

Reduce False Alarm Due to Non-Earthquake Events for On-Site Earthquake Early Warning System in Schools

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An on-site earthquake early warning system (EWS) can provide more lead-time at regions that are close to the epicentre of an earthquake since only seismic information of a target site is required. The on-site system extracts some P-wave features from the first few seconds of vertical ground acceleration of a single station and then predicts the intensity of the forthcoming earthquake at the same station according to these features. However, the system may be triggered by some vibration signals that are not caused by an earthquake or by interference from electronic signals, which may consequently result in a false alarm at the station. In order to reduce false alarms caused by non-earthquake events and at the same time keep earthquake alarms, an approach based on Support Vector Classification (SVC) and Singular Spectrum Analysis (SSA) is proposed. The established SVC model are employed to classify the vibration signals and then a SSA criterion is added for identifying earthquake events that are classified as non-earthquake events by the SVC model with increased accuracy. The proposed approach is verified by using data collected from earthquake early warning stations of the National Center for Research on Earthquake Engineering (NCREE). The results indicate that the proposed approaches effectively reduce the possibility of false alarms caused by unknown vibration events.

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