

ESTIMATING GROUNDWATER ELEVATION USING MACHINE LEARNING TECHNIQUES: A CASE OF METRO MANILA, PHILIPPINES

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ABSTRACT

Groundwater elevation is a significant factor in Geotechnical Engineering because it has a significant effect on the strength, stability, and deformation characteristics of soils, as well as the potential for settlement and soil liquefaction. Groundwater elevation is usually measured after an exhaustive geotechnical site study, and these data were only obtained at the project's location. Multiple data on groundwater elevation can be maximized to identify potential challenges or opportunities that may not be evident on a single data but there are still sites that do not have any data. In order to address this gap, machine learning models were utilized to generate the groundwater elevation for selected locations, in this case, Metro Manila, Philippines. Models of machine learning were trained: Linear Regression Model, Quadratic Regression Model, Tree Regression Model, Boosted Trees Model, and Artificial Neural Network. The Tree Regression Model is the winning model, and its hyperparameter was optimized. Map of the groundwater level in Metro Manila was generated using GIS, shown in Figure 1. Historical studies on Metro Manila were used to validate the generated output of the study.

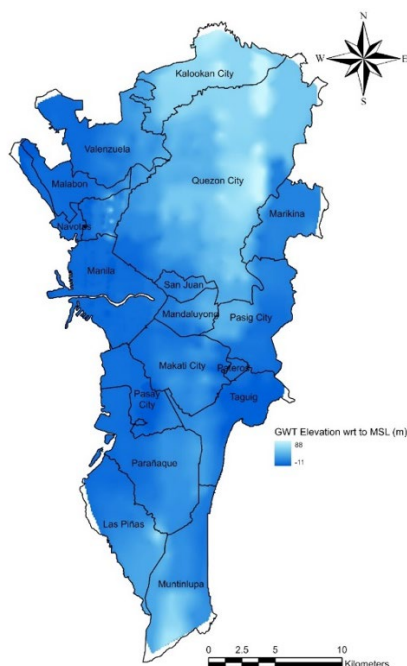


Fig. 1. Generated Groundwater Elevation of Metro Manila by Machine Learning Mode

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