



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%



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.