Abstract

With the widespread growth of various social network tools and platforms, analyzing and understanding societal response and crowd reaction to important and emerging social issues and events through social media data is increasingly an important problem. However, there are numerous challenges towards realizing this goal effectively and efficiently, due to the unstructured and noisy nature of social media data. The large volume of the underlying data also presents a fundamental challenge. Furthermore, in many application scenarios, it is often interesting, and in some cases critical, to discover patterns and trends based on geographical and/or temporal partitions, and keep track of how they will change overtime. This brings up the interesting problem of spatio-temporal sentiment analysis from large-scale social media data. This paper addresses this problem with a framework called Compass.

Challenges

- Large volume of data
- Realtime
- Clean up/filter non-relevant data
- Generic Topic Classification techniques
- Sentiment Analysis
- Adhoc query support
- Information representation

Motivation

- People are open to share views on public events
  - Twitter, Facebook, news blogs
  - Emergency and calamity services
  - Apps with location information

- Spatio-temporal factors:
  - Crowd reaction/response reveals pattern with spatial information.
  - Crowd response on events changes with time.

- Collective crowd opinion matters:
  - Gauge community influence of events
  - Local/global socio-economic concerns
  - Local Health-Food indicators
  - Local Ad-targeting framework

Bursty events results

Sample of bursty event scores from Bursty Event Detection module

US Election Compass architecture:

1. Bursty Event Detection System
2. Tweet Classification Model
3. Sentiment Model
4. Geo-mapping Module
5. Database
6. Interactive Data Visualization

Bursty event detection: 2016-08-10
Newly released emails show State Department ties with Clinton Foundation

Results:

Florida State Left: Compass, Right: Actual

California State Left: Compass, Right: Actual

Compass: Comprehensive Analytics on Sentiment for Spatiotemporal Data
Use Case: Spatio-temporal Sentiment Analysis of US Election

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