

ABSTRACT

The Earthquake Early Warning System (EEW) provides early warning to allow people to move to safer places and increase life safety in affected areas. This system works by detecting and predicting ground movements that occur are earthquakes or not. A system usually includes a combination of elements, such as sensors, communication equipment, data processors, and warning devices. The early warning system written in this thesis will show how the simulation of the Artificial Intelligence (AI) method can assist the system in determining earthquakes with the AI methods used are Artificial Neural Network (ANN) and Collective Intelligence (CI).

Collective Intelligence (CI) and Artificial Neural Network (ANN) are two Artificial Intelligence (AI) methods. ANN is a Machine Learning method that can change a machine/electronic device to learn from environmental conditions. This method allows the device to be able to decide what to do. CI can be described as information from a group of intelligent devices, which are then reprocessed and obtain even more innovative results or decisions. Before applying ANN to the prediction method, seismic signal processing is required first. Seismic signal processing produces the required features and can help or improve the accuracy of ANN in predicting earthquakes.

The combination of ANN and seismic signal processing can change a subsystem to be like an expert in his field, precisely predicting an earthquake. With CI, we can get a lot of information from intelligent devices. This thesis describes the influence of AI methods on earthquake prediction methods and early warning systems. The results obtained from the earthquake prediction method with ANN achieve an average testing accuracy of 81,67% and time to decision-making on the earthquake warning subsystem with ANN reaching 4 seconds.

Keywords : Earthquake Early Warning System, Collective Intelligence, Artificial Neural Network, Seismic Signal Processing