I Stand With You: Using Emojis to Study Solidarity in Crisis Events

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UNC Charlotte
Emoji-2018 Workshop at ICWSM
June 25th, 2018
Crisis Event - Hurricane Irma (Sept 2017)

Hurricane Irma track: Irma is moving north through the Caribbean
Crisis Event - Paris Terrorist Attacks (Nov 2015)

Note: Times reported as Paris local time (GMT +1) on 13 November 2015
How social media responded to crisis events?

Juliana Diaz
@juliana__diaz
I hope the world is ready to help The Caribbean after #HurricaneIrma like they did for #HurricaneHarvey very scary
1:30 AM - Sep 6, 2017

Santiago Sullivan
@dosojossantiago
Let's pray for all those in the path of #HurricaneIrma. It's going to be devastating to so many people. Let's keep donating to help out. 🙏
11:50 PM - Sep 5, 2017

Jamie Jeannette
@JamieJeannette
Prayers for Barbuda...Prayers for anyone in the path of Hurricane Irma...
2:53 AM - Sep 6, 2017
How social media responded to crisis events?

Juliana Diaz (@juliana__diaz)
I hope the world is ready to help The Caribbean after #HurricaneIrma like they did for #HurricaneIvan
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How social media responded to crisis events?

Ben McKee
@benamckee

My heart goes out to the people of Paris tonight. Sending all of my love and hope that nobody else is hurt. #loveandhopeforparis #besafe
6:32 PM - Nov 13, 2015
1,285 848 people are talking about this

Victoria Justice
@VictoriaJustice

Paris... My thoughts are with you. I'm so sad to hear this awful news. Stay safe, we love you. 🙏🏼🙏🏼🙏🏼
7:57 PM - Nov 13, 2015
4,970 3,162 people are talking about this

Rowan Blanchard:

this is not a time 2 jump 2conclusions and blame an entire religion for this. this is a time to to pray for Paris & the safety of the people
7:57 PM - Nov 13, 2015
5,286 4,133 people are talking about this

Ben Mader
@benimadermusic

Praying for Paris and the world tonight. 🙏🏼
10:12 PM - Nov 13, 2015
239 146 people are talking about this
How social media responded to crisis events?

- Ben McKee (@benamckee)
  My heart goes out to the people of Paris tonight. Sending all of my love and hope that nobody else is hurt.
  #loveandhopeforparis #besafe

- Victoria Justice (@VictoriaJustice)
  Paris... My thoughts are with you. I can't bear this awful news. Stay safe, we love you.
  7:57 PM - Nov 13, 2015
  4,970 people are talking about this

- Rowan Blanchard (@RowanBlanchard)
  this is not a time for jokes. Please be kind, pray for an entire religion for this. this is a time to pray for Paris & the safety of the people.
  7:57 PM - Nov 13, 2015
  5,286 people are talking about this

- Ben Mader (@benmadermusic)
  Praying for Paris and the world tonight. 🙏
Solidarity: community spirit or mutual attachment, social cooperation or charity

(Kurt Bayertz, 1999)

Expressional solidarity: Individuals expressing empathy and support for a group they are not directly involved in

(Ashley E Taylor, 2015)
Understanding collective social movements and prosocial behaviors in online social networks, for example #BlackLivesMatter, #NeverAgain, #MeToo
Why are Emojis important?

Easy to be misunderstood but important when communicating online

When used with text, *emojis can reinforce the message* (Markman & Oshima, 2017).

Emojis more likely to be used in socioemotional contexts like crisis events (Derks et al, 2007).
Our Hypotheses

H1: Emoji play a role in automatically identifying (and reinforcing) solidarity messages.

H2: Solidarity is expressed differently by people affected by the crisis event vs. those who are not affected and also over time through their use of emojis.
Data and Pre-processing

Hurricane Irma: 16MM tweets between Sept 6th-12th, 2017.
Data and Pre-processing

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Hurricane Irma: 16MM tweets between Sept 6th-12th, 2017.


Performed Distance Labeling of hashtags ($\kappa = 0.65$) 

Solidarity - #solidaritywithparis, #prayersforpuertorico

Not Solidarity - #breakingnews, #facebook
<table>
<thead>
<tr>
<th># of Tweets</th>
<th>Solidarity</th>
<th>Not Solidarity</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irma</td>
<td>12000</td>
<td>81697</td>
<td>93697</td>
</tr>
<tr>
<td>Paris</td>
<td>20465</td>
<td>29874</td>
<td>50339</td>
</tr>
</tbody>
</table>
RQ1: How useful are emojis as features in classifying expressions of solidarity?
<table>
<thead>
<tr>
<th>Accuracy</th>
<th>Irma corpus</th>
<th>Paris corpus</th>
</tr>
</thead>
<tbody>
<tr>
<td>RNN + LSTM (with emojis)</td>
<td>93.5%</td>
<td>86.7%</td>
</tr>
<tr>
<td>RNN + LSTM (without emojis)</td>
<td>89.8%</td>
<td>86.1%</td>
</tr>
<tr>
<td>TF-IDF</td>
<td>85.71%</td>
<td>75.72%</td>
</tr>
<tr>
<td>TF-IDF + Bigrams</td>
<td>82.62%</td>
<td>76.98%</td>
</tr>
<tr>
<td>Bigrams only</td>
<td>79.86%</td>
<td>75.24%</td>
</tr>
</tbody>
</table>
RQ2: Which emojis are used in expressions of solidarity of crisis events and how do they compare to the emojis used in other (regular) tweets?
<table>
<thead>
<tr>
<th>Rank</th>
<th>Irma Sol.</th>
<th>Irma Not Sol.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>🙏 6105</td>
<td>😞 2098</td>
</tr>
<tr>
<td>2</td>
<td>❤️ 2336</td>
<td>👍 1827</td>
</tr>
<tr>
<td>3</td>
<td>❤️ 1977</td>
<td>😌 1474</td>
</tr>
<tr>
<td>4</td>
<td>🐾 1643</td>
<td>🙏 1193</td>
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<td>5</td>
<td>🐰 1530</td>
<td>😃 823</td>
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<tr>
<td>6</td>
<td>😞 1034</td>
<td>👊 794</td>
</tr>
<tr>
<td>7</td>
<td>🦅 934</td>
<td>♂ 726</td>
</tr>
<tr>
<td>8</td>
<td>🌊 820</td>
<td>⬠ 725</td>
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<td>9</td>
<td>🇺🇸 625</td>
<td>🧔 724</td>
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<tr>
<td>10</td>
<td>🌊 367</td>
<td>⬤ 683</td>
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RQ3: Which emojis co-occur in tweets that are posted within areas directly affected by crisis events as compared to those tweets that are posted from other areas?
Irma within affected regions
Irma within affected regions

Irma outside affected regions
Paris within affected regions
Paris within affected regions

Paris outside affected regions
RQ4: How can emojis be used to understand the diffusion of solidarity expressions over time?
Paris solidarity
RQ5: How can emojis be used to study the temporal and geographical diffusion of solidarity expressions during crisis events?
Irma within affected regions

Irma outside affected regions
Take Home Message

Emojis offer a crucial window into human behavior
Take Home Message

Emojis offer a crucial window into human behavior and how it evolves over time and geographical region.
Take Home Message

Emojis offer a crucial window into human behavior and how it evolves over time and geographical region especially in the context of crisis events.
Take Home Message

Emojis offer a crucial window into human behavior and how it evolves over time and geographical region especially in the context of crisis events and collective social movements.

We show this with the specific behavior of solidarity in two specific crisis contexts.
Email: ssantha1@uncc.edu
Github: http://github.com/sashank06 ➡ Dataset available publicly
References

2. Irma timeline - https://www.express.co.uk/news/weather/850567/Hurricane-Irma-track-florida-usa-path-map-forecast-when-were
8. https://www.boomlive.in/the-streets-of-paris-are-as-familiar-to-me-as-the-streets-of-beirut/
More References

7. https://www.boomlive.in/the-streets-of-paris-are-as-familiar-to-me-as-the-streets-of-beirut/


