Comparative Analysis between K-mean and EM Clustering for Investigate Appropriate Algorithm for Landslide Risk Evaluation

C. N. Madawala, B.T.G.S. Kumara

Department of Computing & Information Systems, Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka

Irregular development activities on mountains and inadequate attention to construction aspects have led to increasing of landslide and sustaining damages to lives and properties. Within the study area, nearly 3275 sq.km of the area expanded over the Ratnapura District; and is to be highly prone to land sliding of 2178 sq.km. Landslides transpired in many regions of this area, and nearly 90 deaths have reported by National Research Building Organization (NBRO), Sri Lanka. If the suitable investigations were performed at the right time, most of the landslides could be predicted relatively and accurately. The main objective behind this of study is to evaluate the landslide risk levels to discover the real extent, timing and the intensity of landslide processes in Ratnapura district, such knowledge will present vital benefit to government officials, and the general public to avoid landslide hazards and mitigate the losses. Clustering Approaches can be used to developed the Risk Analysing model using actual data. This method was based on K-mean and Expectation Maximization (EM) Algorithms by concerning triggering factor; rainfall and causative factors; slope angle, elevation, and intensity. Such data were collected and applied to the Clustering algorithms. In this study, comparing the multiple Clustering algorithms and investigate the most appropriate risk evaluation approach where it can be used to advance hazard monitoring, early warning, and disaster mitigation. The results indicate that EM clustering algorithm showed accuracy over 84% with the highest speed. The highest accuracy over 92% was acquired by the K-means algorithm, but it was more time-consuming than EM algorithm. Therefore, this research proposed that an EM clustering has a strong capability to fit for the Landslide risk evaluation and producing a more relevant and accurate prediction of the landslide vulnerability within the study area.

Keywords: Clustering; K-mean; Expectation Maximization (EM)

[1]Corresponding author.
E-mail address: cnmadawala@std.appsc.sab.ac.lk