

SOCIAL MEDIA INCIDENT STREAMS

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#PSCR2021





SOCIAL MEDIA and SAFETY EMERGENCIES

- People reach out for help on social media during emergencies.
- But public safety doesn't have the capability to monitor social media.
 - Hashtags and keywords have high volume, spam, irrelevant information
 - Lots of "thoughts and prayers"
- Can better systems find critical, actionable information in social media?
- Can they get that information in front of who needs to see it?





SOCIAL MEDIA INCIDENT STREAMS

The Social Media Incident Streams (SMIS) project promotes the development of software that can help public safety personnel manage social media as an actionable source of information.





TEXT RETRIEVAL CONFERENCE (TREC)







5 -S C **DATA RELEASE** CHALLENGE CONFERENCE **SIGN UP EVALUATION**

Participants register to take part in TREC

NIST releases the

tweet data

Participants develop systems to predict categories and priority

NIST measures the effectiveness of participant systems

After the TREC meeting in November, the data is released to the public

TREC PROCESS





The TREC Social Media Incident Streams (TREC-IS) track has three goals:

- Develop and share high-quality data
- Incubate R&D for social media monitoring
- Develop measurement tools to drive improvements

trecis.org





EVENT TWEET SOURCES











SELECTING TWEETS TO ANNOTATE

- For 2018 2020, we down-sampled the tweets we collected to an amount that we could fully annotate prior to the challenge.
- Starting in 2020, we moved to post-challenge annotation:
 - NIST releases the full messy tweet sets
 - Participants classify and prioritize the tweets
 - NIST pools tweets according to their classification scores and predicted priorities up to the amount we can afford to annotate
 - The pool is fully annotated
- Post hoc pooling is known to make better datasets for measuring search.







- Each annotated tweet gets one or more labels from this taxonomy
- Top 6 categories:
 - people requesting services
 - search and rescue
 - information needed
 - calls for volunteers
 - calls for donations
 - telling people to leave an area
- Other categories that differentiate useful tweets and are useful for post-event analysis of response





PRIORITY

- Each tweet is labeled with a priority that is independent of the assigned categories.
- Does this tweet need immediate attention from emergency personnel, or can it wait?
- This is highly correlated with category, but the category doesn't imply the priority.

Critical (Notify immediately) High (Should be viewed by officer) Medium (Can be viewed later)

Low (Can be safely ignored)





SYSTEM STATUS / [404 REMAINING] AWAITING INPUT: SELECT RELEVANT CATEGORIES OR MARK AS UNINFORMATIVE

SEVERE TROPICAL STORM TRAMI, KNOWN IN THE PHILIPPINES AS TROPICAL STORM MARING, WAS A TROPICAL CYCLONE THAT BROUGHT HEAVY RAINS TO TAIWAN AND EAST CHINA DURING MID-AUGUST 2013. THE USER IS A RESPONSE OFFICER RESPONSIBLE FOR METRO MANILA, ONE OF THE THREE DEFINED METROPOLITAN AREAS OF THE PHILIPPINES. WIKIPEDIA PAGE









- For 2020, we added 29 new events, for a total of 75 events:
 - Wildfires
 - Hurricanes/Typhoons
 - Earthquakes
 - Floods
 - Shootings
 - Storms
 - Bombings
 - Hostage situations
 - Accidental explosions
 - Structural fires
- And ... COVID outbreaks from 11 cities!





WHAT'S DIFFERENT WITH COVID?



Mr))) PSCR

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SYSTEM PERFORMANCE





15



WHY IS THIS HARD?

- Classifying tweets is hard because they are short and informal.
 - And that means that longer, more formal tweets from news agencies are the easiest to spot.
- The public safety ontology has lots of categories, with a wide range of prevalence.
- Predicting the priority of a tweet is even harder than classifying it.





ONWARD TO TREC 2021

- Already have 20+ new events in hand.
- Fourteen teams have already registered to participate.
- Our paper, "Incident Streams 2020: TREC-IS in the Time of COVID-19" will appear at the *International Conference on Information Systems for Crisis Response and Management* (ISCRAM 2021).





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- The NIST PSCR program and its Analytics Portfolio
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- TREC SMIS participants 2018 2020:

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Epistoc	CAS	IIT Varanasi	IRIT
NJIT	NYU	U de Jaen	U de Alicante
Beijing U Tech	Chonbuk Nat'l U	U Glasgow	UMD
UF de Minas Gerais			





THANK YOU

For more information:

- contact <u>ian.soboroff@nist.gov</u>
- <u>trecis.org</u> for more about TREC-SMIS
- <u>trec.nist.gov</u> for more about TREC

