Data Mining Approach for Landslide Prediction Using Support Vector Machine for Rathnapura District, Sri Lanka

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Haphazard development activities on mountain slopes and inadequate attention to construction aspects have led to the increase of landslide and consequently sustaining damages to lives and infrastructure. Nearly 3275 sq.km of area spread over the Rathnapura District, seems to be highly prone to land sliding and mass wasting of 2178 sq.km. Landslides occurred in many regions of Rathnapura district Eheliyagoda, Ayagama, Kalawana, and Nivithigala DS divisions, and nearly 90 deaths have reported according to National Research Building Organization (NBRO) 2017 records. Most landslides or potential failures could be predicted fairly and accurately if proper investigations were performed in time. The primary objective of this study is landslide-hazard mapping and risk evaluation to determine the real extent, timing, and severity of landslide processes in Rathnapura district, where such knowledge will provide the most significant benefit to government officials, consulting engineering firms, and the general public in avoiding the landslide hazard or in mitigating the losses. Data mining approach can be used to develop prediction models using existing data. Support Vector Machine (SVM) was selected for this study to possess a strong capability to predict landslides by causative factors, slope, land use, elevation, geology, Soil Materials and triggering factor; rainfall was extracted and applied to the SVM. This research introduces a methodology to produce a more relevant and accurate prediction of the landslide and identify the relationship between the hydrological characteristics, soil characteristics and the landslide vulnerability within the study area. Moreover, an improvement of the hazard monitoring, accuracy of early warning and disaster mitigation was performed. The SVM procedure was found that all of the factors had relatively positive effects on the landslide. Based on these results indicate that SVMs can be useful and practical for landslide susceptibility analysis.

Keywords: Landslide, Support Vector Machine (SVM), Hydrological, Land use, Rainfall