scale (s_{min} and s_{max})
- 4D geometry (space-scale-time), e.g. as boundary representation (points as 4-tuples: $[x, y, t, s]$), CSG objects, simplicial / cell complexes, polytopes, ...

Possible test data sets

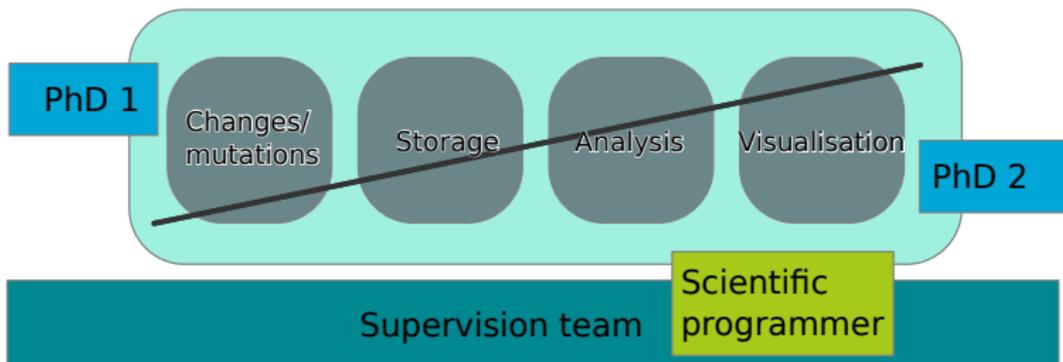
Public geographic data we are considering

- Top10NL: 1:10k, 4 years back in time, yearly
- Basisregistratie Grootschalige Topografie: 1:1k, only most up-to-date data
- Rijkswaterstaat: DTB droog, DTB nat
- Centraal Bureau voor de Statistiek: statistics, neighbourhood regions per year, 10 years back in time
- OpenStreetMap: Volunteered Geographic Information: minutely, hourly, daily, weekly changesets
- ...

Possible research team

Team composition

- Scientific programmer: Common platform with 4D data model
- PhD candidate 1: Focus on ingestion of changes
- PhD candidate 2: Focus on analysis/visualization of changes



Possible contributions

How can you help?

- Additional use cases
- Supply of (real time) test data (e.g. non-public change/update feeds)
- Recommendation letter
- Be part of next user committee
- Supply of useful software (licenses) and/or hardware (e.g. cloud based infrastructure?)
- Work together / PhD research visit (put in effort in man-months)
- Financial contribution

Thank you for your attention

- Questions?
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