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Seismic Hazard Prediction Using Seismic Bumps: Artificial Neural Network Technique

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Abstract : Natural disasters have occurred and will continue to cause human and material damage. Therefore, the idea of "preventing" natural disasters will never be possible. However, their prediction is possible with the advancement of technology. Even if natural disasters are effectively inevitable, their consequences may be partly controlled. The rapid growth and progress of artificial intelligence (AI) had a major impact on the prediction of natural disasters and risk assessment which are necessary for effective disaster reduction. The Earthquakes prediction to prevent the loss of human lives and even property damage is an important factor; that is why it is crucial to develop techniques for predicting this natural disaster. This present study aims to analyze the ability of artificial neural networks (ANNs) to predict earthquakes that occur in a given area. The used data describe the problem of high energy (higher than 10^4J) seismic bumps forecasting in a coal mine using two long walls as an example. For this purpose, seismic bumps data obtained from mines has been analyzed. The results obtained show that the ANN with high accuracy was able to predict earthquake parameters; the classification accuracy through neural networks is more than 94%, and that the models developed are efficient and robust and depend only weakly on the initial database.

Keywords : earthquake prediction, ANN, seismic bumps
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