Landslide Prediction Using Machine Learning

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Abstract

Landslides pose significant threats to human lives, infrastructure, and the environment, particularly in regions vulnerable to heavy rainfall, deforestation, and unplanned development. The increasing frequency of these events highlights the urgent need for effective prediction and mitigation strategies. Traditional landslide prediction methods often suffer from limited accuracy, poor data integration, and delayed responses, hindering timely and reliable disaster management. This project addresses these challenges by integrating advanced geospatial data processing, multi-source satellite imagery, and machine learning (ML) models to develop a real-time landslide prediction and early warning system. Leveraging ML techniques, the system analyzes complex geospatial datasets to uncover hidden patterns, enabling accurate prediction and severity mapping of high-risk zones. The proposed system features a user-friendly interface with real-time, color-coded risk maps to aid decision-making for local authorities and at-risk populations. By providing timely, actionable risk assessments and insights, this solution enhances disaster management efforts, offering a significant improvement over traditional approach. It empowers communities and stakeholders with reliable tools to mitigate the impact of landslides and ensures better preparedness for future events.