

VACCINE

Visual Analytics for Command, Control, and Interoperability Environments
A U.S. Department of Homeland Security Center of Excellence

Spatiotemporal Social Media Analytics for Abnormal Event Detection

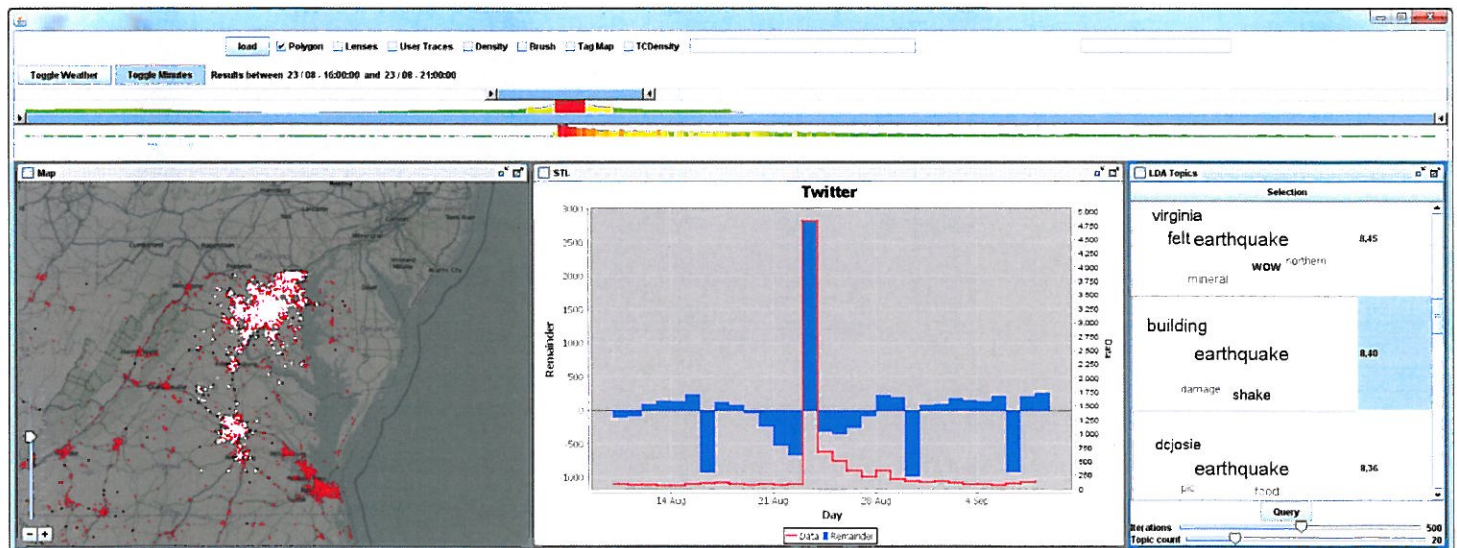
Benefit: This technology provides analysts with the complete topic extraction, abnormality estimation, and event examination. These components are tightly integrated into a highly interactive visual analysis workbench, that allows an analyst to observe, supervise, and configure the method in each individual analysis process.

Collaborators:

- University of Stuttgart

Mission Need

Recent advances in technology have enabled social media services to support space-time indexed data, and internet users from all over the world have created a large volume of time-stamped, geo-located data. Such spatiotemporal data has immense value for increasing situational awareness of local events, providing insights for investigations and understanding the extent of incidents, their severity, and consequences, as well as their time-evolving nature. In analyzing social media data, researchers have mainly focused on finding temporal trends according to volume-based importance. Hence, a relatively small volume of relevant messages may easily be obscured by a huge data set indicating normal situations. In this paper, we present a visual analytics approach that provides users with scalable and interactive social media data analysis and visualization including the exploration and examination of abnormal topics and events within various social media data sources, such as Twitter, Flickr and YouTube. In order to find and understand abnormal events, the analyst can first extract major topics from a set of selected messages and rank them probabilistically using Latent Dirichlet Allocation. He can then apply seasonal trend decomposition together with traditional control chart methods to find unusual peaks and outliers within topic time series.



Virginia earthquake on August 23rd, 2011. Our abnormal event detection system detects the earthquake event using our STL based anomaly detection algorithm. The abnormality degree is extremely high on August 23rd, 2011.

Early Development

Lab Prototype

Commercial Product

For more information, contact:

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