**LANDSLIDE PREDICTION USING ENSEMBLE MACHINE LEARNING MODEL**

**OBJECTIVES**

1. **Accurate Landslide Prediction:** Develop a robust machine learning-based ensemble model combining Random Forest (RF), XGBoost, and Gradient Boosting through a Voting Classifier to classify conditions as Stable or Landslide with high precision.
2. **Real-Time Monitoring:** Implement a Streamlit-based web application to enable real-time data input, providing users with live monitoring and prediction capabilities.
3. **Enhanced Model Performance:** Optimize model accuracy by applying hyperparameter tuning to improve classification efficiency.

**ABSTRACT**

Landslides are a significant geohazard, posing threats to human life, infrastructure, and the environment. This study introduces a machine learning-based landslide prediction system capable of classifying conditions into two categories: Stable (0) and Landslide (1). The system processes real-time sensor data, including rainfall intensity, soil moisture levels, and ground vibrations, through an ensemble machine learning framework. The model integrates Random Forest (RF), XGBoost, and Gradient Boosting using a Voting Classifier, leveraging the strengths of each algorithm for improved accuracy and reliability in landslide prediction. A user-friendly web interface built with Streamlit enables real-time monitoring, data visualization, and prediction results. Additionally, hyperparameter tuning is applied to optimize model performance. Rigorous testing across various environmental scenarios demonstrates the system’s effectiveness in distinguishing between stable and landslide-prone conditions. This scalable and data-driven solution enhances early warning systems, providing a valuable tool for disaster management agencies to improve safety and preparedness in vulnerable regions.