

**A WEB-BASED LANDSLIDE RISK DISSEMINATION PORTAL  
INCORPORATING BAYESIAN PROBABILISTIC RISK PREDICTION  
MECHANISM ON LANDSLIDE CAUSATIVE PARAMETERS**

**U.H.G. Rodrigo<sup>1\*</sup>, G.H.D.T.N. Gammanpila<sup>1</sup>, I.T. Weerakoon<sup>1</sup> and D.R.  
Welikanna<sup>2</sup>**

<sup>1</sup>*Department of Remote Sensing and GIS, Faculty of Geomatics, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka.*

<sup>2</sup>*Department of Surveying and Geodesy, Faculty of Geomatics, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka.*

*\*hasitharodrigo95@gmail.com*

Landslides severely threaten the environment, human life, and infrastructure in hilly regions worldwide. Accurate prediction and identification of landslides are crucial for effective risk management. This study utilises Bayesian probabilities and machine learning techniques with geospatial data analysis to develop a reliable model for landslide identification in Ratnapura district in Sri Lanka, known for its high landslide risk. The study utilised data sources, including SAR images, rainfall data, slope data, aspect data, and land use data, and processed the collected data. Processed parametric data were integrated into a Bayesian probabilistic model. The landslide risk map was created using these probabilistic values to classify the study area into different risk levels. The validation of the Bayesian probabilistic model using data from the NASA Landslide Inventory Catalogue confirms its accurate prediction of risk levels for landslide-occurred locations and known low-risk areas, demonstrating its effectiveness in assessing landslide risk. A machine learning model has been successfully implemented to establish a relationship between rainfall data and geospatial landslide risk, producing an output that accurately reflects their connection. The model demonstrated exceptional performance, achieving a training set accuracy of over 98% and a perfect 100% accuracy on the test set. The developed model was integrated into a user-friendly web application that government agencies and the general public can use to identify high-risk landslide areas. This tool can potentially improve landslide risk management practices in hilly regions worldwide by providing valuable information to stakeholders and decision-makers so they can make informed decisions regarding risk management and emergency response measures. The findings of this research were disseminated through a real-time GIS web application, which facilitated the dissemination of information regarding high-risk areas for landslides to minimise the devastating impact of landslides on communities and infrastructure.

**Keywords:** Bayesian probability, GIS Web application, InSAR, Landslides, Machine learning