

# 5. Geographically exploring Twitter hot-spots

Geographical data are typically visualized using various information layers that are displayed over a map. Interactive exploration by zooming and panning actions needs real-time re-calculation. For layers containing aggregated information (such as counts and sums) derived from voluminous data sets, such real-time exploration is impossible using standard database technology. Calculations require too much time.

We have developed database technology that accurately aggregates data so that they can geographically be explored in real time. The technology is a plug-in to common open source technology. We demonstrate our technology by the exploration of tweeting hot-spots based on twenty to thirty million geo-tagged tweets from The Netherlands and the UK.



### ICT science question

A common operation in calculating with multidimensional data is the computation of aggregates. In order to obtain exact results with high performance from high data volumes, we face the challenge of finding clever ways of pre-calculating data as much as possible. An additional technical challenge is to develop technology that fits into standard open source database and GIS software.

### Application

In geo data visualization, the ability to quickly develop new information layers is important. Although many solutions exist, there is a niche: the combination of visualizing aggregation information, interactive data exploration in real-time, Big Data, calculating exact numbers instead of approximations, and doing so with common open source technology. Our technology for the first time integrates all these features.

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www.utwente.nl/ewi/db/research/currentprojects/Timetrails/

COMMIT/ project

TimeTrails Spatiotemporal Data Warehouses for Trajectory Exploitation

Our research partners are the companies Arcadis and Nspyre. They both have struggled with this combination of requirements in many of their projects.

### Alternative Application

Our database index technology is not specific to geographical data. It can be used with all types of multidimensional data. Visualization in business intelligence or eScience can also benefit from it.

### Nice to know

The DCMR Milieudienst Rijnmond has used our technology to investigate whether people send tweets about unpleasant odours as a possible signal of danger. This turns out not to be the case, probably because people think that nobody reads the tweets anyway. But if people have the idea that their complaining tweets are read, then tweets might be much more convenient than the reporting of unpleasant odours by telephone.



Interactively explore data on a map: showcase tweeting hot-spots.



Interactively explore data on a map: showcase tweeting hot-spots and the dialogue with the public through social media.



Interactively explore data on a map: supporting the dialogue with the public through social media using common open source technology only.



Database indexing of precise aggregations on all offsets and zoom levels necessary for interactive exploration of spatio-temporal and other multidimensional data.

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