

Smart Ambulance

A PROJECT REPORT

Submitted by

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In fulfilment for the award of the degree

of

BACHELOR OF TECHNOLOGY

in

Information Technology Department

Under the Guidance of
Mrs. Sumitra Menaria
(Professor)



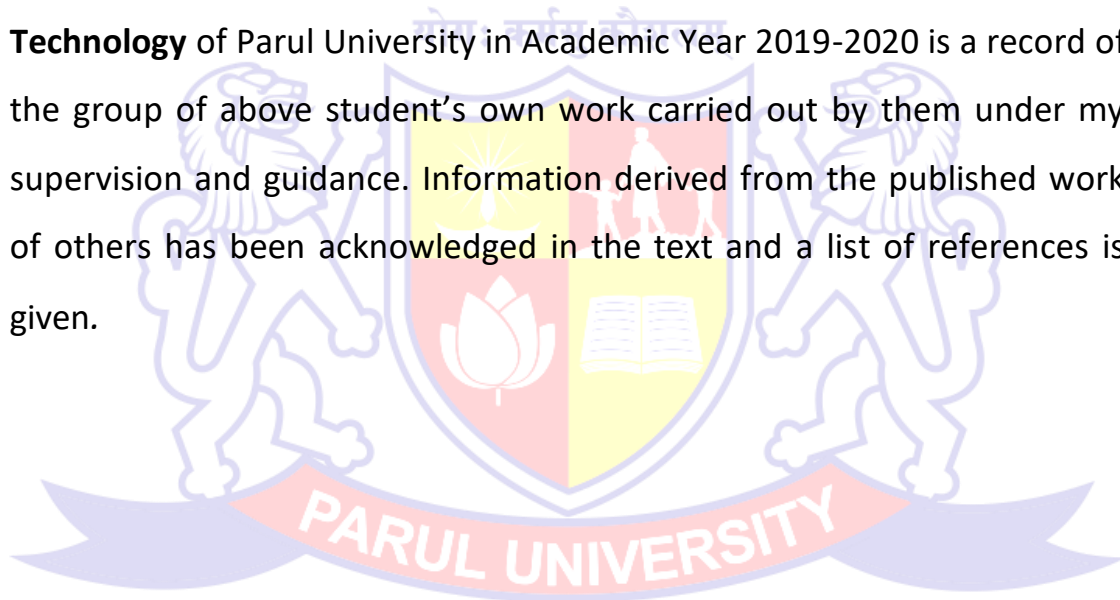
Parul University, Vadodara

April 2020

PARUL UNIVERSITY

CERTIFICATE

This is to certify that the project work entitled “**Smart Ambulance**” for subject **Project-II (03108401)** of 8th Semester, Group No. **PUIT_06** has been successfully completed by **HARSH JASANI - 160303108039, FENIL KALATHIYA - 160303108045, YASH VYAS – 160303108130**, in partial fulfillment of the Bachelor of Technology (B. TECH.) in **Information Technology** of Parul University in Academic Year 2019-2020 is a record of the group of above student’s own work carried out by them under my supervision and guidance. Information derived from the published work of others has been acknowledged in the text and a list of references is given.



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ACKNOWLEDGEMENT

Behind any major work undertaken by an individual there lies the contribution of the people who helped her to cross all the hurdles to achieve her goal.

It gives me the immense pleasure to express my sense of sincere gratitude towards my respected guide **Mrs. Sumitra Menaria** (Professor) for her persistent, outstanding, invaluable co-operation and guidance. It is my achievement to be guided under her. She is a constant source of encouragement and momentum that any intricacy becomes simple. I gained a lot of invaluable guidance and prompt suggestions from her during entire project work. I will be indebted of her forever and I take pride to work under her.

I also express my deep sense of regards and thanks to **Prof. Sumitra Menaria**, (Professor) and Head of IT Engineering Department. I feel very privileged to have had their precious advices, guidance and leadership. Last but not the least, my humble thanks to the Almighty God.

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ABSTRACT

In emergency condition, each and every second is important in saving a human's life. The theme of this project is to use the each second efficiently to save person. Now a days many life's are being expired before the person reaches the hospital in ambulance or life is lost to lack of basic information about the condition of the patient and the delay caused due to this. In this project we have designed a prototype which could save all the delays and save the life at the earliest. The project severs the delays caused by the lack of basic information about the patient and delay caused by the ambulance at the traffic signals. The main theme of the project is that when the patient is in ambulance in emergency condition the ambulance should reach the hospital utmost fast and to send every each and every basic information and condition about the patient to for the prior arrangements for the treatment. It consists of two sections: (i) the basic information and condition of patient is collected in the ambulance by the means IOT (Internet of Things) and make it available to hospital before ambulance reaches the hospital. (ii) The second section is control of traffic lights from the ambulance and makes clearance for its path automatically. Thus this project allows us to save the time of major delay aspects in more efficient and economical manner and save the life.

KEYWORDS : GPS , Emergency medical services, Internet of Things

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LIST OF SYMBOL, ABBREVIATIONS AND NOMENLATURE

Symbol Name	Abbreviations
IOT	Internet of Things
RF	Radio Frequency
GPS	Global Positioning System
WSN	Wireless Sensor Network
RSU	Remote Service Unit
SI	Sensor to Intersection
EM	Expectation Maximization
LED	Light Emiting Diode
IR	Infrared
GSM	Global System for Mobile
RFID	Radio Frequency Identification

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CHAPTER 1 INTRODUCTION

The rapid development of IoT technology makes it possible for connecting various objects such as sensors connecting through the internet and providing more data interoperability methods for application purpose. The Internet of Things (IoT) is the interconnection of uniquely identifiable embedded computing devices within the existing Internet infrastructure. Emergency service should be provided correctly at the needed time. He/she should be taken to the hospital as earlier as possible and treatment as to carry out fast to save his life. This project is mainly based on communication between ambulance and various devices such as mobile phones, hospital computers and traffic signals so that the possibility for saving the life of the needy person will get increased. The cayenne is a user defined application which is used to connect the sensors by Arduino and anyone can access the data with the user id provided.

Problem definition, Objectives and Scope of our project are defined in chapter 2. We have read many research papers which shows different DSS that are already constructed. They have some advantages but there are also disadvantages and limitations. Table 3.2 shows the list of research papers. Existing System are explained in chapter 3. Methodology for system describes the logical explanation for our system. Algorithms and software that are used are also mentioned there in chapter 4. Chapter for research methodology also contains working, project planning, advantages, disadvantages and limitation of our system.

In this chapter I have mentioned in detail the problem statement, objectives and scope of my project. Problem definition defines our inspiration to build this software. Objectives are the pre-defined goals that we want to achieve from this system. Scope is the range or extent of our system that can be achieved in a limited time.

1.1 Problem Statement

In most cases, a patient dies because he/she is not able to reach the hospital on time. This is because of improper traffic management considering the emergency vehicles in account. Also the medical officer handover the patient's report after reaching the hospital which in return takes time for the arrangement of the basic requirement. So, to save human life, some necessary measures have to been taken into consideration.

1.2 Objective

- Control the traffic lights.
- Provide uninterruptable traffic to the ambulance.

1.3 Scope

- This system ones implemented can be very useful in saving human life.
- With the help of GPS, people can easily find and track the ambulance.

CHAPTER 2 LITERATURE REVIEW

In this chapter, a Literature survey of a research paper summary of all research papers that I read related to my project. For existing systems advantages and disadvantages are mentioned below.

2.1 Critical Evaluation of Journal Papers

Paper 1. IoT based Traffic Light Controller in Smart City.[1]

Dr. Sanjeev Sharma, Vaishnavi Giradkar, Aarti Sanap , Snehal Sarolkar had decided to make a system which can control the traffic light with the help of IOT. This system is based on sensor review. They tried to build a decision support system where traffic lights can be controlled based on vehicle density. The research has built a system where raspberry pi has been set as a road side unit which compares the vehicle density from different road and based on the result produced, traffic light is controlled. The researcher had developed this system by using methodology like Web-HTML, JavaScript, etc. The researcher had made the use of IR Proximity Sensors and Rasberry Pi 0 which helps to detect the vehicle density from all the different roads and compare then. IOT h/w on processing the data produce a effective result and accordingly the traffic lights are contolled. The advantage of this system is that the IoT based signals helps to control and manage the traffic considering different aspects such as high priority vehicles and density of traffic. Disadvantage is that sometime the system may not be able to produce the effective result incase of heavy traffic allover the different roads. This may lead to traffic congestion at peak level.

Paper 2. Automated Emergency System in Ambulance to Control Traffic Signals using IoT[2].

Dr. A. Balamurugan¹, G. Navin Siva Kumar, S. Raj Thilak, P. Selvakumar had proposed this system in order to solve the traffic congestion with the help of GPS. Traffic congestion has become a major problem in this technical era. There are various reasons for this traffic congestion. One of these is the rapid growth of the population. As a result of this, the number of cars is increasing annually. The increase in the number of trucks

and commercial vehicles also causes traffic congestion. This causes problems for the ambulance to reach the hospital on the right time. As the result of the rapid growth of technology and engineering field the life of the mankind has got automated. The researcher thought of making an automation like electronic device to communicate between themselves to serve the purpose of the human. This project is based on the IoT and cloud to save the human life at critical situation. The researcher can up with a idea to establish the communication between the traffic signals and the ambulance so that the traffic signal can respond to the arrival of the ambulance and respond according to that. When the traffic signals are changes its states according to the position of the ambulance it can able to make a free way for the ambulance. The advantage is that it provides an automatic traffic signal control through GPS is implemented to avoid congestion of traffic, to reach the particular place, hospital and to save the life of human. The disadvantage is that they don't known the system is going to be work properly or not.

Paper 3. Smart Traffic Light Control System[3].

Traffic light control systems are widely used to monitor and control the flow of automobiles through the junction of many roads. They aim to realize smooth motion of cars in the transportation routes. However, the synchronization of multiple traffic light systems at adjacent intersections is a complicated problem given the various parameters involved. Traffic light configurations:- In the proposed smart traffic light system, two configurations are presented: the first arrangement allows the flow of automotive from road 1 forwardly to road 3 as well as the turning to the right to follow road 4, while the second one permits the cars to move from road 2 directly toward road 4 or shift to the left to pursue road 3. Emergency vehicles:- One of the substantial situations in the traffic light system concerns the passage of emergency vehicles as higher priorities through the roads junction. An emergency vehicle includes ambulances, rescue vehicles, fire brigade, police, and VIP persons that could get stuck in the traffic congestion. This issue may cause several problems that depend on the injury of patient transported, person accident, fire buildings, robbery, and many various critical situations. It is mandatory to implement a technique to solve this predicament. Density traffic light and IR sensors:- The major problem of the existing traffic light systems is that the transition timing slots are fixed within the code. when the flow of cars approaching the intersection roads increases during the traffic peak hours or

decreases during night, the green light activation should be extended or reduced respectively.

Paper 4. Intelligent Traffic Management System for Prioritizing Emergency Vehicles in a Smart City[4].

Traffic congestion worldwide has led to loss of human lives due to failure in transporting accident victims, critical patients, medical, equipments and medicines on time. In the literature, researchers have suggested various solutions, but without taking into consideration how to prioritize emergency vehicles when traffic system is collapsed due to hacking. Our proposed solution, not only navigates ambulances to find the shortest possible paths till their destination, but also presents a counter measure to get rid the problem of the traffic light system when it is hacked during its operation. To show the advantages of our proposed solution over already proposed solution, a simulated environment is used to model various scenario which shows the actual roads and vehicle movement in the implementation. Once the information of emergency vehicles is obtained from sensors, it estimates the distance of emergency vehicles from an intersection and delivers access to the emergency vehicle on that particular road segment immediately. An RSU of the current intersection (RSU-A) informs the RSU of neighboring intersections (RSU-B) with the details of velocity of emergency car and number of vehicles which is moving towards the same intersection-B. The proposed model not only distinguishes emergency messages with several priorities, but also prevents false warnings from malicious entities. The experimental results show that our system outperformed others in terms of time constraints, thereby achieving the goal of allowing emergency services to be met at the shortest possible time. The proposed system eliminates the time delay in medical assistance for accident victims, transporting critical patients and medicines.

Paper 5. Intelligent Traffic Light Control[5].

Marco Wiering, Jelle van Veenen, Jilles Vreeken, Arne Koopman they create in this paper we study the simulation and optimization of traffic light controllers in a city and present an adaptive optimization algorithm based on reinforcement learning. We have implemented a traffic light simulator, Green Light District, that allows us to experiment with different infrastructures and to compare different traffic light controllers. Vehicular travel is increasing throughout the world, particularly in large urban areas. Therefore the need arises for simulating and optimizing traffic control algorithms to better accommodate this increasing demand. Traffic-light based controllers. We can make a controller for each traffic node, taking into account environmental inputs such as the number of cars waiting at each of the 8 directions and learning a value function mapping environmental states and traffic node decisions to the overall waiting time until all cars standing at the intersection have exited the city. In this article we first showed that traffic control is an important research area, and its benefits make investments worthwhile. We described how traffic can be modelled, and showed the practical use of some models. In our approach we let cars estimate their gain of setting their lights to green and let all cars vote to generate the traffic light decision.

Paper 6. Intelligent Traffic Light System to Prioritized Emergency Purpose Vehicles based on Wireless Sensor Network[6].

Amnesh Goel , Sukanya Ray , Nidhi Chandra. In this paper, we propose an adaptive traffic intersection system based on Wireless Sensor Network where the traffic light of one intersection can communicate with the traffic light of the next neighbouring intersections and traffic clearance will be prioritized for special vehicles with the help of sensors. The use of Wireless Sensor Network (WSN) has proved to be a very beneficial in the design of adaptive and dynamic traffic light intersection system that will minimize the waiting time of vehicles and also manage the traffic load at the intersection adaptively. Before this technology when emergency comes to the signal it must wait when their traffic jam so using various types of sensors we make a system that provide clearance of traffic during emergency vehicle comes to the signal. Using sensors it solves the traffic before emergency vehicle arrived. A sensors : To solve this kind of situation, whenever any emergency vehicle passes from road then the road side sensors will

detect the vehicle based on sound system and this sensor will trigger an event to next traffic intersection point informing that a emergency vehicle has to pass and give a clear way with immediate effect which is hereafter refer as SI(Sensor To Intersection) communication. As soon as intersection will receive any signal from road side signals then it will give Red signal to remaining intersection sides and give green to that side from where sensor has triggered that event. This paper touched on key point to give a clear way to emergency purpose vehicles on road so that they can reach to their destination in least time by not stopping at the traffic intersections.

Paper 7. Smart Ambulance Rescue System with Patient Monitoring[7].

Vidya Bangar, Nikita Chaskar, Sayali Kurhade, Dr. Borhade B. M. had develop a system after doing research on current scenario of the human health. They have tried to build a system that will find the minimum distance to reach the hospital. Also detect what kind of disease may occur in a particular age group. The researcher had found that the due to lack traffic congestions, patients aren't able to reach the hospital before time. So, with the help of Outdoor Floyd-Warshall Algorithm, possible closest distance between the patient and doctor in hospital. Nowadays human life has become so much complicated that even a small kind of stress/disorder can cause a severe problem to human health. So, with the help of Expectation-Maximization (EM) data mining algorithm we can get idea of the infectious disease in categorized manner like area group, age group, disease group and also for finding common treatment. The advantage of this system is that it provides timely help to the patient and elderly people in critical situation and develop an intelligent ambulance which will reach the hospitals without any problem in heavy traffics. Flaw in this system can be that it is only under the supervision of Hospital Mangement system that that can be somewhere a loose end for the system.

Paper 8. Smart Healthcare Monitoring using IoT[8].

Shubham Banka, Isha Madan and S.S. Saranya they had decided to make a system where IoT in healthcare is the key player in providing better medical facilities to the patients and facilitates the doctors and hospitals as well. The proposed system here consists of various medical devices such as sensors and web based or mobile based applications which communicate via network connected devices and helps to monitor and record patients' health data and medical information. The major aim of the paper can be to obtain the real-time medical information about a patient via IoT and to provide Internet of Things based healthcare solutions at anytime and anywhere.

Raspberry Pi : The Raspberry Pi is a bank card size microcontroller with the features of a small pc and is extremely popular for development purposes because it offers the entire Linux server and peripheral device connectivity on a single chip and is very cost-effective and we use many more components.

Heartbeat Sensor: The heart rate is measured using a pair of LED and LDR and a microcontroller and it works on the fundamentals of optoelectronics. The infrared radiation is emitted by IR led and the infrared light is reflected by the surface. The proposed system can be set-up in the hospitals and massive amount of data can be obtained and stored in the online database. Even the results can be made to be accessed from mobile through an application.

Paper 9. Smart Health Care System Using Internet of Things[9].

IoT technology in applications has spurred the increase of real-time data, which makes the information storage and accessing more difficult and challenging. We have create a application using IOT and than some devices are connected with the IOT device that can create a health report for the patient's and this report show in application and send the doctor. In addition to IoT services, IoT applications deserve closer attention. It can be noted that services are used to develop applications, whereas applications are directly used by users and patients. Therefore, services are developer-centric, whereas applications, user-centric. In addition to applications covered in this section, various gadgets, wearables, and other healthcare devices currently available in the market are discussed. These products can be viewed as IoT innovations that can lead to various healthcare solutions. The next subsections address various IoT-based healthcare applications, including both single- and clustered-condition applications. Innovative

uses of IoT technology in healthcare not only bring benefits to doctors and managers to access wide ranges of data sources but also challenges in accessing heterogeneous IoT data, especially in mobile environment of real-time IoT application systems. The big data accumulated by IoT devices creates the problem for the IoT data accessing.

Paper 10. A Smart System Connecting e-Health Sensors and the Cloud [10].

This paper presents the design and implementation of an e-health smart networked system. The system is aimed to prevent delays in the arrival of patients' medical information to the healthcare providers, particularly in accident and emergency situations, to stop manual data entering, and to increase beds capacity in hospitals, especially during public events where a large number of people are meeting in one place. Data Collection:- Patients' physical parameters are measured using medical sensors that are connected to a raspberry pi. The raspberry pi is responsible for collecting data from the sensors and transferring it, over SSL, to the cloud environment. The sensors transmit real time data to the application in the cloud continuously based on the delay time which is set in their configuration program. Decision Making :- Figure 2 depicts the system decision making algorithm. We use data mining techniques in order to build our algorithm. The data mining procedures are responsible to create appropriate medical decisions based on three parameters which are patient id, sensor type, and sensor current data. Decision Approver :- After the system makes the decisions, they will be sent to the medical staff who are responsible for the patient's healthcare for approval. There are different ways to notify medical staff including, SMS and email. The integration between wireless sensor networks and cloud computing will create a new generation of technology in many aspects such as patient monitoring with minimal cost, reducing the number of occupied beds in hospitals, and improving medical staff performance. In addition, applying various data mining techniques help to extract and analyze patient's data. The system introduced in this paper provides decisions based on patients' historical data, real-time data gathering, and thus eliminating manual data collection.

Paper 11. Patient Monitoring System Based on IOT[11].

Jorge Gomeza, Byron Oviedob, Emilio Zhumab has made a effective system makes the use of patient's medical history, monitors routine workout, and with the help of visual interface, monitors reading of blood pressure, blood glucose and many among others. Accordingly informs the patient about his/her health and workout schedule. The increased use of mobile technologies and smart devices in the area of health has caused great impact on the world. Health experts are increasingly taking advantage of the benefits these technologies bring, thus generating a significant improvement in health care in clinical settings and out of them. Likewise, countless ordinary users are being served from the advantages of the M-Health (Mobile Health) applications and E-Health (health care supported by ICT) to improve, help and assist their health. The researchers had developed an application using which doctor can keep a watch on patient's health. Using the result, it can suggest what kind of disease can occur, kind of prior measures to be taken, type of exercise to be performed, etc. The advantage is that it improves the quality of life of patients. Directs them to improve their eating habits and workout routines. The disadvantages is that it's just a system that provides suggestion to the patients. If the system fails/crashes, it can give inappropriate result.

Paper 12. Patient Health Care and Ambulance Tracking System[12].

Renuka Bhajantri, Prasad Bhapkar, Pooja Chaugule, Vishwanath Patil, Prof. Mangal Kotkar had tried to built a system in which they are going to take care of patient's health and this data can be shared with the doctor and another module that tracking the ambulance's real time location that can be tracked by user. The researchers had made the use of GPS which helps to track the ambulance and patient's name and id linked with user's profile is send to doctor with the patient's live location. Doctor send the ambulance to that particular location. The ARDIUNO system is used to alter the traffic lights upon its arrival at traffic light junction which would save a lives at critical time. The advantage is that the proposed system is useful for critical patient information easily find out. It provides transportation unit information and as well as patient health information, which is useful in further emergency treatment for doctors. The Ambulance tracking system can help in saving many lives. It can also send current

location using GPS system to the server database. The server in turn sends location and status information to the doctor.

Paper 13. A Smart Ambulance System[13].

In today's world, traffic jams during rush hours is one of the major concerns. During rush hours, emergency vehicles like Ambulances, get stuck in jams. Due to this, these emergency vehicles are not able to reach their destinations in time, resulting into a loss of human lives. We have developed a system which is used to provide clearance to any emergency Ambulance vehicle by turning all the red lights to green on the path of the emergency vehicle, hence providing a complete green bay to the desired vehicle. A „green bay is the synchronization of the green phase of traffic signals. With a green bay setup, a vehicle passing through a green signal will continue to receive green signals as it travels down the road. Around the world, green bay is used to great effect. In addition to the green bay path, apart from this system will also provide patient monitoring from the hospital. In the existing system we don't have automatic control traffic signal, due to this emergency ambulance not able to reach the hospital within time. For this system we have implemented effective smart ambulance system by using GPS, GSM and smart mobile along with ZigBee Technology. From ambulance we will be capturing the patient's parameters along with the coordinates these two details will be sent to control center. Control center will be going to send nearest hospital details to the ambulance, then ambulance will choose the path to hospital and traffic signal within this direction will be green light and this route will be considered it as green bay. Along with this every few minutes patient's parameter's will be sent to the hospital to get the suggestions to monitor patient's condition. This project is targeted to design and develop a real time smart ambulance system.

Paper 14. Automatic Ambulance Rescue System Using Shortest Path finding algorithm.[14].

P. Arunmozhi , P. Joseph William. There is loss of life due to the delay in the arrival of ambulance to the hospital in the golden hour. This delay is mainly caused by the waiting of the ambulance in the traffic signals. It would be of great use to the ambulance if the traffic signals in the path of the hospital are ON. Thus we propose a new design for automatically controlling the traffic signals and achieving the above mentioned task so that the ambulance would be able to cross all the traffic junctions

without waiting. Finding the Nearest Ambulance and Hospital to the Accident Spot when a vehicle meets with accident, it immediately sends its GPS location to the Main server. The server maintains a database of the ambulances available. The server selects the nearest ambulance to the accident spot using the database containing the details of free and busy ambulances at that point of time. Signal section contains RF receiver, while crucial ambulance travelling RF transmitter will send message to RF receiver then RF receiver will provide green signal. In this paper, a novel idea is proposed for controlling the traffic signals in favour of ambulances during the accidents. With this system the ambulance can be manoeuvred from the accident spot to the hospital without time lag. But there may be a delay caused because of GSM messages since it is a queue based technique, which can be reduced by giving more priority to the messages communicated through the server.

Paper 15. IOT Ambulance[15].

S N Sivaraj, S.Vigneshwaran , M.Vishnu Priyan. In emergency condition, each and every second is important in saving a human's life. The theme of this project is to use each second efficiently to save person. Now a days many life's are being expired before the person reaches the hospital in ambulance or life is lost to lack of basic information about the condition of the patient and the delay caused due to this. In this project we have designed a prototype which could save all the delays and save the life at the earliest. The project severs the delays caused by the lack of basic information about the patient and delay caused by the ambulance at the traffic signals. The main theme of the project is that when the patient is in ambulance in emergency condition the ambulance should reach the hospital utmost fast and to send every each and every basic information and condition about the patient to for the prior arrangements for the treatment. Arduino uno board the central controller role is played by the embedded controller. Sensors it is used to measure the physical quantity such as heartbeat and pulse rate etc. The measured quantity is sent as signal to IoT. Various sensor used for measured body temperature and body pressure. This idea can be forwarded to ambulance manufacturing industries. Hence they can implement the product during their design itself. Since there is no world without internet in the future this will turn out to be a growing and trending one in the market. In future as technology raises additional features like GPS tracking can be implemented for traffic clearance.

2.2 Summary of Research Paper

Table 2.1 Research Paper Summary

Sr No.	Title	Publication	Year	Limitation
1	IOT Based Traffic Light Controller in Smart City	IJAR	2018	Congestion may occur if two ambulance passes
2	Automated Emergency System in Ambulance to Control Traffic Signals Using IOT	IJSEC	2015	The application mainly depends on the cloud services.
3	Smart Traffic Light Control System	IEEE	2016	Failure of sensor can reflect the entire system badly
4	Intelligent Traffic Management System for Prioritizing Emergency Vehicles in A Smart City	IJE	2017	Issue with IOT is that the security of the entire system
5	Intelligent Traffic Light Control	IICS	2017	System require more time working
6	Intelligent Traffic Light System to Prioritized Emergency Purpose Vehicles Based on Wireless sensor Network	IJCA	2012	Over hide small vehicles by big vehicles
7	Smart Ambulance Rescue System with Patient Monitoring	IJAR	2017	Only under the supervision of hospital management
8	Smart Health Care Monitoring Using IOT	IJAE	2018	Only authorisd person can access this software

9	Smart Health Care System Using Internet Of Things	JNCET	2016	Inform the patients body report to the patient
10	A Smart System Connecting E-Health Sensors and The Cloud	IEEE	2015	Patients body report store in cloud
11	Patient Monitoring System Based on IOT	The 7 th International Conference	2016	Provides suggestion to the patients
12	Patient Health Care and Ambulance Tracking System	JAC	2019	Internet access is require for tracking the ambulance
13	A Smart Ambulance System	IJIT	2017	Only used for ambulance staff and hospitals
14	Automatic Ambulance Rescue System Using Shortest Path Finding Algorithm	IJSR	2012	Dijkstra's algorithm used for find shortest root
15	IOT Ambulance With Automatic Traffic Light Control	IJIE	2017	ARDUNO UNO is failed than system is failed

2.3 Existing System

2.3.1 Advantages

- Finding shortest path to reach accident spot and back to hospital.
- Provide primary and necessary treatment within the ambulance.

2.3.2 Disadvantages

- Medical officer handovers the patient's report to the doctor after reaching the hospital.
- Ambulance get stuck in traffic congestion which can become danger for patient's life.

2.3.3 Limitations

- Internet access is mandatory for tracking ambulance.
- Cannot control traffic light.

CHAPTER 3 RESEARCH METHODOLOGY

This chapter deals with the research and methodology to do in the project work. It shows detailed and deep insights into the experimentation associated with the project. Also, future working of our project is presented. This chapter deals with the research and methodology to do in the project work. It shows detailed and deep insights into the experimentation associated with the project. Also, future working of our project is presented.

3.1 Introduction of Research Methodology

The various problems regarding the problem statement is studied by us. The possible solutions for these problems are surveyed. We also found many ways to solve the problem.

3.1.1 Working

First of all with the help of IoT h/w, a system will be designed in such a manner that it can alter/change the traffic lights. When the ambulance is transporting the patient to the hospital, using GPS it will select the fastest route with uninterrupted traffic. If any traffic signal comes in its way, it will send a signal to traffic controlling system to make the signal GREEN and other signals RED so as to give a free way too the ambulance. Hospital database will contain records of Doctor's timing in particular hospital and what kind of facilities it provides to the patient regarding medical treatment. Staff present in the ambulance will monitor the patient's health and will enter the report in the database that can be send/accessed by the respective hospital staff so as to make all the prior preparation, e.g. blood from blood bank, getting OT ready, etc.

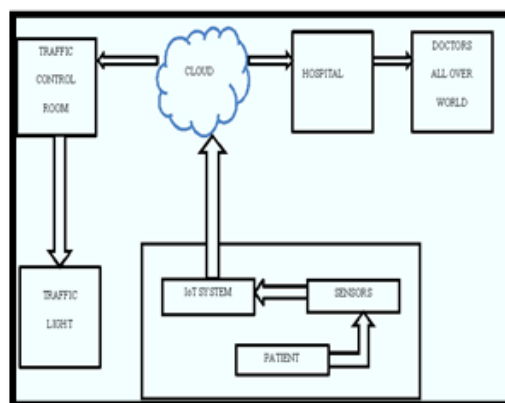


Fig 3.1 System Architecture [6].

3.1.2 Advantages

- Using our system, ambulance can control the traffic signal so as to find an uninterruptable way.
- Medical officer sends the patient's report to the doctor before reaching the hospital.
- Can track the nearby ambulance.

3.1.3 Disadvantages

- Internet is required.
- Traffic Signal can be hacked.

3.2 Methodology

1) Arduino UNO

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc.[2][3] The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits.[1] The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable.[4] It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts.



Fig 3.2.1 Arduino UNO [4]

In our project it is used to control the traffic signal by triggering the signal to the traffic controller so as to make an uninterrupted way for the ambulance.

2) GPS

GPS receiver receives information signals from GPS satellites and calculates its distance from satellites. This is done by measuring the time required for the signal to travel from satellite to the receiver. To determine distance, both the satellite and GPS receiver generate the same pseudocode signal at the same time. The satellite transmits the pseudocode; which is received by the GPS receiver. These two signals are compared and the difference between the signals is the travel time.

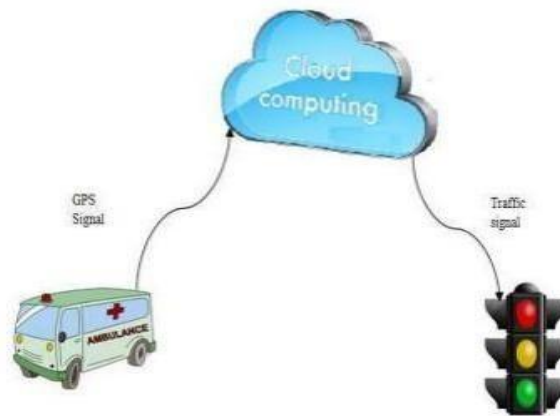


Fig 3.2.2 Component of the System [6].

In our project it is used to track all the nearby ambulance, find the shortest path to reach the ambulance, track the traffic light coming in midway.

3) Hospital Information

It maintains the record of what kind of facilities are provided within the hospital regarding treatment of patient. It also maintains the record of the patients once visited to the hospital. And this information is accessible by the medical officer as well as ambulance staff.

CHAPTER 4 IMPLEMENTATION

This project contains 3 modules that are controlling traffic light, tracking of ambulance and a database that stores patient's details. So, here's how we have implemented our project.

Hardware:

- Arduino UNO
- ESP8266
- RFID
- U-Blox Neo-6M

Software:

- Arduino IDE

Programming Language:

- C,C++

Working:

In this project, we have used C and C++ programming language to integrate the hardware according to the application. We have used BLYNK app to track the location of Ambulance using GPS module, store the patient details and share it with the hospital. Blynk is a platform with IOS and Android apps to control Arduino, Raspberry Pi and the likes over the Internet. It's a digital dashboard where you can build a graphic interface for your project by simply dragging and dropping widgets. ESP8266 and RFID scanner are connected to the Arduino board to control the traffic lights. If the scanner detects the presence of the ambulance nearby, the traffic light will be turned green for that route.

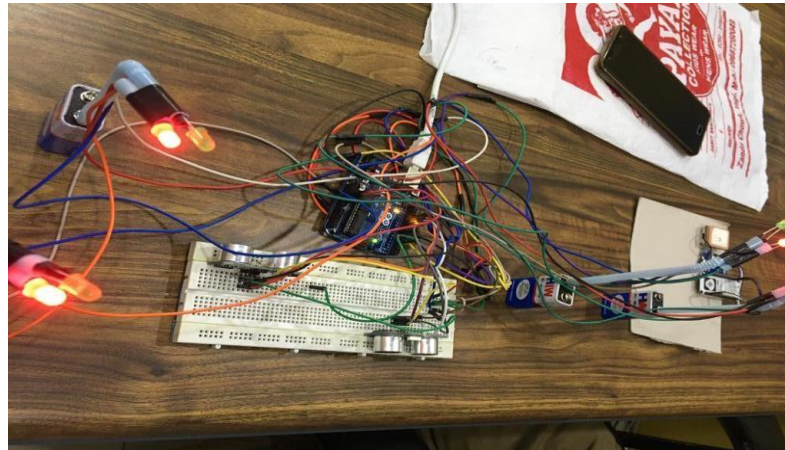


Fig 4.1 Prototype-1

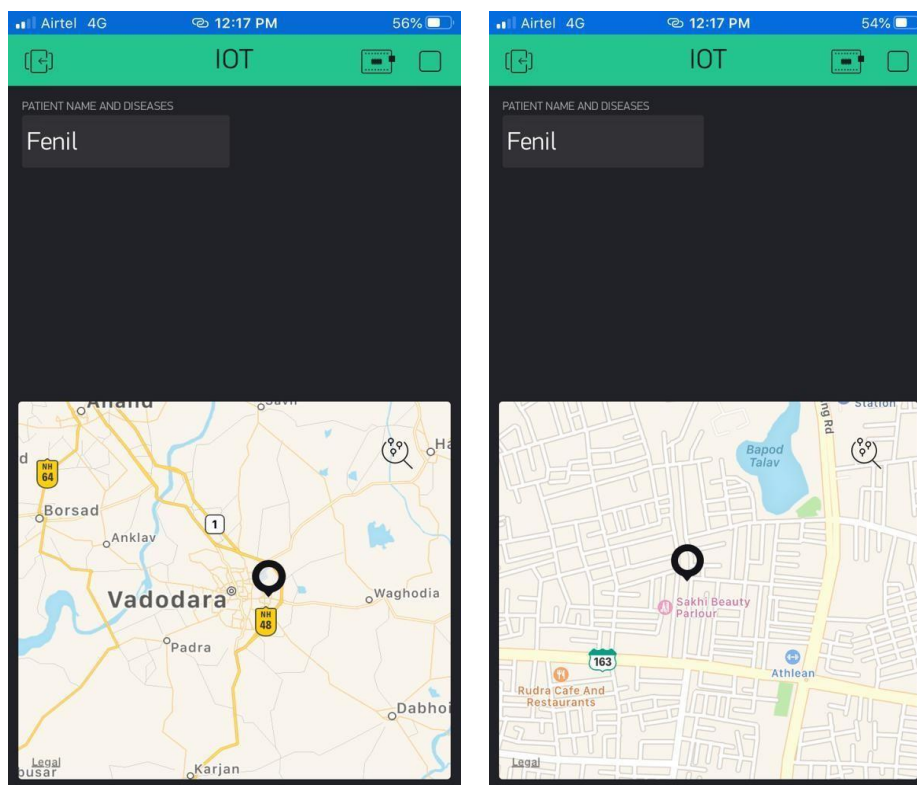


Fig 4.2 Prototype-2

GPS Data:

GPS device is connected to the ESP8266. TX, RX on D0 and D1 and VCC to the 3.3 v and GND to the GND(-ve) of ESP module, keep this device in open space(open roof) so that this device can connect to the satellite to get the location, once this module makes a connection with satellite it will start blinking and you will get latitude and longitude.

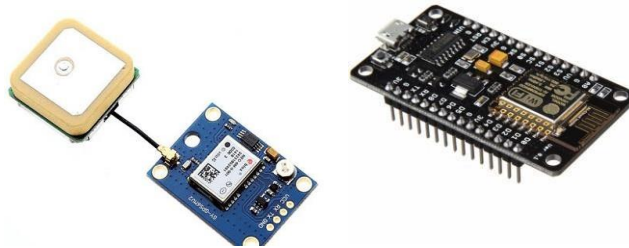


Fig 4.2 GPS device (U-Blox Neo-6M) and ESP8266

Traffic Light:

Arduino is used to controlling the light, the RFID scanner will detect ambulance in front of it and send a signal to the Arduino and it changes all the traffic light on that path from RED to GREEN.

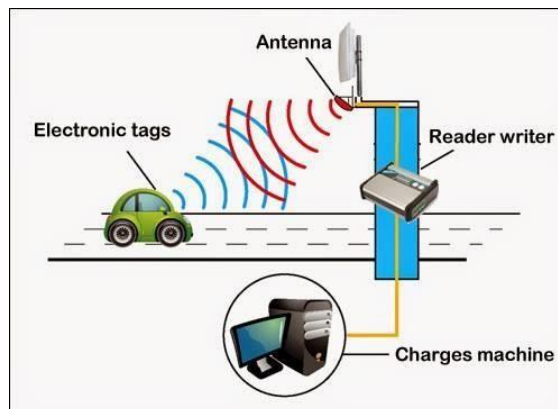


Fig 4.3 RFID

CONCLUSION

This project mainly depends on measures very conscious in all aspects. Our system controls traffic signals, tracks the ambulance and shares the patient's details with the hospital. The proposed system is more reliable, easy to operate and can be equipped.

REFERENCES

1. Tanvi Tushar Thakur, Ameya Naik, Sheetal Vatari, Manjiri Gogate, "Real Time Traffic Management using Internet of Things" International Conference on Communication and Signal Processing, pp.6-8, 2016,
2. Sheela. S, Shivaram. K.R , Sunil Gowda.R , Shrinidhi.L , Sahana.S , Pavithra.H.S, "Innovative Technology for Smart Roads by Using IOT Devices" International Journal of Innovative Research in Science, Engineering and Technology, pp.1-4 Vol. 5, Special Issue 10, May 2016,
3. N. Kham, and C. Nwe, "Implementation of modern traffic light control system", International journal of scientific and research publications, Vol. 4, Issue 6, Jun. 2014.
4. Chatrapathi, C., Rajkumar, M.N. and Venkatesakumar, V., "Vanet based integrated framework for smart accident management system", in Soft-Computing and Networks Security (ICSNS), 2015 International Conference on, IEEE., (2015)
5. Obuhuma, J. I., Moturi, C. A, "Use of GPS With Road Mapping For Traffic Analysis".
6. Devyani Bajaj, Neelesh Gupta, "GPS Based Automatic Vehicle Tracking Using RFID".
7. Siva Kumar Avula, Cheng Siong Lim, Shubhangi C Deshmukh, IEEE "Impact of Ambulance Dispatch Policies on Performance of Emergency Medical Services", December 2011.
8. Smart Real-Time Healthcare Monitoring and Tracking System using GSM/GPS Technologies", The Master of IEEE Projects 2015.
9. R. Kyusakov, J. Eliasson, J. Delsing, J. V. Deventer, and J. Gustafsson, "Integration of wireless sensor and actuator nodes with IT infrastructure using service-oriented architecture," IEEE Trans. Ind. Informat., vol. 9, no. 1, pp. 43–51, Feb. 2013.
10. Lounis, A., Hadjidj, A., Bouabdallah, A., & Challal, Y. (2012, July). Secure and scalable cloud-based architecture for e-health wireless sensor networks. In Computer communications and networks (ICCCN), 2012 21st international conference on (pp. 1-7). IEEE.
11. Strollo, S. E., Caserotti, P., Ward, R. E., Glynn, N. W., Goodpaster, B. H., & Strotmeyer, E. S. A review of the relationship between leg power and selected chronic disease in older adults. The journal of nutrition, health & aging, 19(2), 240-248, 2015.
12. Smart Real-Time Healthcare Monitoring and Tracking System using GSM/GPS Technologies", The Master of IEEE Projects 2015.
13. Kumari Nimmi , Ruby Kumari, Pragati Bag, "Wireless Motor Speed Control Using Rf Sensor," Dept. Of Elect & Telecommunication, Bharath University Chennai-73.

14. Joseph Owusu, Francis Afukaar and B.E.K. Prah, "Urban Traffic Speed Management: The Use of GPS/GIS"
15. Kumari Nimmi , Ruby Kumari,Pragati Bag, "Wireless Motor Speed Control Using Rf Sensor," Dept. Of Elect & Telecommunication, Bharath University Chennai-73.