

## **ABSTRACT**

*Geographically, Indonesia is an archipelagic country located in the Pacific Ring of Fire, which is the meeting point of three of the world's tectonic plates, including the Indo-Australian Plate, the Eurasian Plate, and the Pacific Plate. Indonesia, especially Java, is at high risk for earthquakes, requiring fast tracking of their source and magnitude. However, seismology in Indonesia still uses a traditional multi-station method, which is more time-consuming and complex. This is especially true in overcoming the challenge of the vast distances between stations in Indonesia, resulting in delays in issuing early warnings to the public. This study suggests using a single-station method with a 1D Convolutional Neural Network model to analyze earthquake centers from Java's seismic data (2009-2017), addressing delays caused by the long distances between Indonesia's stations. The focus of this study is on identifying effective data preprocessing methods and the development of a single station-based 1D CNN model using Mean Absolute Error (MAE) and R Square as evaluation metrics. The results from all scenarios in this study show that the data division technique using clustering based on location and normalization of seismic waves using Constant Scaler with a 10-second time window and without batch normalization in the model has successfully produced the lowest MAE with an overall MAE value of 0.0982. This corresponds to the highest R Square values for estimating longitude, latitude, depth, and magnitude, which are 0.669, 0.393, 0.221, and 0.714, respectively. Thus, this study can demonstrate significant capability based on its effectiveness in comparing performance in data processing scenarios, its success in achieving ideal standards for evaluation metrics, and its innovative approach in predicting earthquakes in the early warning system for earthquakes as an effort to mitigate disasters on the island of Java and surrounding areas.*

**Keywords :** *Indonesia, Earthquake Early Warning System, 1D Convolutional Neural Networks , Location Clustering, Windowing, Mean Absolute Error*