Sharing Real-time Traffic Information with Travelers using Social Media

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Real-time Incident Information

Traffic Incidents

Social Media based Information Sharing Platform

Instantaneous Information Spreading

Traveler Decision Making

Spontaneous Information Sharing
Data Collection

- FDOT runs 14 Twitter accounts (13 English, one Spanish)
  - FL511 service
- Data was collected for 13 English accounts and ‘I4Ultimate’ account.
- Twitter Streaming API
- From April 08, 2017 to July 21, 2017
## FDOT Twitter Accounts

<table>
<thead>
<tr>
<th>No.</th>
<th>User Screen Name</th>
<th>Region/Facility</th>
<th>#Locations</th>
<th>Account Created at</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>@fl_511_i4</td>
<td>I-4</td>
<td>#Florida #Tampa #Lakeland #LakeBuenaVista #Orlando #LakeMary #Daytona</td>
<td>1/12/2012</td>
</tr>
<tr>
<td>2</td>
<td>@FL511_95Express</td>
<td>I-95 express lanes</td>
<td>#Florida #FortLauderdale #Miami</td>
<td>1/24/2017</td>
</tr>
<tr>
<td>3</td>
<td>@fl511_central</td>
<td>Central Florida</td>
<td>#Orlando #Daytona #SpaceCoast #Kissimmee #Ocala #Brevard</td>
<td>10/6/2010</td>
</tr>
<tr>
<td>4</td>
<td>@fl511_i10</td>
<td>I-10</td>
<td>#Florida #Jacksonville #Tallahassee #Pensacola #LakeCity #Crestview</td>
<td>10/6/2010</td>
</tr>
<tr>
<td>5</td>
<td>@fl511_i75</td>
<td>I-75</td>
<td>#Florida #Gainesville #Ocala #Tampa #Sarasota #Fort Myers #Lake City</td>
<td>10/6/2010</td>
</tr>
<tr>
<td>6</td>
<td>@fl511_i95</td>
<td>I-95</td>
<td>#Florida #Jacksonville #DaytonaBeach #FortLauderdale #Miami</td>
<td>10/6/2010</td>
</tr>
<tr>
<td>7</td>
<td>@fl511_northeast</td>
<td>Northeast Florida</td>
<td>#Jax #StAugustine #Gainesville #StJohns #Lake City</td>
<td>10/7/2010</td>
</tr>
<tr>
<td>8</td>
<td>@fl511_panhandl</td>
<td>Panhandle</td>
<td>#Tallahassee #Pensacola #Panama City #Destin #Crestview</td>
<td>1/12/2012</td>
</tr>
<tr>
<td>9</td>
<td>@fl511_southeast</td>
<td>Southeast Florida</td>
<td>#SEFL #Miami #FtLauderdale #Broward #Palm Beach</td>
<td>5/10/2017</td>
</tr>
<tr>
<td>10</td>
<td>@fl511_southwest</td>
<td>Southwest Florida</td>
<td>#Naples #Ft Myers #Cape Coral #Sarasota #SWFL</td>
<td>10/6/2010</td>
</tr>
<tr>
<td>11</td>
<td>@fl511_state</td>
<td>traffic reports from</td>
<td>#Tampa #Orlando #Miami</td>
<td>10/7/2010</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@myfdot</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>@fl511_tampabay</td>
<td>traffic info provided by</td>
<td>#Tampa #Hillsborough #Pinellas #Pasco #LakeLand #Polk #SRQ</td>
<td>10/6/2010</td>
</tr>
<tr>
<td></td>
<td></td>
<td>@MyFDOT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>@fl511_turnpike</td>
<td>Florida's Turnpike Mainline</td>
<td>#Miami #FortLauderdale #Orlando #PortStLucie</td>
<td>10/6/2010</td>
</tr>
<tr>
<td>14</td>
<td>@I4Ultimate</td>
<td>Real-time traffic of I-4</td>
<td>Official page of @MyFDOT_CFL's I-4 Ultimate project</td>
<td>11/25/2014</td>
</tr>
</tbody>
</table>
Measuring Effectiveness

- **Activity**: total number of tweets posted by an account
- **Influence**: total number of followers and lists added
- **Attention**: measured by new followers received, re-tweets posted and list added.
- **Efficiency**: measured by the amount of attention received per unit activity

\[
\eta_u(t_i, t_f) = \frac{\sum_{t=t_i}^{t_f} att_t(u)}{\sum_{t=t_i}^{t_f} act_t(u)}
\]

\(att_t(u)\) = attention received by the account \(u\), during the time period \(t\)
\(act_t(u)\) = activities or tweets posted by the account \(u\) in the time period \(t\).
Activity and Influence

![Graph showing activity and influence metrics for various accounts. The graph includes columns for tweets, total followers, list count, and tweets per day. The accounts are represented as individual bars and connected by a trend line.]
Attention Received

Twitter Account

Followers Received
Retweets Posted
List Added
Attention Received

- Followers received per thousand tweets
- Retweets per thousand tweets
- List added per thousand tweets
‘fl511_central’, ‘fl511_i4’, ‘FL511_95Express’ had constant trend of daily activity
Content Analysis: Topic model

• Objectives of topic extraction
  – Find what kind of tweets are shared more
  – Determine the prevalence of a user’s posts to a topic
  – Determine the importance of a word to a topic

• Number of Topics:
  – 50 topics gave the minimum value of perplexity.
Content Analysis - Propagated Information
Content Analysis - Propagated Information

‘fl511_central’ highly contributes to topics #17, #27, #40, #44 and #46.
Topic #42 is about the tweets informing travelers about lane blockages due to crashes.
Content Analysis - Non-Propagated Information

- mostly timestamps related words
- other non-informative words
- tweets posted about regular updates are less likely to be propagated
Key Insights

• Information about recent projects (‘I4Ultimate’) has gained more attention

• Tweets with congestion, blockage, clearing updates with specific route mention gain more attention

• Tweets posted about regular updates are less likely to propagate among other users
Conclusion

• FL 511 Twitter accounts have significant activities, influence and effectiveness in sharing real-time traffic information
• Efficiency metrics can be used to measure information spreading
• Twitter can be more effectively used with
  – filtering out repetitive updates
  – prescriptive real-time information