

# Social Media Data Analysis for Disaster Management

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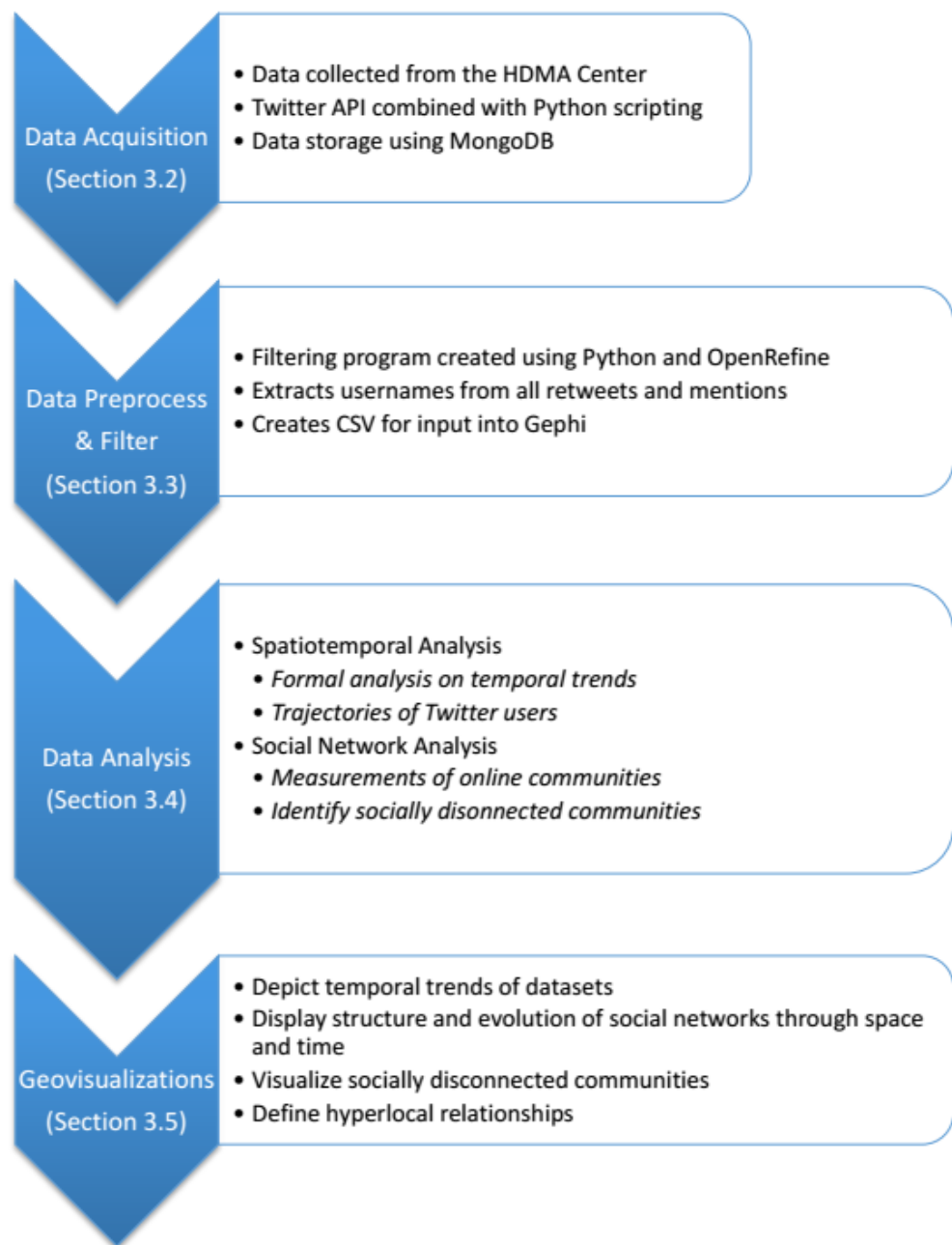
Summer Workshop

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# Situational Awareness and Realtime Monitoring

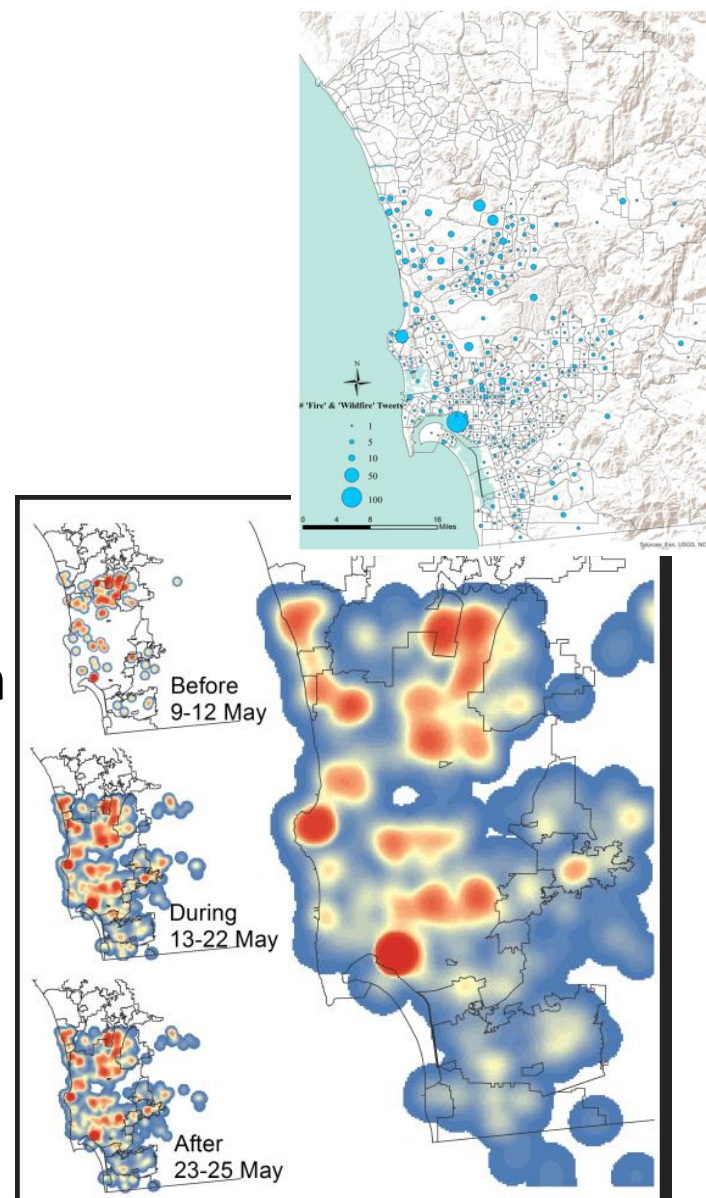
- **Situational awareness** is ‘information gathered from a variety of sources that can form the basis for incident management decision-making’
- **Real-time Monitoring of Social Media**
  - Combining geotagged tweets with content analysis
  - Real-time monitoring of disaster affected areas using social media can offer emergency responders direct information on
    - where people are
    - what people in the areas really need
    - where the assistance should be targeted right as it is needed.

# An example flow chart



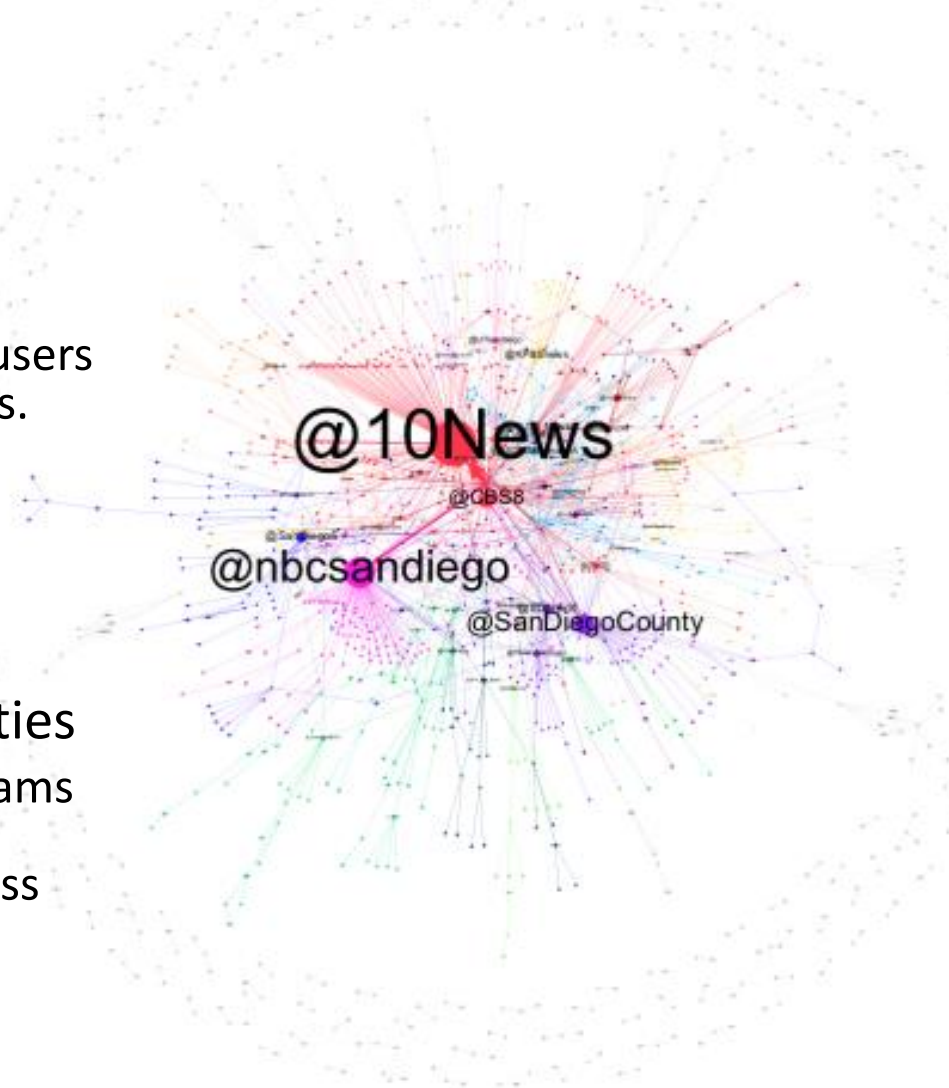
# Spatiotemporal Analysis - Hot Spots and Differential Maps

- **Hot Spots and Differential Maps**
  - Provides a group, macro-level analysis of the data
  - Analyzes the changes in Twitter activity over space and time
  - Helps in understanding which areas have active Twitter users, and which areas have a strong online presence in social media



# Spatiotemporal Analysis - Social Network Analysis

- **Social Network Analysis**
  - Social Network Graph
    - Nodes are identified as Twitter users and the linkages are their tweets.
  - Shows the structure of online networks that formed during disaster events
  - Detects the opinion leaders
  - Socially disconnected communities
    - Once identified, outreach programs can be expanded to ensure all people gain situational awareness and real-time updates



# Spatiotemporal Analysis - Trajectories of Individuals

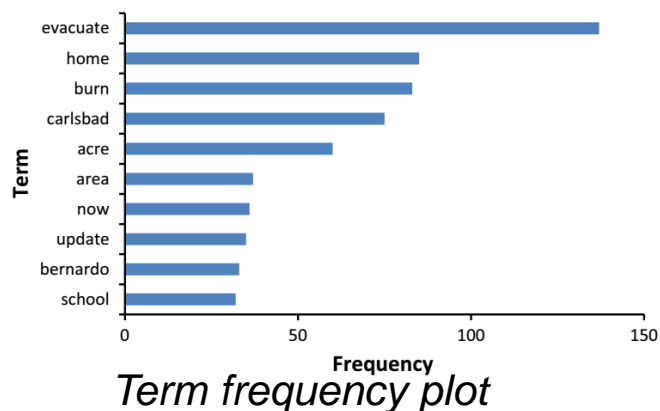
- **Trajectories of Individuals**

- Provides an individual, microlevel analysis of the data
- Shows human behavior and movement during disaster events
  - Where people go and when they get to their destination
- Helps response agencies in future decision making
  - When establishing shelters and distributing aid
  - Understanding people's response times to evacuation notices



# Text Mining – Identify Conversational Topics

- Identifying important terms and term clusters in subject-related tweets.
- Importance of a term is defined based on the frequency of its appearance in tweets.
- These clusters reveal the main topics in the subject-related conversations on Twitter
- Inform decision making by authorities.



Number	Term clusters
Cluster 1	know; thank; firefight
Cluster 2	home; Carlsbad; burn
Cluster 3	wind; Carlsbad; area
Cluster 4	Carlsbad; contain; acre
Cluster 5	burn; evacuate; 4S Ranch
Cluster 6	acre; burn; contain
Cluster 7	evacuate; home; Bernardo

*Term clusters in wildfire tweets*



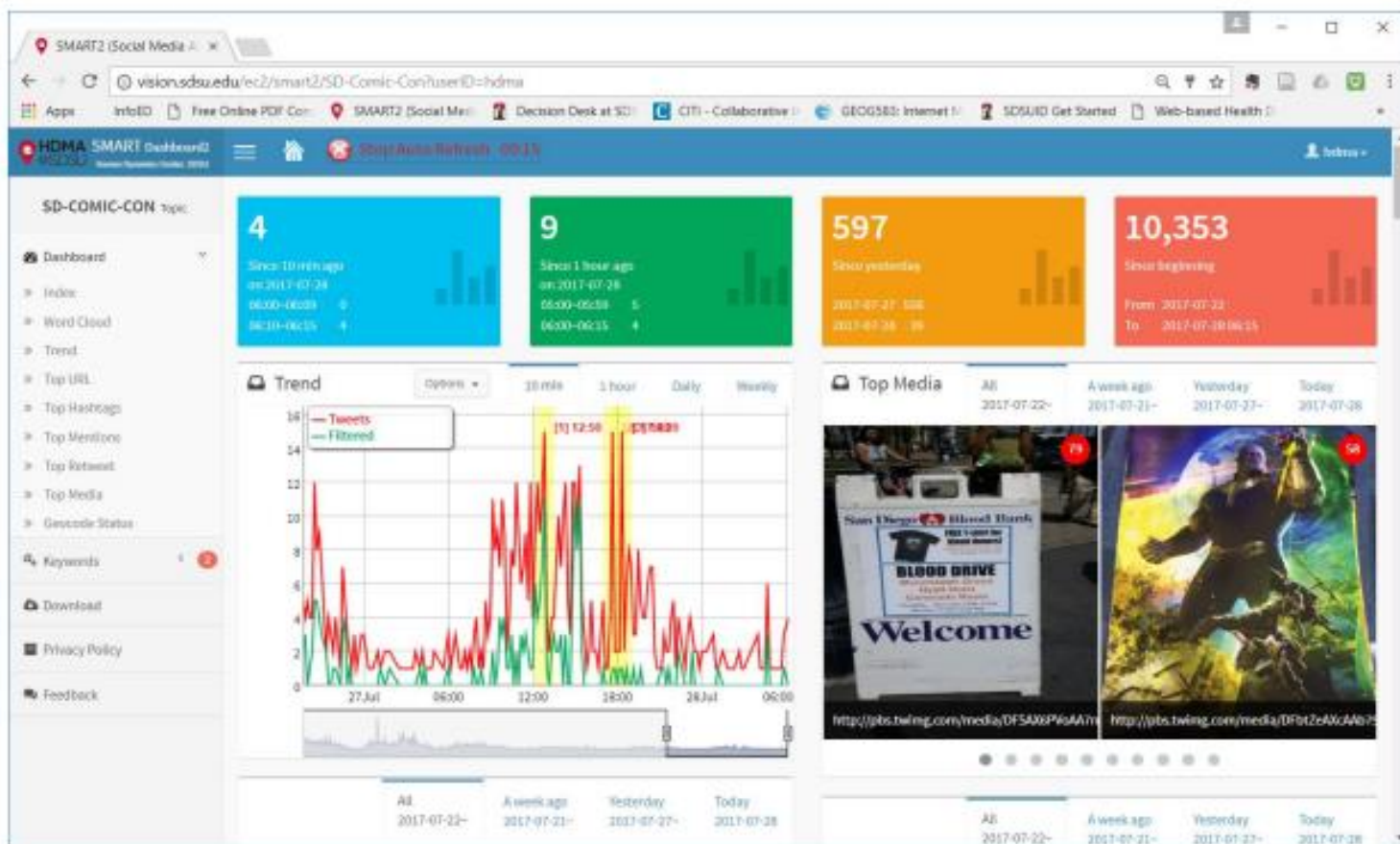
# Social Perception Analysis Model

- Supporting tool to assist with evacuation planning
  - Using San Diego wildfire historical data (e.g., San Diego wildfire 2014)
  - Semantic and trend analysis techniques to extract knowledge from social media
  - To understand evacuees' general perception, sentiments, and attitude toward evacuation-related subjects
  - The extent of social confirmation of the official warnings and recommendations
  - Which channel gets more notice
  - To provide guides on the frequency of the warnings and recognizing the boundary between adequate warnings and over-warning situations or excessive fear appeals.
  - Keywords and semantic features relevant to wildfire evacuation



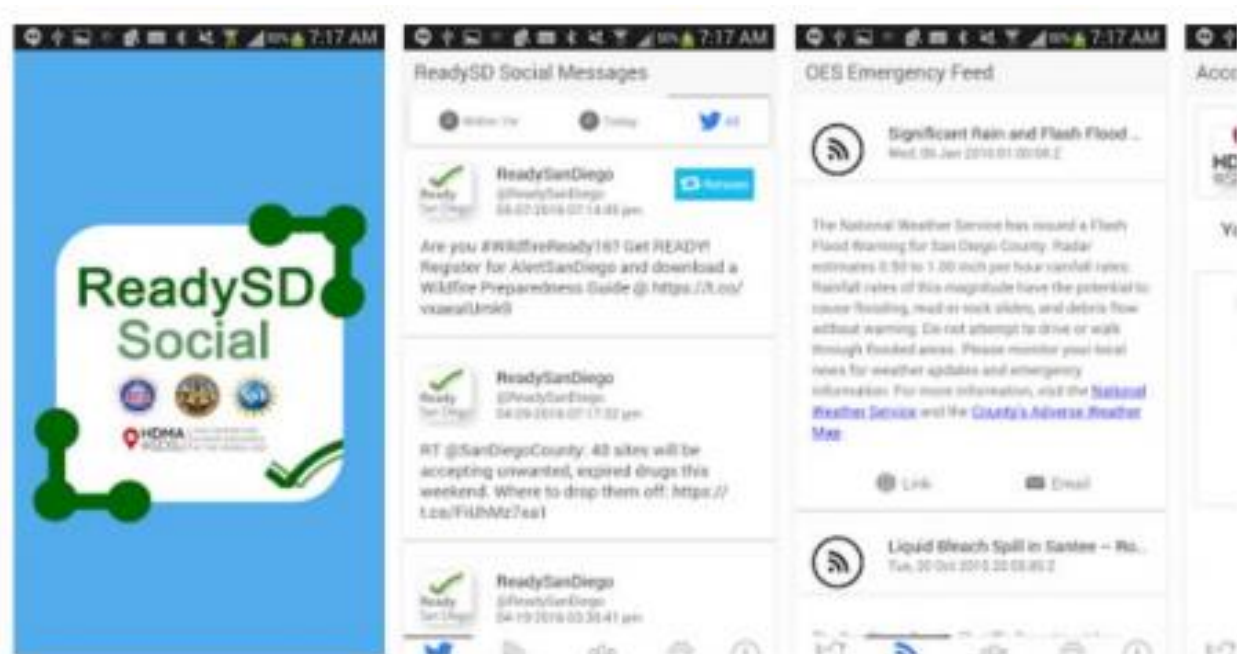
# Build a public opinion monitor

- Social Media Analytics Research Testbed (SMART) dashboard



# Create a resident feedback

- SD Emergency mobile app
  - Update and improve social perception analysis model
    - 1000 volunteers
    - Analyzing direct feedback and comments from registered volunteers



# Questions?

