EQ Alert: Using Smartphone for on-site earthquake early warning

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Large magnitude earthquakes continue to thread Taiwan and worldwide countries. Earthquake early warning (EEW) provides seconds to minutes of warning, allowing people to move to safe zones and automated slowdown and shutdown of transit and other machinery. Existing EEW systems only operating in a few nations, mainly due to the high cost for establishment and maintenance. Smartphones are prevalent to the populace and contain accelerometers that can also be used to detect earthquakes. In this study, a mobile application software called "EQ Alert" is developed to estimate peak acceleration of the coming earthquake using an artificial neural network with measured P-wave features of a single smartphone. The APP will detect the quality of the recorded acceleration signal automatically and apply suitable parameters. Shaking table tests are conducted to verify the feasibility of "EQ Alert". The results show that the APP can detect the event of an earthquake and predict the peak acceleration successfully during both the world's significant earthquake events and the Meinong earthquake in Taiwan.

Keywords: EQ Alert, on-site EEW, smartphone, peak acceleration, app