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A Prototype System For Predicting Lake Sedimentation Levels Using A Neural Network Algorithm

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Abstract. Sedimentation presents a major environmental concern, especially in tropical freshwater ecosystems such as Lake Limboto. The rapid accumulation of sediments reduces water capacity, disrupts aquatic habitats, and increases seasonal flood risks. This study introduces a prototype prediction system powered by neural network algorithms to estimate sedimentation levels by integrating multiple environmental factors, including rainfall intensity, land cover dynamics, vegetation indices (NDVI), slope gradient, and proximity to water bodies. Data were collected from satellite imagery and field-based hydrological observations, then processed to train an adaptive predictive model. The system architecture supports modular development and delivers spatial predictions through a web-based interactive dashboard. High-risk zones are visualized in map format to facilitate informed decision-making in watershed management and land-use planning. Model evaluation shows superior predictive accuracy compared to conventional statistical methods, offering an innovative approach to environmental monitoring and policy support for government and local stakeholders.

Keywords: Lake Sedimentation, Neural Network, Satellite Imagery, Spatial Prediction, Lake Limboto