Smart Mobilization System

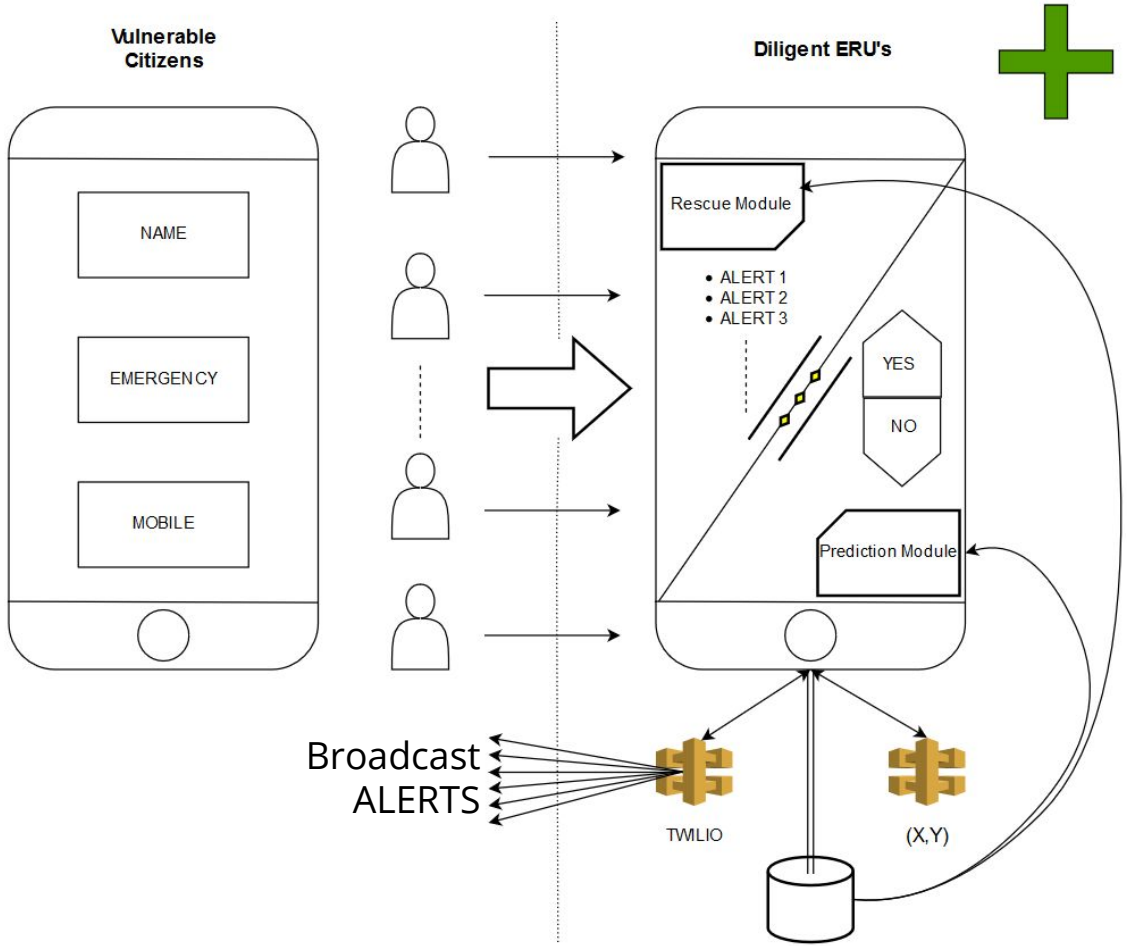
Aaryan Oberoi
Murali Nandan N
Rajal Nivargi
Jay Vyas

Storyline

A natural calamity has just hit the east coast. The devastation is inexpressible and the response teams have been on high alert. Huge number of victims have been requesting help online directed towards friends and authorities. A team from PSU brought a “smart mobilization system” to aid the response teams. All the users sending the emergency appeals are now channeled through a central App and a “cool” NLP module is helping the teams to direct the required help towards the victims. All without any hassle. Furthermore, the team has helped the ERU (Emergency Response Units) with a wildfire in no time. No wonder, the team has won many hearts and definitely won the HackPSU.

Problem Statement

- Lack of a rich information communication system between the rescuer and the victim at risk to identify the immediate aid services required
- A problem worth solving as at the times of calamity, in a chaos, even the best of response teams are bound to human error in panic. A smart system like ours will be working hand-in-hand to aid the response teams for better decisions.
- Help reached to a victim at right time can save their life. We are sure it's priceless.


Vulnerable Citizens
Diligent ERU's
NAME
EMERGENCY
MOBILE
Rescue Module
• ALERT 1
• ALERT 2
• ALERT 3
YES
NO
Prediction Module
Broadcast ALERTS
TWILIO
(X,Y)

DATASETS - NLP

- Open Source data - tweets & posts from Twitter and Facebook (Unlabelled)
- Hashtag data - Cleaned and dumped into a corpus. (Unlabelled)

FIGURE-EIGHT

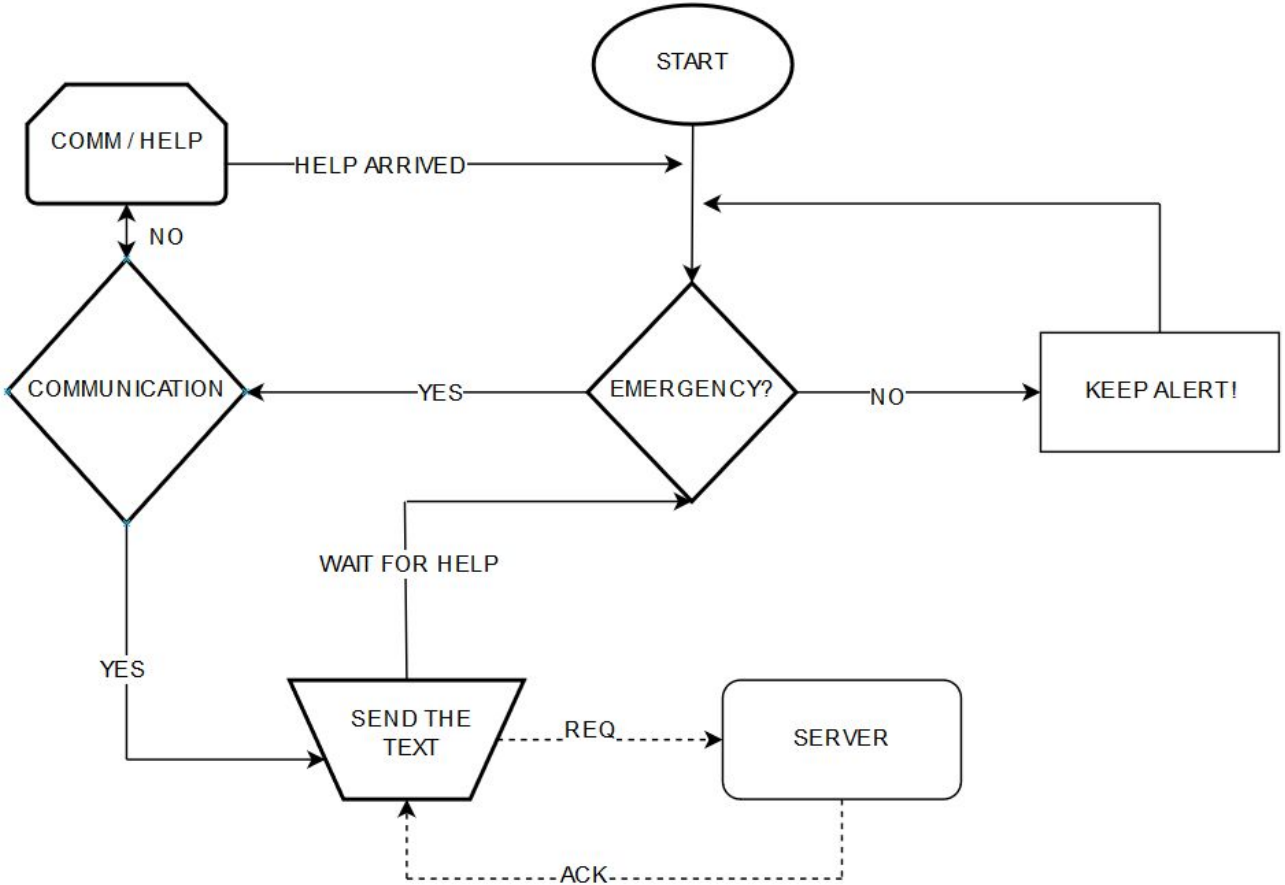
- Semi-Supervised labelling of the huge data corpus (Labelled)
- Tagging messages with limited set of keywords. (Labelled)

DATASETS - DISASTER PREDICTION

- Open Source data - Data of wildfires taken from satellites and drones.
- Geospatial data - heat maps of regions prone to wildfires.

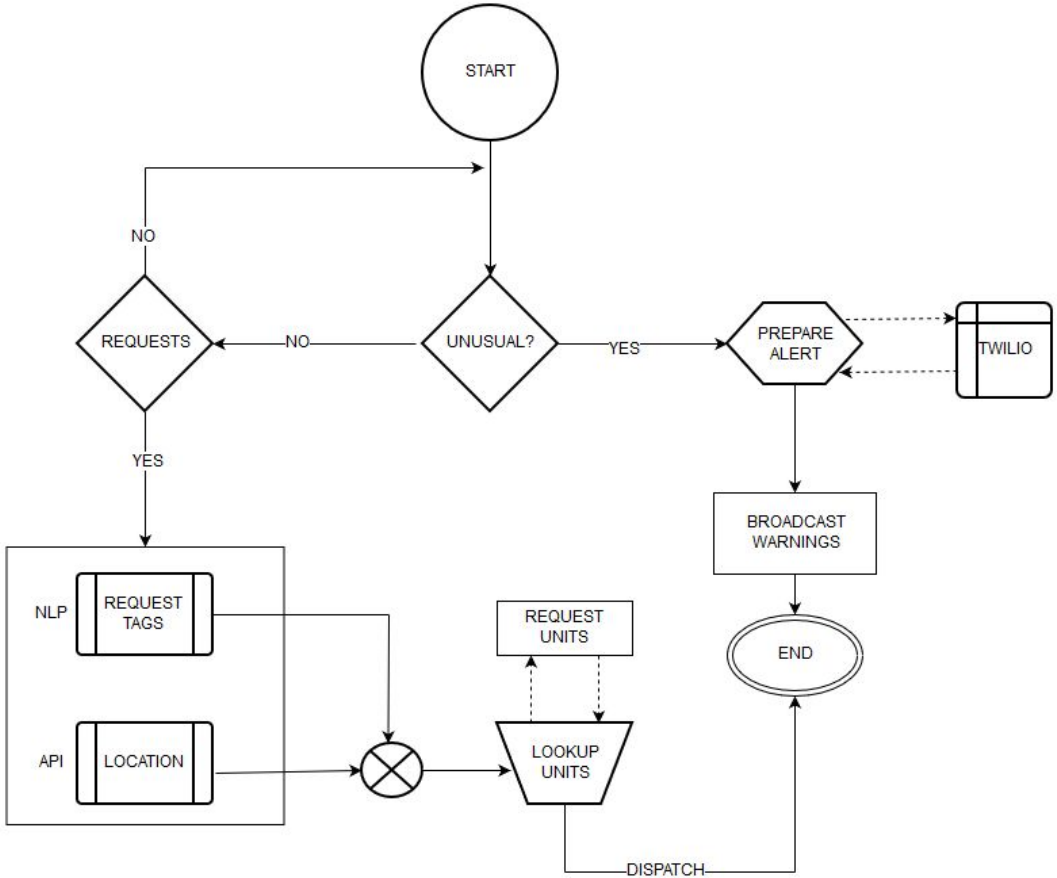
This dataset is totally labelled data. A train-validation-test split was performed to train with a CNN.

Each training example - (Image,Label if its a wildfire or not)


START
COMM / HELP
HELP ARRIVED
NO
COMMUNICATION
YES
EMERGENCY?
NO
KEEP ALERT!
WAIT FOR HELP
YES
SEND THE TEXT
REQ
SERVER
ACK

Method - Message Annotation

- Cleaned the messages for removing numbers and special characters.
- Tokenized the messages and the stop words are removed.
- Further cleaning to split the hashtags into a complete sentence.
- Processing to get full sense of known abbreviations.
- Labelled data trained with a GridSearchCV model.
- Any new emergency request will now be annotated with appropriate tags.


START
NO
REQUESTS
NO
UNUSUAL?
YES
PREPARE ALERT
TWILIO
YES
BROADCAST WARNINGS
NLP
REQUEST TAGS
API
LOCATION
REQUEST UNITS
LOOKUP UNITS
END
DISPATCH

Method - Disaster Prediction

- Limiting the disaster to Wildfires for the scope of HackPSU.
- Labelled Images are trained on a CNN.
- Binary Cross Entropy Loss and RMSProp.
- Polling satellite data periodically to make predictions based on the learned features.
- Responding to the prediction by broadcasting safety alerts to all the citizens in the vulnerable areas.

LAMP Stack

- Hosted a local server on apache.
- MySQL database for all the citizen, appeal data and annotations.
- PHP as a backend

Future Scope

- Use the data from other geospatial data sources and build a robust model for other calamities.
- Have a feedback system that works between the citizens and rescue organizations.
- Model to learn the address from the emergency appeals made by the citizens.

Thank you