A Classification Model to Analyse the Spread and Emerging Trends of the Zika Virus in Twitter

*ABSTRACT*

*The recent trend in sharing critical information on social networks such as Twitter has been a motivation for us to propose a classification model that classifies tweets related to Zika and thus enables us to extract helpful insights for the community. In this paper, we try to explain the process of data collection from Twitter, the pre-processing of the data, building a model to fit the data and present some useful predictions and insights that will be helpful in the fight against the Zika virus.*

1. INTRODUCTION

The zika virus, is responsible for causing the Zika disease and is primarily carried by the *Aedes* species mosquito. The incubation period of the disease lasts for at most a week and has symptoms such as fever, rashes, headache and conjunctivitis.

Zika virus was declared as a Public Health Emergency of International Concern (PHEIC) by World Health Organization (WHO) on 1st February, 2016. At present, there are no cure such as vaccines or any other form of treatment for this disease and thus makes it a serious global health issue.

Social networking such as Twitter, Facebook etc. have often been treated as useful sources of information for community support on social outbreaks, especially on the global spectrum. Twitter is a popular micro blogging website where users interact socially by posting messages or so called ‘tweets’ on the Twitter platform. Twitter data has been previously been used for various data analysis such as sentiment analysis, event detection etc. and can be easily accessed by the publicly available Twitter API. Twitter is highly popular in mobile application throughout the world and the users can post tweets that can be considered as precise sources of information as they have a 140 character limit. Moreover, there are many verified accounts of reputed people, organizations and communities and thus add more credibility to the tweets.

**Pre-processing of the tweets:** The Twitter Streaming API was used to collect the most recent tweets. The tweets collected by the API are then pre-processed initially to make the later analysis easier. The URL’s, hashtags and user mentions are separated from the text in the original tweet. We also provide an initial analysis of the tweets such as showing graphically countries from where tweets related to Zika are being tweeted the most.

**Building the Classification Model:** After the pre-processing of the collected tweets, we divide our initial data set into training data set and testing data set having 67% and 33% number of tweets respectively. All the tweets in the training data set belong to either of the 3 classes – ‘fight and prevention’, ‘cure’, ‘infected and death’. We then use the Support Vector Machine (SVM) algorithm Naïve Bayes algorithm to train our data and evaluate the accuracy of our methodology using the training data set.

**Comparisons:** The accuracy of the SVM and Naïve Bayes algorithm is compared and then we justify why SVM was chosen as the final classification algorithm for the empirical model.

**Analysing Tweets and Community Support:** After building the intelligent model and determining the accuracy of the empirical model, we have demonstrated how social networks such as Twitter can be used to gather community support about diseases like Zika by analysing the classified tweets.

Few research has been done in building intelligent models for community support on social networking sites and thus our approach demonstrates one such novel method.