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Application of Real Time Recurrent Neural Network for Detection of Small Natural Earthquakes in Poland

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A b s t r a c t

This study is an application of a Real Time Recurrent Neural Network (RTRN) in the detection of small natural seismic events in Poland. Most of the events studied are from the Podhale region with a magnitude of 0.4 to 2.5. The population distribution of the region required that seismic signals be recorded using temporary stations deployed in populated areas. As a consequence, the high level of seismic noise that cannot be removed by filtration made it impossible to detect small events by STA/LTA based algorithms. The presence of high noise requires an alternate method of seismic detection capable of recognizing small seismic events. We applied the RTRN, which potentially can detect seismic signals in the frequency domain as well as in the phase arrival times. Data results of small local seismic events showed that the RTRN has the ability to correctly detect most of the events with fewer false detections than STA/LTA methods.

Key words: seismic detection, artificial neural network, recurrent neural network.