ABSTRACT

Weather is one of the most unpredictable things in Indonesia. One of the factors is because Indonesia is an archipelago flanked by two vast oceans, the Indian Ocean and the Pacific Ocean. In addition, Indonesia, which is known as an "equatorial country", creates uncertainty and changes in weather movements very quickly. So, until now the Meteorology, Climatology and Geophysics Agency (BMKG) still has difficulty predicting the weather accurately. The Deep Learning approach is used to analyze and process weather data in this study. Observation data as many as 7 bands are used to generate 13 rain parameters that will be used as rain predictors. The deep learning algorithm used is the Long-Short Term Memory (LSTM) algorithm which is often used for processing data in the form of time series. This study provides a recommendation analysis of rain detection parameter combinations for heavy rain prediction and compares 1-hour and 2-hour heavy rain prediction models. This research uses a dataset of 8738 data from September 1, 2022 to October 31, 2022. The results found that two parameters, namely parameter 8 and parameter 9, have recommendations that should be considered for further data processing or prediction models. This is based on a silhouette value of 0.5 and a smaller BIC value when n clusters equal 3 in parameter 8 and 9 experiments, than several other parameter combinations. However, if you look at the accuracy results of the heavy rain prediction model made with 80% test data and 20% test data, the 2-hour prediction model is more recommended than the 1-hour model, with the best prediction model results being a combination of parameters 1, 2, 4, 10, and 11 with an accuracy of 87%. Further modeling using 3-hour modeling on a combination of parameters 1, 2, 4, 10, and 11 resulted in an accuracy of 88% on new test data. Modeling with a long time provides promising accuracy results but can provide large noise.

Keywords: Rainfall, Prediction, Long Short-Term Memory, Himawari-8 Satellite