

A Conceptual Framework for Flood Early-Warning System for the Lower Flood Plains of Kalu Ganga Using Twitter Crowd-sourcing and Internet of Things

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Flood is one of the common natural disasters in all over the world. Sri Lanka has two major monsoons: Southwest (May to September) and Northeast monsoon (December to February) causing for floods along the one third of low lands. The objective of this study is to develop a framework that is relatively credulous community based flood early-warning system for the populous areas near by the riverbanks of Kalu Ganga in Kalutara district in Sri Lanka. The study focuses on two major affected areas that are Palindanuwara and Agalawatta. There are six major tributaries joined to the river between Kalutara and Ratnapura making Ratnapura as a considerable catchment area for the river. Therefore, the system collects real-time bulletins, associated with predefined keywords and posted by the Twitter crowdsourcing living in Ratnapura and surroundings, using Twitter stream API. It uses hashtags to filter locations and performs the text analysis. While the percentage of likelihood of flooding is estimated based on the number of positive twitters, the possibility of a flood is verified using the incline or decline trend of the water levels collected from Ground Control Units located in flood risk areas. If the Ground Control Unit confirms that there is a possibility of a flood, the system generates a flood-positive alert that can be used to warn people living in those areas. The proof of the concept was successfully tested by simulating the flood situation using the Ground Control Units. Thus, it can be concluded that the Twitter crowd-sourcing can be effectively used to warn the community about upcoming flooding situations beforehand.

Keywords: Crowdsourcing, Flood, Early-warning system, Internet of Things, Twitter