

## A Comparative Assessment of Some Algorithms for Modeling and Forecasting Horizontal Displacement of Ialy Dam, Vietnam

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**Abstract :** In order to simulate and reproduce the operational characteristics of a dam visually, it is necessary to capture the displacement at different measurement points and analyze the observed movement data promptly to forecast the dam safety. The accuracy of forecasts is further improved by applying machine learning methods to data analysis progress. In this study, the horizontal displacement monitoring data of the Ialy hydroelectric dam was applied to machine learning algorithms: Gaussian processes, multi-layer perceptron neural networks, and the M5-rules algorithm for modelling and forecasting of horizontal displacement of the Ialy hydropower dam (Vietnam), respectively, for analysing. The database which used in this research was built by collecting time series of data from 2006 to 2021 and divided into two parts: training dataset and validating dataset. The final results show all three algorithms have high performance for both training and model validation, but the MLPs is the best model. The usability of them are further investigated by comparison with a benchmark models created by multi-linear regression. The result show the performance which obtained from all the GP model, the MLPs model and the M5-Rules model are much better, therefore these three models should be used to analyze and predict the horizontal displacement of the dam.

**Keywords :** Gaussian processes, horizontal displacement, hydropower dam, Ialy dam, M5-Rules, multi-layer perception neural networks

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