

ABSTRACT

EARTHQUAKE CLUSTERING IN INDONESIA USING DENSITY-BASED SPATIAL CLUSTERING APPROACH OF APPLICATIONS WITH NOISE (DBSCAN)

By

Nifelling Rosmelia Sandewa

21110014

Earthquakes are disasters that cannot be prevented and occur without warning. Apart from that, the location of the epicenter, time of occurrence and strength of earthquakes cannot yet be predicted precisely and accurately. Indonesia is at the meeting point of three of the world's major tectonic plates. Indonesia is also located within the Pacific Ring of Fire, which is one of the areas with high seismic activity in the world. Therefore, mitigation is needed to minimize the impact of earthquakes. One way to mitigate earthquakes is by processing data using clustering to determine the characteristics of the earthquake data. This research uses the Density-based Spatial Applications with Noise (DBSCAN) approach as an algorithm for clustering earthquakes in Indonesia. This research data is secondary data taken from the USGS website with a minimum limit of 2 to 10 mag, maximum depth of 700 km, in 2014-2023. The research produced eps 0.3 and MinPts 10 as the best combination of parameters, which resulted in three main clusters. Noise clusters include earthquakes with extreme magnitudes and depths that do not fit general patterns. Cluster 0 consists of shallow to medium magnitude earthquakes that are widespread in subduction zones and active faults. Meanwhile, Cluster 1 includes large and shallow earthquakes that have a high risk of disaster.

Keywords: DBSCAN, Clustering, Earthquake