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Emotional Trends in Social Media – A State Space Approach

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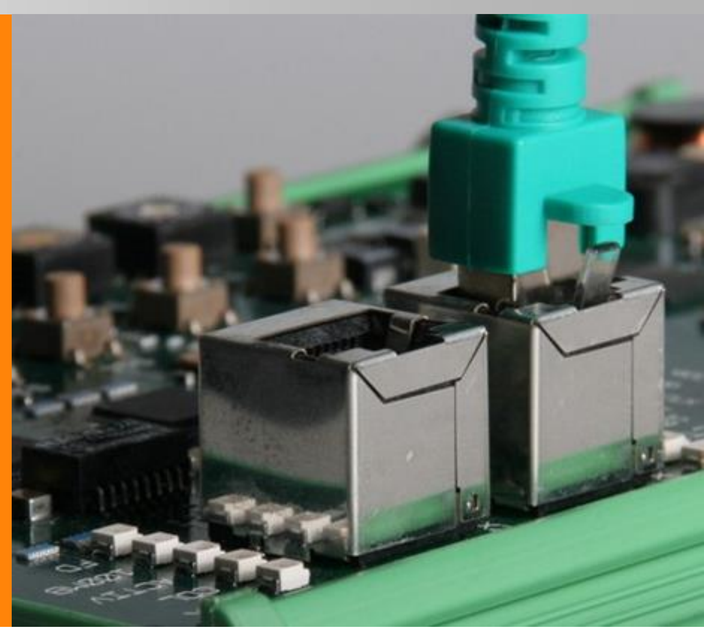
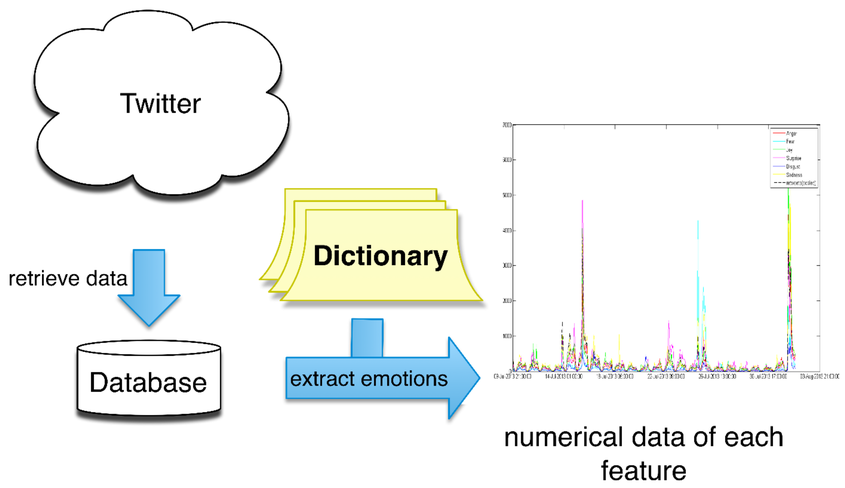
European Conference on Artificial Intelligence (ECAI) 2014, Prague



Motivation

- The estimation of emotional trends in twitter discussions, mainly based on two assumptions from the field of psychology:
  - The number of Tweets mainly **depends on previous dynamics** of the discussion, i.e. a state-space modeling approach is used for the first time.
  - Humans mainly **react to emotional stimuli**, i.e. Tweets are automatically characterized by their emotional content.



Data retrieval framework for emotion extraction

Application

- Trend estimation
- Future trend prediction
- Information extraction of dynamic discussion evolution
- Emotion extraction and observation [2]

Approach

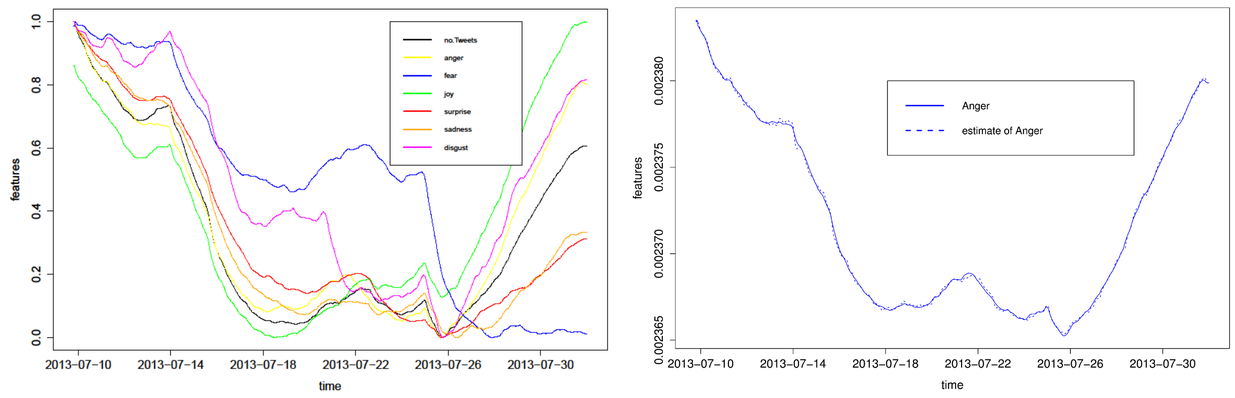
- The six basic emotions (according to [3]) of conversations are extracted and used for system identification and parameter estimation of a **state space model**, which deals with events and its transitions.
- Data is processed using a two-step approach:
  - 1. System identification
  - 2. Trend estimation with Kalman Filtering

Solution Results

The two assumptions of the motivation are reflected in the results:

- The derived system is useful to deduce the evolution of discussions upon emotional features and make hidden changes more apparent (see Fig. 2 (a)).
- A state space approach is able to model the dynamics of a twitter discussion and deals efficiently with cyclic events and noise (see Fig. 2 (b)).

The approach is not limited to a certain amount of data compared to [1].



(a) (b)

Figure 2: Result of trend estimation

References

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Why are they excited?: identifying and explaining spikes in blog mood levels. In *Proceedings of the Eleventh Conference of the European Chapter of the Association for Computational Linguistics: Posters & Demonstrations*, pages 207–210. Association for Computational Linguistics, 2006.

[2] F. Rangel and P. Rosso.
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[3] P. Ekman.
Universals and cultural differences in facial expressions of emotion. In *Nebraska symposium on motivation*. University of Nebraska Press, 1971.

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