Utilising Mobile Mesh Networks for Disaster Management

IDEAS PROJECT What's your Big Idea? Join. Create. Together.
Nokia Apps4D Challenge — Special Mention

Dr. Ali Al-Sherbaz
Lecturer, Computing
School of Science & Technology
ali.al-sherbaz@northampton.ac.uk

Rashmi Dravid
Senior Lecturer, Computing
School of Science & Technology
rashmi.dravid@northampton.ac.uk

THE UNIVERSITY OF NORTHAMPTON
School of Science and Technology
Avenue Campus
Northampton, NN2 6JD, U.K.

Context:

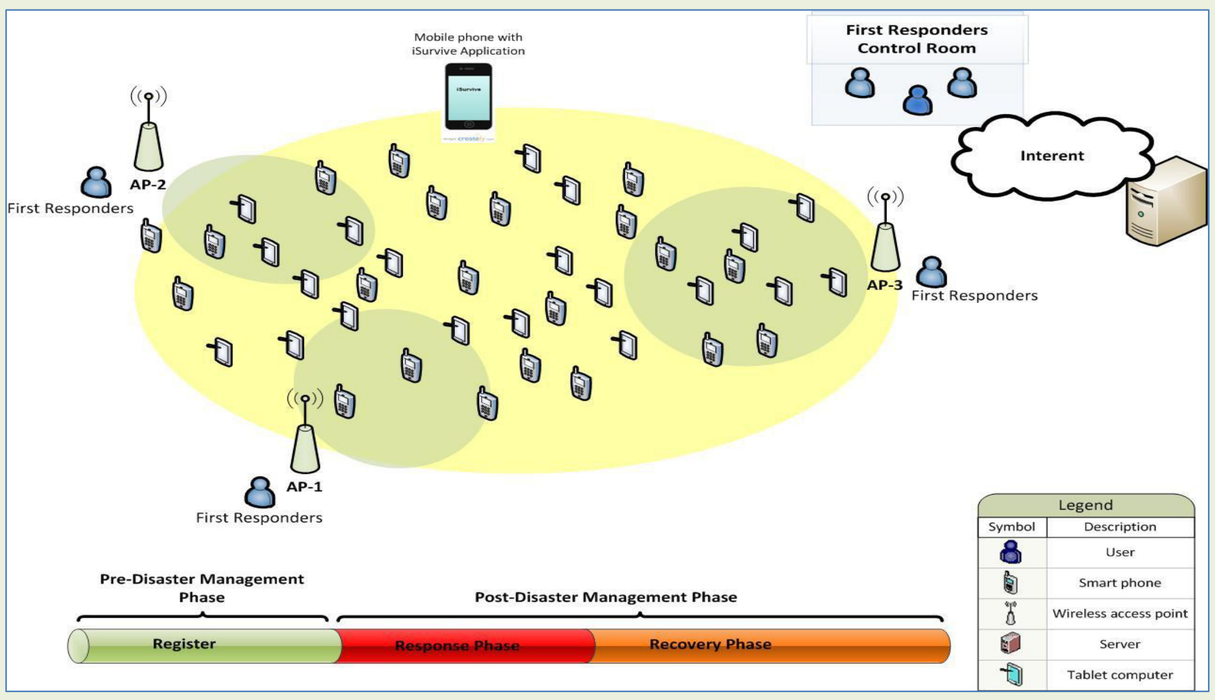
Disaster management process involves two main phases:

- Pre-disaster processes that include disaster mitigation and preparedness
- Post-disaster processes involve
- Response: Quick overall response from emergency services, i.e., paramedics, police, and anti-terrorist squad as well as specialist disaster recovery teams
- Recovery: mobilising support, services and resources

Project Objectives:

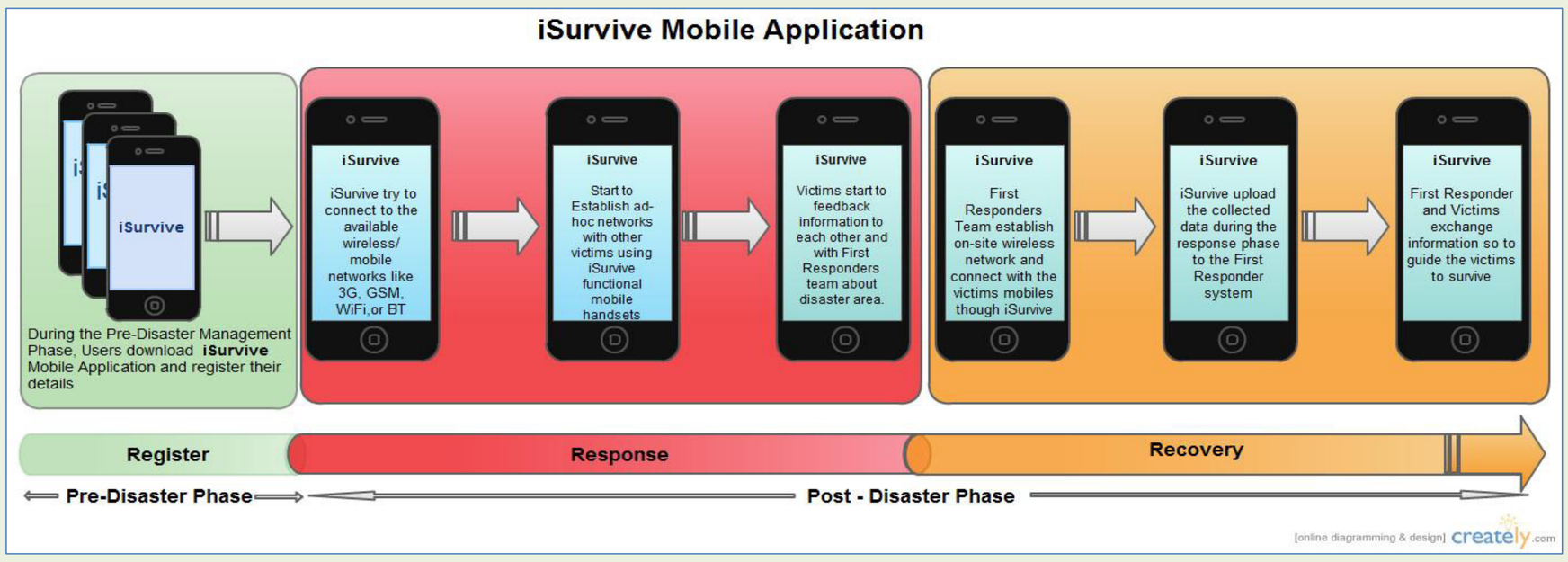
- Design a System that addresses **Preparedness, Response and Recovery** phases of disaster management system
  - **Preparedness**
    Design a web-based system, available at a *Control Center* to hold profiles of subscribers to iSurvive Mobile Application
  - **Response and Recovery**
    Design an application for mobile phones, ***iSurvive***, to facilitate communication using ubiquitous mobile mesh networks between:
    - **Victims** - People in the disaster area
    - **First Responder** - Onsite specialist disaster management team
    - **Control centre** – Offsite specialist disaster management team
- Additional extensions to the System to include security in communications between different entities

Disaster Management System Communication Model



Communication Model

Communication entities



- Mobile application, ***iSurvive***, is initiated by *victims ,* in the Disaster Area.
- i**Survive** kick- starts communication process using wireless and mobile communication technologies from GSM, 3G, WiFi, Bluetooth and probably GPS and helps to set up ad-hoc networks using functioning mobile phones within Disaster area.
- These *Self-Configurable Ad-hoc* networks facilitate two-way communication within the disaster area, with *Control Centre* and *First Responders* using instructions, messages, images and videos.
- Recovery phase starts after the connection between *victims* and *first responders* are established
- Data from within disaster area is gathered by *first responders* to pass on to *Control Centre* for analysis, validation, guidance and instructions.
- *The Control Centre* uses ***iSurvive*** to guide first responders and victims and offers additional services including Data Validation, Monitoring and Logging communication.
- The *Control Centre* uses the information received from disaster area to track *victims'* profile, already available on web-based system, for purposes such as contacting next of kin etc.

Issues:

- User Interface design
- Battery Life of Mobile handset
- Security and Data Validation