Earthquake Magnitude and b Value Prediction Model using Extreme Learning Machine

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Earthquake Prediction has been a challenging research area for many decades, where the future occurrence of this highly uncertain calamity is predicted. In this paper, several parametric and non-parametric features were calculated, where the non-parametric features were calculated using the parametric features. 8 seismic features were calculated using Gutenberg-Richter law, total recurrence time, seismic energy release. Additionally, criterions such as Maximum Relevance and Maximum Redundancy were applied to choose the pertinent features. These features along with others were used as input for an Extreme Learning Machine (ELM) Regression Model. Magnitude and Time data of 5 decades from the Assam-Guwahati region were used to create this model for magnitude prediction. The Testing Accuracy and Testing Speed were computed taking Root Mean Squared Error (RMSE) as the parameter for evaluating the model. As confirmed by the results, ELM shows better scalability with much faster Training and Testing Speed (up to thousand times faster) than traditional Support Vector Machines. The Testing RMSE (Root Mean Squared Error) came out to be. The model proves to be successful and can be implemented in early warning systems as it continues to be a major part of Disaster Response and Management.

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