

Identification of Landslide Features Using Back-Propagation Neural Network on LiDAR Digital Elevation Model

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Abstract : The prediction of a landslide is a difficult task because it requires a detailed study of past activities using a complete range of investigative methods to determine the changing condition. In this research, first step, LiDAR 1-meter by 1-meter resolution of digital elevation model (DEM) was used to generate six environmental factors of landslide. Then, back-propagation neural networks (BPNN) was adopted to identify scarp, landslide areas and non-landslide areas. The BPNN uses 6 environmental factors in input layer and 1 output layer. Moreover, 6 landslide areas are used as training areas and 4 landslide areas as test areas in the BPNN. The hidden layer is set to be 1 and 2; the hidden layer neurons are set to be 4, 5, 6, 7 and 8; the learning rates are set to be 0.01, 0.1 and 0.5. When using 1 hidden layer with 7 neurons and the learning rate sets to be 0.5, the result of Network training root mean square error is 0.001388. Finally, evaluation of BPNN classification accuracy by the confusion matrix shows that the overall accuracy can reach 94.4%, and the Kappa value is 0.7464.

Keywords : digital elevation model, DEM, environmental factors, back-propagation neural network, BPNN, LiDAR

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