

A SURVEY OF RISK TAKING ANALYSIS AND PREDICTION OF MAGNITUDE AND TIME OF EARTHQUAKE IN SAN FRANCISCO BY ARTIFICIAL NEURAL NETWORK

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ABSTRACT

As artificial neural network showed its efficiency in prediction of time series and temporal-spatial series, in recent years, some efforts are made to use artificial neural network in prediction of temporal and spatial distribution of earthquakes. In this research, by the study of the history of activities and previous movements of dynamic faults in 121 to 123 longitude and 37 to 39 latitude with very complex dynamic system in earthquake-field regions of San Francisco, a simplified image of fault is made by artificial neural network and we can determine the efficiency of artificial neural network by this model. By the analysis result, the released energy of earth is determined to a definite date.

The databases include 950 data including occurrence time, distance from fault plane, focal depth and earthquake magnitude. The total data were separated into network training and network test after normalization by STATISTICA software. The present study applied 782 data in terms of occurrence time, 30% of data (232 data) were used as test and 70% of data (549 data) were used as training. Each series had real input and outputs and finally the network could predict output and a suitable prediction network is the one with the least difference of real output and predicted output.

By artificial neural network, the earthquake occurrence and magnitude are predicted. The results showed that proposed method is good for earthquake prediction. The maximum error value of test is 0.0466 or 4.66% and it indicated the validity of prediction.

INTRODUCTION

In the current world, due to the lack of assurance, decision making process is very difficult. Various tools are created to help the decision makers. Risk management by unique solutions and strategies could create systematic methods for engineering issues. To consider scientific aspects, all beneficiaries of risk analysis, considered a united framework as necessary. Earthquake prediction is one of the most important risk management tools. Thus, seismic evaluation is necessary in earthquake-stricken regions in the world. In this study, the obvious features of risk management are used and by earthquake prediction and management method of earthquake risk, various frameworks are investigated. San Francisco is exposed to earthquakes of intra-plane ruptures and by stud of satellite images and air magnetic maps, geotectonic, geology and etc., we found about tens of active faults in this region. Great seismic faults (Figure 1) indicated the activity history