Content Virality on Online Social Networks: Empirical Evidence from Twitter, Facebook, and Google+ on German News Websites

Irina Heimbach, Benjamin Schiller, Thorsten Strufe, Oliver Hinz

Privacy and Data Security, Dept. of Computer Science, TU Dresden, Germany
E-Markets, Dept. of Economics and Law, TU Darmstadt, Germany

Hypertext 2015, Middle East Technical University Northern Cyprus Campus
Motivation: Content Virality
Background & Related Work

- Word of Mouth
- Communication Channels
- Information Diffusion
- Influencer
- Content Characteristics
- OSN Statistics
  - Article Characteristics
  - Article Features
  - Author Characteristics
  - Attention Competition
Data Collection

Ongoing Project (since January 2012)

March - September 2012
454,888 articles

4,278 random articles (1%)
**Dataset Characteristics**

- **Number of Articles:** 4,278
- **Date Range:** March - September 2012

### Graphs

1. **Distribution by Day of the Week:**
   - Mon: 600 articles
   - Tue: 700 articles
   - Wed: 600 articles
   - Thu: 800 articles
   - Fri: 600 articles
   - Sat: 500 articles
   - Sun: 400 articles

2. **Distribution by Time of Day:**
   - 3:00: 100 articles
   - 6:00: 200 articles
   - 9:00: 300 articles
   - 12:00: 400 articles
   - 15:00: 500 articles
   - 18:00: 600 articles
   - 21:00: 700 articles
   - 24:00: 800 articles

3. **Distribution by Category:**
   - Cars: 4,278 articles
   - Career: 1,200 articles
   - Society: 800 articles
   - Culture: 600 articles
   - Lifestyle: 500 articles
   - Politics: 400 articles
   - Local: 300 articles
   - Travel: 200 articles
   - Humor: 100 articles
   - Sports: 500 articles
   - Technology: 400 articles
   - Business: 300 articles
   - Science: 200 articles

4. **Distribution by Platform:**
   - Facebook: Shares
   - Twitter: Tweets
   - Google+: One-ups

*Content Virality on Online Social Networks*
Data, Coding, and Estimation

**OSN Statistics**
- # of Tweets
- # of One-ups
- # of Shares

**Article Features**
- # of pictures
- # of videos

**Author Characteristics**
- Female first author?
- News agency?
- Writing complexity
- First author fame

**Content Characteristics**
- Positivity
- Emotionality
- Anger
- Anxiety
- Awe
- Sadness
- Surprise
- Practical utility
- Interest

**Attention Competition**
- Position
- Section (13)
- Publication time
- Time of day (8)
- Day of week (7)
- # of articles
- Monthly reach

=> Negative binomial regression
Examples

**Surprise**

{1 \ldots 5}

avg : 2.47

std dev : 1.02

max : 5.00

German politician Ströbele wants to change law to legalize incest

**Anger**

{1 \ldots 5}

avg : 2.28

std dev : 1.16

max : 5.00

Cycling worldcup: German team is disqualified

**Writing Compl.**

{0 \ldots 100}

avg : 67.64

std dev : 15.37

max : 100.00

European central bank employees demand protection of retirement pays from inflation

**# of Pictures**

$\mathbb{N}_0^+$

avg : 3.37

std dev : 9.14

max : 22.00

18 German movies are part of Cannes

---

German politician Ströbele wants to change law to legalize incest

Cycling worldcup: German team is disqualified

European central bank employees demand protection of retirement pays from inflation

18 German movies are part of Cannes
# Results - Sharing Patterns

<table>
<thead>
<tr>
<th>Category</th>
<th>Facebook</th>
<th>Twitter</th>
<th>Google+</th>
</tr>
</thead>
<tbody>
<tr>
<td># of shares over time</td>
<td>![Thumbs Up] 6:00 - 15:00</td>
<td>![Thumbs Down] 12:00 - 21:00</td>
<td>![Thumbs Up] Fri</td>
</tr>
<tr>
<td>Day of week</td>
<td>![Thumbs Up] Fri</td>
<td>![Thumbs Down] Sun</td>
<td>![Thumbs Up] Fri</td>
</tr>
<tr>
<td>Time of day</td>
<td>![Thumbs Up] 6:00 - 15:00</td>
<td>![Thumbs Down] 12:00 - 21:00</td>
<td>![Thumbs Up] Fri</td>
</tr>
<tr>
<td>Sport</td>
<td>![Thumbs Down]</td>
<td>![Thumbs Down]</td>
<td>![Thumbs Down]</td>
</tr>
<tr>
<td>Career</td>
<td>![Thumbs Up]</td>
<td>![Thumbs Up]</td>
<td>![Thumbs Up]</td>
</tr>
<tr>
<td>Cars</td>
<td>![Thumbs Up]</td>
<td>![Thumbs Up]</td>
<td>![Thumbs Up]</td>
</tr>
<tr>
<td>Business</td>
<td>![Thumbs Down]</td>
<td>![Thumbs Up]</td>
<td>![Thumbs Up]</td>
</tr>
<tr>
<td>Lifestyle, Travel</td>
<td>![Thumbs Down]</td>
<td>![Thumbs Down]</td>
<td>![Thumbs Up]</td>
</tr>
<tr>
<td>Humor</td>
<td>![Thumbs Down]</td>
<td>![Thumbs Down]</td>
<td>![Thumbs Down]</td>
</tr>
</tbody>
</table>
Results - Impact on Virality

Positivity
Emotionality
Sadness
Anger / Interesting
Awe
Practical Utility
Complexity
First Author / Location
# of Pictures / Videos
Media Agency as Source

Content Virality on Online Social Networks
Summary, Conclusion, & Future Work

March - September 2012

4,278

Content Virality on Online Social Networks

Benjamin Schiller | Datenschutz und Datensicherheit | TU Dresden