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A Quick Intro

Hypothesis Question:

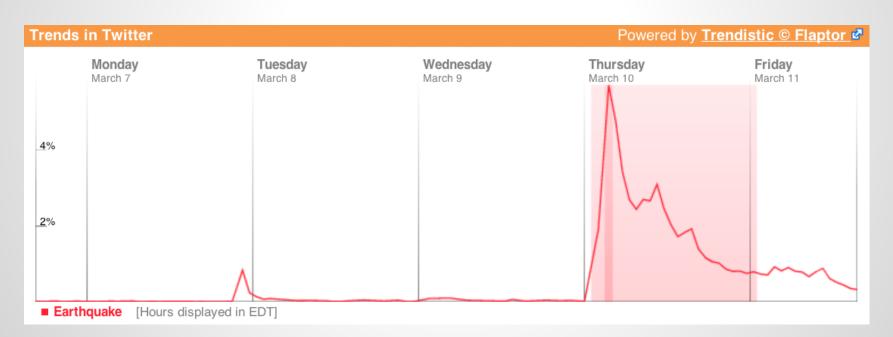
How many relevant tweets are needed to successfully sense that an earthquake has occurred? Is this process faster than how quickly scientific organizations release their findings?

3 Sources of data:

Past (Social), Present (Social), Present (Scientific)

Past Social Data

Historically twitter activity responds to earthquakes.



Video

| - M6.6 - Manokwari, 01:16:54 UTC. 84km | Tweets Each Hour (UTC time): | |
|--|------------------------------|------------------|
| kwarl | 7007455 37070 | |
| ere may be a earthquake ile) which will happen in the sia to be flooded. | 00:00 622 | |
| | 01:00 914 | |
| | 02:00 507 | |
| | 03:00 430 | |
| | 04:00 403 | |
| | 05:00 452 | |
| | 06:00 313 | |
| | 07:00 708 | |
| 5.9 earthquake, near the ndonesia. Apr 21 10:16am | 08:00 673 | |
| | 09:00 625 | |
| | 10:00 1238 | |
| | 11:00 474 | |
| | 12:00 449 | |
| apan ido, Japan region, Apr 21 | 13:00 496 | |
| | 14:00 289 | |
| | 15:00 297 | 1200000000000000 |
| | 16:00 502 | Date: Saturda |
| (15m ago, 95km SE of | 17:00 277 | Magnitude: 4. |
| http://t.co/2XckB8FJ* | 18:00 545 | Region: Hokka |
| | 19:00 387 | |
| | 20:00 422 | |
| Boo: In friendship and | 21:00 467 | |
| ed by the earthquake and | 22:00 501 | |
| | 23:00 557 | |
| http://t.co/8378ZTdp | (T-17-50)(0.35-1/) | |

Social Quake Website

 Provides scientific data by using a CSV feed provided by USGS.

Provides the social data determined from the Social Quake script.

 Provides current EQ-related tweets organized by the top three most active regions.

What We Created



Quake Activity on Twitter: HIGH

22-04-2012 18:39 UTC



Recent Tweets

Indonesia

RT @siwon407: Shocked & saddened to hear an earthquake has affected a country & people close to my heart. Indonesia, you're in my though ... --anggun_charie

Earthquake: Summary - M6.6 - Manokwari, Indonesia 2012-04-21 01:16:54 UTC. 84km (52mi) SSE from Manokwari,... http://t.co/AEXIyIu1

--RoadWarriors360

SOS news: probably, there may be a earthquake (9.0 on the Richter Scale) which will happen in the ocean, causing Indonesia to be flooded.

RT @NewEarthquake: 6.9 earthquake, near the north coast of Papua, Indonesia, Apr 21 10:16am

Japan

4.8 earthquake, Hokkaido, Japan region. Apr 21 11:29pm at epicenter (15m ago, 95km SE of Sapporo, depth 94km). http://t.co/2XckB8Fj"
--reliefdotlife

Hope For Japan Beanie Boo: In friendship and support of those affected by the earthquake and tsunami in Japan, T... http://t.co/8378ZTdp --conocabas

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Dear human species, Japan quakes are manmade!http://bit.ly/iiM8G0 #Politics #911 #9_11 #311 #3 11 #iapan #earthquake #CNN #Jewish

Alaska

#earthquake: M 1.5, Central Alaska http://t.co/sbwimDWq

Real time USA Earthquake details Magnitude 1.5, Central Alaska http://t.co/MbyqglCp

Social Data

Earthquake Tweets Today: 12548

Probable Earthquake Locations:

Indonesia: 5013 Japan: 458 Alaska: 435

Tweets Each Hour (UTC time):

00:00 --- 622 01:00 --- 914 02:00 --- 507

03:00 --- 430 04:00 --- 403 05:00 --- 452 06:00 --- 313 07:00 --- 708

08:00 --- 673 09:00 --- 625 10:00 --- 1238 11:00 --- 474 12:00 --- 449

13:00 --- 496 14:00 --- 289 15:00 --- 297 16:00 --- 502

17:00 --- 277 18:00 --- 545 19:00 --- 387

19:00 --- 387 20:00 --- 422 21:00 --- 467 22:00 --- 501 23:00 --- 557

Scientific Data

Indonesia

Date: Saturday, April 21, 2012 01:16:52 UTC Magnitude: 6.6 Region: near the north coast of Papua, Indonesia

Japan

Date: Saturday, April 21, 2012 14:29:37 UTC Magnitude: 4.8 Region: Hokkaido, Japan region

Alaska

Date: Friday, April 20, 2012 23:56:23 UTC Magnitude: 3.8 Region: Central Alaska



How social quake works

- 1. We gather all earthquake related tweets through TweetStream in real time.
- 2. Filter out common words such as titles of songs with earthquake in them.
- 3. Relevant tweets get added to an hourly total of mentions. If a city/state/geolocation is mentioned in a tweet then we also record its location.

How social quake works

4. If an hourly total is larger than expected then we consider an EQ to have occurred.

5. The social data is uploaded to SocialQuake's website in real time.

Methods Used

- . Tweetstream + Python + Php
- Gathered common tweets relating to earthquakes
- Filtered out unrelated earthquake words
- Created a counter to measure the amount of Tweets per hour and per day
- Analyzed tweets to find mentioned location
- Built a scale to define quake activity that is based on a grounded theory approach (Glaser Strauss 1967)

Results

- Determined when and where an earthquake occurs through social data.
- Social data was able to report the location of an earthquake that confirmed scientific data, sometimes before scientific data from USGS was released

Conclusion and Future Work

Conclusions

- Created a functioning website that determines location and time of an earthquake, displays top 3 earthquakes each day, and relevant tweets for the data.
- Gathered common earthquake tweets in one central location

Conclusion and Future Work

Future Work

- Should look at the correlation between tweet mentions and the magnitude of the earthquake being talked about.
- At what point in strength on the Richter scale do people start to tweet about the earthquake in significant numbers?
- Should we not mention earthquakes in our scientific data if it doesn't meet that threshold?

Questions?

Comments?