

Twitter based Disaster Response using Machine Learning

Rabindra Lamsal, T.V. Vijay Kumar

School of Computer and Systems Sciences, Jawaharlal Nehru University, New Delhi 110067

Special Centre for Disaster Research, Jawaharlal Nehru University, New Delhi 110067

rabindralamsal@outlook.com, tvvijaykumar@hotmail.com

Abstract

Twitter, a microblogging platform, receives real-time information via informal conversations and it has, accordingly, become the main source of data for research studies based on emergency situational awareness. Millions of tweets are posted on Twitter every day, and during disasters, the frequency of tweets relating to an ongoing crisis event grows exponentially. This unprecedented increase in the number of tweets during disasters needs to be monitored, identified, processed and analyzed, so that necessary measures can be taken at the earliest to reduce the loss or damage during emergencies. However, due to large voluminous data being available during crisis hours, it is almost impossible for a human to perform these tasks in real-time. NLP and Machine learning techniques can be used for processing Twitter data. In this regard, a semi-automated AI-based disaster response system for Twitter data is proposed. The proposed system monitors the Twitter feed for tweets specific to a crisis event, and whenever a new tweet is retrieved from the near real-time Twitter feed, the proposed disaster response system would be able to translate or transliterate the tweet, if required, pre-process the tweet and finally classify the tweet to the most appropriate class. The proposed system uses the Bag-of-words (BoW) model based on the TF-IDF term-weighting scheme. The classifier used by the proposed system is trained, on QCRI dataset, using classification-based machine learning algorithms namely Naïve Bayes, Logistic Regression, Random Forests, k-Nearest Neighbors and Artificial Neural Networks. The proposed disaster response system would be capable of extracting essential situational awareness information related to a disaster and would also be capable of sketching tentative area of critically affected population.

Keywords

Disaster Response, Machine Learning, Social Analytics