Transportation Geotechnics
Volume 40, May 2023, 100978

Predicting tunnel water inflow using a machine learning-based solution to improve tunnel construction safety

Arsalan Mahmoodzadeh [a], Hossein Ghafourian [b], Adil Hussein Mohammed [c], Nafiseh Rezaei [d], Hawkar Hashim Ibrahim [e], Shima Rashidi [f]

https://doi.org/10.1016/j.trgeo.2023.100978

Abstract

Water inflow is a typical and complicated geological hazard that may have a significant effect on both the building timeline and the safety of a tunnel under construction. Therefore, accurate water inflow estimation in tunneling is a key factor for the project's success. Such information is critical for the early conceptual and design phases, when key choices must be made. For this purpose, an optimized model based on the gene expression programming (GEP) method was proposed to estimate the water inflow in tunnels. An equation was generated for the optimized GEP model through the best fit of the predictions. Finally, by comparing the equation's outputs with the actual ones and comparing its behavior with practice, its potential ability for estimating the water inflow of tunnels was approved. This model can reduce the uncertainties about tunnels and give machine learning development in tunnel planning.