

Integrated Machine Learning Framework for Flood and Landslide Hazard Assessment

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Abstract: *Among the most devastating natural disasters in South Asia are floods and landslides, which result in numerous fatalities, damage to infrastructure, and disruption of the local economy. Conventional hazard prediction models are unable to keep up with the rapid changes in climate and the increased variability of rainfall. According to recent research, combining many machine learning (ML) approaches greatly increases the accuracy of hazard prediction. The data inputs, feature engineering techniques, and model performance of current ML-based frameworks for flood and landslide hazard assessment are compared in this foundation study. The study provides an overview of well-known methods utilizing Deep Learning architectures, Random Forest (RF), Support Vector Machines (SVM), and Gradient Boosting. It draws attention to present shortcomings in data accessibility, transferability, geographical resolution, and model interpretability. The conceptual underpinnings of the suggested integrated machine learning framework are presented in this base article.*

Keywords: Machine Learning, Flood Prediction, Landslide Susceptibility, Remote Sensing, GIS, Ensemble Learning, DEM, Hydrological Hazards

