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A Hybrid Model Tree and Logistic Regression Model for Prediction of Soil Shear Strength in Clay

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Abstract : Without a doubt, soil shear strength is the most important property of the soil. The majority of fatal and catastrophic geological accidents are related to shear strength failure of the soil. Therefore, its prediction is a matter of high importance. However, acquiring the shear strength is usually a cumbersome task that might need complicated laboratory testing. Therefore, prediction of it based on common and easy to get soil properties can simplify the projects substantially. In this paper, A hybrid model based on the classification and regression tree algorithm and logistic regression is proposed where each leaf of the tree is an independent regression model. A database of 189 points for clay soil, including Moisture content, liquid limit, plastic limit, clay content, and shear strength, is collected. The performance of the developed model compared to the existing models and equations using root mean squared error and coefficient of correlation.

Keywords : model tree, CART, logistic regression, soil shear strength
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