

ABSTRACT

Disasters in Indonesia have a high probability of occurrence because most of them are disaster-prone areas. High rainfall and located at the meeting point of three continental plates cause frequent floods and earthquakes. To reduce the impact of disasters, the disaster monitoring and mitigation system is needed so that the authorities can provide better disaster mitigation. This system is a web-based application that contains a dashboard for monitoring disaster data/graphics, tools for prediction and classification of disasters and tools for sending early warning messages via Telegram. In this research, the system is built using water level data, weather data, and earthquake data. Water level data and earthquake data are obtained from sensor measurements using Internet of Things (IoT) and weather data is obtained from weather data provider. The data needs to be processed to ensure that it can be used by the Deep Learning model with the Gated Recurrent Unit (GRU) algorithm to predict or classify disasters. Model testing can be done using test data to determine model performance. GRU model on flood prediction using the previous 24 hours of input data to predict the next 6 hours of output, resulting in an MAE evaluation score of 0.0349 or an error around 3.49%. GRU model on earthquake classification achieved an accuracy of 99.91%. The models that were built have achieved optimal evaluation scores and are implemented in a web-based Disaster Monitoring and Mitigation application using Streamlit. The flood prediction model has a weakness that it is unable to predict sudden increases in water, due to the limitation of training data that covers this condition.

Keywords: *Flood, Earthquake, Internet of Things, Recurrent Neural Network, Gated Recurrent Unit, Web*