Eurasian Journal of Analytical Chemistry
ISSN: 1306-3057 OPEN ACCESS 2018 13 (SP): 261-266

Framework for Emergency Alert System to Public Service Sector (EA-PSS) Using IOT

R. Sujatha*, W. Christopher Rajasekaran, Anu Baisel, Ezhil Kumar

Received 05 November 2018 ▪ Revised: 23 November 2018 ▪ Accepted: 02 December 2018

Abstract: Nowadays many risks occur due to unexpected incidents which result in the vast number of damage to human life. The instant alerting system helps in ensuring immediate action and to save many lives in such situations. So we propose an emergency alert system to public service sector (EA-PSS) using internet of things (IoT) to reduce the contingency peril, with the use of this alarm method. It additionally automates the emergency alarms to the more proximate departments like the fire station, police station, and hospital ambulance. Therefore the purpose of this project is to design and develop an emergency security system that can provide security against intrusion. This system will generate the short message service (SMS) to the concerned authority. To make this system highly interactive in nature, sensors and PIC 16F877A are used to alert the PSS in case of emergencies. Hence expeditious provisional medication can be facilely done by IoT based EA – PSS framework.

Keywords: Internet of Things (IoT), Public Service Sector, Emergency Alert, SMS, PIC.

INTRODUCTION

IoT [Internet of Things] is a system which is interconnected with physical gadgets and things. Empowers to gather and trade the information between the physical world and PC framework with the help of embedded system and network connectivity. In IOT, the objects are controlled and sensed by available network connectivity. It will become part of our overall infrastructure just like water, electricity, telephone, TV and most recently the Internet. Whereas the current Internet typically connects full-scale PCs, the Internet of Things known as a feature of the Future Internet will associate everyday objects with a strong integration into the physical world. To accomplish a genuine Internet of Things we need to move away from such small-scale, vertical application silos, towards a horizontal infrastructure on which a variety of applications can run simultaneously. The information might be refreshed to a particular site or an interpersonal organization by which the client can ready to get to the information. The main objective of our framework is to save the human life from the unexpected accidents which occur in the buildings within a minimal period of time and to provide the required public service sector to that emergency building [7]. Another objective is to store the details of the accidents that have been happened can be used during the time of investigating the building in order to make any improvements [9]. The stored details in the cloud will be more valuable to make improvements in view of the people security. Over the most recent couple of years, the advancement of business sectors and applications, and accordingly their financial potential and their effect intending to societal patterns and difficulties for the following decades has changed significantly.

RELATED WORKS

In today's modern world the accidents increase as such like the population of people increases, in order to provide service to the people at a minimal amount of time we are proposing a framework called emergency alerting process. In this project, PIC16F877A is used as the prime controller [8]. Here we are using GSM, Buttons, Smoke Sensor and LCD display. At whatever point the Smoke sensor identifies, SMS will be sent to the fire station with the complete location [13]. The buttons will be placed in the building so that during an emergency situation, buttons can be used to send the SMS to the police service and in

R. Sujatha*, Assistant Professor (Senior), School of Information Technology and Engineering, VIT, Vellore, India.
W. Christopher Rajasekaran, Assistant Professor, Department of English, VIT, Vellore, India.
Anu Baisel, Assistant Professor (Senior), Department of English, VIT, Vellore, India.
Ezhil Kumar, Placement Coordinator, Centre for Placement and Training, VIT, Vellore.

addition the ambulance service by triggering the respective buttons placed. The details of the sensor which has been recognized and when the buttons are pressed with its exact location will be stored in the database and later can be retrieved by the cloud [11]. The intention of storing the details of all incidents that happened in the building is to have a reasonable history of the accidents of that specific building. By having the historical backdrop of such details will be useful for improving advancement or a few changes to the building according to the people security. Every one of the information sent to the data server will be shown in the LCD screen when the administrator needs to see the details.

Problem Statement

Due to many accidents in buildings, common people are greatly influenced. Numerous human lives are at risk because of the unexpected incidents like fire events [17] by the unconscious to the people, then any health care issues may happen suddenly and burglaries may happen in a building. As of now, individuals won't realize what to do in such circumstance so that the emergency alert system will give activities to be performed instantly in such circumstance [18]. In case of different accidents distinctive preliminary activities are carried out to save the human lives, that is if fire happens the sensor detects the smoke of flame and an alert message is sent immediately through the GSM (Global System for Mobile Communication) to the rescue centre which includes the details of the building location like address of the building at where the fire happens [6, 12].

Then the public service sector like police service, fire service, and hospital ambulance will arrive at the specific building to take respective actions to save human lives. In the event of a burglary or health care, issues occur the people are supposed to press a button based on the need. As per the need of the people, the service will be given instantly.

Immediately the button is pressed the message will be automatically sent through the GSM to the rescue center then the specific groups will give assistance to people in general.

Existing System

There are a few frameworks for the automation of home yet there is no programmed framework to screen the home, and now daily's building emerges in a significant number of the spots of the city for the survival of the general population.

The current framework gives automation for the process of saving a human life like programmed security caution framework during the fire and manual security alert by the people who are in the need of the assistance from the security.

The framework gives the security alarm and the security will pass the message to the sectors for the need of assistance to the building which is an issue. The people have to complain about the issue which has made in the building to the security to call relevant sector department for the need of assistance. At that point, the activity will be finished by the sector departments with respect to the issue saw from the security.

Proposed System

We proposed this emergency alert system to settle on the choices without human intercessions during the crisis because the possibility of emergency is erratic [17]. The MQ-2 sensor is utilized as a part of the discovery of gas spillage and this sensor is also used for the detection of the smoke which is formed by the fire [1]. This sensor works alongside the IoT to alarm the concerned expert on the condition before any damage may cause for the general population.

The motivation behind sending an alert message to the specific service is mandatory in case of emergency, so this system works automatically or manually according to the type of the situation and sends an alert message to the public service sector specifically fire service, police service and ambulance service with its entire location[2,10].

In the event of a crisis, the demand ought to be made to the required services alone. This reduces the arrival of unwanted services to that situation. To reduce this error the demand must be so certain about the requirement for the services such as police, ambulance [3]. This interface explains that the list of available services and furthermore the circumstance based approach. For instance like burglary, murder, and healthcare situation. In the event that a burglary happens, the fundamental needy service is the police, not the ambulance and the fire services. So this common circumstance based approach is very useful to alert the expected services [4]. We use GSM module to transmit messages from the PIC microcontroller that is shown in LCD screen [8, 14].

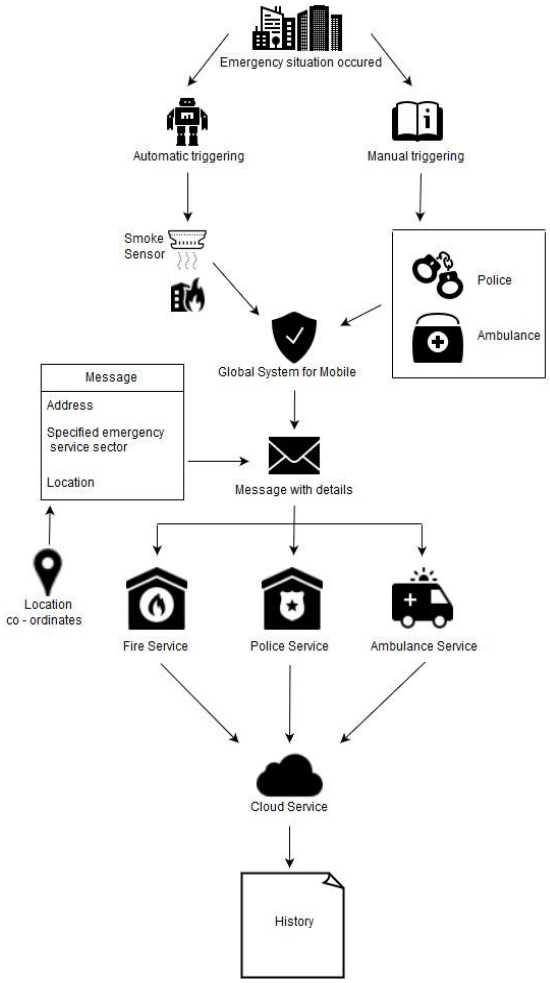

Figure 1: System architecture

Implementation

The main aim of our framework is to save human lives in a minimal time period. Figure 1 represents the full perspective of the framework. The process of sending a message to the public service team through GSM contains the location of the accident occurs and the time, date of the accident. The message will be sent in case of both automatic triggering and manual triggering. In the meantime, the details of the accident will be stored in the cloud for the later view. This file can be seen at whatever point required in the form of excel. This excel file will contain all the details of the message in case of emergency. The details of the accident will be helpful for the building manager for the better advancement of the working later on. While the administrator needs to do the adjustment in the building or disaster will be imminent on the off chance that he/she needed to enhance the working in a higher way around then they can see this report to get a thought of what mind the building must be created and what are the measures to be taken for the issues which have happened before. So the storage of the details is very exceptionally essential at any of the periods. The final parts of the framework, for the most part, concentrates on the storage of the accident details in the cloud and recover it later as Excel file.

The proposed framework contains four modules to perform action based on the need of saving lives they are as follows.

A. Automatic / Manual triggering

If there should be an occurrence of flame, the alert will be automatically triggered by the security and the security will send the message to the public sector which includes a police station, fire station and hospital ambulance [2]. Then the public service team will process some expected activities to save the human life. If in case of any accidents the person has to give alert to the security that is manual triggering, then the process continues as such like the automatic triggering to save the human life.

B. Smoke detection

In current innovation situation, monitoring of gases produced is very important for home appliances such as air conditioners to electric chimneys and safety systems at industries were very crucial [5]. In this

framework, we utilize the MQ-2 smoke sensor which has high sensitivity contrasted with different gases like LPG, Propane, Hydrogen, and Methane [1]. The MQ-2 gas module is mounted on a printed circuit board which has a working voltage of 5VDC [16].The sensor output values can get by methods for both analog and digital life.

C. Send alert message

GSM has a key element of Subscriber Identity Module known as SIM card which is utilized around the world. This module was used in the process of transferring message in view of the demand of the people to the rescue center with the details which includes the location of the building where the service is required [6]. These details will be transmitted through the GSM when the sensor is recognized or the people manually trigger the keypad button.

D. Data storage

The details of the accident are stored in the cloud for the security reason and to evade the crash of database in a few issues. The storage of data in the cloud is secured and the information cannot be utilized by any of the people rather than the respective concern of the building and the service departments [15]. The detail of the message contains the place of the accident occurs and the time, date of the accident that is stored in the cloud. In this cloud module, we can retrieve each and every data in the form of excel file which contains the type of emergency, address, location, date and time [19]. This excel file is fundamentally utilized by the building administrator to check the state of the building and to make changes regarding the accidents in the future advancement of the building.

System Specification

i) Software Requirements:
1. MPLAB IDE
2. Embedded C
3. ASP.NET
4. Visual Studio 2013
5. SQL Server Management Studio

ii) Hardware Requirements:
1. PIC Microcontroller 16F877A
2. Smoke Sensor MQ-2
3. UART Transmitter and Receiver
4. LCD
5. Keypad
6. GSM Module

RESULTS AND DISCUSSION

Hence our proposed framework will be helpful for the way toward sparing human life at an early time period. The smoke sensor identifies the smoke and sends alert to the public service sector. Similarly, the required button sends alert to the appropriate public services. The messages will be sent speedier to get the service from the PSS. The message is transmitted to the appropriate services through the GSM module from the PIC microcontroller which displays the location of the building where the accident has occurred [12]. The status of the framework is shown on the LCD screen. The historical backdrop of services requested by the people will be stored in the cloud database and can be retrieved later to see that for the better advancement of that building.

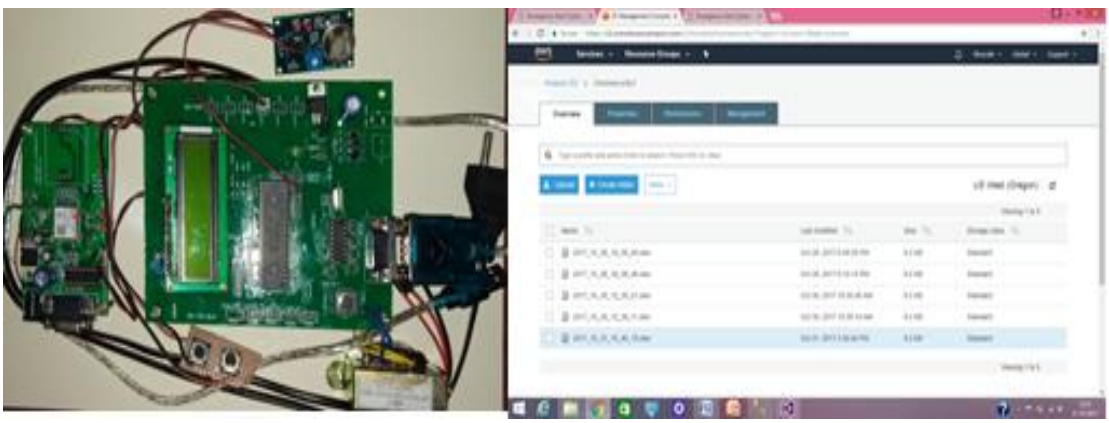

Figure 2: Working of alert system

The above figure 2 illustrates us the working of the alert system which accumulates the smoke and buttons as input and the information is sent to the microcontroller thereby sending messages through GSM module. Through the UART receiver the information is passed as signal to the interface and stored in cloud accommodations.

CONCLUSION AND FUTURE WORK

We have described our proposed framework which will be providing service to the public by means of saving their life in critical situations at the minimal time period. The smoke sensor consequently identifies the smoke and sends a message to the rescue center. The GSM module transmits the message effectively to the center to perform required activities by the service team. The messages that are sent to the service sector will likewise be stored in the cloud database and it can be seen later at whatever point fundamentally. The points of interest will be recovered as EXCEL sheet.

In future we will expand our framework for giving support of the harmed individual at the very least time, that is after the arrival of rescue teams if any individual is harmed seriously they must be taken to the hospital at the earliest opportunity to give treatment and spare their life. In order to provide service quickly, the ambulance driver will have the details of a nearby hospital and the details of a patient in and out of that particular hospital, these details will be persistently refreshed by the doctor's facility administration to the ambulance driver [20]. The updated details will be stored in the cloud database and can be recovered later. So the patient can be taken to the hospital as quickly as time permits and can give treatment prior.

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