TopicWave: Interactive Visual Analytics of Spatiotemporal Topics Distribution of People's Reactions to Events from Geo-tagged Social Media

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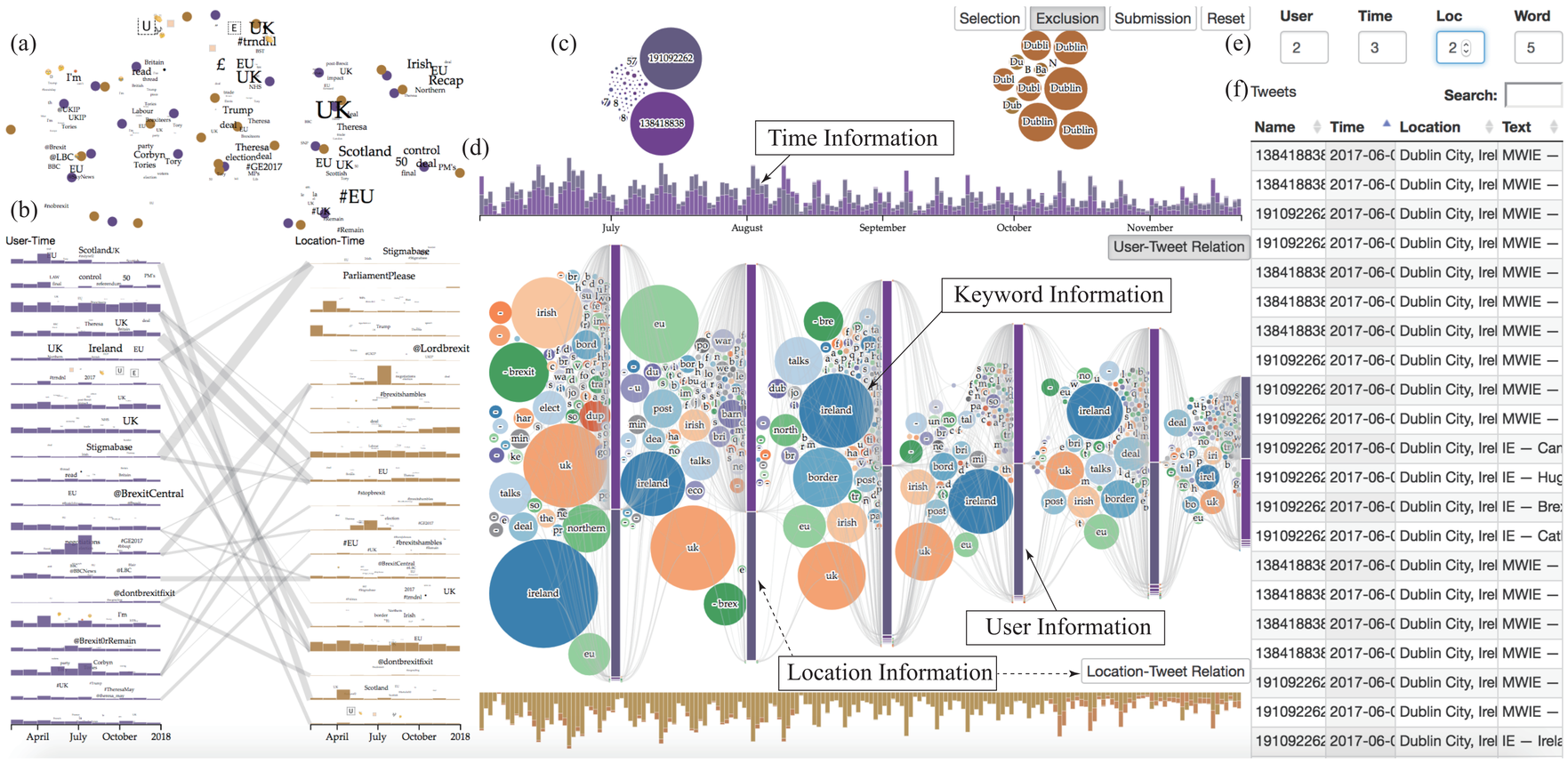
Background

People often post messages in social media to express their opinions and ideas concerning various events happening in the world. It is an interesting but challenging task to understand how the opinions vary across people, locations, and times. Our goal is to provide multi-faceted visual analytics approach to investigate people's reactions to events.

Methodology

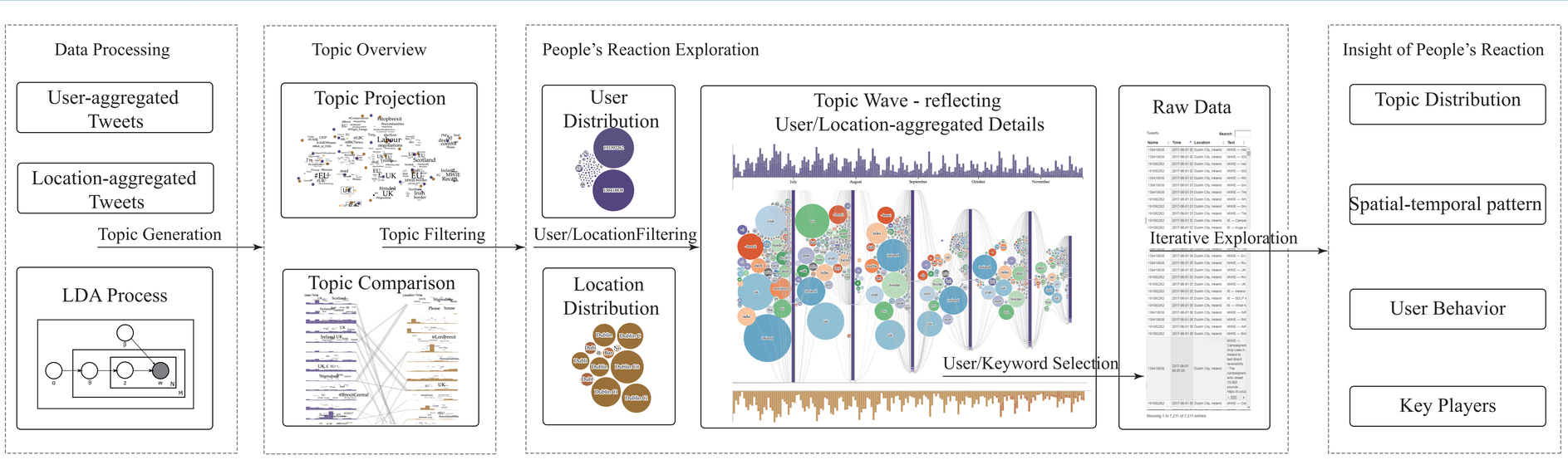
We propose TopicWave, an approach combining topic modelling with interactive visual techniques, for exploring the spatial-temporal variation of discussion topics derived from people's reactions to significant events expressed in geotagged social media. We aggregate social media messages coming from each user and from each location by time intervals for topic modeling. From topic overview to details, we visualize the evolution of discussion topics, which are represented by significant keywords, for groups of users or locations using a river metaphor. Interactive tools allow the analyst to explore how the popularity of each topic and its semantics (i.e., the representative keywords) vary over the sets of people and locations and evolve over time.

Visual Analytics System



Visual analytics interface to social media, including
(a) topic projection view
- visualizing topic distribution
(b) topic comparison view
- visualizing temporal distribution of tweets in each topic
(c) user/location view
- visualizing user and spatial attributes with tweet amounts
(d) temporal view
- visualizing dynamic patterns of user/location
(e) exploring parameters
(f) raw data table.
- visualizing raw data with name, time, location and time

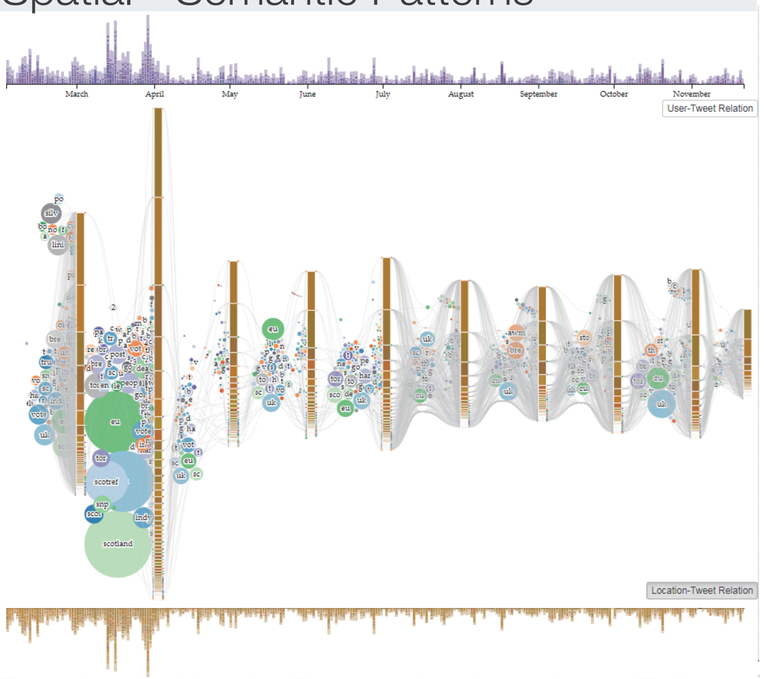
Visual Anapytics Pipeline



Visual analytics pipeline for people's reactions analysis. TopicWave supports interactive exploration from an overview to details on demand using filtering according to topic, user, location, and keyword.

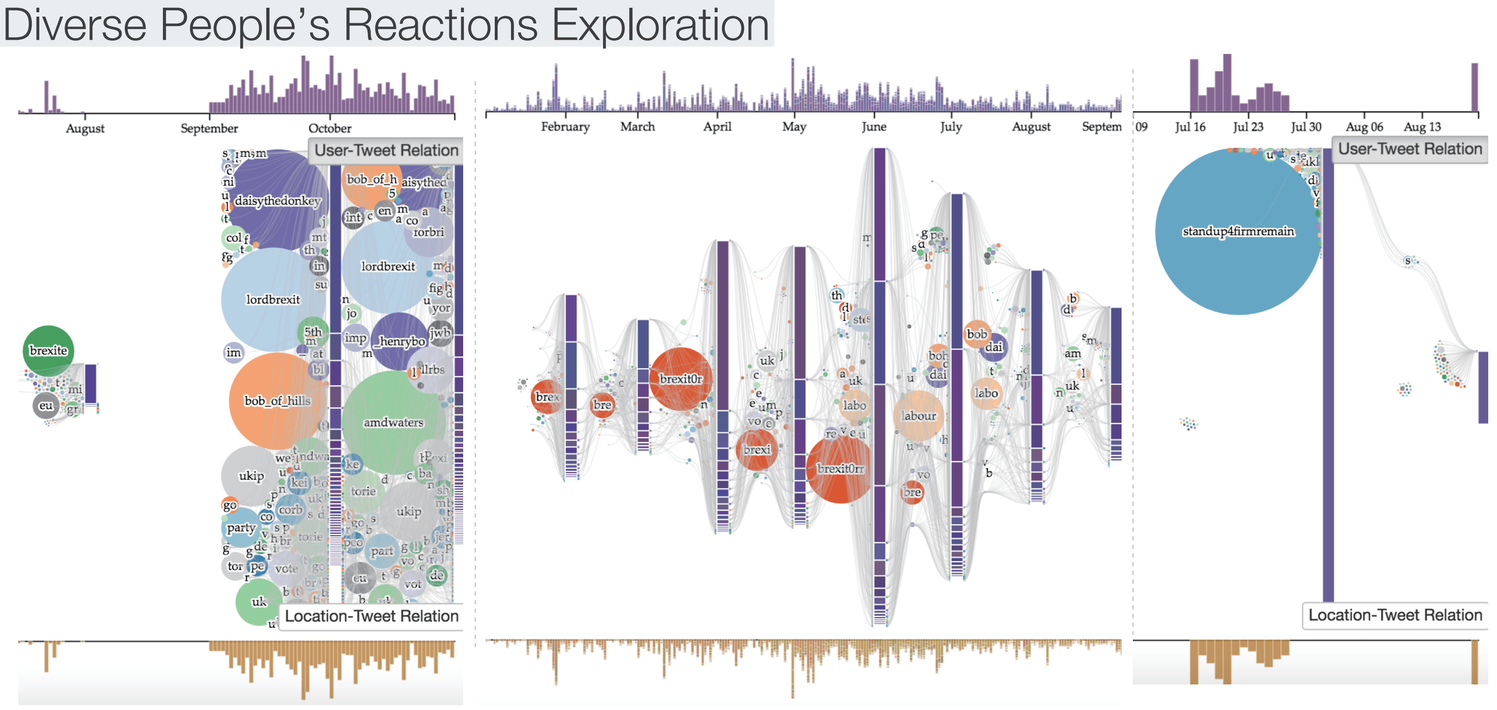
Case Study

Spatial - Semantic Patterns



Bursting in March; Dominating locations: Edinburg, Glasgow; keywords: Scotref, Vote, Scotland

Diverse People's Reactions Exploration



Supporters: "lordbrexit, ukip"

Neutral example: "BrexitOrRemain"

Opponents: "Standup4remains"

Acknowledgements

This work was partially supported by German Science Foundation (DFG) in priority research program SPP 1894 on VGI and by EC in projects SoBigData (grant agreement 654024) and DiSIEM (grant agreement 700692).

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