A quantitative method for vulnerability assessment of buildings to landslides using DBN-SVM

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Abstract

The analytical method for vulnerability assessment to landslides is generally only applicable to buildings of a specific structure, while the data-driven vulnerability assessment method can be applied to a large number of buildings with different structural types and has a development value in the context of big data. In order to avoid the defects of traditional machine learning methods such as over-fitting and low evaluation accuracy, this paper proposes a DBN-SVM method, which aims to combine the good feature extraction ability of deep learning and the good classification ability of SVM. Based on the data of Shenzhen landslide in 2015, the main work is as follows: 1. Through the principal component analysis of data using DBN, redundant information is eliminated and feature correlation is reduced. 2. The classifier of the last layer of standard DBN is changed to SVM optimized by PSO, which effectively improves the classification performance. 3. Compared with the basic BPNN, SVM and DBN methods, it can be found that the DBN-SVM method can effectively improve the accuracy of vulnerability assessment of buildings to landslides.

Keywords: Vulnerability assessment to landslides; Deep learning; DBN-SVM