

Ph.D. Thesis Title

Efficacious Management in Long-Lasting Crisis Using a Data Driven Decision Support System Through Using Social Networks: A case Study of the COVID-19 Pandemic

Abstract

This research investigates the potential of AI to extract valuable insights from X (Twitter) social networks regarding the coronavirus disease of 2019(COVID-19) pandemic, particularly after the World Health Organization WHO's COVID-19 vaccination announcement. By employing advanced Machine Learning algorithms, our study aims to extract and analyze relevant information, sentiments, and trends from X messages to provide valuable insights for crisis management in the post-vaccination phase of the COVID-19 pandemic. We also attended to Twitter-based decision-making during the pandemic, incorporating sentiment analysis and regional considerations. The study presents the development of a fully automated data driven Decision Support System (DSS) that utilizes deep learning algorithms. To realize our DSS, a new machine learning-based framework for post-COVID-19 information mining has been proposed based on CNN, BiLSTM and FFNN model. So, users' opinions on selected topics could be extracted. The proposed solution was tested using X (Twitter) dataset. The best classification performance was achieved using BiLSTM, with an F1-score of 0.84 on the test set. An important aspect of our research is that the results is visualized to show country-wised opinion on the selected topics. The findings of this study are expected to contribute to the development of AI-powered decision support systems for effectively responding to public health crises and emergencies.

Keywords: AI, COVID-19, crisis response, WHO, vaccination, decision support system, public sentiment, real-time data analysis.