

## Decomposing Bloggers' Moods

Towards a Time Series Analysis of Moods in the Blogosphere

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## Introduction

- Our interest in weblogs
  - Very large amount of subjective data
  - Annotated with emotions (moods)
    - LiveJournal users choose to tag post with mood
  - Tracking counts over time
  - Understand (analyze) this data

## MoodViews.com

Gilad Mishne, Maarten de Rijke, Krisztian Balog



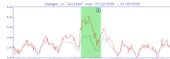
- MoodViews is a collection of tools for tracking the stream of mood-annotated text made available by LiveJournal.
- Three tools available so far:
  - Moodgrapher: tracks global mood levels
  - Moodteller: predicts global mood levels
  - Moodsignals: finds and explains peaks in mood levels



Moodgrapher



Moodteller



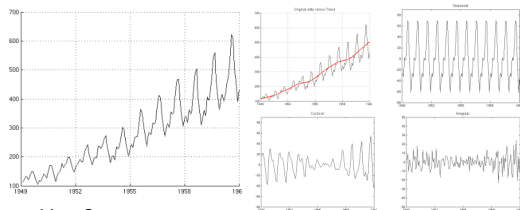
Moodsignals

## Time series analysis

- Time series
  - Collection of observations made sequentially through time (Real valued data that change over time)
  - Eg. financial data (sales, stocks), average temperature, etc.
- Decomposition into components
  - Trend
  - Seasonal
  - Cyclical
  - Irregular

## Time series analysis - example

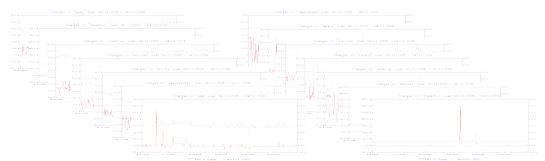
International airline passengers, from January 1949 to December 1960



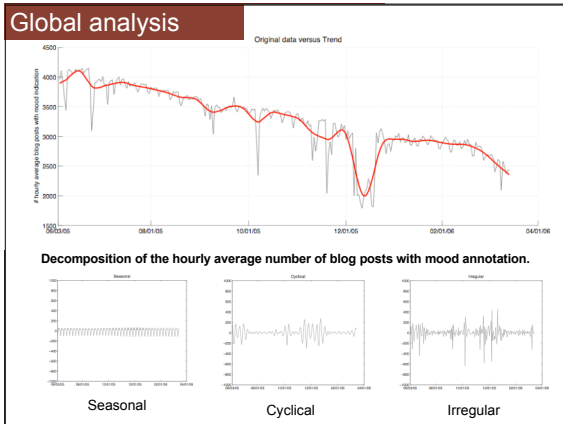
- How?
  - E<sup>4</sup> Matlab toolbox for time series modeling and decomposition
  - E<sup>4</sup> State-Space Estimation of Econometric Models
  - <http://www.uem.es/info/icae/e4/>

## Time series analysis for mood counts

over 300 days of mood counts and mood levels for 132 moods



- Why?
  - Look at the data from a different angle
  - Understand the data
    - What changes are due to trend / seasonal effect / irregularity?

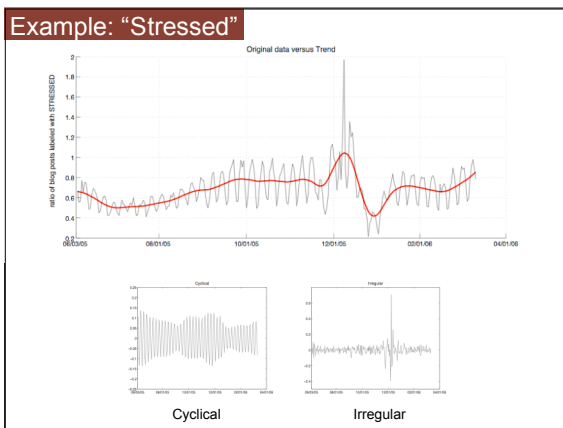


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## Decomposition of single moods

- Use relative mood counts
  - the percentage of blog posts that are labeled with the given mood (compared to all posts with mood labels)
- Seasonal effects
  - We have less than a year's worth of data
  - Not able yet to capture true 'seasonal' variations
  - Seasonal component is omitted

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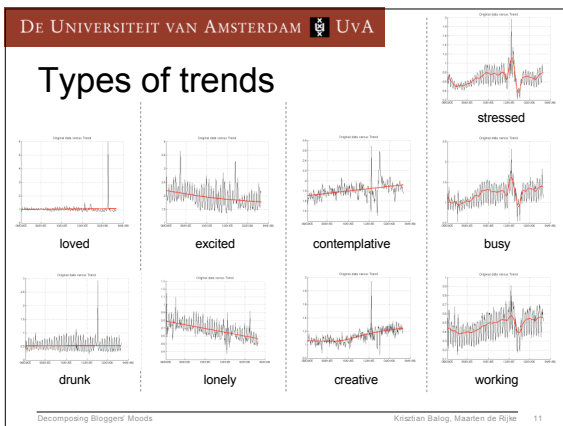
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## Impact of global events

Original data versus Trend      Original data versus Trend

cheerful      annoyed

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## Conclusions

- Applied standard time series analysis techniques to mood levels
  - Looked at global picture and at individual moods
- New insights into our mood data
  - Intuitions confirmed (impact of global events)
  - Interesting phenomena (types of trends)
  - Discoveries (changing cyclical components)

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## Future work

- Find correlations between moods
- Aggregate moods according to trend, cyclic behavior, etc. so as to get a more global picture
- More complex modeling of the data
  - Take daily, weekly, monthly intra- and interdependencies into account
- We used standard models - room for improvement