Artificial Intelligence Based Smart Emergency Ambulance Using IoT

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Abstract
Street gridlock turns into a significant issue for exceptionally packed metropolitan urban areas. India is the second most populated country on the planet and is a quickly developing economy. It is confronting awful street blockage in the urban communities. As per Times of India around 30% of passings are caused because of postponed emergency vehicle to reach at clinic. In proposed framework we are attempting to lessen the postponement for the rescue vehicle. To smoothen the emergency vehicle development we think of "Keen Ambulance". We are attempting to give the green signs to the path where the emergency vehicle needs to go through by physically turning switch on specific path. We will utilize the innovation loved RF Module. This framework was planned so that it ought to be initiated when it got signal from rescue vehicle dependent on radio recurrence (RF) transmission and we utilized Arduino to change the succession back to the typical arrangement before the crisis mode was enacted. In second stage, we are building up a site for doing enrollment about clinical history, everything being equal. This information will assist with saving the time in clinic to get prepared for treatment. This information can be recovered by utilizing exceptional id and unique finger impression confirmation. This produced information will be shipped off the specific clinic before the coming to of emergency vehicle over yonder. As this framework is completely computerized, it perceives the emergency vehicle and control traffic lights. This framework controls traffic signal and saves the time in crisis period. Accordingly, it goes about as a lifeline project.

Keywords: RF Module, Traffic Monitoring, Fingerprint Authentication.

1. INTRODUCTION
1.1 Problem Statement:
In today's real world even in increase of vehicles growth, traffic signals are programmed and still running on fixed timers which will does not vary based on the volume of vehicle accumulation at junction. Due to this scenario there will be a chance of increased waiting time. As no provisions are available with present traffic monitoring system for getting any information about vehicles. Because of this, it will become very difficult to track vehicle and to control signals [1]. So, it creates complexities in emergency situations to minimize delay time of emergency vehicle and may put lives at risk. Medical records implicit all information connected with medical care of the patient and it is the most crucial information in terms of isolation of patient. When patient enters the hospital in emergency condition, delay occurs for starting the treatment for analyzing the patient medical history and maintaining the patient medical records manually may result in loss of information of patients. Now a day's policies and technology are rapidly moving towards the security of patient.

1.2 Field of The Project:
The projects mainly focus on sensing information with the help of biometrics of human. This is secure cycle for keeping records. Just by perceiving unique mark we can acquire the data related with that patient. It is exceptionally advantageous interaction of keeping records. Biometric reacts quickly, ordinarily distinguishing a patient in just one second. Just by perceiving finger impression reality that biometric certifications are special for every persistent and can't be neglected or replicated. This innovation will serve to precisely follow a patient time. The following field of our undertaking centers on correspondence innovation. For correspondence we use RF module [2], [4] 434 MHz this is utilized for single way correspondence and works under Amplitude Shift Keying (ASK) Modulation otherwise called Binary ASK. RF Transmitter is joined to crisis vehicle and RF

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Receiver will be introduced closer to the flagging framework. The other significant zone of this venture is robotization where the information of the patient's clinical records can be recovered and shipped off the specific medical clinic. By utilizing the gathered information, the specialists or medical attendant can plan essential therapy or emergency treatment for the specific patient [3].

1.3 Objectives:

The aim of this project is to provide basic first aid to every patients on time, to attend the patient and send him/her to hospital as soon as possible amidst the heavy traffic zone, to change the traffic signal according to direction of the ambulance, to achieve this condition, direction switch in the ambulance must be pressed then the signal is immediately transmitted from ambulance to receiver of traffic control system via RF Module and to start the treatment immediately, previous medical records can be accessed with the help of biometric sensor and the patient health records can be analyzed in prior.

2. PROPOSED SYSTEM

2.1 Block Diagram of Traffic Signal Control System:

Whenever a switch is pressed, a parallel data is sent to HT12E which encodes the parallel data into serial data and feds to RF transmitter [5]. The RF receiver receives the serial data and feds to HT12D which decodes the serial data into parallel data and it is sent Arduino NANO. It then processes the received data and adjusts the traffic signal accordingly. The overall block diagram of traffic signal control system is shown in Fig. 1.
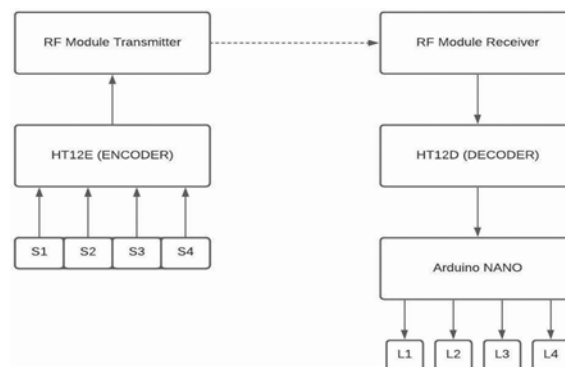

Fig. 1. Block Diagram of Traffic Signal Control System

2.2 Block Diagram of Biometric Based Medical Records:

While escorting a patient to hospital, their medical records are accessed using their fingerprint and it will be sent to the hospital immediately via mail. And another feature of this system is to send what kind of patient is arriving to the hospital via mail.
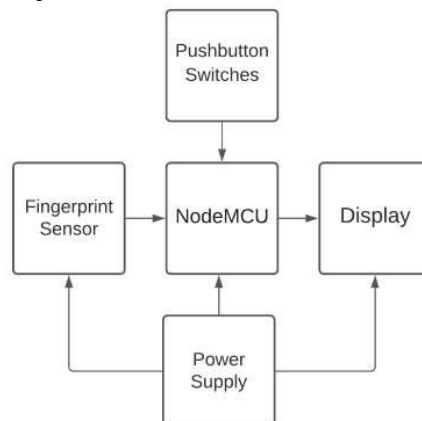

Fig. 2. Block Diagram of Biometric

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The Traffic Signal Control System consists of two parts [6]. First circuit diagram represents receiver side in ambulance it was shown in the Fig. 3 and the second circuit diagram shows the transmitter side in traffic signal it was shown in the Fig. 4.
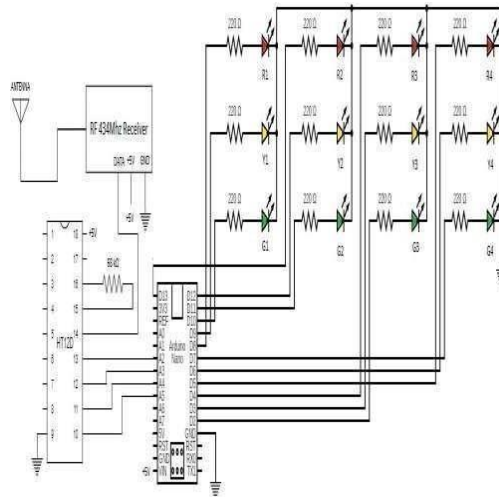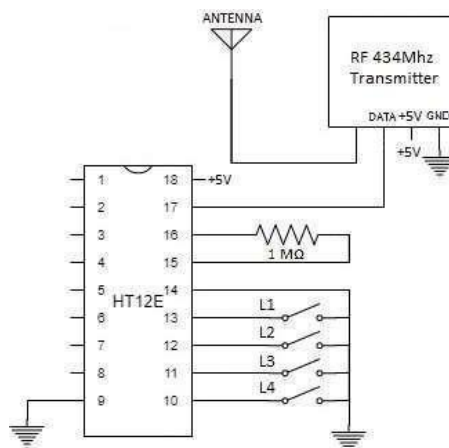

Fig. 3. Receiver side

Fig. 4. Transmitter side

The following Fig. 5 is the circuit diagram of biometric based medical records and it is set in ambulance
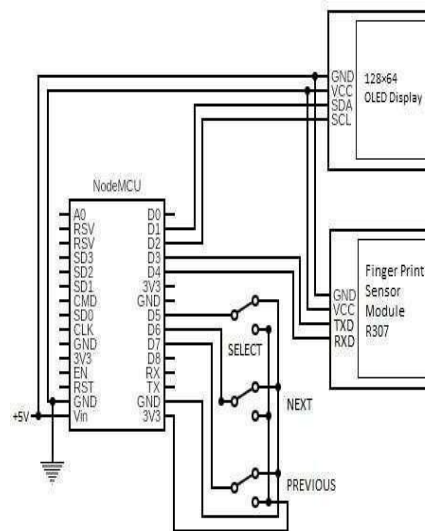
Fig. 5. Biometric Based Medical Records

3. IMPLEMENTATION OF TRAFFIC SIGNAL CONTROL SYSTEM
3.1 Flowchart of Traffic Signal Control System:
This flowchart shows the step-by-step procedure of control of signals in traffic signal control system.

Fig. 6. Flowchart

The system waits for user input. Then it captures the fingerprint using a sensor. After capturing fingerprint, it analyses and matches the fingerprint [7-10] with its medical data of the particular person which is already stored in it and that data is sent to the hospital via email. If the fingerprint captured does not match with any data, it again comes to its initial mode, where we can use the predefined options to notify what kind of patient is arriving to the hospital.

3.2 Methodology of Traffic Signal Control System:
The main methodology of proposed model is to allow clear flow of vehicles for preventing emergency

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vehicles from traffic congestion during emergency situations. As the existing model is inefficient to solve congestion controlling for priority vehicle clearance. So, this project illustrates "Intelligent Traffic Control System" using radio frequency wireless communication technology [11-13]. This system primarily consists of Arduino Uno (ATmega 328p) microcontroller, Encoder (HT12E), Decoder (HT12D), RF transmitter and RF receiver are mainly designed to work under two modes are normal mode and emergency mode.

3.2.1 Normal Mode:
In normal mode whole working of system is based on operation of on-chip microcontroller which is programmed to control traffic signals with fixed predefined time intervals. So, based on predefined time intervals signals in different ways are getting altered at different interval of time. Similarly, every 18 central traffic control system is programmed with different functions and methods according to the traffic congestion in particular way.

3.2.2 Emergency Mode:
In this system, emergency mode is activated by changing switch state to high on transmitter side. When a particular switch gets activated then a signal along with encoded data is transmitted through RF transmitter to the RF receiver installed at central traffic control system nearer to every traffic junctions. After data reception the microcontroller will control signal states for smooth flow of emergency vehicle. So, in emergency mode traffic lights will be controlled by received data. In emergency mode, the radio frequency signal is transmitted by activating switches. When the switches are activated a particular voltage of signal which is produced will be encoded (parallel data will be converted into serial data) along with some address bits which provides security to transmission data. Finally, this encoded data is given to data pin of RF transmitter to establish serial communication between transmitter and receiver. After establishment of connection a signal of frequency 434 MHz will transmit the encoded data to receiver which is connected to microcontroller through decoder which decodes the received data signal by frequently checking security bits of signal. If the received security bits are matched then valid transmission pin of decoder will get activated and decoded data is given to microcontroller. And the microcontroller will control system according to decoded signal. So, when an emergency mode is activated it gives a Green signal to that particular direction and sets Red signals to all other roads or directions approaching the Junction.

3.3   Methodology of Biometric Based Medical Records System:
This Biometric based Medical Record System works in the accompanying manner. At whatever point a patient gets in the emergency vehicle, his/her unique mark is filtered and their recently put away clinical information is recovered and it is shipped off the clinic by means of email. Something else about this framework is it has predefined choices in it which is gotten to utilizing the given press catches and the ideal alternative is chosen which is additionally shipped off the clinic through email [14-16]. Those alternatives address what sort of persistent is showing up to the emergency clinic. The convention utilized here is Simple Mail Transfer Protocol. Simple Mail Transfer Protocol is a TCP/IP convention utilized in sending and accepting email. Be that as it may, since it is restricted in its capacity to line messages at the accepting end, it is normally utilized with one of two different conventions, POP3 (Post Office Protocol) or IMAP (Internet Message Access Protocol), that let the Client save messages in a worker letter box and download them occasionally from the worker. As such, clients ordinarily utilize a program that utilizes SMTP for sending email and either POP3 or IMAP for accepting email. SMTP fills in as a three-venture measure, utilizing a customer/worker model. Initial, an email worker utilizes SMTP to communicate something specific from an email customer, like Outlook or Gmail, to an email worker. Second, the email worker utilizes SMTP as a hand-off help to send the email to the accepting email worker. Third, the getting worker utilizes an email customer to download approaching mail by means of IMAP and place it in the inbox of the beneficiary.

4. RESULT AND DISCUSSION

4.1   Comparison of results:

The proposed traffic control system was implemented and the following table 4.1 shows the output of the traffic signal in which the ambulance or any emergency vehicle passes through that particular lane.

Table 4.1 Output of the traffic signal

Switch	R1	Y1	G1	R2	Y2	G2	R3	Y3	G3	R4	Y4	G4
L1	0	0	1	1	0	0	1	0	0	1	0	0
L2	1	0	0	0	0	1	1	0	0	1	0	0
L3	1	0	0	1	0	0	0	0	1	1	0	0
L4	1	0	0	1	0	0	1	0	0	0	0	1

The Biometric Based Medical Records System was implemented when a patient gets in the ambulance, their fingerprint is scanned and it will find its match in the database. After finding its match, the acquired data will be sent to the hospital immediately via email.

4.2   Hardware Result:

In this manner, the traffic light control framework was tried under various conditions and the yield was checked. Below Fig. 7 is the hardware setup of Traffic Signal Control System.

Fig. 7 Hardware of Traffic Signal Control System

The Biometric Based Medical Records System was tested and the output was verified. Below Fig. 8 is the hardware setup of Biometric Based Medical Records System.
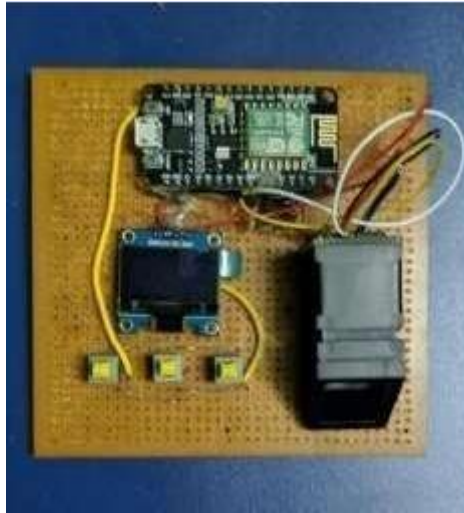
Fig. 8 Hardware setup of Biometric Based Medical Records System

5. CONCLUSION AND FUTURE SCOPE

This venture "Savvy Ambulance" has been effectively planned and tried. In this execution of traffic light control framework, we have utilized Radio Frequency Technology. It is created with reconciliation of all equipment segments. Presence of each module has been analyzed out and set cautiously along these lines adding to the best working of the unit. Besides, with the advantage of growing innovation utilizing exceptionally progressed IC's the task has been effectively executed. The primary advantage of this Biometric Based Medical Record System is online increase of the patient information base. Quite possibly the main application is that it very well may be utilized during crisis condition. Patient's record blunder can be limit utilizing biometric procedure. Fingerprints are unforgotten. Our fundamental objective is to make a maintainable, helpful and secure arrangement that permits the specialists to all the more successfully utilize patient information to improve generally wellbeing, quality and effectiveness of care.

Further upgrades should be possible to the model by testing it with longer reach RF modules. As of now, we have carried out framework by thinking about one street of the traffic intersection. It tends to be improved by extending to every one of the streets in a multi road intersection. Basic health details can be included by government. Further we can identify the address and contact number by using aadhar card. The Biometric Based Medical Records system can be used by healthcare providers to keep records and secure patient health record. The system is expected to enhance the effectiveness and the overall efficiency of hospital management. The integration of biometrics is to increase the user's confidence in this system.

6. REFERENCES

1. Inam Ullah Khan, Muhammad Umar Khan, Hafiz Muhammmad and Syed Bilal Hussain Shah, "Traffic Density Based Light Control System", Journal of American Academic Research, Vol. 5, Issue. 2, June 2017.
2. R.Sureshkumar, R. Balaji, G. Manikandan and Appanaboina Masthan "Advanced Traffic Clearance System For Ambulance Clearance Using Rf-434 Module", International journal of chemical sciences, 14(4), pp:3107-3112, 2016.
3. Bilal, J. M. and Jacob, D., "Intelligent Traffic Controller System", IEEE International Conference on Signal Processing and Communications, 2007
4. R. Puviarasi, Mritha Ramalingam, Elanchezhian Chinnavan and Ajay Kalayan,"Design of Intelligent Traffic Controlling System using RF Transponder", International Conference on Advances in Electrical, Electronics, Information, Communication and Bio-Informatics, 2018
5. Neerav Bhatia, Abhishek Bedi, Ravinder Nath Rajotiya, "Smart Ambulance using RFID Technology", International Research Journal of Engineering and Technology, Vol. 5, Issue 4,

2018.

6.   https://www.elprocus.com/rf-module-transmitter- receiver

7.   Pooja Kadam, Nivedita Patil, Pooja Patil, Snehal Shitole, Prof. Patil S.D., Prof. Patil D.R , "Smart Ambulance with Traffic Management", International Journal for Research Trends and Innovation, Vol. 5, Issue. 6, 2020.

8.   Ankur Dumka and Anushree Sah , "Smart ambulance system using concept of big data and internet of things", Advances in ubiquitous sensing applications for healthcare, pp.155-176, 2019.

9.   Girish H. R , J. Vinay Kumar , Kumara Swamy N. R , Sachin Kumar. M, Sudhakara H M, " A Review: Smart Ambulance and Traffic Controlling System", International Journal of Engineering Research and Technology , Vol. 9, Issue. 4, 2020.

10.   Sandhya D, Mr. Prashanth H S, Shalini V, Sheela, Vydehi Bhat, "Smart Ambulance with Traffic Control", Journal of Emerging Technologies and Innovative Research, Vol. 7, Issue 6, 2020.

11.   Neelam Dahiya, Meenu Garg, Sheifali Gupta and Sheifali Gupta, "Smart Ambulance System Using Internet of Things: A Rumination", Journal of Computational and Theoretical Nanoscience, Vol. 16, No.10, pp.4249-4254, 2019.

12.   Shruthi U1, Sindhu N1, Supriya R Aithal1, Swati Shripad Bhat1, Bhavani K, "IoT Based Smart Ambulance System", International Research Journal of Engineering and Technology, Vol. 6, Issue. 7, 2019.

13.   Nila Sultana, Methila Farzana Woishe, Tamanna Zaman Bristy and Dr.Md. Taimur Ahad, "An Efficient IoT Enabled Smart Ambulance Routing Appling LOADng Routing Protocol: Aiming to Achieves Sustainable Development Goals", Turkish Journal of Computer and Mathematics Education, Vol.13, No. 2 , pp.157-170, 2022.

14.   Kardas G and Tundi ET, "Design and implementation of smart card based health care system for patient record Management", Science new Magazine, 2006.

15.   Yang Qinfeng and Mu Li, "Out-patient-centered information system design", The New England Journal of medicine, pp. 209-304, 2007.

16.   Veeramuthu Venkatesh, V Vaithyanathan, B.Manikandan and Pethuru Raj "A Smart Ambulance for the Synchronized Health Care –A service Oriented Device Architecture-Based", International Conference on Computer Communication and Informatics, 2012.