

The detection of tectonic tremors relies heavily on the similarity and time lapse of the arrival of tremor bursts from multiple stations. Station coverage and density therefore, are the key factors on detection ability. In places where the tremor signals are weak in amplitude and short in duration, they were manually checked to exclude the small earthquakes swarm or loud noise, resulting in time-consuming and subjective determination of tremor catalogs. The big challenge now goes to the classification of tremor signals using single station. The advances of machine learning techniques allow an automatic search for patterns in large data sets. In this study we evaluate the performance of the simple supervised classifier, K-nearest neighbor (KNN), which classifies objects by a majority of votes to a training class, defining by the distance to the training examples.

Using three component broadband seismograms recorded by Broadband Array in Taiwan for Seismology (BATS) and a temporary array deployed on the southern Central Range between January 1 to September 16 of 2016, three classes of events were labeled including $M < 2$ local earthquakes, tectonic tremors, and ambient noise, with a total number of 291. Using 27 seismic features based on characteristics in waveforms, spectral content, energy concentration in frequency and time, we evaluated the performance of the KNN algorithm at 7 different stations. Applying a leave-one-out strategy to access the classification accuracy, we successfully differentiated tremors from local earthquakes and ambient noise with higher than 85% accuracy at each station.

