عنوان مقاله:

Predicting Liquefaction Resistance of Soils Using Random Artificial Neural Network

محل انتشار:

دومین کنفرانس بین المللی مهندسی عمران؛یافته های نوین و کاربردی (سال: 1402)

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خلاصه مقاله:

This paper presents an approach to address structural uncertainties existing in Artificial Neural Network (ANN) modeling. This probabilistic approach is implemented to predict the liquefaction potential of soils based on Cone Penetration Test data. For this purpose, the number of hidden layers and the number of neurons in each layer are chosen as the random variables of interest. The concept of Monte Carlo simulation is employed, and random networks are constructed through ۱۰,۰۰۰ simulations. By conducting multiple simulations, it has been determined that the highest prediction accuracy (۹۵.۶%) is associated with a network having ۱۵ hidden layers, while the lowest prediction accuracy (۲۵%) is related to a network with ۱۳ hidden layers. The results lead to the conclusion that the network structure of ANN does not follow a specific pattern, highlighting the inherent stochastic nature of the network. It is also illustrated that the prediction accuracy of the ANN model can be efficiently expressed with a certain probability, through the proposed probabilistic approach.

کلمات کلیدی:

;Probability; Statistics; Liquefaction; cone penetration test; neural network; Monte Carlo simulation

لینک ثابت مقاله در پایگاه سیویلیکا: