PARTICIPATORY AND MOBILE GIS BASED COMMUNITY HAZARD WARNING SYSTEM

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Sri Lanka currently stands out among the most peaceful nations in the world with the armed separatist conflict arriving at an end in May 2009. It is apparent that within a brief time of six years favourable situations for the prevalence of law-based pluralism, social cohabitation, good governance and financial opportunities have emerged. Nevertheless Sri Lanka is no exemption for natural disasters such as tsunamis, landslides and flash floods etc. Frequent bomb explosions and terrorist attacks on the economic targets were also among the potential hazards experienced by the society. Irrespective of frequent recurrence of such disasters the authorities are so far not adequately equipped with automated systems to send warning messages to the specific communities within a given geographic boundary and to relevant authorities together with calculated risk estimations on the number of people, buildings, and other significant places possibly be affected.

Therefore, reporting a risk situation to responsible parties instantaneously is exceedingly becoming significant. If responsible authorities receive information immediately with the supporting information they can analyze and estimate the risk and identify the affected area using GIS and other related software. This research involved developing two different Android applications to address the aforesaid need. One Android application will collect citizens' data, important places and other relevant government organizations of the study area. Then the information were sent automatically to MySQL database with the X, Y coordinates through HTTP header. The other Android application reports incident's location coordinates and the information from anywhere in the country that will reach the server within 5 to 10 seconds.

PHP timer script running on WAMP server will access to the store in MySQL and automatically store data in MS SQL Server Express. Incident's locations stored in MS SQL Server Express will be accessed through ArcGIS 10.1 in-order to analyze the risk and to send warning messages to the inhabitants who would possibly be affected with the calculated risk factors (High Risk Zone, Medium Risk Zone and Low Risk Zone) through e-mails and SMS. This entire process has been automated using 'Model Builder' to increase the speed of the process and to reduce human errors.

For assigning calculated risk for individuals Visual Basic Script has been used and two separate python scripts have been used within the ArcGIS "Model Builder" to send emails and SMS. Furthermore the system will send detailed report to the relevant government organizations through e-mail and SMS. This system is tested with sample data for accuracy and completeness, it reveal that bulk SMS sending speed heavily depends on GSM provider, hence a SMS Gateway is recommended to address this issue. An early warning system of this nature has never been practiced in Sri Lankan disaster management history.