DEVELOPMENT OF A MOBILE APPLICATION FOR EMERGENCY RESPONSE SYSTEM

Alo, O. O.[1], Adewusi O. O.[2], Owolabi, A. A.[3], Badmus, T. A.[4]

[1]Department of Computer Science and Engineering,
Ladoke Akintola University of Technology, Ogbomoso. ooalo@lautech.edu.ng
[2]Department of Computer Science and Engineering,
Ladoke Akintola University of Technology, Ogbomoso. oluwakemiadewusi@gmail.com
[3]Department of Computer Science and Engineering,
Ladoke Akintola University of Technology, Ogbomoso. abramizdabest@yahoo.com
[4]Open and Distance Learning Centre,
Ladoke Akintola University of Technology, Ogbomoso. tabadmus@lautech.edu.ng

Abstract

Emergency has in time past led to loss of lives and property. Hence, there is need to prepare for likely emergency cases in advance. The level of preparation will determine how well incurred loss will be minimized. Emergency response involves a set of highly coordinated activities from teams of experts. Today in Nigeria, response to emergency cases is very poor due to lack of proper communication between the emergency response team and the victim or rescuer. Thus, the objective of this paper is to develop a mobile application that could be used to coordinate activities between the Emergency responders and the victim or rescuer at the point of incidence. The developed mobile app was implemented in JAVA environment. The app consists of Home Page, Registration, Emergency selection, notification and location page. The user of the app can perform tasks such as reporting an emergency case. The Emergency selection page handles selection of the type of emergency case to be reported by the user of the app. The Emergency notification page reveals the detailed information of the emergency notification alert received which include the GPS location and the kind of emergency assistance the victim needs. The location of the victim in need of an emergency support and the basic information of the victim are handled by the Emergency location page. The developed app was tested when a fire outbreak occurred at a named location in Ogbomoso, Oyo State, Nigeria. The response obtained shows that the developed app accurately works well for the intended purpose. Thus, the developed mobile app could be used to coordinate victim/eye witness to emergency response team activities when there is emergency incidence.

Keywords: Emergency, Emergency Signal, Mobile, Application

1. Introduction

An Integrated Emergency Management System (IEMS) is defined as a systematic, proactive approach to guide departments and agencies at all levels of government, non-governmental organizations, and the private sector to work seamlessly to prevent, protect, respond, recover, and mitigate the effects of incidents, regardless of the cause, size, location, or complexity in order to reduce the loss of life and property and harm to the environment [1]. This paper developed an Emergency response system for Nigerian context. Section 2 of this paper gives our related work while section 3 and 4 gives a full detail about our design and implementation. Section 5 concludes the paper.

2. Related Works

There have been so many approaches to Emergency Management System (EMS). Some important characteristics have been identified by some authors as important in any Emergency Response System. A good Emergency Management should consists of four phases for effective management of human caused or natural disaster which are Mitigation, Preparedness, Response and Recovery [2]. Contrast between the proposed system and existing system are (1) location is based upon the GPS location of the victim's phone while the existing system's victim's location is based upon the phone user address that is kept by the network operator

and the network operator's address of the user is not always correct in Nigeria. (2) Medium of communication in the proposed system is by text message while medium of communication in the existing system is via voice call which might be wrong or impossible to make in some life threatening situations. (3) The proposed system makes use of software installed on a mobile phone (Android) as a means of communicating with the emergency operator while the existing system makes use of phone call.

3. System Design and Implementation

[3] A good emergency response system ensures that the responsibility to deal with emergencies is placed first on the individual and then on successive levels of government, as the resources and expertise of each are needed. This system has been designed such that the responsibility is evenly distributed. The Emergency response system comprises of the front-end and back-end. Each end of the system is made of both software and hardware components. Figure 1 shows the process flowchart of the developed emergency response system.
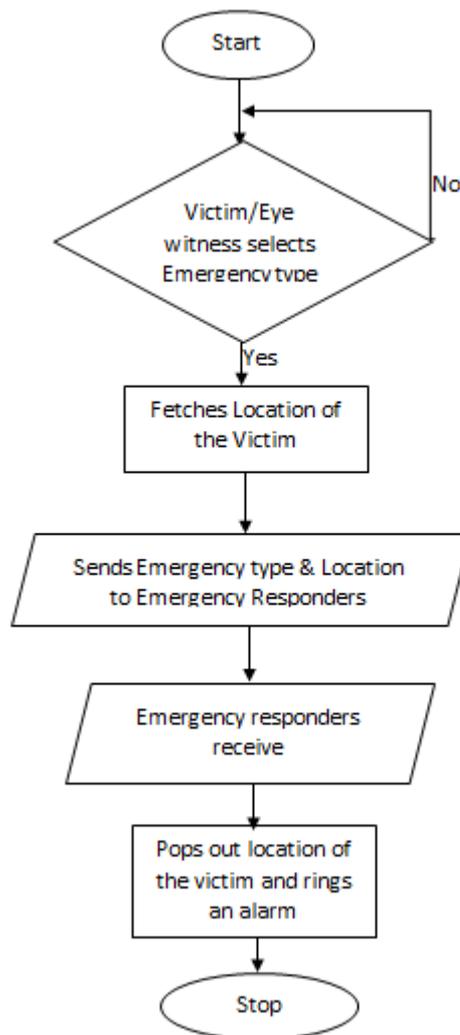
Figure 1: Process Flowchart for the Emergency Response System

3.1 Hardware Requirements

The implementation of Emergency Response (EMR) System on a client-server mobile environment requires the following facilities:
  i.   Workstation
  ii. Mobile phone(Android)
  iii. Network cable for connecting Workstation computer peripheral

The compactable personal computer which has the following configurations or specification can be used as the workstation. This includes:

  i.   A Pentium Dual core system with a processor speed of 2.20 GHz
  ii. Enhanced keyboard
  iii. Scroll mouse
  iv. A colored SVGA or VGA monitor
  v.   Hard disk of about 10GB space or more
  vi. A minimum of 2GB of RAM
  vii. An Uninterrupted Power Supply (UPS)

3.2 Software Requirements

In developing the application, the following softwares were used:
  i.   MySQL
  ii. Eclipse Integrated Development Environment (ADT) –Mobile Phone(Android)
  iii. Programming Language (Java) –Mobile Phone(Android)
  iv. Microsoft Visual Studio 2012 (Ultimate) -Workstation
  v.   Programming Language(C#) –Work Station

The Use case Diagram depicted in Figure 2 shows a simple way by which a victim and an emergency responder can interact with the system. The simple interaction of a victim to the system involves registration for first time use, selecting of emergency type and sending of emergency signal. The interaction of an Emergency responder only involves monitoring and receiving of new emergency signals sent.
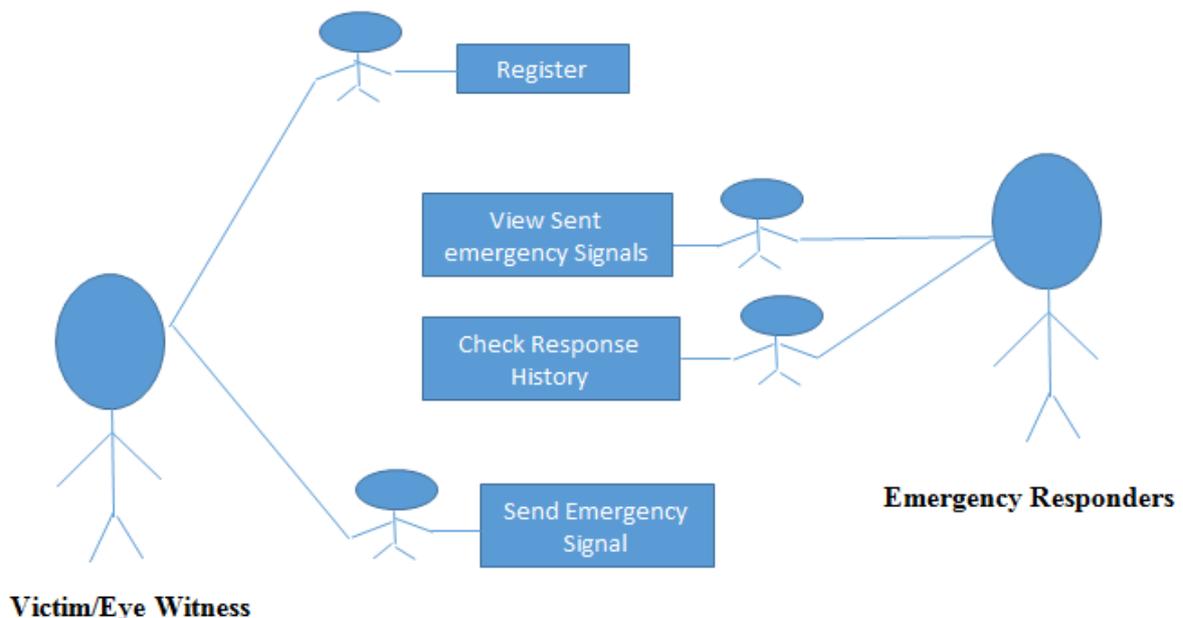
Figure 2: Use Case Diagram for the Developed System

3.3 Implementation of the Developed Mobile App for EMR System

In this section, the implementation in terms of the Graphical User Interface (GUI) and Database Schema is extensively discussed.

3.3.1 Database Schema of the Developed Mobile App for EMR System

Figure 3 shows the database structure for the implementation of the back-end of the whole system. Also, graphical user interface implementations of the emergency response system are explained as follows.
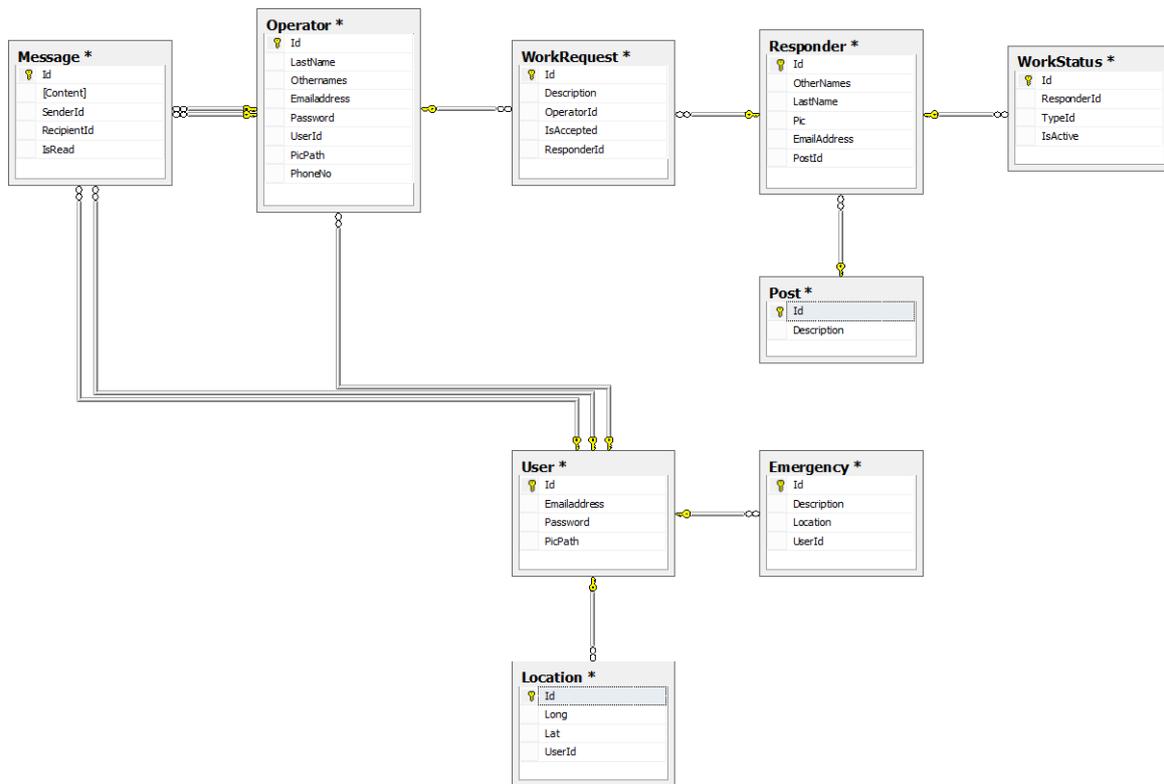
Figure 3: Database Schema for the back-end of the Developed Mobile App

(a).   **Home Page Screen:** Figure 4 shows the start screen of the developed mobile app. It consists of three menu needed for navigation in order to perform different task such as creating a record, reporting an emergency incidence or updating a record.

Figure 4: Home Page of the Developed EMR System

(b).   **Emergency Selection Page:** Figure 5 shows the emergency notification page of the victim/eye
         witness. This page allows the victim/eye witness to notify the response team of an impending or on-
         going emergency situation

Figure 5: Emergency Selection Menu of the EMR System

(c).   **Registration Page**: The registration page of the developed phone application user is depicted in
         Figure 6.
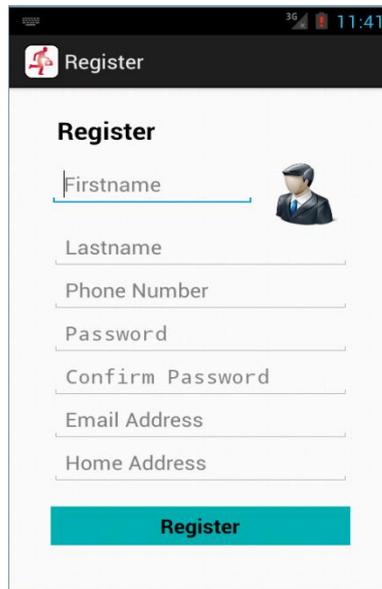
Figure 6: Users Registration Page

(d).   **Emergency Notification Page:** This page gives the detailed information of the emergency notification alert received which include the GPS location and the kind of emergency assistance the victim needs as shown in Figure 7.

Figure 7: Emeregency Notification Page

(e).   **Emergency Location Page:** Figure 8 describes the location of the victim in need of an emergency support and the basic information of the victim.
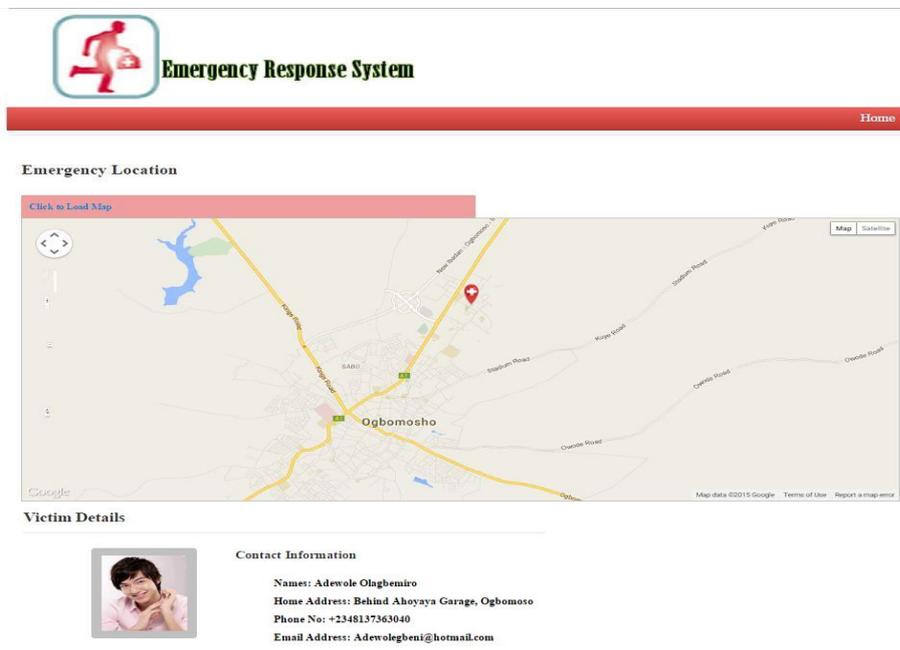
Figure 8: Page Showing the location of the Emergency

4. Conclusion

In this paper, we have been able to develop mobile application for Emergency Response System. The developed mobile app was tested when a fire outbreak occurred at a named location in Ogbomoso, Oyo State, Nigeria. The result obtained shows that the developed mobile app accurately works well for the intended purpose. Thus, the developed mobile app could be used to coordinate victim/eye witness to emergency response team activities when there is emergency incidence.

References

[1] Art, (2008): Integrated Emergency Management system.
[2] Godfrey, (2010): Federal Emergency Management.
[3] Annex L, (2006): Federal Emergency Preparedness and Response System