Does Content Determine Information Popularity in Social Media?

A Case Study of YouTube Videos’ Content and their Popularity

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What drives information popularity online?
What drives information popularity online?

Content?
What drives information popularity online?

Dissemination?
The effect of content vs dissemination

• Intuitively, both factors *should* matter

• However...
  – The individual effect of content has been less explored
  – Most previous work is on dissemination
Our Study

• **Users perception** of the content
  – Mechanical Turk

• Information from a live system
  – YouTube videos

• Evaluation methodology
  – Two focused research questions
  – Experimental setup to focus on content only
Research Questions

• [Q1] Given a pair of YouTube videos with similar topic, can users reach consensus on their relative popularity (preference)?

• [Q2] When users reach consensus, does the preferred video match the most popular one on YouTube?
Video Pair 1 of 4: Please watch both videos and then answer the form below

Please provide answers to the form

If you are confused, go back to instructions. You will continue from here on returning.

Which video did you like more?  
- Video 1 (left)  
- Video 2 (right)  
- I liked them both  
- I don't like either of them

Which video would you share with your friends?  
- Video 1 (left)  
- Video 2 (right)  
- Both  
- Neither

Which video do you predict will be more popular on YouTube?  
- Video 1 (left)  
- Video 2 (right)  
- I think they will be equally popular  
- I don't know

Did you already know one of these videos?  
- Video 1 (left)  
- Video 2 (right)  
- Both  
- Neither

If you want, provide extra feedback on the videos:

Send Evaluation

I was unable to watch one (or both) of the videos.
Pair of videos (up to 100,000 x difference in views)
Video Pair 1 of 4: Please watch both videos and then answer the form below.

Three different content perception questions:

- Which video did you like more?
  - Video 1 (left)
  - Video 2 (right)
  - I liked them both
  - I don't like either of them

- Which video would you share with your friends?
  - Video 1 (left)
  - Video 2 (right)
  - Both
  - Neither

- Which video do you predict will be more popular on YouTube?
  - Video 1 (left)
  - Video 2 (right)
  - I think they will be equally popular
  - I don't know

- Did you already know one of these videos?
  - Video 1 (left)
  - Video 2 (right)
  - Both
  - Neither

If you want, provide extra feedback on the videos:
Evaluation Forms

• E1: Which video did you enjoy watching more?
  – Individual

• E2: Which video would you be most willing to share with a friend or group of friends?
  – Social

• E3: Which video do you predict will be more popular on YouTube?
  – Global
Experimental Setup

• Two Topics (Baseball Videos, Music Videos)

• 9 different videos. 3 for each popularity group
  • 0 to 10 views
  • 1,000 to 10,000 views
  • 1,000,000 or + views
  • At least 10x different between groups

• 36 pairs per topic

• 8 MT users evaluated each pair
Q1: Can Users Reach Consensus?

• Consensus
  – Statistically positive Fleiss’ Kappa

• Fraction of the cases where Kappa is positive
  – Kappa above 0.4 in practice
Q1: Can Users Reach Consensus?

Percentage of Pairs Which Users Reached Consensus
(Kappa statistically above 0 with a p-value of 0.01)

<table>
<thead>
<tr>
<th>Category</th>
<th>User Liked</th>
<th>User Shared</th>
<th>User Predicted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major League Baseball</td>
<td>19%</td>
<td>8%</td>
<td>41%</td>
</tr>
<tr>
<td>Music Videos</td>
<td>8%</td>
<td>3%</td>
<td>11%</td>
</tr>
</tbody>
</table>
Q1: Can Users Reach Consensus?

- **User Liked**
  - Major League Baseball: 19%
  - Music Videos: 8%
- **User Shared**
  - Major League Baseball: 8%
  - Music Videos: 3%
- **User Predicted**
  - Major League Baseball: 41%
  - Music Videos: 11%

Very few agreements when asking users what they would share.
Q1: Can Users Reach Consensus?

More agreements when asking what they predict will become popular

- User Liked: 19% (Major League Baseball), 11% (Music Videos)
- User Shared: 8% (Major League Baseball), 3% (Music Videos)
- User Predicted: 41% (Major League Baseball), 8% (Music Videos)
Q1: Can Users Reach Consensus?

• More agreement when asking if users can predict what is more popular

• Other factors have larger influence on cases without consensus
  – Also possible due to subjective user opinions

• However, what can we say about the cases with consensus?
Q2: Does Consensus Predict the Popularity on YouTube?

Percentage of cases where the preferred video matches YouTube’s Popularity:

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<th>User Predicted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major League Baseball</td>
<td>100%</td>
<td>100%</td>
<td>84%</td>
</tr>
<tr>
<td>Music Videos</td>
<td>100%</td>
<td>100%</td>
<td>75%</td>
</tr>
</tbody>
</table>
Q2: Does Consensus Predict the Popularity on YouTube?

At least 75% of the cases
Discussion and Future Work

• Consensus is hard to reach
  – Subjective user opinions
  – Other factors affecting popularity

• Preference towards popular content

• Can we predict the popularity of videos using our methodology?

• How can we quantify the importance of the content and dissemination factors?
Thank You!
User Feedback

U1: the girl in the video 2 was stunningly beautiful so i would share that one
U2: Video 2 was sad and dark and I didn’t like the girl’s voice.
U3: I secretly like Evanescence but I would never let my friends know.
U4: The video on the left was much better music for my tastes
Demographic Survey

Percentage Distribution:

- **Never**: 4%
- **Yearly**: 1%
- **Monthly**: 1%
- **Weekly**: 18%
- **Every Day**: 13%

### Major League Baseball

- **Watch Videos**: 48%
- **Share Videos**: 44%
- **Share Content**: 39%

### Music Videos

- **Watch Videos**: 18%
- **Share Videos**: 29%
- **Share Content**: 28%
Mostly watch videos daily or weekly

- Never: 8%
- Yearly: 4%
- Monthly: 10%
- Weekly: 13%
- Every Day: 48%

- Major League Baseball
  - Watch Videos: 44%
  - Share Videos: 39%
  - Share Content: 29%

- Music Videos
  - Watch Videos: 45%
  - Share Videos: 28%
  - Share Content: 32%
Share videos on a weekly, monthly, or even yearly basis

Major League Baseball

- Watch Videos: 48%
- Share Videos: 39%
- Share Content: 29%

Music Videos

- Watch Videos: 44%
- Share Videos: 40%
- Share Content: 28%
Demographic Survey

• Avid YouTube Viewers
  – Daily/Weekly modes

• Infrequent Shares of Videos
  – Monthly mode

• However, somewhat common sharing in general
  – Weekly mode
Q1: Can Users Reach Consensus?

- Greater for Prediction. Up to 52% of pairs (p-val < 0.05)
- Kappa > 0.4 or > 0.75 when consensus is reached
- Very rare agreements when asking which video users share
Interesting example without consensus

Popular Baseball Video on YouTube but with a Watermark

Unpopular Baseball Video.