A Flood Monitoring Tool for Urban Areas Using Satellite, Weather and Social Data

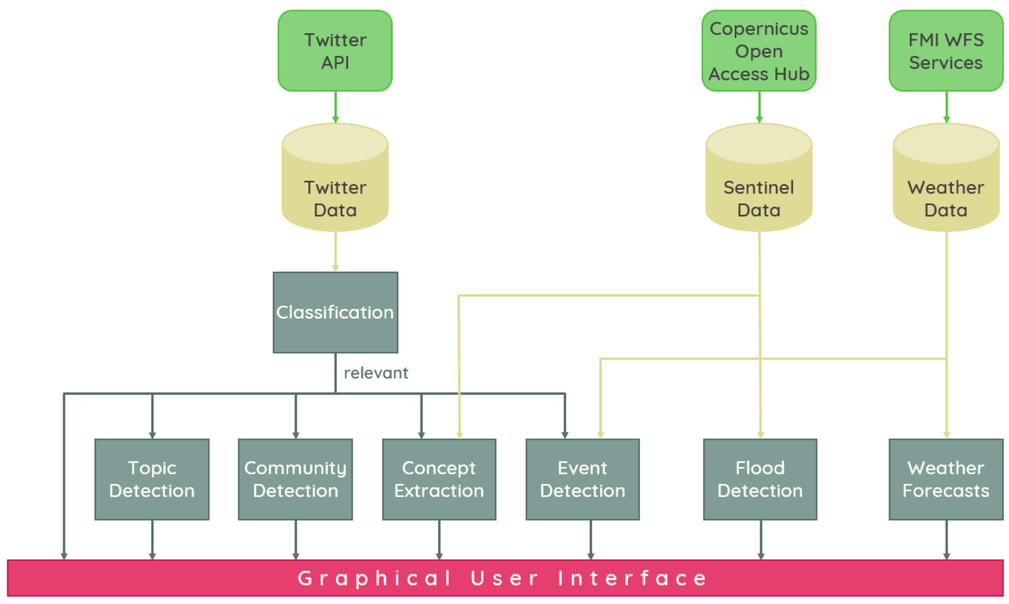
Stelios Andreadis, Anastasia Moumtzidou, Ilias Gialampoukidis, Stefanos Vrochidis, Ioannis Kompatsiaris

Information Technologies Institute, CERTH, Thessaloniki, Greece

Introduction

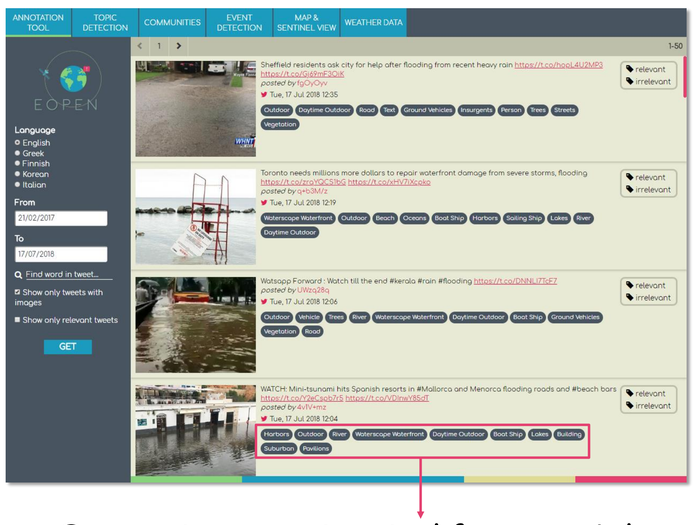
- Large streams of open data become available on a daily basis:
  - Sentinel data are published online through Copernicus
  - Weather forecast data are available from meteorological institutes
  - Citizen observations are uploaded on social media platforms, such as Twitter
- All these data sources are fused by our tool for the specific area of interest
- The extracted knowledge supports water authorities and civil protection agencies in their need to:
  - Monitor a flood event
  - Generate notifications
  - Make decisions
  - Have a holistic view of an area at the preparedness, response and recovery stages

System Architecture



Tool Capabilities

Concept Extraction

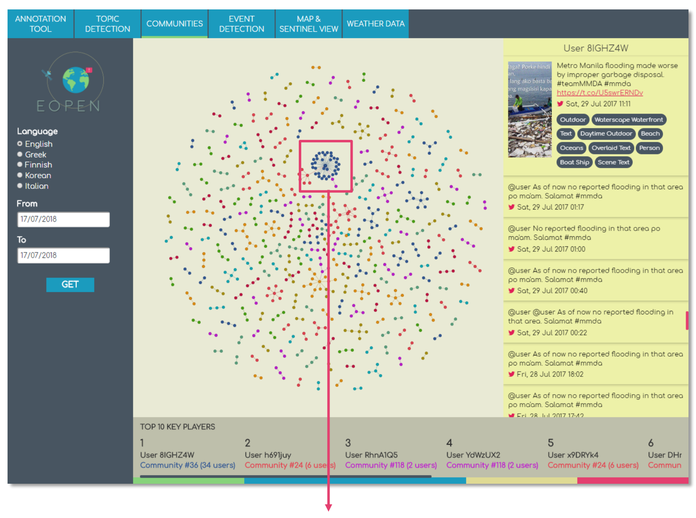


Concepts are extracted from social media images.

Topic Detection

Topics are groups of similar tweets and word clouds contain the most frequently met terms.

Community Detection

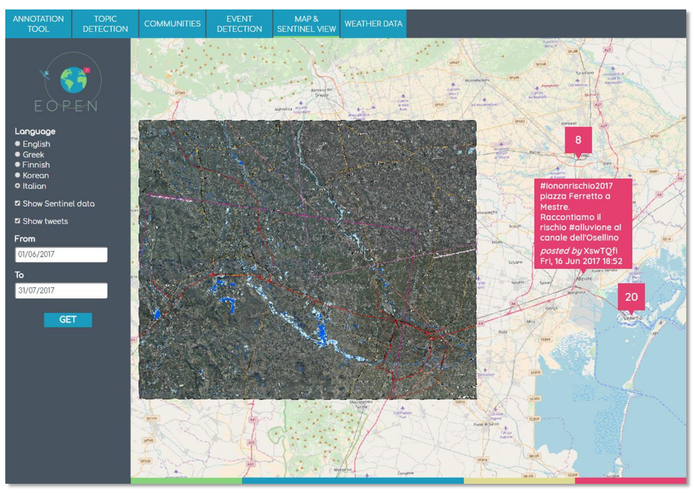


Animation of user communities to identify authorities in a social network of user interactions.

Event Detection

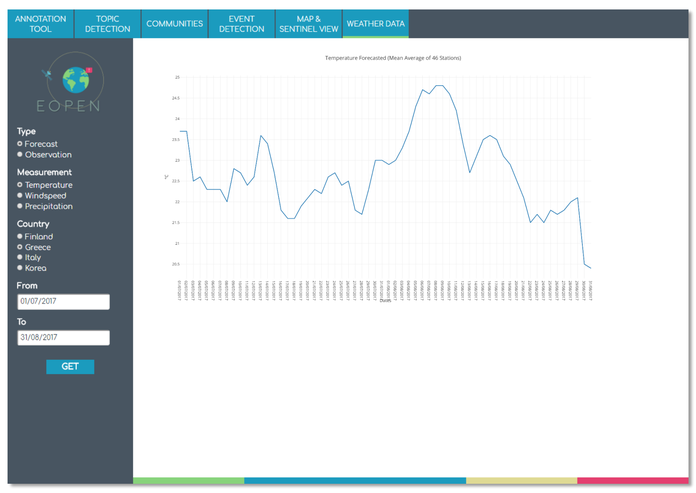
The increase of the number of tweets can be perceived as an event.

Flood Detection



Satellite images* analyzed to detect flooded regions and relevant tweets are positioned on a map.

Weather Forecasts



Weather forecasts or real-time measurements are presented on graphs.

http://mklab-services.iti.gr/eopen/

Concluding Remarks

- Creation of value-added Earth Observation products for the protection of critical infrastructure
- Real-time monitoring to avoid the delays in the generation of satellite images
- Built on top of European High Performance Computing infrastructure when needed
- Exploits the ESA Data and Information Access Services (DIAS) in a bilateral agreement with Serco SpA Italy

Future Work

- Linking with existing Copernicus services, such as the Copernicus Emergency Management Service (EMS)
- Fusion with proprietary EO products on demand
- Extension to other natural hazard events, beyond floods (e.g. fires, landslides, earthquakes)

* The satellite image presented in the screenshot was provided by Distretto delle Alpi Orientali.

Contact point: Ioannis Kompatsiaris (ikom@iti.gr)

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