

Rolling Message Display using GSM

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Abstract:- Public Safety emergency communication systems are crucial to an effective incident and disaster response. Lack of situational awareness and communications are of the most cited factors that hamper Public Safety's ability to make crucial decisions.

We are in any situation. This system will be private so that no other interference will be developing a system, which will enable the organization to broadcast a message to all the display sites faced by them.

Our system is reliable distributed and scalable architecture that enables a common situational awareness picture to enhance collaboration. To address these issues, the system being developed will have a Rolling Message Display Mobile Application and a Website.

Due to the strong open-source development community and API flexibility, the Android operating system was selected for the mobile application. The Android application will be developed in Android Studio, a web-based application using HTML, CSS, JavaScript, and PHP.

Every authorized user can access the Android application as well as the web-based application to broadcast messages to any display sites, which will have a LED Screen to display the messages. This system will enable the organization to broadcast messages in an emergency using a GSM or Internet.

Keywords:- HTML: Hypertext Markup Language, LED: Light Emitting Diode, CSS: Cascading Style Sheets, GSM: Global System for Mobile communication, PHP: Hypertext Pre-processor.

I. INTRODUCTION

In this project, we are developing a system for the organization to enable them to broadcast messages in emergencies.

Their certain problems faced by any organization to communicate while any emergency. These are as follows:

- Unavailability of any system to perform such activity.
- Avoid the use of any apps like WhatsApp.

We are developing a system, which will enable the organization to broadcast a message to all the desired sites in any situation. This system will be private to only Organization so that they will face no other interference.

In the rolling message system, we are about to generate a system will enable you to broadcast message to the desired site by an authorized user.

This will include an Android Application and a Web site to facilitate the working.

- *The Android App:-* The Android app will enable the user to broadcast a message as well as read the current message, which is being displayed on all the LED screens of the desired site.
- *The Website:-* The website includes a login page. After making a log in the user can now broadcast a message as well as the user can also view the current message, which is being currently getting displayed at all the police stations using their desktop computer.
- *At Display Sites:-* At all display sites there will be the LED screen on which the messages will be displayed which has been broadcasted through the Android app or the Website.

II. PROBLEM DEFINITION

The project started with the requirement gathering from the client, in our case Organization. After getting the requirements, a basic layout was design in order to fit the requirements of the system.

The requirement was for the communication system, which helps the police to communicate with each other during the time of emergency. Hence, the technology opted for transmission of messages was GSM. GSM has a wide scope as it can be integrated with the current technology.

As GSM is a cellular network, all cell phones get connected easily even at low bandwidth. Along with the use of GSM Module for broadcasting SMS, we have used web-based application.

The web-based application is developed in case of failure of the GSM Module. The web-based application is designed with HTML, CSS, JavaScript, and PHP.

The web-based application has the same functionality as that of the android application. Using both the functionality

of the system, the user can broadcast the messages in an emergency.

the messages, which are being sent from the website, are accessed from here.

III. SYSTEM ARCHITECTURE

GSM is a cellular network. Our system uses two main technological applications. These include the Android Application and Web-Based Application.

These two technologies can be integrated with the GSM Functionality. The Android Application will make use of GSM Module to transmit the SMS. The user to different locations that are available in the Android application will send this SMS. Since we know that every mobile phone has a GSM module in its integrated system, hence we are about to use that technology to broadcast the messages to different locations using the android application.

IV. SYSTEM DESCRIPTION

A. System Hardware Architecture

As we are using a GSM module for our functionality, we need to use some other hardware components along with it. The hardware components include the GSM module, the Arduino Mega 2560, and a LED screen.

The LED Screen is used to display the messages, which will be sent by the users from different locations. Every LED screen will have a defined size, for reference, we have used a LED Screen of size 16 x 2. This is not a standard size, as the LED Screen may have different size, depending on the client's requirements.

Every LED Screen will be connected to a GSM module. Hence, we can say that each LED Screen will have a unique SIM card associated with it. Therefore, each LED Screen will have a unique number, which will enable the user to access a particular LED Screen.

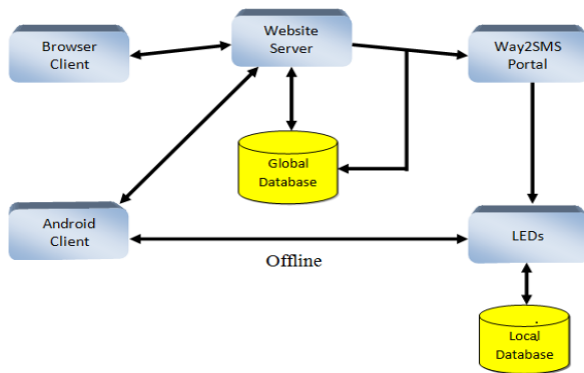


Fig 1:- Overall Architecture

Along with the Android application, we will be providing an extra functionality of Web Based Application. This website will be useful if the GSM fails at any point.

Every message from the mobile phone will reach the GSM module attached to the LED system. The SMS will get stored in the Incoming and Outgoing SMS queue. This queue will have all the SMS that was being broadcast. The SMS manager, therefore, manages all the messages, which are in the SMS queue.

SMS autoreply manager provides the functionality of giving acknowledgment to the user that the message has been reached to the destination.

The Address manager takes care of the address of the incoming message. It shows the source of the message from where the message has arrived. The Incoming SMS Reporter gives notification of the new messages, which have arrived from different locations.

The Web SMS Downloader and Web SMS Uploader is used for the website. These are connected to the Internet web-based SMS, which gives them data from the website. All

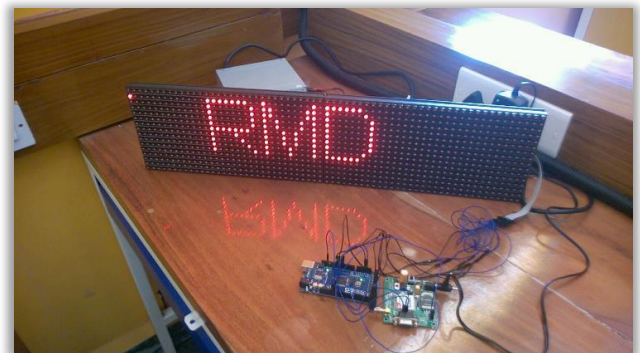


Fig 2:- System Hardware Architecture

B. Arduino Mega 2560 & GSM Interfacing:

The GSM module will get the information from the wireless medium. This information is the messages being sent by the users from different locations. For a particular LED Screen, each user has to select the location of the LED Screen. This will make sure that message reaches the right LED Screen.

GSM module then forwards the packets to the Arduino. The Arduino chip will then process the packet in an appropriate format such that it can be displayed on the LED Screen.

The user can now view the message, which has been received on the LED Screen. As soon as the message is received, the LED Screen will start displaying the message.

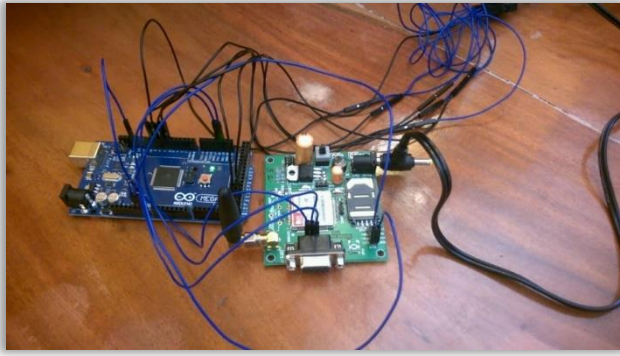


Fig 3:- Interfacing of Arduino Mega & GSM 900A

V. SYSTEM WEB-BASED APPLICATION

The GSM module will be connected to the wireless medium. In our case, this medium is air for both, the Web-based application and the Android application as well.

A Web Application is one that is analogous to a website i.e. “Lives” or exists on a remote server. It benefits ease from of development and platform independence.

In addition, a Web application requires an active internet connection and cannot access the underlying hardware of client's machine completely.

A. System Android Application:

The android application stays on the user's device once installed. It can work completely without an active internet connection. The hardware can be accessed completely by an Android application.

Android application can provide existing features of the website plus extra device-specific features. In addition, it can work Offline if network-based internet bandwidth is low i.e. it can send normal text messages directly to LED Displays.

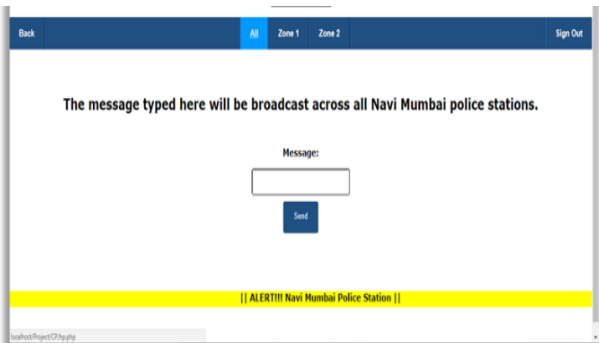


Fig 4:- Website Homepage



Fig 5:- Website Zone 1 page

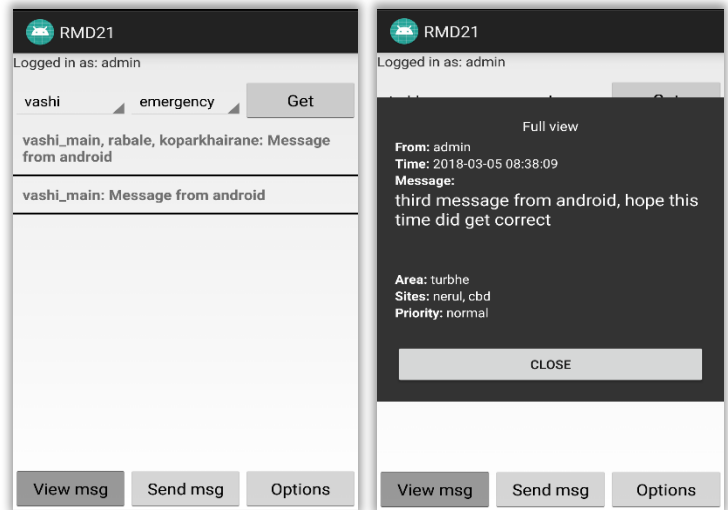


Fig 6:- Viewing history of messages through Android

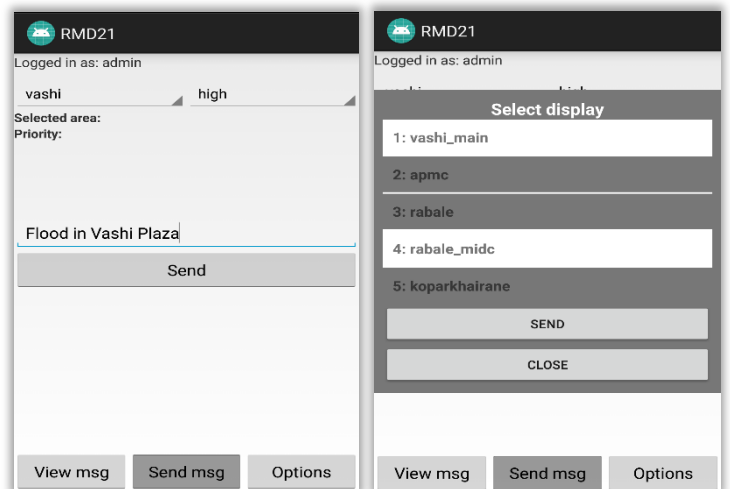


Fig 7:- Broadcasting message through Android

VI. ANALYSIS AND RESULTS

The following graph shows the comparative results of the existing system and the implemented system. The X-axis, coordinates represents the number of users, whereas the Y-axis coordinates represent the time required to communicate with others.

From the following graph, we can observe that there is a significant increase in the response time, as the time required has decreased. Hence, the existing system takes a larger time to respond to any emergency.

In an emergency, the users can broadcast messages to multiple users, and this will be very effective as a small increase in response time can make a huge difference.

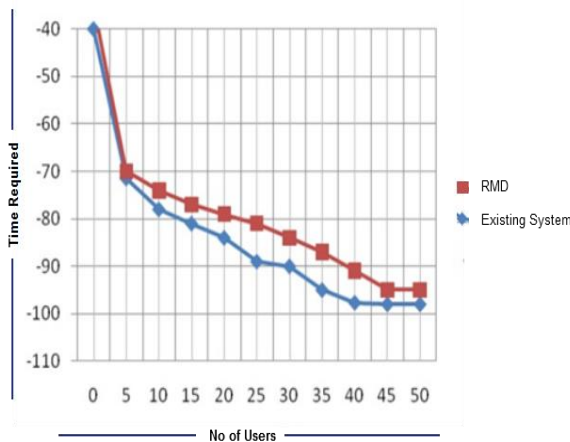


Fig 8:- RMD v/s Existing system

VII. CONCLUSION

Communication systems are crucial to the effective incidents and response. Lack of situational awareness and communications are of the most cited factors that hamper organization’s ability to make crucial decisions.

To address these issues, the system being developed will have a Rolling Message Display mobile application and a website. An Android operating system is selected due to the strong open-source development community and API flexibility for the mobile application.

Every authorized user can access the android application as well as the web-based application to broadcast messages to an organization, which will have a LED Screen to display the messages. This system will enable the organization to broadcast messages in any situation using a GSM Module.

VIII. FUTURE SCOPE

Our system provides reliability, distributed, and scalable architecture for a common incidence awareness picture to enhance collaboration.

The system being developed will have a Rolling Message Display Android Application and a secure system. The Android Application will be developed in Android Studio, & Hardware to work faster and secure.

In future, if any updates are required to be made, then it will be possible to make the changes. Usage of methodology which can be modified easily. The modification will not affect the other modules. Modification in the current system according to the current client’s requirement is possible.

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