Gravelly soil liquefaction potential assessment on updated case history dataset using machine learning classifier

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Seismic soil liquefaction is a complex phenomenon that causes destructions to the environment, structures, and human life. Various studies have explored different approaches and procedures to construct predictive models for liquefaction in sandy soil over the years but have disregarded the possibility that gravelly soils could liquefy. However, the literature on seismic soil liquefaction in gravelly soils is still limited. Furthermore, the accuracy of predictive models is not well understood, and they are far from adequately addressing the problem of gravelly soil liquefaction. Consequently, predicting seismic soil liquefaction remains a significant challenge, and research on this area is ongoing. The aim of this research is to utilize machine learning techniques and a reliable database (comprising 234 case histories based on shear wave velocity tests from 17 earthquake-induced gravelly soil liquefaction events) to construct prediction models. These models will employ decision tree algorithms, including Random Tree, Logistic Model Tree, Random Forest, and Reduced Error Pruning Tree, to assess the potential for liquefaction in gravelly soils.