



Accident Detection and Smart Ambulance Management System

Prof. D. B. Madihalli
Assistant Professor
E&C Engg. Dept.
H.I.T, Nidasoshi,
Karnataka, India
dbmadihalli.ece@hsit.ac.in

Ms. Ashrafi M. Attar
Student
E&C Engg. Dept.
H.I.T, Nidasoshi
Karnataka, India
ashrafiattar2000@gmail.com

Ms. Rutika A. Kanade
Student
E&C Engg. Dept.
H.I.T, Nidasoshi
Karnataka, India
ritikakanade4972@gmail.com

Ms. Vijaylaxmi S. Avarade
Student
E&C Engg. Dept.
H.I.T, Nidasoshi
Karnataka, India
vsavarade@gmail.com

Abstract - Emergency situations like accidents require immediate. With the increase in the number of vehicles on the road the accidents are also increasing. In such situations it is very difficult to identify the person if the accidents are serious. Prior knowledge of the medical case history of the person can be beneficial in providing proper and quick treatment to such victims in case of serious emergency conditions. However in current approaches there is no access to the victims or patients case history which delays in proper treatment and can lead to even loss of life of the patient. This project deals with the development of smart ambulance kit for real-time retrieval of personal information and medical case history during emergency conditions using biometric verification and IOT based user access system. The proposed project deals with the development of IOT connected smart ambulance kits which can be installed in ambulance or emergency vehicles. In case of emergency conditions such as accidents, the victims finger is placed on the kit present in the ambulance. The smart kit checks for the victims fingerprint and fetches the user case history along with personal details, emergency contact number, medical case history and other vital details and displays it on the display interfaced with the smart kit. Additionally when the fingerprint is placed the smart medical kit automatically informs the family members regarding the accident and shares them the live link to track the ambulance. The system simultaneously sends IOT notification to the doctors of the hospital prior to the arrival of the patient so that the doctors can be prepared to treat the

patient before the patients arrive at the hospital.

Key words – Raspberry Pi, Finger print sensor, GPS Modem, GSM Modem.

I. INTRODUCTION

The numbers of accidents are increasing day by day. If the accidents happen at remote places and if the victim is unconscious it is very important to know the identity of the patient. Most of the times due to unknown identity there is delayed treatment or if the person case history is not known there is a chance of getting wrong treatment. There is no existing approach to immediately reveal the identity of the person in case of emergency.

In recent years, the digital images are turned out to be more widespread all over the world. Many organizations such as civil department, IT sector are depends on the digital images for identification. The fingerprint identification is one of the common identification techniques which is used on larger scale. The technique is fast, reliable, least cost and easiest way to identify the individual. It is mainly used for authentication purpose and for its accurateness. As accident takes place on larger scale, the identification of patient becomes difficult. After accident takes place, the appropriate medical treatment is necessary. During emergency, the ambulance plays a vital role. After the ambulance is arrived, during the transportation the identification of patient as well as its pre-medical history should be retrieved till we reach the hospital.

In recent times, the mobile based applications are used on large scale. As technology is increasing, people are able to use

applications and get the benefits. The application provides healthcare services which will meet the urgent requirement of real time access to patient's data. The efficient healthcare application depends on capability to connect medical history, patient, doctors and procedure. A limited access to patient's information can be result into lack of treatment. This pre-medical information can be useful to doctor for the treatment of patient at crucial time.

Generally a hospital maintains all the patient's details and assigns one unique ID. In case if a person meets with an accident and is found unconscious without any identity proof, it is hard to identify that person and also to provide information to the family required to start the initial treatment. In the current system, if you go to a hospital, you are generally provided with a card the first time you register yourself with the particular hospital. It takes your general details like phone no., name. On every visit to the hospital, information about the medical diagnosis is updated in the hospital's server.

II. BLOCK DIAGRAM

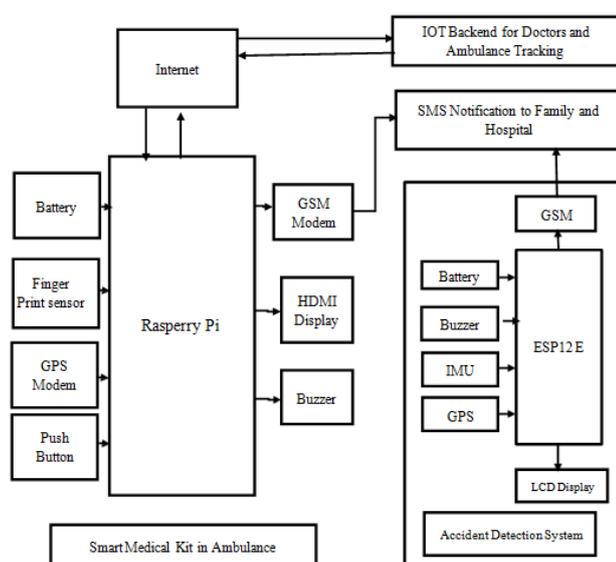


Figure 1: Block Diagram of the project

The hardware part of the system consists of the Raspberry Pi as the primary processing unit, which is interfaced with the fingerprint sensor and an HDMI display. During the emergency conditions the fingerprint sensor processes the data of the victim and calls a web service using IOT which returns all the victim information using REST API. The HDMI display interfaced with the Raspberry Pi will be used display all the information of the victim once the

fingerprint is scanned. The GPS modem interfaced with the raspberry pi will be used to fetch the geographic location details of the ambulance and send the notification to the family members of the victim using SMS. The system also used the IOT communication protocols to send the notification to the doctors panel using web services to help doctor prepare in advance using the available victim data. The Ambulance kit is connected to the internet and will continuously send the tracking details to the cloud backend which can be tracked by the family members. The push button interfaced will be used to exercise different options such as enrolment of the users. The other part of the project is accident detection and notification system to ambulance in vehicles. This involves a vehicle prototype with ESP12 controller and an IMU sensor to detect the accidents. The GSM modem is interfaced with the ESP32 controller will be used send the notifications to the hospital and police station once the accident is detected.

III. COMPONENT DESCRIPTION

RASPBERRY PI: The raspberry pi model B board is a credit-card sized, low cost computer that just plugs into a TV or computer monitor (with HDMI port) and it is capable to connect with a standard mouse and keyboard.

It is a little device that easily enables people to explore computing, and to learn about the programs in languages like python. It is very powerful tool that is capable of doing anything which you would accept a desktop computer to do, from playing high- definition video, browsing the net and to making spreadsheets, word processing etc.

FINGER PRINT SENSOR:

Figure 2: Finger Print Sensor

R307 Fingerprint module consists of optical fingerprint sensor, speed DSP processor, high performance fingerprint alignment, high capacity FLASH chips and other hardware and software composition, stable performance, simple structure, with fingerprint entry, image processing, fingerprint matching, search and template and other functions. The armature is hinged to the yoke and mechanically linked to one or more sets of moving contacts.

GPS MODEM:

Figure 3: GPS Modem

It can track up to 22 satellites on 50 channels and achieve the industry's highest level of sensitivity i.e. 6 dB tracking while consuming only 45ma supply current.

Unlike GPS modules it can do up to 5 location updates a second with 2.5m horizontal position accuracy. The u-box 6 positioning engine also boasts a Time-To-First-Fix (TTFF) of under second.

GSM MODEM: At the heart of the module is a SIM800L GSM cellular chip from SimCom. The operating voltage of the chip is from 3.4v to 4.4v which makes it an ideal candidate for direct LiPo battery supply. All the necessary data pins of SIM800L. GSM chip are broken out to a 0. Pitch headers. This includes pins required for communication with a microcontroller over UART.

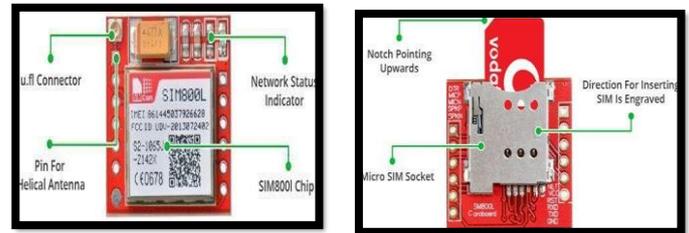


Figure 4: GSM Modem

IV. ADVANTAGES

- a. The system automatically displays all the details of the patient in the ambulance using biometric scan making it easier to confirm the identity of the patient or victim.
- b. The proposed system automatically send the notification to the family members in case of such incidents along with the link to track the location of the ambulance using maps so that family members get notified regarding such incidents
- c. The system also informs the doctors in advance regarding the medical case history of the person in ambulance so that doctors can be prepared to give correct treatment to the patient in case of such emergency conditions.
- d. The system implements IOT based panel for individual registration and biometric verification, hence can be accessed from anywhere.
- e. The proposed solution can also detect the accidents and automatically inform the ambulance, police station and family members in case of such accidents.
- f. The system can be installed in all ambulances.

V. RESULT

- a. System provides an innovative and effective way to identify the victim of the accident by using IOT and finger print sensor.
- b. The system detects the accident and the medical kit developed gives the detail about the patient including his medical case history.
- c. System can immediately identify the person and his information using the web application backend hence save lives during emergency conditions.
- d. System sends the medical case history to the doctor by a backend panel so that doctor can prepare the treatment well in advance before the arrival of the patient. By this we can save number of lives.

CONCLUSION

The proposed project deals with the development of the real time retrieval of personal information and medical history during emergency conditions. From the proposed concept we are concluded that the system provides an innovative and effective way to identify the victims of the accidents by using IOT and finger print sensor.

REFERENCES

- [1]. Ali MM, Yannawar P, Gaikwad AT (2016) Study of edge detection methods based on palmprint lines. In: International Conference on electrical, electronics, and optimization techniques (ICEEOT). IEEE, pp 1344–1350.
- [2]. Anif M, Putra AS, Ernawati D, Prabuwo AS (2015) HoMeTrack: RFID-based localization for hospital medicine tracking system. In: 2015 2nd international conference on information technology, computer, and electrical engineering (ICITACEE). IEEE, pp 449–453.
- [3]. B Rani et al [3] proposed a review on vehicle tracking and accident detection system using accelerometer which detects the accidents and automatically sends SMS notification to family members.
- [4]. Chen CL, Hu JX, Fan CL, Wang K KH (2016) Design of a secure medical data sharing system via an authorized mechanism. In: IEEE International conference on systems, man, and cybernetics (SMC), 2016. IEEE, pp 002478–002482.
- [5]. Rajeswari P, Raju SV, Ashour AS, Dey N (2017) Multi-fingerprint unimodel-based biometric authentication supporting cloud computing. In: Intelligent techniques in signal processing for multimedia security. Springer International Publishing, pp 469–485.

