Visualization of Social Media Flows with Interactively Identified Key Players

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Propagation patterns

http://vis.pku.edu.cn/weibova/weiboevents
**Introduction**

- Who are the key players in the propagation process?

- What roles do they play?

- Celebrity
  - Opinion leader
  - Official account
Introduction

- Developed a system to identify key players
  - Interactively filter to pick out key players
  - Explore the relationship and roles of key players
Pipeline

Server-end

Database

Crawler

Sina Weibo

User

Event

Location

Keyword

Multi-faceted Filter

Entity Graph

Front-end

Task Manager

Sort & Select

Create a new filter

Update

Repost Pathway

Update
Filter operations

- Entity – user, event, weibo, keyword, location

<table>
<thead>
<tr>
<th>Entity</th>
<th>Attributes</th>
<th>Actions</th>
</tr>
</thead>
</table>
| User     | #followers #following #following / #followers #mutual-following verified #events-involved #weibos #direct-reposted users #direct-reposted users / #reposted users | a1. select as a candidate  
a2. copy to a new list  
a3. list followers  
a4. list locations  
a5. list events the user participated in  
a6. list weibos the users posted |
# Filter operations

- **Entity** – user, event, weibo, keyword, location

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| Event   | #tweets  
#participants                        | b1. list all weibos in the events  
b2. list all participants in the events  
b3. list all keywords in the events |
| Weibo   | time  
#comments  
#likes  
text length  
#direct-reposts  
#reposts  
#direct-reposts / #reposts  | c1. list all reposts of the weibos  
c2. list all direct reposts of the weibos  
c3. list authors of the weibos  
c4. list keywords of the weibos  
c5. list events the weibos belong to |
| Keyword | frequency                                     | d1. list relevant weibos                                               |
| Location| frequency                                     | e1. list relevant users                                                |
Filter operations

- Operation: (entity, sortingkey, distribution, action)
  - Entity: user, event, weibo, keyword, location
  - Sortingkey: attributes of entities
  - Distribution: places of selected players in the list ([0 – 10%], True/False)
  - Action: actions of entities

(user, # followers, [0 – 3%], list followers (a3))
Visual interface

Event List & Repost Pathway

Task Management Panel

Multi-faceted Filter

Entity Graph
Filter process

Start a new filter from: ⚛️ $\wedge \wedge \wedge \wedge$

- $\wedge \wedge 4 \wedge P$
  - #weibos
    - 广东工业大学学生...
    - 广东工业大学GD...
    - 广东工业大学学生...
    - 广东工业大学GD...

- $\wedge \wedge 925 \wedge P$
  - #reposts
    - 广东工业大学学生...
    - 广东工业大学GD...
    - 广师头条

- $\wedge \wedge 213 \wedge P$
  - text length
    - 卡乐B肥妹姿
    - 华师化环13大材...
    - 华南理工大学学生...
    - 晓剑_Ivan

- $\wedge \wedge 4 \wedge P$
  - #followers
    - 华南理工大学学生...
    - 卡乐B肥妹姿
    - 晓剑_Ivan
    - 华师化环13大材...
Visual interface: entity graph
**Visual interface:** repost pathway

- **A & B: mutual follow**
- **A & B: no follow**
- **A follows B**
Case 1: student asking for interview of TV Star

@姚晨 你好，我是中国传媒大学2011级新闻学学生。我的新闻采访老师要求我们完成一个名人采访。我很欣赏你，所以想对你进行一个一个半小时的采访。这个采访没有八卦商业目的。或许这条微博会被埋没在你众多的消息中，但如果你看到它，请考虑给我一个机会，时间地点由您来定。邮箱714868794@qq.com.谢谢!

Filters

- Group A: most popular peoples
  - $\langle \text{user}, \#\text{followers}, \text{top 3}, \text{select as candidates}(a1) \rangle$
  - 姚晨(User B), 新浪娱乐(User C), 微博名人(User D)

- Group B: users brought most reposts
  - $\langle \text{user}, \#\text{reposted-users}, \text{top 3}, \text{select as candidates}(a1) \rangle$
  - 南小七(User A), 姚晨(User B), 十年砍柴(User E)
Case 1: student asking for interview of TV Star

- **Analysis**
  - 姚晨 (User B) triggered a burst of reposting
  - 十年砍柴 (User E) reposted many times and attracted much attention
  - 十年砍柴 (User E) criticized 南小七 (User A) for not being polite
Case 1: student asking for interview of TV Star

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  - 十年砍柴 (User E) criticized 南小七 (User A) for not being polite
Case 2: advertising on Microblog

- Advertisement 1: 古曼堂 (User A)
  - Group A: <(user, #reposted-users, top2, select as candidates(a1)>
    - 古曼堂(User A), 微博搞笑排行榜(User B)
  - Group B: <(user, #weibos, top1, select as candidates(a1)>
    - 微博搞笑排行榜(User B)
  - Group C: <(user, #followers, top10, select as candidates(a1)>

![Diagram showing connections between users and hashtags]

User A  User B  User A
Case 2: advertising on Microblog

- Advertisement 2: 美妆搭配师Amy (User C)
  - Group A: <(user, #reposted-users, top10, select as candidates(a1)>
  - Group B: <(user, #followers, top10, select as candidates(a1)>

![Diagram showing Group A and Group B connections]

User C
Case 2: advertising on Microblog

- Comparison of different advertising patterns
  - Advertisement 1: relied on a popular account
  - Advertisement 2: relied on lots of accounts special for marketing
Conclusion and future work

- A visual analytics system to identify key players
  - Interactively filter to pick out key players
  - Analyze the roles of key players

- Future work
  - Support more entities and attributes to enhance compatibility
  - Provide a global sensing of the events’ propagation
Acknowledgements

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Thank You
### Filter operations

- **Task:** a series of operations

<table>
<thead>
<tr>
<th>Feature</th>
<th>Task Vector</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>A lot of followers</td>
<td>$(user, #followers, [0 - x%], a1)$</td>
<td>Popular user</td>
</tr>
<tr>
<td>A lot of weibos</td>
<td>$(user, #weibos, [0 - x%], a1)$</td>
<td>Active user</td>
</tr>
<tr>
<td>Users directly reposted UserA</td>
<td>$(user, *, UserA, a6), (weibo, *, *, c2), (weibo, *, *, c3)$</td>
<td>Disseminator of A</td>
</tr>
<tr>
<td>Reposted by influential users</td>
<td>$(weibo, #direct-repost/#reposted, [0-x%], c3), (user,<em>,</em>,a1)$</td>
<td>Information bridge</td>
</tr>
</tbody>
</table>