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Single Layer Recurrent Neural Network for detection of swarm-like earthquakes in West Bohemia and South-west Iceland

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We present a new method of local event detection based on neural networks. The proposed algorithm uses a unique neural network architecture. It combines features used in other neural network concepts like Real Time Recurrent Network and Nonlinear Autoregressive Neural Network to achieve a good detection performance. We use the recurrence combined with various delays applied to recurrent inputs to make the network remember history of many samples - the Single Layer Recurrent Neural Network (SLRNN). The network was first trained and tested on data from local seismic network in West Bohemia (Webnet). Then we applied the trained network to different dataset from local seismic network in South-west Iceland (Reykjanet). Both networks monitor earthquake swarm areas, both networks have similar number of stations used for detection and both cover roughly equal areas. We show that the neural network trained on Webnet data could be used on Reykjanet data with satisfactory results.