**Realtime Flood Forecasting: River flow analysis using Machine Learning Techniques**

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***ABSTRACT***

Kalu Ganga river basin in Sri Lanka is highly susceptible during the monsoon seasons, which frequently causes devastating floods, disrupting the lives of local communities. Addressing this critical issue, this research focusses on enhancing the accuracy of water level predictions in the Kalu Ganga river basin. Traditional methods of water level prediction have proven to be inefficient, highlighting the need for more advanced and accurate forecasting techniques.

This study developed a rolling forecasting system aimed at predicting future water levels at the Ratnapura station in the Kalu Ganga using various machine learning algorithms. Data collected over a period of 10 months was utilized, with 75% allocated for training and the remainder for testing and validation. We employed four machine learning models, namely Support Vector Regression (SVR), Random Forest (RF), Artificial Neural Network (ANN), and Long Short-Term Memory (LSTM) were used for prediction. All models demonstrated high accuracy in predicting water levels, with the ANN and LSTM models marginally outperforming the SVR and RF in most cases. However, challenges were noted in accurately predicting peak water levels across all models. The limited 10-month data duration potentially constrained the models' predictive capability over extended periods.

In conclusion, the rolling forecasting system developed in this study holds promise for integration into the rivernet.lk system, potentially enhancing flood management capabilities. Further research using a larger dataset spanning over multiple years is recommended to improve the accuracy of the models in predicting water levels over longer periods. This study offers significant insights that could advance water resource management and flood mitigation efforts in Sri Lanka.

**Keywords:** Flood forecasting, LSTM, Kalu Ganga, rolling forecasting, Machine learning