Application of Neural Networks for Flood Prediction in Rathnapura Town in Sri Lanka

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Floods are a kind of major natural disaster in the world as well as in Sri Lanka. In Sri Lanka, major floods are associated with the two monsoon seasons namely south-west and north-east. During south-west monsoon; the western, southern and Sabaragamuwa provinces are vulnerable to floods. The threats of floods have presented destruction of human lives, property, infrastructure and economy. Hence, an effective flood prediction system could help mitigate the worst effects of floods. This study proposes a novel flood prediction model for Rathnapura town in Sri Lanka. Rainfall of five meteorological stations namely Alupola, Hapugasthenna, Guruluwana, Lelopitiya, and Rathnapura impacts the water level of the Kalu River during monsoons and hence the main reason for floods. This study was conducted in two phases. In the first phase, K-mean clustering was used to cluster the water level of the Kalu River according to the rainfall of five meteorological stations. In the second phase, an Artificial Neural Network model was implemented for forecasting floods in Rathnapura town according to the rainfall of above-mentioned five stations. The dataset for this study was obtained from the Department of Irrigation, Sri Lanka and it contained 1955 records. The proposed model showed 96% accuracy for flood prediction in the testing phase. By using this model, we can provide a prior warning for floods in Rathnapura town. Hence, it will be useful to minimize the social and economic losses that may occur due to flood.

Keywords: Flood prediction, K-mean clustering, Artificial Neural Network