Back to results | 1 of 1

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The performance comparison of the decision tree models on the prediction of seismic gravelly soil liquefaction potential based on dynamic penetration test

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Abstract

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Abstract

Seismic liquefaction has been reported in sandy soils as well as gravelly soils. Despite sandy soils, a comprehensive case history record is still lacking for developing empirical, semi-empirical, and soft computing models to predict this phenomenon in gravelly soils. This work compiles documentation

from 234 case histories of gravelly soil liquefaction from across the world to generate a database, which will then be used to develop seismic gravelly soil liquefaction potential models. The performance measures, namely, accuracy, precision, recall, F-score, and area under the receiver operating characteristic curve, were used to evaluate the training and testing tree-based models' performance and highlight the capability of the logistic model tree over reduced error pruning tree, random tree and random forest models. The findings of this research can provide theoretical support for researchers in selecting appropriate tree-based models and improving the predictive performance of seismic gravelly soil liquefaction potential.

Author keywords

dynamic penetration test; gravelly soil; liquefaction; logistic model tree; random forest; random tree; reduced error pruning tree

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