

# Crisis Eyewitness Tweets Classification

Hongmin Li

Department of Computer Science, Kansas State University

# Social Media - Important Tool during Emergencies

First hand information, rescue requests etc. - useful for first responders gaining situation awareness and planning rescue operations

## FAMILIES OF PEOPLE MISSING AFTER HURRICANE MICHAEL TURN TO SOCIAL MEDIA FOR CLUES

By NBC News · October 15, 2018



### How social media is reshaping disaster rescue



Published: January 2018

Facebook offers new ways to communicate in a crisis. Research reveals how to use it effectively.

## How Social Media Came To The Rescue After Kerala's Floods

August 22, 2018 · 4:48 PM ET

KAMALA THIRUGARAJAN

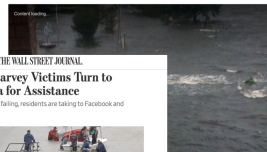


U.S. NEWS · 08/22/2018 03:05 pm ET · Updated Oct 14, 2018

## Hurricane Florence Flood Victims Turn To Social Media For Rescue

Government and civilian rescuers are working to get trapped people to safety in New Bern, North Carolina.

By Willa Pelt



THE WALL STREET JOURNAL

## Hurricane Harvey Victims Turn to Social Media for Assistance

With local 911 systems failing, residents are taking to Facebook and Twitter



People and rescue boats line a street at the east San Houston Turnpike as evacuations continued from flooding in Houston on Monday. PHOTO: MELISSA PHILLIPS/ASSOCIATED PRESS

By Deepa Senthikumar and Georgia Wells

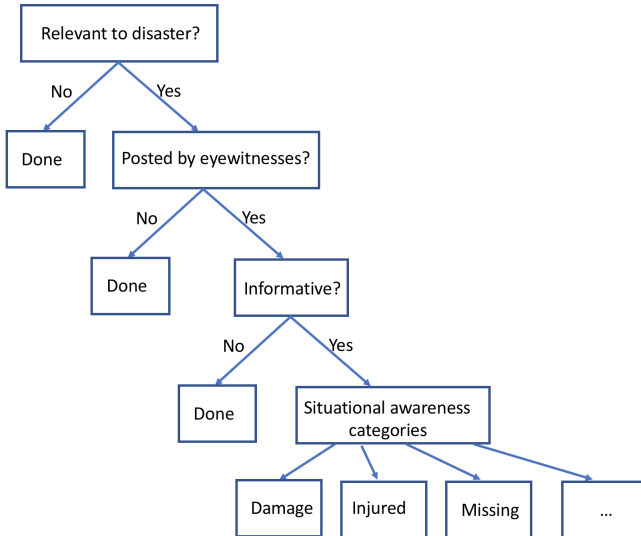
Aug. 29, 2017 9:50 am ET

4 COMMENTS

## Problem: Information Overload



# Auto-filtering to Reduce Information Overload



# Labeled Datasets

- CrisisLexT26
- Our own labeled data
- CrisisNLP Eyewitness dataset
- In total about 5,000 English eyewitness tweets for mainly disasters of Earthquakes, Floods, Hurricanes and Wildfires

# Labeled Datasets

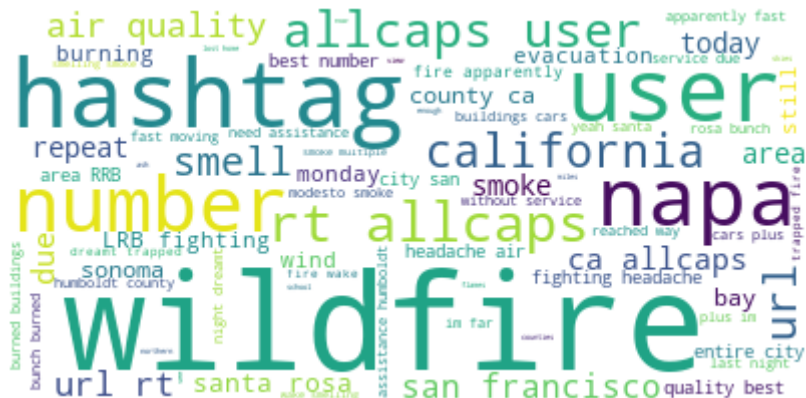
| CrisisLexT26              | Eyewitness | Non-eyewitness | Total |
|---------------------------|------------|----------------|-------|
| 2013_Alberta_floods       | 235        | 736            | 971   |
| 2013_Queensland_floods    | 144        | 781            | 925   |
| 2013_Australia_bushfire   | 95         | 853            | 948   |
| 2012_Colorado_wildfires   | 66         | 886            | 952   |
| 2013_Colorado_floods      | 65         | 854            | 919   |
| 2013_LA_airport_shootings | 42         | 878            | 920   |
| 2013_West_Texas_explosion | 26         | 873            | 899   |
| 2013_Boston_bombings      | 13         | 901            | 914   |
| Total                     | 686        | 6762           | 7448  |

| Our labeled           | Eyewitness | Non-eyewitness | Total |
|-----------------------|------------|----------------|-------|
| 2017_California_Fire  | 42         | 2552           | 2594  |
| 2017_Harvey_Hurricane | 313        | 4568           | 4881  |
| 2017_Irma_Hurricane   | 260        | 8789           | 9049  |
| Total                 | 615        | 15909          | 16524 |

| CrisisNLP-Sample 1 | Eyewitness | Non-eyewitness | Total |
|--------------------|------------|----------------|-------|
| Floods             | 148        | 113            | 261   |
| Earthquakes        | 367        | 321            | 688   |
| Hurricanes         | 296        | 100            | 396   |
| Total              | 811        | 534            | 1345  |

| CrisisNLP-Sample 2 | Eyewitness | Non-eyewitness | Total |
|--------------------|------------|----------------|-------|
| Floods             | 627        | 551            | 1178  |
| Earthquakes        | 1600       | 200            | 1800  |
| Hurricanes         | 465        | 1199           | 1664  |
| WildFire           | 189        | 1379           | 1568  |
| Total              | 2881       | 3329           | 6210  |

## 2017 California WildFire







# Supervised Learning

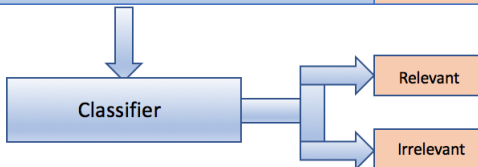
## Labeled dataset

|   |            |
|---|------------|
| Large road signs down over I-37 near Corpus. #ksatwx #harve       | Relevant   |
| #HurricaneHarvey At least one dead in Texas, more casualtie       | Relevant   |
| Currently stuck on Monroe.... R.I.P my truck... #HurricaneHar     | Relevant   |
| I've got a water stain the size of Texas on my shirt so that's co | Irrelevant |
| 10/30-11/2 Water Infrastructure Conference happening in #Housto   | Irrelevant |

# Supervised Learning

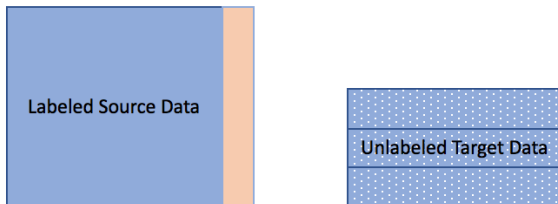
Learn a classifier

|   |            |
|---|------------|
| Large road signs down over I-37 near Corpus. #ksatwx #harvey        | Relevant   |
| #HurricaneHarvey At least one dead in Texas, more casualties feared | Relevant   |
| Currently stuck on Monroe.... R.I.P my truck... #HurricaneHarvey    | Relevant   |
| I've got a water stain the size of Texas on my shirt so that's cool | Irrelevant |
| 10/30-11/2 Water Infrastructure Conference happening in #Houston    | Irrelevant |



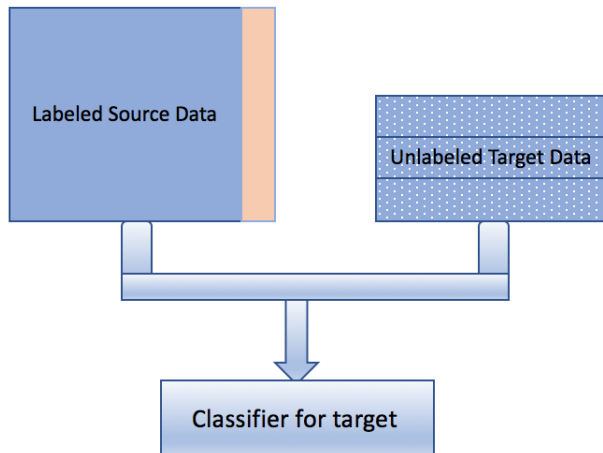
# Domain Adaptation

Labeled source data and unlabeled target data



# Domain Adaptation

Learn a classifier for the target



# Final Goal

- We can build one model for each type of disaster in the training set separately or combine all available eyewitness tweets to just build one model which hopefully can achieve comparable results
- Build a web app with the best classification model
- Integrate Twitter API to allow users to search real-time filtered eyewitness tweets when a disaster occurs

Thanks for your time

Questions?