





RAPID: Collaborative Research: Data Mining and Fusion between Unmanned Aerial Systems and Social Media Technologies to Improve Emergency Operations

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Objectives

- Emergency operation centers (EOCs) are tasked to rapidly and accurately collect and process data in order to make informed decisions to concerned agencies and stakeholders during natural hazards.
- A fusion of innovative technologies is envisioned to help EOCs efficiently conduct tasks during natural disasters.
- Our long-term goal it is to identify roadmaps on how to mine, integrate, and disseminate information from UAVs, social media, and other technological platforms for EOCs to make informed decisions and quickly bring communities and cities back to normalcy.



Social Media Data Acquisition and Collection

- Datasets were collected during several named hurricanes to preserve perishable social media data.
- Dataset purchased: Hurricane Barry (7/6/2019 7/27/2019), based on relevant keywords, approximately 850K Tweets.
- Datasets collected from real-time stream API.
- Hurricane Laura (8/26/2020 9/12/2020):
 - ❖Based on hurricane-related keywords: 150M Tweets
 - ❖Within 25 miles of Beaumont, TX: 840K Tweets
 - Within 25 miles of Lake Charles: 1.1M Tweets
- Hurricane Dorian (8/30/2019 8/31/2019), based on relevant keywords, 76M Tweets.



Text-mining Data Cleaning and Filtering

 Hurricane Harvey data available from Co-PI Nina Lam was used to test the objectives on infrastructure damage.

Filtering step	Number of tweets	% of total
Dataset previously purchased from Twitter using Hurricane Harvey-related keywords for 08/17/17 – 09/07/17 (3 weeks)	45.5M	
Filtered the full dataset using 68 infrastructure-related keywords	12.3M	100%
Original tweets with user profile locations in Texas and Louisiana (retweets, spam and automated tweets removed)	268.8K	2.2%
Tweets found in filtered dataset with at least 1 photo or video attached	22.7K	0.2%

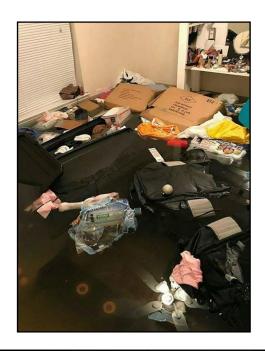




Text-mining Data Cleaning and Filtering

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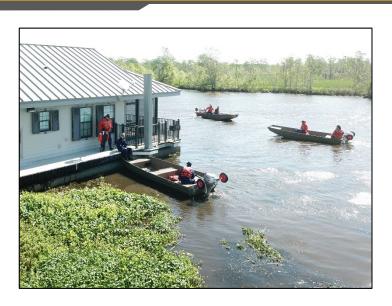






Outreach to EOCs and First Responders







- Disseminate information to save lives during hurricanes and limit misinformation.
- Facilitate community resilience by allowing quick damage assessments and recovery claims of physical and social infrastructure.
- Improve efficiency and effectiveness of search and rescue through UAVs.
 Assist U.S. Coast Guard for upcoming 2021 hurricane season.
- Participate in the Louisiana Governor's Office of Homeland Security and Emergency Preparedness operations during 2021 hurricane season.

