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Discovering Dedicators with Topic-based Semantic Social Networks

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Motivation

 In order to spread information successfully, some extraordinary people are needed [Gladwell, 2002].



Dedication: the extent to which a user has dedicated to transmit information in selected topic areas to the people in their egocentric social networks



Influencer vs. Dedicator



Dedicators are right people to deliver certain information to their friends directly! (Real Contributor)



→ getting people engaged in an issue

Do not know whether the green users read it or not

Via "conversation"



Topic-dependent Dedication

- Our approach is to analyze Twitter conversations
 - The actual flow of information among people



- Online Conversations promote two-way information exchange of certain issues
- Conversations usually have one or more topics
 → We look for topic dependent dedicators



Research Goal

- How to measure dedication of a user for certain topic areas?
- How does the dedicator differ from the influencer?
- What are the characteristics of the dedicators?



Twitter Conversation Dataset

Dataset Collection Process

- Collect "public timeline" of Twitter at 30s interval 09/09/2011 ~ 10/04/2011
- Keep **users** having "@" tweet, 3,200 tweets in total
- Recover all the conversations of each user
- Filter out users having < 400 conversations
- Remove stopwords, unusual meaningless words such as "aaaa", "mossst"

Volume of Dataset		
#Users	1,550	
#Conv	1M	
#Tweets	6M	



Topic-based Semantic Social Network

- In order to measure topic-dependent dedication
- Ego-centric topic-based semantic social networks [Jang et al. 2012]
 - Each relationship is represented as a topic distribution



- Topic Diversity: coverage of topics
- Topic Purity: topical focus



Use of Common Global Topics

- Topic spectrums are different from user to user
- Need for common topics to compare dedication levels
- Keep individual topics while mapping them to global topics
- Our approach





Use of Common Global Topics

- Topic spectrums are different from user to user
- Need for a common topics to compare dedication levels
- Keep individual topics while mapping them to global topics
- An example of a global topic and associated individual topics

	Top-ranked words representing a topic
Global Topic	<pre>{song, listen, music, sing, album, }</pre>
User1's topic	{like, just, song, new, album, }
User2's topic	{song, love, like, album, listen, }
User3's topic	{like, listen, music, song, panic, }
User4's topic	{kim, love, lil, album, plai, }
User5's topic	{queen, selena, listen, album, think, }



Dedication Factors

• To measure a user's dedication level for a topic

1st conversation

Volume

of conversations, # of conversation partners

• Engagement

of conversations per partner, # of tweets in a conversation, inverse of time lag between conversations

2nd conversation

- Personal Tendency topic diversity, topic purity_
- Topic Weight topic probability





last conversation

Absolute vs. Relative Level Dedication



We combine absolute level dedication and relative level dedication when measuring dedication level of a user!

• Need to consider both absolute (community level) and relative (individual level) dedication



Analysis

Correlation Analysis

• Uniqueness of Factors

Factors Compared	Correlation
volume vs. engagement	0.182
volume vs. tendency	0.143
engagement vs. tendency	-0.042
	p<0.01

• The three factors capture different aspect of dedication

Factors Compared	Correlation
volume vs. topic weight	-0.006
engagement vs. topic weight	0.116
tendency vs. topic weight	0.546
	p<0.01



Characteristics of Dedicators

- Comparison between Dedications and Influences
 - Influence: In-degree influence (# of follower links)

Influence vs. dedication	Correlation
In-degree vs. Dedication (absolute & relative levels)	-0.030
In-degree vs. Dedication (absolute level)	-0.005
In-degree vs. Dedication (relative level)	-0.118
	p<0.01

No Correlation!

 In-degree influence & dedication measure different aspects of an individual



Characteristics of Dedicators

- Comparison between Dedicators and Influencers
 - Example
 - Topic about music ({song, listen, music, sing, album, ...})
 - 77 users have communicated on this topic

No overlap between them

Avg. Indegree (# follower Volume (Absolute) Volume (Relative) Engagement (Absolute) Engagement (Relative) Personal Tendency (Absolute) Personal Tendency (Relative)



Characteristics of Dedicators

• Role of Factors Contributing to Dedication





Summary

- Proposed the concept of dedicators in social networks referring to the theory of "The Law of the Few"
- Findings
 - Users with high in-degree influence tend not to be strong dedicators
 - Top dedicators tend to have richer conversations, taking advantages of smaller and manageable social networks
- Application
 - Identifying real contributors in information dissemination in marketing



Thank you!

Any Questions?