Crowdsourcing –
Using Social Media for Rapid Damage Assessment

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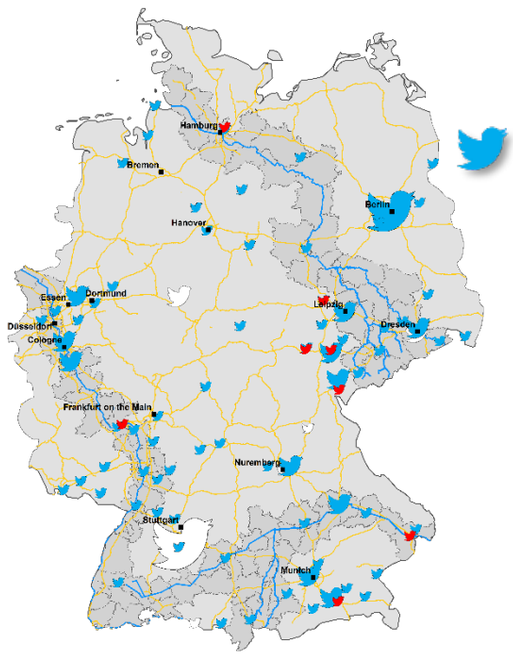
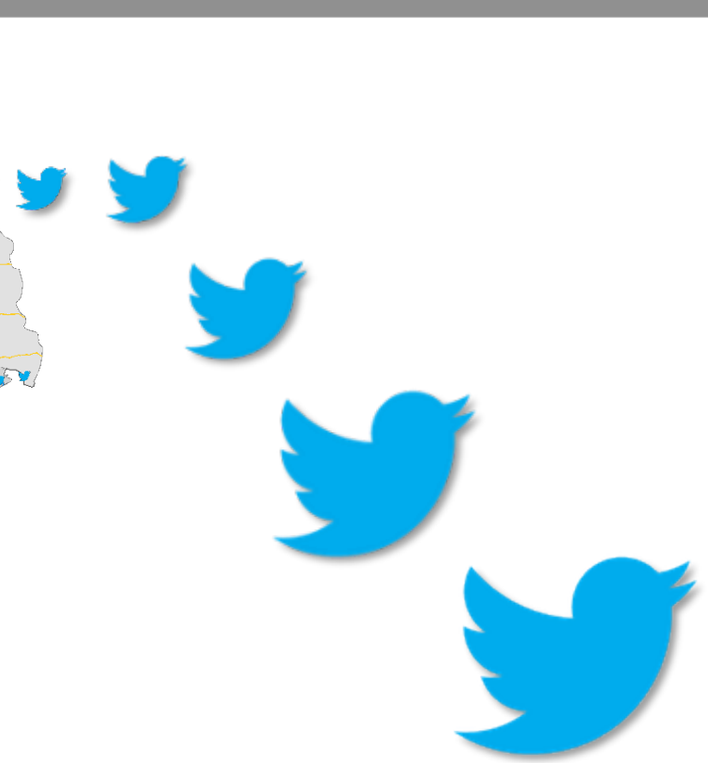
CENTER FOR DISASTER MANAGEMENT AND RISK REDUCTION TECHNOLOGY





KIT – Universität des Landes Baden-Württemberg und nationales Forschungszentrum in der Helmholtz-Gemeinschaft

Helmholtz-Centre Potsdam
GFZ German Research Centre for Geosciences

Data Source

- social media (implemented)
  - Flickr
  - Twitter
- social media (potential)
  - google+, instagram, ...
  - text and image platforms with an api
- background information
  - OSM (maps)
  - GeoNames (gazetteer)
- verification
  - USGS, GEOFON

Data Input

- images from Twitter and Flickr
  - on demand collection of batch data (Flickr)
- tweets filtered by domain specific search terms
  - infrastructure: power, outage, interruption, downtime → global scale
- tweets filtered by location (bounding-box)
  - number varies strongly for each region → local scale
- tweets filtered by time

- generally
  - **uncertain** in quality/trustworthiness and quantity
  - **temporally** continuous
  - **hazard types**
    - Earthquake, Flood, Volcano, Tsunami, Cyclone, Hail/Thunder, Blizzard, Tornado, Drought/Heat wave

Output

operational

- intensity map (shape, raster, vector) → within minutes
- georeferenced Photos (shape, image) → within seconds
- general information on event & related tweets (json, shape) → within seconds
- e-mail alert (e-mail) → within minutes

Output Data

- relevant classified data
- make information accessible for interpretation by domain experts

intended (future)

- automatic classified tweet content as tables (shape, csv) → within minutes
  - damage reports, felt intensity, cries for help

Project Links

CEDIM

established

- rapid flood event analysis in Germany (Kai Schröter)
  - provision of photos for derivation of water depths → internal
- post-disaster damage mapping (Silke Eggert)
  - reports to estimate a impact and magnitude → internal
- internal (Dittrich, Fohringer, Lucas)
  - task assignment, data sharing, mutual help during FDAs, etc.

potential

- loss assessment for earthquakes (James Daniell)
  - photos of damaged infrastructure for intensity estimation → internal
- transportation interruptions (Tina Bessel)
  - eyewitness observations of disrupted infrastructure → internal
- James Daniell (Armand Vervaek, earthquake-report.com)
  - TO: E-Mail alert for earthquakes → internal + limited external
  - FROM: pre-alerts/alerts based on IP-localization AND experience reports
- any CEDIM Member → “subscription“ to e-mail alert for specific disaster type

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Motivation

- During a natural disaster, latest information are crucial to enable a fast response of local authorities and disaster relief organization
- Exploiting social media can significantly complement information given by modern sensors

Goal

- Identify relevant information from observations disseminated via social media

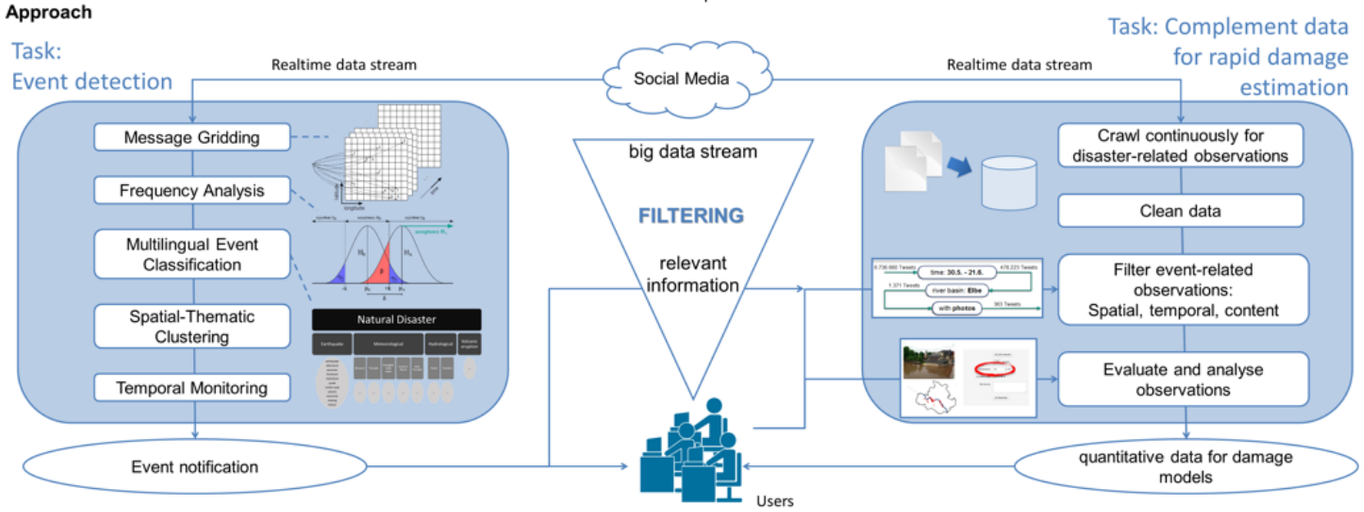
Challenges

- Few relevant observations in large data stream
- Heterogeneous data
- Data often only temporarily available

Result

- Effective multilevel filtering of observations from social media enhances detection of disaster events and supports rapid damage estimation by providing additional quantitative data

Approach



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