

Ubiquitous Devices & Applications for Disaster Prepared Smart Homes and Environment

Jane W. S. Liu

Institute of Information Science, Academia Sinica

In the recent decade, we have seen great advances in disaster prediction and detection technologies, as well as information and communication technologies (ICT) for disaster preparedness and response. Equally impressive are the wide deployments in developed regions of advanced ICT support infrastructures. Now, emergency alert authorities in typical developed regions can generate accurate warnings of devastating natural disasters seconds and minutes or more before they occur, encode alert messages in a standard machine-readable format and broadcast the messages via all communication pathways. Indeed, alert authorities in US, Canada, and many parts of EU and Asia can warn people in this way.

To date, disaster warning messages, though in a machine-readable format, are consumed mostly by people. Limits in human reaction time limit the effectiveness of the warnings. A natural next step in the advancement of disaster preparedness and response technology is the emergence of smart things that can respond to warnings of imminent calamities with humanly impossible speeds. This is the motivation behind Intelligent Guards against Disasters, or iGaDs. The term iGaDs refers to a diversity of embedded devices, systems and applications that can authenticate and process standard-conforming disaster warning messages and respond by taking appropriate actions to help us prevent loss of lives, reduce chance of injuries and minimize property damages and economical losses when disasters strike.

This talk will first present scenarios to motivate the use of iGaDs and an overview of architecture and key components of diverse iGaDs that are configurable and customizable while in use. It will then discuss technological challenges in making iGaDs pervasive elements of future smart homes and environment, including how to keep energy consumption of battery operated iGaDs low, interface with other smart environment applications, and real-time asynchronous alert delivery over Internet.