

IoT based Notifier

Ankita Khan¹, Brijesh Kumar², Ashish Kumar³, Md. Akram Kazmi⁴, Sanjaykumar J H⁵

¹⁻⁴UG student, ⁵Assistant Professor, Dept. of Information Science and Engineering, Sapthagiri College of Engineering, Bengaluru, India

Abstract - The Internet of Things has come due to integration of multiple technologies. There are numerous serious concerns in the growth of IoT, especially in the regions of privacy and security. Hence a smart IoT based notifier is being developed to address these issues. This project's vision involves enhancement of the existing technologies used in our department for notifying the various staff members on being called by our head of the department. Traditionally it involves an alarm to be used by the head of the department to inform his personal assistant to notify the respective staff about the message. It can be improved by making a secure digital alarm which visually replicates a land line phone with buttons and LCD screen to enter the unique number assigned to each faculty and the enter button to confirm the submission of the number which via an application will notify the respective staffs on their mobile phones about the message to meet the head of the department immediately via wireless connectivity provided by the institution as our campus is 24x7 Wi-Fi enabled. Also, it is a secure device which involves fingerprint lock so that the device can exclusively be used by the head of the department only.

Keywords: Internet of Things, Alarm, Notifier, Privacy, Security

1. INTRODUCTION

The Internet of Things (IoT) is a technology transition in which devices allow us to sense and control the physical world by making the objects smarter and connecting through an intelligent network. The basic premise and goal are to connect the unconnected. The term was created by Kevin Ashton in 1999 to integrate the company's supply chain with the Internet while working for Proctor and Gamble

The Internet of Things has evolved as a result of the integration of multiple technologies, real-time analytics, machine learning, embedded systems, etc. Some of the real-time IoT applications are Connected Roadways, Connected Factory, Smart Creatures, Smart Connected Buildings, etc. In IoT, push notifications are small messages to the users in response to any action and are independent of sites. Pop-ups, on the other hand, appear only when users are on the site.

This project's vision involves the enhancement of the existing technologies used in our department for notifying the various staff members on being called b

involves an alarm to be used by the head of the department to inform his personal assistant to notify the respective staff about the message. This involves manual work as well as can result in delays or errors as it involves human intervention.

The current scenario can be improved by making a secure digital alarm which visually replicates a landline phone with buttons and LCD screen to enter the unique number assigned to each faculty and the enter button to confirm the submission of the number which via an application will notify the respective staffs on their mobile phones about the message to meet the head of the department immediately via wireless connectivity provided by the institution as our campus is 24x7 Wi-Fi enabled. Also, it is a secure device that involves fingerprint lock so that the device can exclusively be used by the head of the department only.

This project will use no extra resources and can provide secure, fast, smart, and efficient communication between the head of the department and the staff members. The main objective of this project is to cut down human intervention and employ effective use of digitalization to minimize delay and miscommunication with negligible upfront costs for the resources to be applied.

2. LITERATURE SURVEY

[1] Mobile technologies are used in institutes to facilitate services. This technology can play an important role in many fields such as m-Health. As such, providing services is an interesting research area. Moreover, according to the EM-DAT, the international disaster database provided by the Center for Research on the Epidemiology of Disasters (CRED), the number of technological disasters has decreased between 2010 and 2015 as. However, the total number of incidents accompanied with those disasters that include industrial, miscellaneous, or transport accidents, have increased as seen in Fig. 1b. [4]The augmentation of various sensors along with mobile computing and telecommunication systems provide a cheap, quick, and a flexible WSN that closely

monitors the natural disasters operating on low power consumption. Disaster Prevention and rescue missions are covered by these utilities. However, utilization of wireless sensors brings forth a challenge of transmitting and storing huge amounts of data to be readily available for the search and rescue teams when needed. Although natural disasters have a great impact on human population and society, technological disasters, or man-made disasters, are prevalent and their effects are just as crucial as the natural ones. Thus, managing those hazards is vital. The utilization of Information and Communication Technologies (ICTs) can enhance the effectiveness of disaster management.

Alarm notifier is the use of mobile technologies within the department administration to deliver services. It can be seen as the new frontier of service delivery, and transforming department by making services more accessible. This idea is for making efforts to provide more access to information and services for citizens, businesses, and civil servants through wireless devices. Therefore, smart phones support the capability of disaster management through its sensors. For instance, tracks all the natural and technological disasters occurring globally, so affected users may only find out about the disaster if they attempt to search for disasters in a particular area. This is not efficient and does not alert users of a disaster. Consequently, our proposed system reduces the amount of stress and anxiety caused by the lack of awareness of real-time disasters. Furthermore, the American Red Cross developed an application for first aid with instructions of the different emergencies a person might suffer from. This application assumes that the injured user or the witness is aware of the medical condition the injured person is suffering from, and thus only provides instructions to a predefined list of emergency diagnostic cases. On the other hand, our proposed system provides the users with sets of instructions to follow based on the gender, age group, state of consciousness, and symptoms the injured person is suffering from. In this paper, we propose a convenient crisis and emergency management mobile application. A wide range of users with different age groups can utilize the proposed system for relief in various emergency situations; both on large and small scales that range from personal emergencies to community disasters at their time of occurrence. Consequently, real-time mapping for outdoor and indoor localization systems are integrated to locate the area of the disaster. Furthermore, it is incorporated with a system to provide the user with the

right course of action to be taken in case of several personal emergency cases, whether the user is experiencing it first-hand or just as a witness.

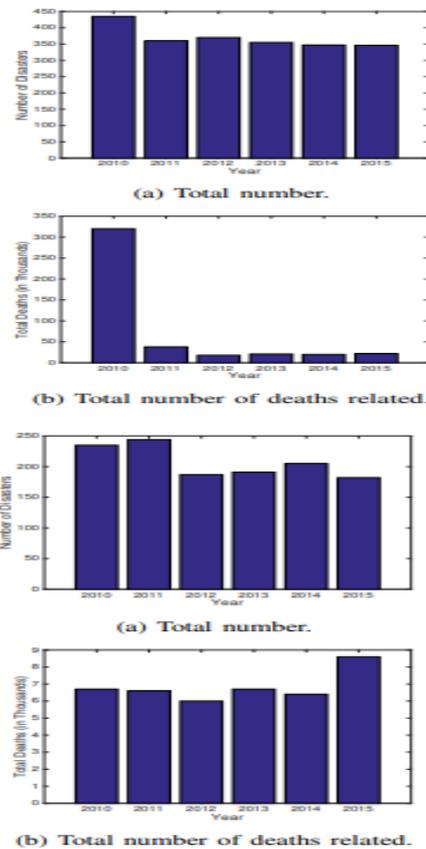


Fig- 1: Technological and Natural disasters over the past 5 years in the continent

Our proposed system’s main contributions include: indoor localization and offline-activated floor plans through the use of GSM, instant emergency aid system, and a dual-end real-time alert system.

The protocol used in KNN used in pattern recognition and regression. Its advantage is information of disaster can be detected within 5 seconds. But on the other hand, it requires lot of predefined data.

[2] In this paper the authors had discussed about State-based or condition-based alarming that has emerged as a prevalent method to reduce nuisance alarms and inhibit alarm floods in the alarm management of process industries. The protocol used is Modified Apriori Algorithm which detects the frequent mode patterns. The State-based alarming is used to reduce nuisance alarms. But on the other hand, it requires database of timestamp textual messages for events.



Fig- 2: Smart mobile based emergency management architecture

[3] In this paper the authors discussed about that, in most recent years, many interesting applications for mobile devices are designed to improve our living quality and deal with house care issues under Android framework. The protocol used is GPS used to search record, locate and contact. The advantage is its quick response. On the other hand, it is complex and has a limited range.

[5] In recent years, due to exceptional technology-push and changing operative framework conditions in industrial practice the concept of Industry 4.0 is rapidly developing. This opens opportunities for developing industrial applications for various needs such as automated and pro-active monitoring, control, decentralized decisions making, management, and maintenance resulting in improved efficiency, accuracy and economic benefits. On the other hand, as industrial systems getting more complex, the amount of warning equipment is growing.

Each introduced IoT device in case of emergency or malfunctioning can turn into a source of alarms. As such, more and more alarms are generated daily resulting into gigabytes of data and introducing an increased load on operators who are unable to reasonably handle the alarms. In the process industries, efficient alarm systems play a critically important role for the economic, safe and efficient operation. However, most existing industrial alarm systems are not ready for the era of IoT as even in their current form they suffer from insufficiently considered design, producing too many alarms to be handled by operators. Such alarm overloading is extremely detrimental to the circuitual role played by alarm systems. Furthermore, the principles of modern economy require from companies to maximize the

utilization of machinery, including the growing number of being newly added IoT devices, with a minimal amount of people involved.

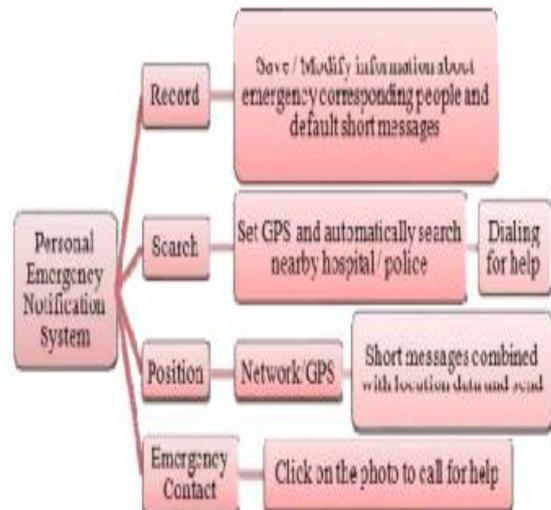


Fig- 3: Main functions in the emergency notification system

Two important concepts in alarm analysis are (a) lifetime or life duration of an alarm; (b) time gap between alarms. Every time an event occurs in an alarm management system it is recorded and stored in the historical event log with two associated time stamps. First, its activation time (ACTt) is the moment when the alarm is activated, e.g. due to a threshold violation, operator action etc. Second, its return to normal time (RTNt) occurs when an alarm is tuned off, e.g. due to an operator action or to a change to a normal threshold level value. Alarms are activated at a particular time and then they return to normal at a subsequent point in time. The time gap between alarms is simply the amount of time that exists between the activation times of each alarm within the historical alarm log.

3. METHODOLOGY

The proposed model contains the following components: ATmega 328 Microcontroller, LCD, WI-FI Module, Finger Print Sensor, Buzzer & Power Supply Unit. The Software used the proposed model are Embedded C programming, Arduino IDE, Express PCB.

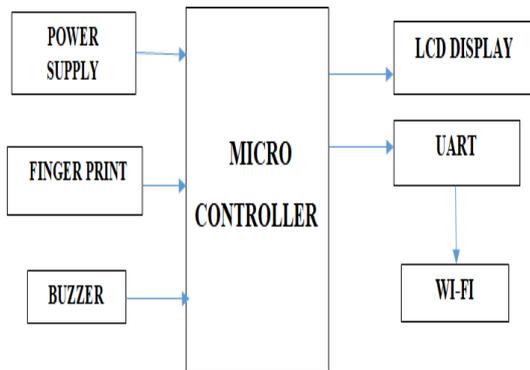


Fig- 4: Proposed Model

The power supply is used to take up the electricity generally the device will take the electricity up to 5V, so we can use a battery, power supply, or any power generating source. The Fingerprint sensor is used for verification and validation. The UART stands for Universal Asynchronous Receiver/Transmitter. The UART connects with the WI-FI for so that it can transmit the data send by the Microcontroller to the Teacher's Staffroom in the form of a Beep Sound coming out of the Buzzer and a message in the mobiles phones of the respective teacher assigned with the unique digit in the Microcontroller. LCD Display is a screen that can be seen by the Head of Department, wherein each digit has a unique value to each of the faculty members. The Microcontroller is 3X4 board having digits from 0-9, enter, and cancel.

The Proposed Model uses an LCD screen to enter the unique number assigned to each faculty and then the enter button is used to confirm the submission of the number on the Microcontroller which has a secured fingerprint locking mechanism in order to maintain the verification and validation. After the submission of the number on the Microcontroller via wireless connectivity, it will notify the respective faculty member on their mobile phones to meet the Head of Department immediately. If the respective faculty member doesn't reply to the message received on their mobile phone within 5 minutes, then after the threshold time has ended, a second notification will be received on the staff room on to a screen with a beep sound coming out of the buzzer and faculty member unique digit to the displayed on to the screen in the Staffroom.

The Application of the Proposed Model are following: College Management System, Public transport inquiry and ticketing system, and Office Management.

4. CONCLUSION

In the existing system, it involves an alarm to be used by the Head of the Department. Traditionally it involves an alarm to be used by the head of the department to inform his personal assistant to notify the respective staff about the message. This involves manual work as well as can result in delays or errors as it involves human intervention. In the proposed system it will use no extra resources and can provide secure, fast, smart, and efficient communication between the head of the department and the staff members. The main objective of this project is to cut down human intervention and employ effective use of digitalization to minimize delay and miscommunication with negligible upfront costs for the resources to be applied.

5. FUTURE ENHANCEMENT

For the Future Enhancement, we can make use of the Personal Digital Assistant (PDA) like Amazon Alexa, Google Siri, etc. instead of the Microcontroller used with the other components to call the faculty members.

REFERENCES

- [1] Mohammed Ghazal, Samr Ali, Marah Al Halabi, Nada Ali, and Yasmina Al Khalil, "Smart Mobile-based Emergency Management and Notification System".M. Young, The Technical Writer's Handbook. Mill Valley, CA: University Science, 1989.
- [2] Wenkai Hu, Tongwen Chen, "Discovering Association Rules of Mode-Dependent Alarms From Alarm and Event Logs".K. Elissa, "Title of paper if known," unpublished.
- [3] Sih-Ting Zeng, Ching-Min Lee, "Personal Emergency Notification Application Design for Mobile Devices".
- [4] Fellow, and Sirish L. Shah, "Design of Conceal Alarm System Based on GSM".
- [5] Veronika Domova, Aldo Dagnino, "Towards intelligent alarm management in the Age of IIoT".
- [6] F. Reena Sharma, S.Geetanjali Wasson, "Speech Recognition and Synthesis Tool: Assistive Technology for Physically Disabled Persons," International Journal of Computer Science and Telecommunications, vol.3, issue 4, April 2017.
- [7] M.A. Anusaya, S.K. Katti, "Speech Recognition by Machine: A review," International Journal of Computer Science and Information Security, vol.6, no.3, 2016.
- [8] B. Singh, N.Kupar, P. Kaur, "Speech Recognition with Hidden Markov Model: A Review," International

Journal of Advanced Research in Computer Science and Software Engineering, vol.2, issue 3, March 2012.

- [9] J. Picone, "Fundamentals of Speech recognition," unpublished.
- [10] P.Saini, Parneet Kaur, "Automatic speech recognition: A Review," International Journal of Engineering Trends and Technology, vol. 4, issue 2, 2013.
- [11] L. Schindler, "Web Based Education: A Speech Recognition and Synthesis tool," unpublished.
- [12] L.F.Hodges, "Interacting with Virtual Humans through Voice Recognition and Intercation", unpublished.
- [13] Cardinaux, F.; Bhowmik, D.; Abhayaratne, C.; Hawley, M.S. Video based technology for ambient assisted living: A review of the literature. J. Ambient Intell. Smart Environ. 2011, 3, 253–269.
- [14] Chaaoui, A.A.; Climent-Perez, P.; Flores-Revuelta, F. A review on vision techniques applied to Human Behaviour Analysis for Ambient-Assisted Living. Exp. Syst. Appl. 2012, 39, 10873–10888.
- [15] DG COMM "Research and Speechwriting" Unit, European Commission. Active Ageing Special Eurobarometer 378. Conducted by TNS Opinion & Social at the request of Directorate-General for Employment, Social Affairs and Inclusion; European Commission: Brussels, Belgium, January 2012.