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Modeling the landslide susceptibility of a mountainous forest using Artificial Neural Network

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Landslides can result in huge economic losses in forest management in mountainous areas. Simulation of landslide susceptibility (LS) using a reliable methodology is very helpful for planning and maintenance of forest road. This study presented a landslide susceptibility prediction model using the Artificial Neural Network (ANN) and Geographic Information System (GIS) and by adopting the physiographic information. To develop such model, the data of terrain slope, aspect, geology formation, curvature, distance to rivers, and distance to faults at 99 landslide points occurred in a mountainous forest area in the northern Iran, were feed to an ANN model with Purelin transfer function and various number of hidden layers and neurons. Results of the modeling showed that the best model had a determination coefficient (R^2) of 0.85 in prediction of the landslide susceptibility variations. The results also indicated that the most susceptibility for landslide occurrence were predicted for 200 to 400 meter distance from the faults, for 0 to 100 meter distance from the main rivers, for concave slope unit profile, and for slope class of 36 to 83 %. The landslide susceptibility map was generated by transferring the values predicted by the model to GIS environment.