Problem Statement

Emergencies and disasters impact population's health. Public health plays a critical role in working with health and non-health sectors responsible for preparing for and responding to emergencies. In emergencies, large numbers of people may require medical attention. Health care systems may be overstretched, and public order may be threatened. Hence, we want software solution such that social media can be used in public health emergency response. Such tool/page/plugin should have the below capabilities.
(1) Alarm message during emergencies
(2) Providing precautionary steps to be taken during emergency/disasters
(3) Help in finding nearby available healthcare systems
(4) Providing First aid/primary steps to be taken/provided to patients, in case of emergencies/disasters.

Problem keywords :

- Public health during emergencies .
- Medical attention needed by huge population.
- Health care system may be over stretched .
- Public order disruption.

Urgency for Solution

1. Increase in frequency of Disasters on Global Scale due to rapid onset of climate change.
2. Huge loss of human lives due to exponential increase in population
3. Non existence of proper software solution to build a connection between people in crisis and people out of crisis.

Interpretation of problem statement

Primary responders are either capable people inside the affected area or the people nearest to the affected zone.

Official help arrives with a delay and then coordinates with the already formed self help groups or carries out SAR with coordination among locals (information).

Part of making sure Health Care is maintained during vulnerable times is to provide a channel where information about availability of Official and Civilian owned resources is made available to everyone and that channel is open for updation to every citizen who can be of help .

Building of Solution

Various hierarchies of information exchange exist of during disaster. These include:

1. Agency to Agency
2. Agency to Community
3. Community to community

These are often not coordinated and cause delay in calculation and execution of disaster response.

This solution will bring forth all these hierarchies to a common ground.

Solution continued...

1. **SITUATIONAL AWARENESS**
    a. Analyzing the inputs received from social media in real time and confirming the authenticity of disaster.
    b. Visualization of information in real time.

2. **Intelligent use of Available Resources**

    a. Reporting by those affected in ongoing calamity by indicating availability / scarcity of Medical and Health related resources.
    b. Reporting immediate danger to life.

3. **Interaction and coordination of Govt. Agencies with the people in and around disaster area to optimize medical relief.**

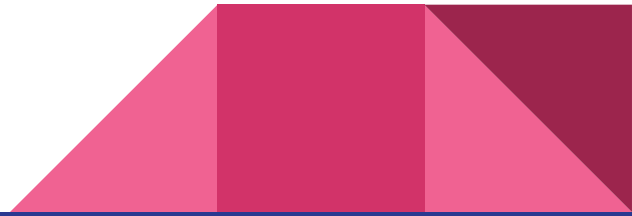
Solution Pipeline

Fetch API

1. Data Collection
2. Data Preprocessing
3. NLP model to extract relevant information {Need, Availability} of resources.
4. Storing information in relational database on cloud {AWS RDS MYSQL instance}

Query API

1. Continuous polling database for updates.
2. Interactive mapping of information on web app.



Before cleaning

#NepalEarthquake ... Contact: 9863758273!! I can accommodate 5 people in Mirkot, Nepal

After Cleaning

nepalearthquake contact 9863758273 i can accommodate 5 people in mirkot nepal

After Tokenization

["nepalearthquake", "contact", "9863758273", "i", "can", "accommodate","5","people","in","mirkot","nepal"]

Code Snapshots

Importing libraries

```
from tweepy import API
from tweepy import Cursor
from tweepy.streaming import StreamListener
from tweepy import OAuthHandler
from tweepy import Stream

import credentials, keywords

import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import re
import json
import string
import pymysql
from sqlalchemy import create_engine

import nltk
from nltk.corpus import state_union
from nltk.tokenize import PunktSentenceTokenizer
```

Building Connection

```
class TwitterAuthenticator():

    def authenticate_twitter_app(self):
        auth = OAuthHandler(credentials.CONSUMER_KEY, credentials.CONSUMER_SECRET)
        auth.set_access_token(credentials.ACCESS_TOKEN, credentials.ACCESS_TOKEN_SECRET)
        return auth

class TwitterStreamer():
    """
    Class for streaming and processing live tweets
    """
    def __init__(self):
        self.twitter_authenticator = TwitterAuthenticator()

    def stream_tweets(self, fetched_tweets_filename, hash_tag_list):
        #this handles twitter authentication and the connection to the Twitter Streaming API
        listener = TwitterListener(fetched_tweets_filename)
        auth = self.twitter_authenticator.authenticate_twitter_app()
        stream = Stream(auth, listener)

        stream.filter(track = hash_tag_list)
```

What's New !

1. Interactive dashboard for disaster management.
2. Live mapping of people to be tracked by Formal as well Informal

   Emergency Responders.
3. Fast responsive forum aiming to directly connect with people.
4. Login portal for Government Organizations to act according to the available information.

For eg: If food is available on the way between FER and people in need, no requirement of carrying the supplements beforehand thus reducing overhead and speed.

Challenges

1. Extraction of information from other social media apps such as Instagram, Facebook, Pinterest.
2. Training of model on the self-created dataset from previous disasters.
3. Tracking locations of people in need more accurately.
4. Introducing image recognition for photos of disaster.
5. Use of firehose API and other paid api to improve upon retrieval of information.