EMERGENCY VEHICLE DETECTION

PROJECT REPORT

Submitted by

ASWATHY T G
USN No: 20MCAR0105

in partial fulfillment for the award of the degree

of

MASTER OF COMPUTER APPLICATIONS

DEPARTMENT OF
INFORMATION TECHNOLOGY

SCHOOL OF COMPUTER SCIENCE AND IT

JAIN KNOWLEDGE CAMPUS
JAYANAGAR 9th BLOCK BANGALORE

APRIL - 2022

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Jain Knowledge Campus
Jayanagar 9th Block Bangalore, 560069

This is to certify that the project entitled

EMERGENCY VEHICLE DETECTION

Is the bonafide record of project work done by

ASWATHY T G

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MCA during the year
2020-2022

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CERTIFICATE

This is to certify that ASWATHY T G, USN No:20MCAR0105 for the course of MCA in the Department of IT, School of Computer Science and IT has fulfilled the requirements prescribed for the MCA degree of the of JAIN (Deemed to be University).

The Project entitled, "EMERGENCY VEHICLE DETECTION" was carried out under me direct supervision. No part of the dissertation was submitted for the award of any degree or diploma prior to this date.

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2.	.....

JAIN School Of Computer Science and IT
DEEMED-TO-BE UNIVERSITY

DECLARATION

I affirm that the project work titled "EMERGENCY VEHICLE DETECTION", being submitted in partialfulfillment for the award of MASTER OF COMPUTER APPLICATIONS is the original work carried out by me. It has not formed the part of any other project work submitted for award of any degree or diploma, either in this or any other University.

ASWATHY T G

USN Number: 20MCAR0105

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ABSTRACT

As in India, a person dies on every tick of the clock so, we have proposed an application that will provide emergency health response to the patient. The main purpose of this project will fill the gap between the patient and ambulance response time. Ambulances are a vital part of emergency medical services. Usually, patients have a finite range of ambulance contacts; thus, whenever in an emergency, they find difficulty. With this project, it is proposed that the application would enable the patient to book a ride to the hospital. The patient can upload their current location as well as their destination location into this website.

The system would then show the nearby available ambulances and the patient can choose its appropriate rides by comparing the quotations and distance of every ride over a region. On the other hand, the ambulance driver would get a prompt about the booking made by the patient. The driver gets a confirmation email from the user who gave the alert. The ambulance driver wants to confirm the booking or reject the request made by, once the ambulance is not available the driver can reject the booking. When the driver accepts the request, the application will guide the driver towards the destination through the map link uploaded by the user. The admin would get all the central information and get all the information of users and ambulance drivers daily report, admin would control the inquiry and calling functionalities.

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CHAPTER 1

INTRODUCTION

1.1 Overview

According to a report published by Times of India about 146,133 people were killed in road accidents in India in the year 2016. Unfortunately, about 30% of deaths are caused due to delayed ambulances. Another Indian government data shows. More than 50% of heart attack cases reach hospital late, which can constitute unavailability of ambulances too but majority of it is due to patients stuck in traffic.

Medical science has been a blessing to live on earth. Any critical patient with minimal probability of recovery can be treated and with a radical health response. But, during an emergency, a patient needs to be quickly treated. Evacuating a sufferer to the hospital looks pretty manageable but, in concrete, it is considerably complicated; moreover, it becomes complex in traffic ways. In the modern era where the population is increasing day by day, people feel uncomfortable and frightened due to dangerous aspects of road accidents, some known and unknown diseases which require quick treatment but unfortunately due to a couple of minute delay some important lives are lost. Therefore, to give quick first-aid to the patient, the rescue system of every country should be maintained and trained well for the betterment of human beings and to avoid the deaths which occur due to delay in rescue process. So, our first goal is to maintain the ambulance service system By Using Emergency Vehicle Booking system.

The proposed system aims to ensure simplicity, effectiveness, and responsive factors, that serves the user to discover the nearby ambulance and hospitals. It will benefit the user to reserve the ambulance so that the distressed could be driven to the dispensary on time, saving his life. The patient can track the ambulance based on their location.

As we listened to the word ‘Ambulance’ the first thing that came to mind is the rescue process. In the modern era where the population is increasing day by day, people feel uncomfortable and frightened due to dangerous aspects of road accidents, some known and unknown diseases which require quick treatment but unfortunately due to a couple of minute delay some important lives are lost. Therefore, to give quick first-aid to the patient rescue system of every country

should be maintained and trained well for the betterment of human beings and to avoid the deaths which occur due to delay in rescue process. So our first goal is to maintain the ambulance service system first by making an android application for the rescue process. It will provide all the rescue centers to stand on one platform through ambulance service applications. In case of any accident we call an ambulance for help via call. There are many organizations which provide ambulance services in Pakistan. But there is a problem with these organizations that they did not work together. There is a possibility that the ambulance of that organization will not be available near the place of the accident. So this application will help people to find ambulances near them of any organization.

User will properly sign up in the app with his mobile and CNIC number for authentication so that irrelevant people will not use this app without any reason. In case of emergency he will request for an ambulance made from his phone that will be directly updated on a centralized main office where 24/7 server will automatically check his request, calculate coordinates and will check the availability of ambulance in very nearly station, if there is no ambulance available in that station, then server will check up next near station and response back to the user that request is in progress and how much time it takes to reach, and from which station. All this process and management will be handled virtually using a defined algorithm. The whole history will be maintained on the server side. When the task is done then status and number of ambulances will be updated on the server.

1.2 Aim of the Project

A new and a great experience in the world of hospital. This will help the user to find the nearby ambulance and the nearby hospital based on their location. It helps the user to book the ambulance or call it to the place of emergency so that the patient can be taken to the hospital on time and their life can be saved. The user can completely track the ambulance based on their location. This system will help the common people in day to day life as there are many accidents on the road, patients suffering from cardiac arrest, pregnant ladies who are due etc. This system aims at providing better ambulance facilities to the patients and help save lives.

1.3 Project Objectives

The purpose of the application is to give a better idea for a rescue system with a user-friendly interface in case of emergency and rescue situations. At the present, there is no such application which can facilitate the people in case of emergency. The system which facilitates the public in the situation of emergency.

1.4 Existing System

These days, automation plays a major role in many industries. Microcontrollers in today's world are widely used for automating everything possible to reduce the cost so it can be used by every individual and to improve the standards with its efficiency. In the present traffic condition the ambulance will take a lot of time to reach the hospital. Many people lose their lives or are in trouble due to heavy traffic. The government or the general public should come up with some special ideas for the ambulance so that they are able to take the patients to the hospital on time and save their life.

1.5 Proposed System

We are helping our user to track the nearby ambulance for emergency purposes such as accidents, cardiac arrest, and ladies who are due to deliver, etc so that patients can be taken to the hospital as soon as possible and their life can be saved. The user checks the nearby ambulance so that the patient can be taken to the hospital. Once the ambulance arrives at the patient's location the ambulance location is taken and the nearby hospital and clinics are shown so that the patient can be taken. The user apart from booking the nearby ambulance they can see all the hospitals.

1.6 Problem Statement

The sudden increase in the number of emergencies reported by the federal road safety has transcended the manipulation of the existing system used by the ambulance dispatcher and this prompted a lot of problems which encompass the delay of dispatching ambulances. It was very complicated to observe or track the location of any dispatch ambulance. Since there was no tracking facility in the manual method. It was very difficult to keep records of ambulances

available and ambulances on duty. All these and more are encountered due to the debilitation of the prevailing system used.

Ambulance plays a very crucial role when an accident occurs on the road network or in case of any medical emergency and the need arises to save a human life. Manual booking of an ambulance at times of emergency can take away precious time as it is a time-consuming process. Furthermore, the delay caused due to the heavy traffic congestion in between the pickup spot and the hospital facility may increase the risk of death for the victim.

The system proposed here will help the users book an ambulance easily in an instant. The user will have to select the ambulance size, pick-up point & hospital. In case of emergency, the user will have to just select the pick-up point & destination and the system will automatically book the nearest ambulance and hospital. Once booked the ambulance operator will receive a notification for confirmation of the booking. The Ambulance driver can view the pick-up and drop location on Google Maps. The users will receive the contact details of the driver. The Hospitals can also view the booking history. This is how this Ambulance Booking App will act as a life savior in times of medical emergency.

CHAPTER 2

LITERATURE REVIEW

Managing traffic and maintaining order is the most demanding task in the contemporary day. Sometimes emergency vehicles like ambulance, fire-fighters get stuck in the traffic causing threat to life in many cases. It is important to give priority to these vehicles and help to clear its path. But it is difficult or sometimes impossible for traffic police to handle this. For this reason, we need an automated system that will be able to detect an emergency vehicle on a heavy traffic road, let the controller know or automatically navigate other vehicles to clear its path.

P. Iyappan, B. Nanthini Devi, P. Nivedha and V.Sayoojya proposed a method in "Lisa-lifesaver" [1] where a web application system named LISA which passesthe accidental spot and information to nearby ambulance, police station and to the person's relatives and casualty blood group donors are also spotted. The main concern with this system is the web application are more prone to security breaches, it is also known to operate at a slightly slower speed and moreover problems arising because of different browsers one needs to ensure that app supports all variety of browsers.TV Sethuraman, Kartik Singh Rathore, Amritha G,Kanimozhi G proposed a method "IoT based system for Heart Rate Monitoring and Heart AttackDetection"where an IoT based system has been implemented which monitors the heartbeat by a hardware system comprising of a Node MCU and pulse sensor. An alert system is also added which goes off if the heartbeat shoots up and goes down a particular permissible level given in the formulated algorithm. This alert message is received by the doctor through a mobile phone application. Doctors Can access the heartbeat data of the patient from any location with the help of this system [6].Rashmi A. Nimbalkar and R.A. Fadnavis proposed a system in "Domain Specific Search of Nearest Hospital and Healthcare Management System" which helps in locating the nearest hospital available,contacts their ambulance emergency system then accesses the health record of emergency patients that can critically assist in prehospital treatments. Yuanyuan Du, Yu Chen, Dan Wang, Jinzhao Liu and Yongqiang Lu proposed a method in "An Android-Based Emergency Alarm and Healthcare Management System" which

is an emergency alarm and health care management system and is mainly deployed in an android-based phone. The proposed system can detect the location of the users when they are in trouble and trigger the alarm with the help of the GPS and GSMnetwork. Immediate measures can be taken manually when the alarm is received. It also manages the health record of the user.

In 2019, Shuvendu Roy, Md. Sakif Rahman [2] worked on a paper "Emergency Vehicle Detection on Heavy Traffic Road from CCTV Footage Using Deep Convolutional Neural Network". They have proposed an automated system to detect emergency cars from CCTV footage using the deep Convolutional neural network. A populated country like Bangladesh faces too much traffic on the road and because of that emergency cars like ambulances and fire-service fall into trouble in the middle of the road. It can be embedded with CCTV to track emergency can and give priority in that road to pass the emergency can. With this automated process, no human effort will be required to manually help such a scenario. This model has achieved impressive results in detecting and identifying emergency cars of all kinds.

In 2020 "A Hybrid Framework for Expediting Emergency Vehicle Movement on Indian Roads "by Dr Minal Moharir, Abhishek Raman, Kaushik S, Dr. Rajeswara Rao K.V.S [3]. This paper proposes a model that employs real time image processing and object detection using a convolutional neural network (CNN) architecture called SSD Mobilenet. Unlike a few other architectures, SSD Mobilenet requires very limited computation, hence enabling swift detection. Furthermore, an acoustic signal (sound) processing (pitch detection) algorithm is employed to detect the sirens of emergency vehicles to nullify the potential false positives (e.g. an ambulance in a non-emergency scenario) that creep into object detection using image processing. Both algorithms work in unison, bolstering the accuracy of detection. Upon detection, the signal instantly switches to green, facilitating the expedited movement of emergency vehicles, even in high traffic conditions. The interplay of the algorithms has been described and appropriate mechanisms for overcoming the shortcomings of the model have also been devised, thereby cutting down on false positives and increasing the accuracy of detection.

In 2020 Dr. Rajeswara Rao K.V.S, Kaushik S and Abhishek Raman [4] introduced a paper "Leveraging Computer Vision For Emergency vehicle detection Implementation and Analysis". This paper is an attempt to examine the use of object detection and instance segmentation for emergency vehicle detection, which is indispensable to any Intelligent Transportation System.

More particularly, emergency vehicle detection can be programmed into autonomous vehicles as well as traffic signal controllers for preferential signal switching upon encountering emergency vehicles. The architectures implemented are Faster RCNN for object detection and Mask RCNN for instance segmentation. The computational results of these implementations, their accuracies and most importantly, their suitability for emergency vehicle detection in disordered traffic conditions are deliberated. Additionally, the object detection model is contrasted with instance segmentation and the merits and demerits of each are identified, again in the context of emergency vehicle detection. Object detection and instance segmentation have been described for emergency vehicle detection and localization. Both are effective in identifying an emergency vehicle from a cluster of vehicles, and hence can be leveraged for applications in intelligent transportation systems like deployment of smart traffic signals and autonomous vehicles.

In 2020 “A Priority Vehicles Detection Network Model Based on Machine Learning for Intelligent Traffic Lights” presented by Rodrigo Carvalho Barbosa,Muhammed Shoaib Ayub,Renata Lopes Rosa, Demostenes Zegarra Rodriguez and Luncakorn Wuttisittikulkij [5]. This work proposes a novel vehicle detection model named Priority Vehicle Image Detection Network (PVID Net), based on YOLO, a lightweight design strategy for the PVID Net model using an activation function to decrease the execution time of the proposed model, a traffic control algorithm based on the Brazilian Traffic Code, and a database containing Brazilian vehicle images. The effectiveness of the proposed solutions were evaluated using the Simulation of Urban mobility (SUMO) tool. Results show that PVID Net reached an accuracy higher than 0.95, and the waiting time of priority vehicles was reduced by up to 50%, demonstrating the effectiveness of the proposed solution. The experimental results demonstrated that the proposed solution composed of the Lightweight PVIDNet and a control algorithm for intelligent traffic presented a high accuracy with a low complexity, as well as a fast image detection process, which are important features of intelligent traffic lights. Furthermore, the reduction of waiting time at traffic lights for emergency vehicles is obviously important in an emergency situation.

M Bin-Yahyaa, E M. Shakshukib in their research “E- AMBULANCE: RealTime Integration Platform for Hetero- geneous Medical Telemetry Systempaper” [6] introduced the Electronic

emergency ambulance response system; an intelligent ambulance design that performs automatic response developments into intensification to regulating to boost some likelihood from protecting sufferers of health frightening situations by using IOT sensors, DDS standards. Additionally to this, added factors of Quality of Services strategies and Real-Time Publish-Subscribe Protocol which could be harmo- nized to magnify the sense of Data Distribution Services in medicinal operations across numerous radio communication technologysuchasWirelessFidelityandmanymore.

In 2020 Wei-Ho Tsai [7] presented a paper" Acoustic-Based Emergency Vehicle Detection Using Convolutional Neural Networks". This work investigates how to detect emergency vehicles such as ambulances, fire engines, and police cars based on their siren sounds. Recognizing that car drivers may sometimes be unaware of the siren warnings from the emergency vehicles, especially when in-vehicle audio systems are used, we propose to develop an automatic detection system that determines whether there are siren sounds from emergency vehicles nearby to alert other vehicles' drivers to pay attention. A convolutional neural network (CNN)-based ensemble model (SirenNet) with two network streams is designed to classify sounds of traffic soundscape to siren sounds, vehicle horns, and noise, in which the first stream (WaveNet) directly processes raw waveform, and the second one (MLNet) works with a combined feature formed by MFCC (Mel-frequency cepstral coefficients) and log-mel spectrogram. Their experiments conducted on a diverse dataset show that the raw data can complement the MFCC and log-mel features to achieve a promising accuracy of 98.24% in the siren sound detection. In addition, the proposed system can work very well with variable input length. Even for short samples of 0.25 seconds.

In 2020" Intelligent Traffic Control System" is a paper by Srikanth S, Srivatsa K, Venkata Prabakaran S, Revathy P [8]. In this paper a model is proposed for calculating traffic heaviness on roads using processing techniques for images with ambulance detection system and controlling model for traffic Signals with the information extracted from images of vehicles on roads captured by video camera. The traffic intensity depends on the total vehicles on the road. The proposed model counts the vehicles in the lane and checks for the presence of emergency vehicles, whenever an emergency vehicle is detected that particular lane is allowed to move and the signal is turned to green. The system focuses on using image Processing techniques as an

efficient way of detecting Emergency vehicles since this method reduces the chances of Failures and helps in ensuring that the emergency vehicles Have a hassle-free movement while trying to perform their Duties.

One of the Preliminary research on the Influence of am- bulance facility on resource use in the emergency department (ED) held an objective to find how the ambulances are associ- ated with the resources which were used in ED [9]. A review was made to the spective administrative database to ensure whether the resources which were to be used in ambulances were as per the order of ED. In multivariate paradigms that set for the influences of age, sex, triage, seriousness, and transient determinants, ambulance transportation secured its fellowship with more comprehensive resource use. Hence, a preparatory investigation designates that sufferers coming to facilities by the Emergency Department by emergency vehicle use considerably excess enhanced sources than expected equivalents.

Ola Cab was founded on 3 December 2010 by Bhavish Aggarwal, currently CEO, and Ankit Bhati. As of 2017, the company has expanded more than 600,000 vehicles across 110 cities. In November 2014, Ola diversified to incorporate autos on a trial basis in Bangalore. Post the trial phase, Ola Auto expanded to other cities like Delhi, Pune, Chennai and Hyderabad and Kolkata starting December 2014. In December 2015, Ola expanded auto services in Mysore, Chandigarh, Indore, Jaipur and Guwahati, Visakhapatnam. Ola was valued at $US5 billion as of September 2015.

CHAPTER 3

SYSTEM ANALYSIS

As we listened to the word ‘Ambulance’ the first thing that came to mind is the rescue process. In the modern era where the population is increasing day by day, people feel uncomfortable and frightened due to dangerous aspects of road accidents, some known and unknown diseases which require quick treatment but unfortunately due to a couple of minute delay some important lives are lost. Therefore, to give quick first-aid to the patient rescue system of every country should be maintained and trained well for the betterment of human beings and to avoid the deaths which occur due to delay in rescue process. So our first goal is to maintain the ambulance service system first by making a website for the rescue process. It will provide all the rescue centers to stand on one platform through ambulance service.

We all are aware of the technological advancements which are facilitating the medical processes to increase mortality rates and surgical efficiencies. But the same thing is lacking when it comes to the methods by which patients can get access to such advanced treatments. One such issue is the on-time availability of ambulances to carry patients under precarious conditions to the required healthcare center.

Many times ambulance assistance or service teams shadow the need of a doctor when it comes to immediate first aid or minor relief cases. The team of paramedics and health workers can very efficiently rescue you out of the immediate trauma using preliminary rounds of medications. But there are certain factors which keep them away at times of need, like –

1. Inability to track the accurate location of the victims or patients.
2. Lack of information on tentative availability of ambulances near them.
3. Unpredictable routes and road conditions often is a great reason for the delay in their arrival.
4. Lack of coordination between the hospital or clinic, ambulance driver, and the team.
5. A digital solution like an ambulance booking app can resolve all these issues to ensure efficient ambulance services.

What is Python?

Python is a popular programming language. It was created by Guido van Rossum, and released in 1991.

It is used for:

web development (server-side),
software development,
mathematics,
system scripting.

What can Python do?

- Python can be used on a server to create web applications.
- Python can be used alongside software to create workflows.
- Python can connect to database systems. It can also read and modify files.
- Python can be used to handle big data and perform complex mathematics.
- Python can be used for rapid prototyping, or for production-ready software development.

Why Python?

- Python works on different platforms (Windows, Mac, Linux, Raspberry Pi, etc).
- Python has a simple syntax similar to the English language.
- Python has syntax that allows developers to write programs with fewer lines than some other programming languages.
- Python runs on an interpreter system, meaning that code can be executed as soon as it is written. This means that prototyping can be very quick.
- Python can be treated in a procedural way, an object-oriented way or a functional way.

CHAPTER 4
SYSTEM DESIGN & ARCHITECTURE

The embedded systems in a traffic signal can be programmed to accept an input from the detection unit whenever an emergency vehicle is detected and subsequently switch the signal to green from red. A reliable and robust system that can accurately detect an emergency vehicle and fast track its flow through heavy city traffic is an asset to any Intelligent Transportation System or Smart City venture. Autonomous vehicles can also have built-in emergency vehicle detection capabilities to allow priority movement of ambulances, fire engines etc. In both use cases, it is essential to ensure that there are sufficient computational resources for the execution of the computer vision models. Both object detection as well as image segmentation differ from conventional image classification in the sense that they identify the location/coordinates of the object under detection. On the other hand, an image classifier would simply assign a particular label to the image when the object it is trained to detect is found in the image. For the intelligent traffic signal application, a conventional image classifier would be ineffective as it is necessary to identify the lane in which the emergency vehicle is present, so as to switch the signal for that particular lane. An object detection model would be an ideal fit for this application. In the case of an autonomous vehicle, greater precision is required as the vehicle will have to maneuver itself based on the spatial extent of the emergency vehicle. In this case, an instance segmentation model, which traces the emergency vehicle by performing pixel wise classification, would be the best fit. Although the object detection model will generate a bounding box, it will be unable to provide the exact coordinates of the emergency vehicle.

User characteristics

• Admin: Is a super user of this app who is responsible for editing or deleting the ambulance and adding or editing hospital. They monitor the overall system.

• Hospital: Is the person who uses the website to receive data from the ambulance through the app. As per the data from the operator in the ambulance, the response from the hospital is sent back.

• Ambulance: Picks up the patient and takes the patient's readings from the sensors.

• Patient: Is the person who needs the ambulance services.

B. External Interface Requirements

• User Interfaces: The application interface will work optimally on any android platform above android version 4.1 Operating System. As a test server, we can use XAMPP server with MySQL Database and HTML 5, CSS.

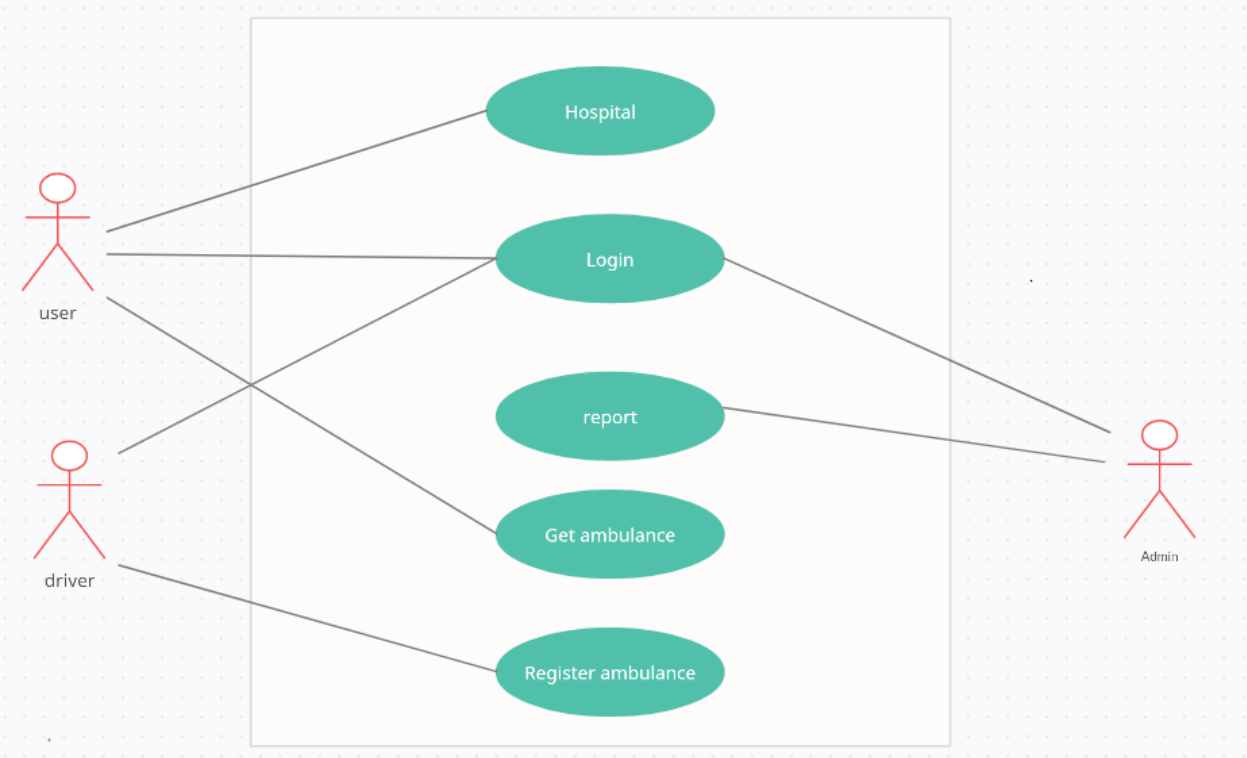
4.1 USE CASE

A use case is a methodology used in system analysis to identify, clarify and organize system requirements. The use case is made up of a set of possible sequences of interactions between systems and users in a particular environment and related to a particular goal. The method creates a document that describes all the steps taken by a user to complete an activity.

Use cases are typically written by business analysts and can be employed during several stages of software development, such as planning system requirements, validating design, testing software and creating an outline for online help and user manuals. A use case document can help the development team identify and understand where errors may occur during a transaction so they can resolve them.

Every use case contains three essential elements:

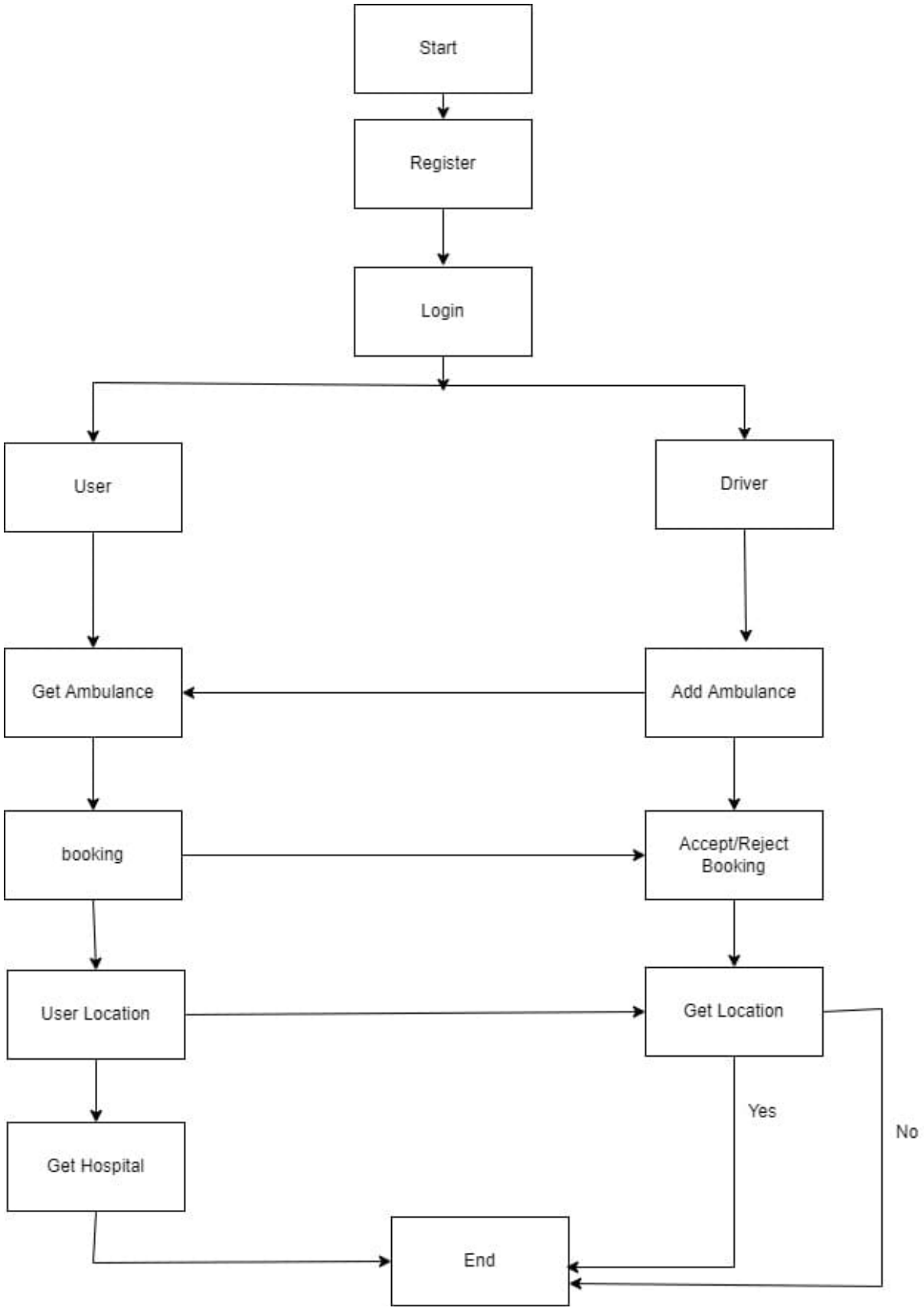
- The actor. The system user -- this can be a single person or a group of people interacting with the process.
- The goal. The final successful outcome that completes the process.
- The system. The process and steps taken to reach the end goal, including the necessary functional requirements and their anticipated behaviors



4.2 FLOWCHART

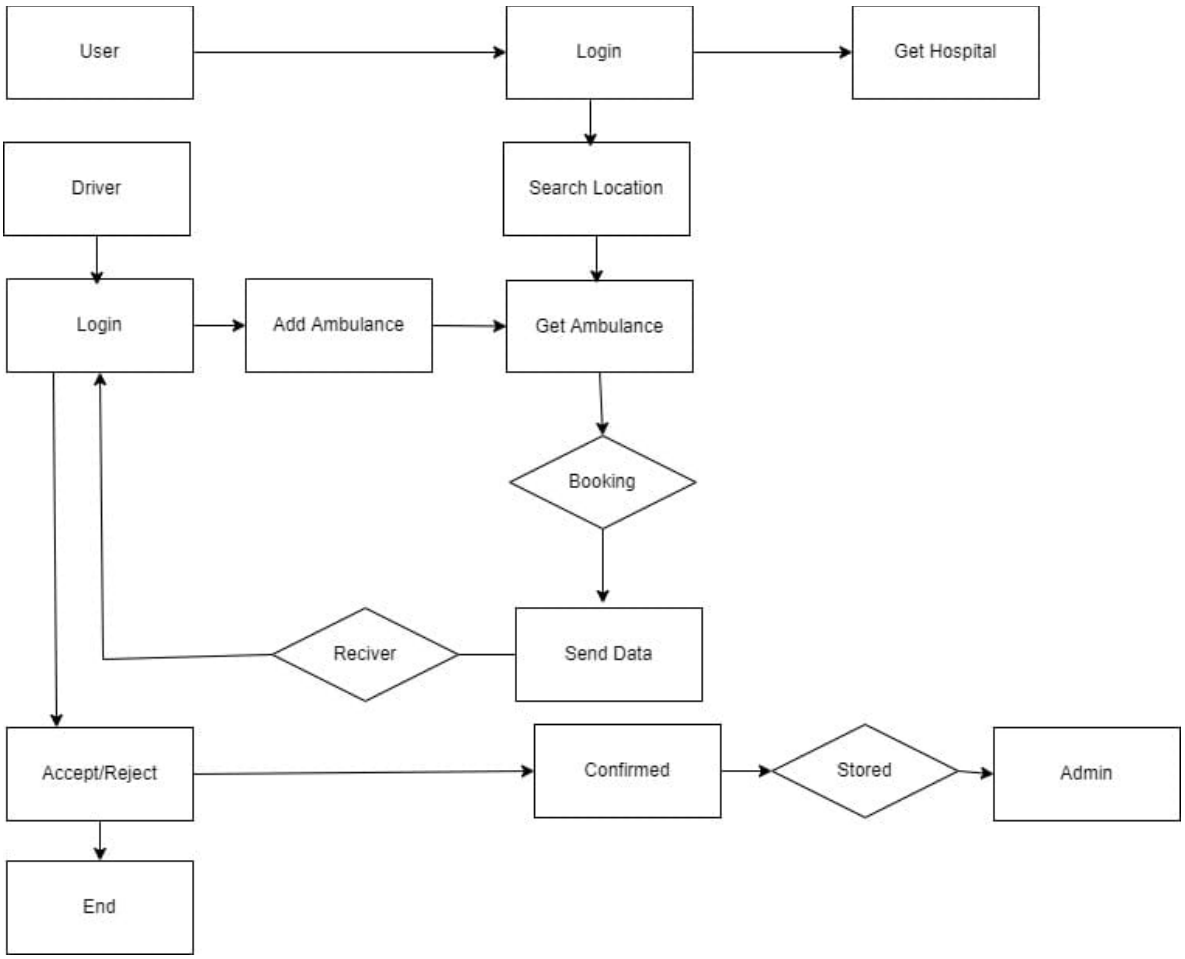
A flowchart is a picture of the separate steps of a process in sequential order. It is a generic tool that can be adapted for a wide variety of purposes, and can be used to describe various processes, such as a manufacturing process, an administrative or service process, or a project plan. It's a common process analysis tool and one of the seven basic quality tools.

Elements that may be included in a flowchart are a sequence of actions, materials or services entering or leaving the process (inputs and outputs), decisions that must be made, people who become involved, time involved at each step, and/or process measurements.


Start
Register
Login
User
Driver
Get Ambulance
Add Ambulance
booking
Accept/Reject Booking
User Location
Get Location
Yes
No
Get Hospital
End

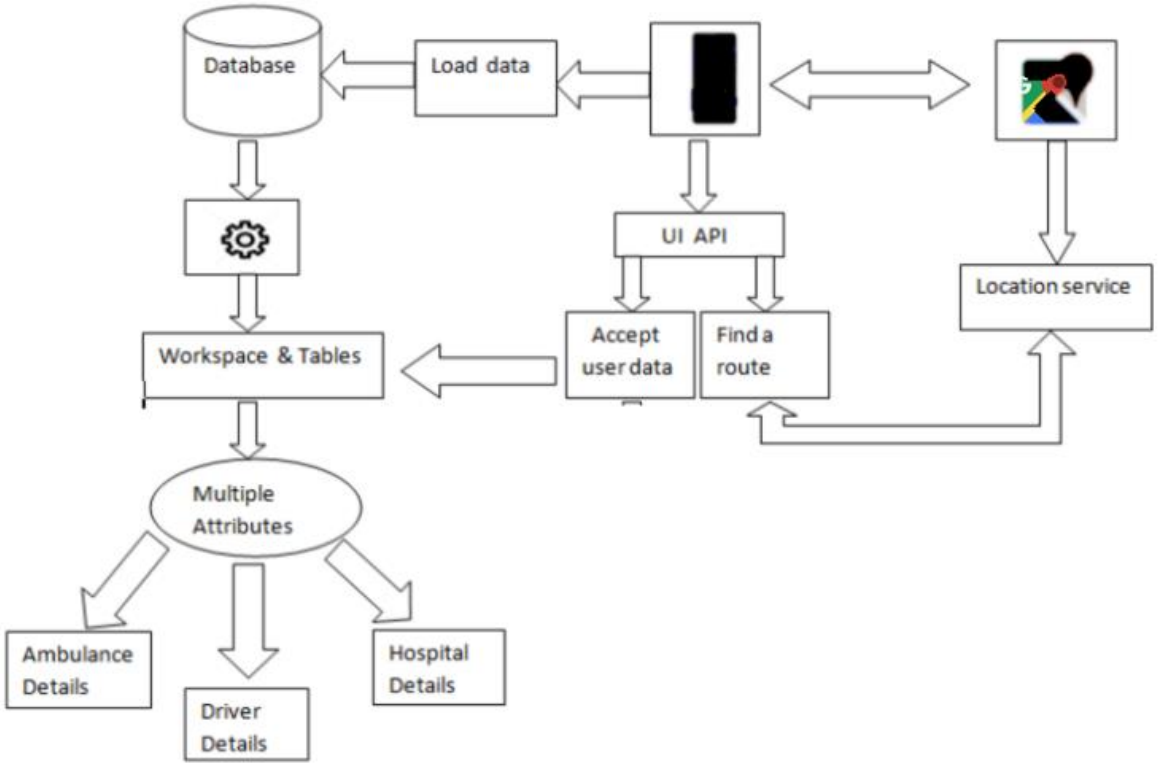
4.3 SYSTEM DESIGN

The ambulance service depends upon modules that search ambulances by location through this website. This module can be used to implement and find the location of an ambulance of a particular place within users location. This application also can be used to search nearby ambulances from the searched location on a map of users current location. Here user's can share their current location or destination location to the specified ambulance drivers through this website. Depending on the user's location, the server processes the data and matches with records stored into the database.. After processing data the result of the user's query is sent back to the user. It makes it easier t o understand the user. This can be done using Google Map API's functionality. There is a set of predefined markers that are made available in Google Map API. But for user's convenience custom pins are used. This API guideline is provided in Google Maps documentation.



4.5 SYSTEM ARCHITECTURE

We are giving the facility of booking ambulances similarly to how we book cabs. It will be a very important application for us from which we can reduce time and deliver patients on time. In our application there will be modules in which one will b e for the admin, user/patient and other will be for ambulance drivers. In our project data will be kept safely and in a systematic way which will easily keep records of users and drivers. In our project we can easily locate ambulances as well as users accurately through which it will reduce the time of calling to each other.



CHAPTER 5

SYSTEM REQUIREMENTS

5.1 INTRODUCTION

Software Requirements Specification (SRS) is a description of a software system to be developed, laying out functional and nonfunctional requirements, and may include a set of use cases that describe interactions the users will have with the software.

5.2 SYSTEM REQUIREMENTS

Whenever you purchase software or hardware for your computer, you should first make sure your computer supports the system requirements. These are the necessary specifications your computer must have in order to use the software or hardware.

5.3 FUNCTIONAL REQUIREMENTS

Functional requirements are those that refer to functionality of the system. That is what services it will provide to the users.

- It provides a clear way for the ambulance to save the valued lives of people.
- Easy flow of traffic.
- Greater efficiency of the system.

5.4 NON–FUNCTIONAL REQUIREMENTS

Non-functional requirements are those that refer to the non –functionality of the system. That tells about how the system is beneficial for the user.

The different non –functional requirements are listed below:

- **Performance Requirements** The system is expected to have reasonable short time response. As the camera is continuously capturing images in the traffic signal, once the ambulance is detected in a fraction of second the way will be cleared immediately.

- **Reliability** The system should be 99% reliable. Since it may need some maintenance or preparation for some particular day, the system does not need to be reliable every time. So, 80% reliability is enough.

- **Efficiency** By changing the color of the single it will clear the way to the ambulance and save lives. Availability Camera, database, and neural network class classifier are always available any time.

- **Maintainability** The system should be optimized for supportability, or ease of maintenance as far as Possible.

5.5 PROGRAMMING PLATFORM FEATURES

PYTHON

Python is a general-purpose interpreted, interactive, object-oriented, and high-level programming language. It was created by Guido van Rossum during 1985- 1990. Like Perl, Python source code is also available under the GNU General Public License (GPL). This tutorial gives enough understanding on Python programming language.

Features in Python

There are many features in Python, some of which are discussed below –

1. Easy to code:

Python is a high-level programming language. Python is very easy to learn the language as compared to other languages like C, C#, Javascript, Java, etc. It is very easy to code in python language and anybody can learn python basics in a few hours or days. It is also a developer-friendly language.

2. Free and Open Source:

Python language is freely available at the official website and you can download it from the given download link below click on the Download Python keyword.

3. Object-Oriented Language:

One of the key features of python is Object-Oriented programming. Python supports object-oriented language and concepts of classes, object encapsulation, etc.

4. GUI Programming Support:

Graphical User interfaces can be made using a module such as PyQt5, PyQt4, wxPython, or Tk in python.

PyQt5 is the most popular option for creating graphical apps with Python.

5. High-Level Language:

Python is a high-level language. When we write programs in python, we do not need to remember the system architecture, nor do we need to manage the memory.

6. Extensible feature:

Python is a Extensible language. We can write some Python code into C or C++ language and also we can compile that code in C/C++ language.

7. Python is Portable language:

Python language is also a portable language. For example, if we have python code for windows and if we want to run this code on other platforms such as Linux, Unix, and Mac then we do not need to change it, we can run this code on any platform.

8. Python is Integrated language:

Python is also an Integrated language because we can easily integrate python with other languages like c, c++, etc.

9. Interpreted Language:

Python is an Interpreted Language because Python code is executed line by line at a time. Unlike other languages C, C++, Java, etc. there is no need to compile python code; this makes it easier

to debug our code. The source code of python is converted into an immediate form called bytecode.

10. Large Standard Library

Python has a large standard library which provides a rich set of modules and functions so you do not have to write your own code for every single thing. There are many libraries present in python such as regular expressions, unit-testing, web browsers, etc.

11. Dynamically Typed Language:

Python is a dynamically-typed language. That means the type (for example- int, double, long, etc.) for a variable is decided at run time not in advance because of this feature we don't need to specify the type of variable.

HTML

HTML stands for Hyper Text Markup Language, which is the most widely used language on the Web to develop web pages. HTML was created by Berners-Lee in late 1991 but "HTML 2.0" was the first standard HTML specification which was published in 1995. HTML 4.01 was a major version of HTML and it was published in late 1999. Though the HTML 4.01 version is widely used, currently we are having the HTML-5 version which is an extension to HTML 4.01, and this version was published in 2012.

Features of HTML:

It is easy to learn and easy to use.
It is platform-independent.
Images, videos, and audio can be added to a web page.
Hypertext can be added to the text.
It is a markup language.

CSS

CSS is used to control the style of a web document in a simple and easy way.

CSS is the acronym for "Cascading Style Sheet". This tutorial covers both the versions CSS1,CSS2 and CSS3, and gives a complete understanding of CSS, starting from its basics to advanced concepts.

Why to Learn CSS?

Cascading Style Sheets, fondly referred to as CSS, is a simple design language intended to simplify the process of making web pages presentable.

CSS is a MUST for students and working professionals to become a great Software Engineer specially when they are working in Web Development Domain. I will list down some of the key advantages of learning CSS:

Create Stunning Website - CSS handles the look and feel part of a web page. Using CSS, you can control the color of the text, the style of fonts, the spacing between paragraphs, how columns are sized and laid out, what background images or colors are used, layout designs,variations in display for different devices and screen sizes as well as a variety of other effects.

Become a web designer - If you want to start a career as a professional web designer, HTML and CSS designing is a must skill.

Control web - CSS is easy to learn and understand but it provides powerful control over the presentation of an HTML document. Most commonly, CSS is combined with the markup languages HTML or XHTML.

Learn other languages - Once you understand the basics of HTML and CSS then other related technologies like javascript, php, or angular become easier to understand.

5.6 SOFTWARE COMPONENTS FEATURES

VISUAL STUDIO CODE

Visual Studio Code, also commonly referred to as VS Code, is a source-code editor made by Microsoft for Windows, Linux and macOS. Features include support for debugging, syntax highlighting, intelligent code completion, snippets, code refactoring, and embedded Git. Users can change the theme, keyboard shortcuts, preferences, and install extensions that add additional functionality.

Features

Visual Studio Code is a source-code editor that can be used with a variety of programming languages, including Java, JavaScript, Go, Node.js, Python and C++. It is based on the Electron framework, which is used to develop Node.js Web applications that run on the Blink layout engine.

Out of the box, Visual Studio Code includes basic support for most common programming languages. This basic support includes syntax highlighting, bracket matching, code folding, and configurable snippets. Visual Studio Code also ships with IntelliSense for JavaScript, TypeScript, JSON, CSS, and HTML, as well as debugging support for Node.js. Support for additional languages can be provided by freely available extensions on the VS Code Marketplace.

An orange version of the Visual Studio Code logo for the insiders version of Visual Studio Code
Visual Studio Code Insiders logo

Instead of a project system, it allows users to open one or more directories, which can then be saved in workspaces for future reuse. This allows it to operate as a language-agnostic code editor for any language. It supports many programming languages and a set of features that differs per language. Unwanted files and folders can be excluded from the project tree via the settings. Many Visual Studio Code features are not exposed through menus or the user interface but can be accessed via the command palette.

Visual Studio Code can be extended via extensions, available through a central repository. This includes additions to the editor and language support. A notable feature is the ability to create extensions that add support for new languages, themes, and debuggers, perform static code analysis, and add code linters using the Language Server Protocol.

Source control is a built-in feature of Visual Studio Code. It has a dedicated tab inside of the menu bar where you can access version control settings and view changes made to the current project. To use the feature you must link Visual Studio Code to any supported version control system (Git, Apache Subversion, Perforce, etc.). This allows you to create repositories as well as to make push and pull requests directly from the Visual Studio Code program.

Visual Studio Code includes multiple extensions for FTP, allowing the software to be used as a free alternative for web development. Code can be synced between the editor and the server, without downloading any extra software.

WINDOWS 10

Windows 10 is a major release of Microsoft's Windows NT operating system. It is the direct successor to Windows 8.1, which was released nearly two years earlier. It was released to manufacturing on July 15, 2015, and later to retail on July 29, 2015.[18] Windows 10 was made available for download via MSDN and TechNet, as a free upgrade for retail copies of Windows 8 and Windows 8.1 users via the Windows Store, and to Windows 7 users via Windows Update. Windows 10 receives new builds on an ongoing basis, which are available at no additional cost to users, in addition to additional test builds of Windows 10, which are available to Windows Insiders. Devices in enterprise environments can receive these updates at a slower pace, or use long-term support milestones that only receive critical updates, such as security patches, over their ten-year lifespan of extended support.

Advanced features

1. New Start Menu

Microsoft has brought back the Start Menu. Now, when you click on the Start button at the bottom left of the screen, you get two panels side by side, with the left column showing pinned, recent, and most-used apps.

You also get a power button at the top for options such as Hibernate, Standby, and Shutdown, while the right column features a selection of live tiles that you can customize, resize, and reorganize. Plus, you can have the Start Menu expand to the full screen whenever you want, eliminating the need for a Modern UI Start Screen.

2. Cortana Integration

Windows 10 will bring Microsoft’s voice-controlled digital assistant Cortana to desktop computers to make it easier for you to interact with your device without lifting a finger. You will be able to search your hard drive for specific files, pull up photos from specific dates, or launch PowerPoint presentations just by telling your PC to do so. You can even get Cortana to send an email while you’re working on a spreadsheet, making multi-tasking much more manageable.

3. Microsoft Edge Web Browser

Internet Explorer was replaced by Microsoft Edge, which features a new rendering engine called EdgeHTML. Edge integrates with the Cortana Digital Assistant to provide voice control, search, and personalized info to users.

Users can also use Edge to annotate web pages, and these annotations are stored on OneDrive and can be used with other users. A “Reading List” function syncs content between devices and a “Reading Mode” that strips out the formatting to allow more comfortable reading on devices. Many of the alterations have been made to keep Edge more in line with rival browsers, such as Chrome and Firefox.

4. Virtual Desktops

Unless you have a multi-monitor setup, it can be easy to run out of screen space. For that reason, Windows 10 provides multiple desktops that you can work in and quickly switch between. The virtual desktops feature in Windows 10 is called “Task View” and is located on the Taskbar. To add a new desktop, all you need to do is click the Plus sign. You create multiple desktops, and switching between them is just a matter of connecting the Task View button again and moving your mouse over the thumbnail of the one you want. Once the workspace is displayed above, click on it (or click the Task View button again) to start using it.

5. Universal Apps

To make the transition across devices more seamless, Microsoft is introducing a new category of software called Universal Apps, which use the same code but adapt their interface to the device in your hand. Microsoft is also bundling its own set of Universal apps with the OS, including Photos, Videos, Music, Maps, People & Messaging, and Mail & Calendar, which function the same way on tablets, and PCs. The content is stored and synced via Microsoft’s cloud service OneDrive so you can pick up where you left off on another device.

CHAPTER 6
IMPLEMENTATION

6.1 GENERAL PROCEDURE

The development plan describes the solution development process used for the project. This phase consists of guidelines and processes that are created by the development team during the solution. The development role manages the processes of creating the development plan. In this phase the main focus is on the key aspects of the development process which are going to be utilized. This may also include standards and protocols that are required by participating organizations. It may also include establishment priorities and budget restriction.

Ambulance Driver

It can happen that in spite of availability, you are unable to get connected with an ambulance in an emergency. There can be many factors leading to such a condition like –

1. Disturbance in communication networks.
2. Ambulance drivers often fail to spot the exact location where they have to reach.
3. They lack real-time interaction tools to coordinate with respective hospitals or clinics for updates.
4. They can never beat or break the traffic conditions and rules along with route difficulties.
5. Owing to the major difficulties based on communication, location tracking, and interaction, your ambulance booking app can be the most worthy solution.

Patients

If you are the patient or someone attending one, the waiting time for the ambulance arrival is stressful and can be responsible for life-risk as well. An online ambulance booking app can ward off many difficulties of patients like –

1. Knowing the availability of ambulances near the pick-up location.

2. Get location information of the ambulance en-route to the pick-up location.
3. Establish smooth communication with the Ambulance Service team.
4. Get an accurate estimated time of arrival of the ambulance.
5. If patients or their attendants get to know about the status and location of the ambulance, it releases them from a great deal of mental stress. This is possible only with an ambulance booking.

Ensures Authenticity

Every person registering on the ambulance booking app is required to go through a brief registration process. In this process, they have to provide all their details related to their identity and communication ready for verification. So it ensures the authenticity of users as well to avoid any operational deficiency in your business.

Data Management

The app stores all data of every user, be it the patient, driver, service provider, or ambulance service team. This can help you as an admin to monitor all data straight from your dashboard to monitor and improve the operational efficiencies of your business. Reports related to ambulance duty travel, driver performance, and revenues can be easily accessed from the dashboard of the app on a single tap.

By now you must have understood the importance of the online ambulance booking system. If you are planning to go for Ambulance Booking Development, the following is the guide on how you should start it.

User Registration and Authentication

Your app must be able to confirm the identity of the user by allowing him or her to create credentials by a brief registration process using which they can log in any time they need.

Selection of Ambulance Type

Users must be able to select the type of ambulance they need as per their journey and medical requirements. Based on their selection, the app will display the availability of the selected ambulance type.

Select Booking Type

The user app must allow users to categorize their booking type as normal or emergency based on which the ambulance driver can take the initiative to reach faster.

Driver App Features

For drivers, the most important information they must have are pick and drop locations, accurate GPS, and route guidance. These three features will always help them to provide quick service.

Registration and Authentication

It is the matter of the ambulance and the patients it will carry, so it is very important to verify driver details for authenticity.

Route Mapping

The app must be able to guide the drivers through the route and suggest better routes in case of any over commotion.

Booking Control

Drivers must be able to accept and reject booking orders. If any driver finds that he is far from the pick-up point, he can cancel the order so that the nearest ambulance receives it.

This is your panel as the owner of the entire business concept. Your app must be the control panel of the entire online ambulance booking software with features like –

User Management

You must be able to control the user activities with all permission to add, edit, delete, and list user details whenever required.

Driver Management

This feature of the app must enable you to monitor all activities of the drivers along with their attendance and performance.

Ambulance Management

You must be able to manage the ambulances in terms of their running, maintenance schedule, driver allotment, and availability.

Booking Management

Your app must be able to show you all booking details and history with real-time booking alerts for you to monitor better.

This website consists of the following four modules:

Admin module

Admin of the system maintains the overall system and is responsible for adding or deleting hospitals and ambulances. Admin coordinates the actions of the entire system. Admin can get the daily report of the users and drivers who registered and accessed through this. And also get feedback from both the users.

Ambulance module

Picks up the patient from the location where the user address and safely go to the hospital where they want. The booked users' details will be shared to the mail and the driver has the choice to accept or reject the request.

Patient module

In these modules the user can register using his/her details and updates in it and book the ambulance nearby and share location to the corresponding driver and make updates.

CHAPTER 7

RESULT AND SCREENSHOT

7.1 TEST CASES

System testing of software or hardware is testing conducted on a computer, integrated system to evaluate the system's compliance with its specified requirements.

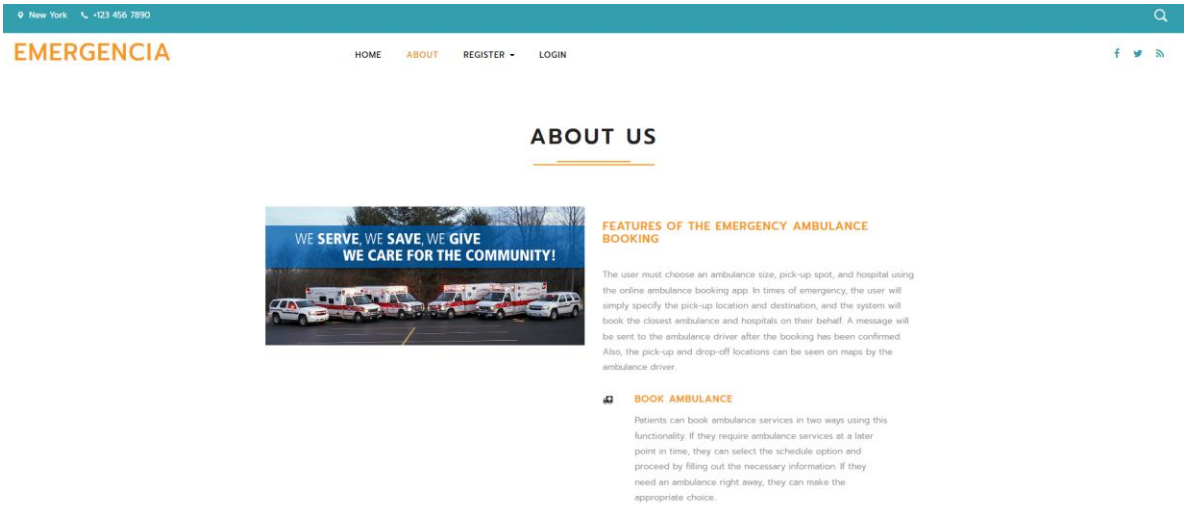
SL. NO	TEST CASE	EXPECTED OUTPUT	OBSERVE OUTPUT	RESULT
1	Registration	Enter username & password, successfully registered	Enter name & password, successfully registered	Passed
2	Login	Enter username & password, successfully registered	Enter username & password, successfully registered	Passed
3	Booking	Booked successfully	Booked successfully	Passed
4	Hospital	Add by admin & viewed details successfully	Add by admin & viewed details successfully	Passed
5	location	Added and navigated it successfully.	Added and navigated it successfully.	Passed
6	Email	Send the data successfully	Send the data successfully	Passed
7	Feedback	Admin get feedback successfully	Admin get feedback successfully	Passed
8	Alert	Alert to driver & accept or reject	Alert to driver & accept or reject	Passed

The testing phase is performed after the coding to detect all the errors, provide quality assurance, and ensure reliability of the software. Testing is vital to the success of the system. During testing, the software to be tested is executed with the set of test cases, and the behavior of the system for the test cases is evaluated to determine if the system is performing as expected. Clearly, the success of testing is revealing errors that depend critically on the test cases.

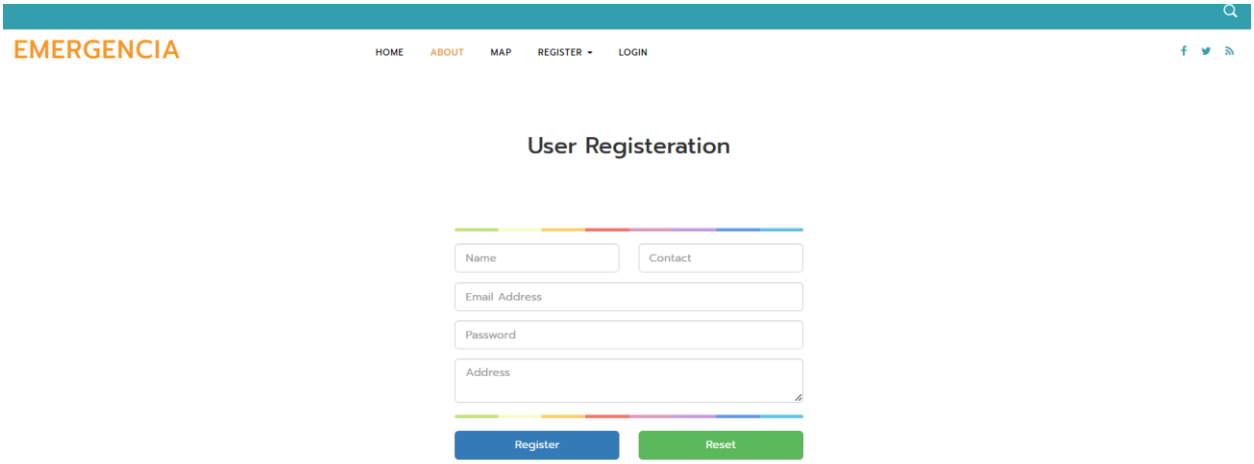
7.2 SCREENSHOT

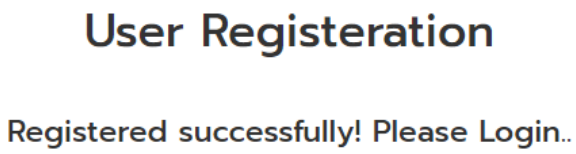
HOME PAGE

ABOUT PAGE

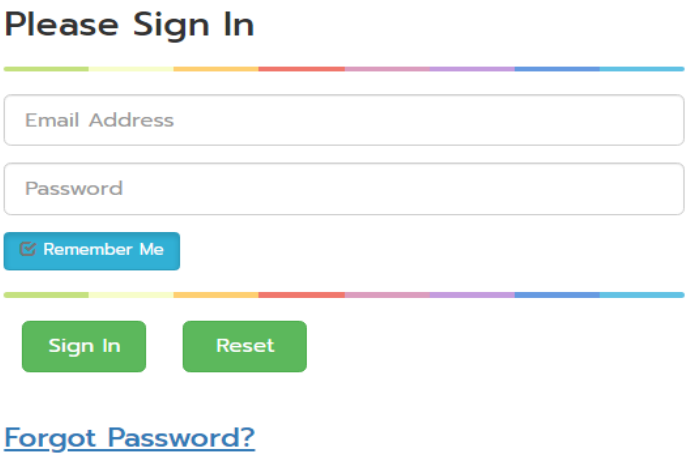


USER REGISTRATION PAGE



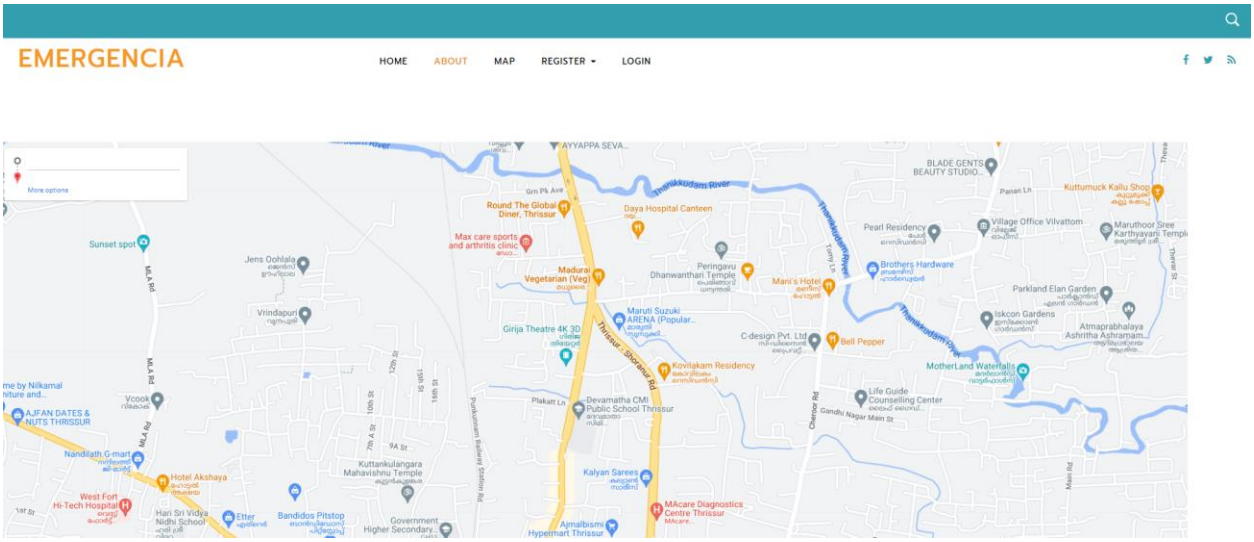


USER LOGIN PAGE

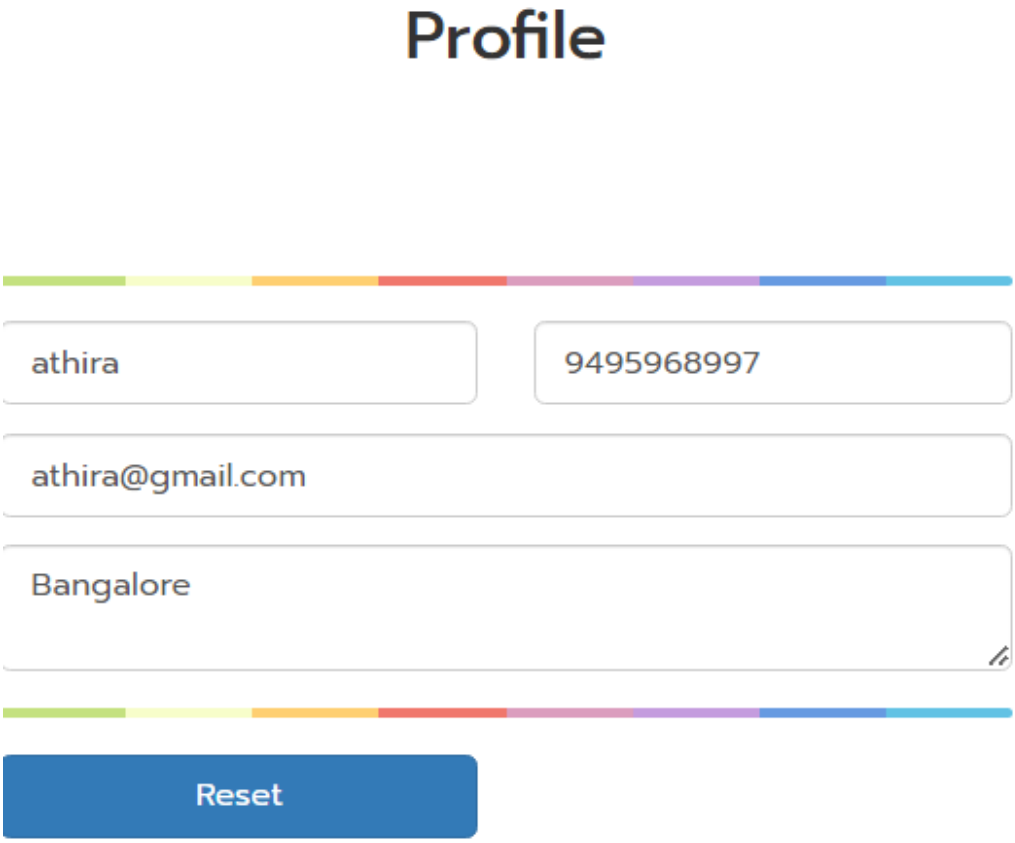


USER HOME PAGE

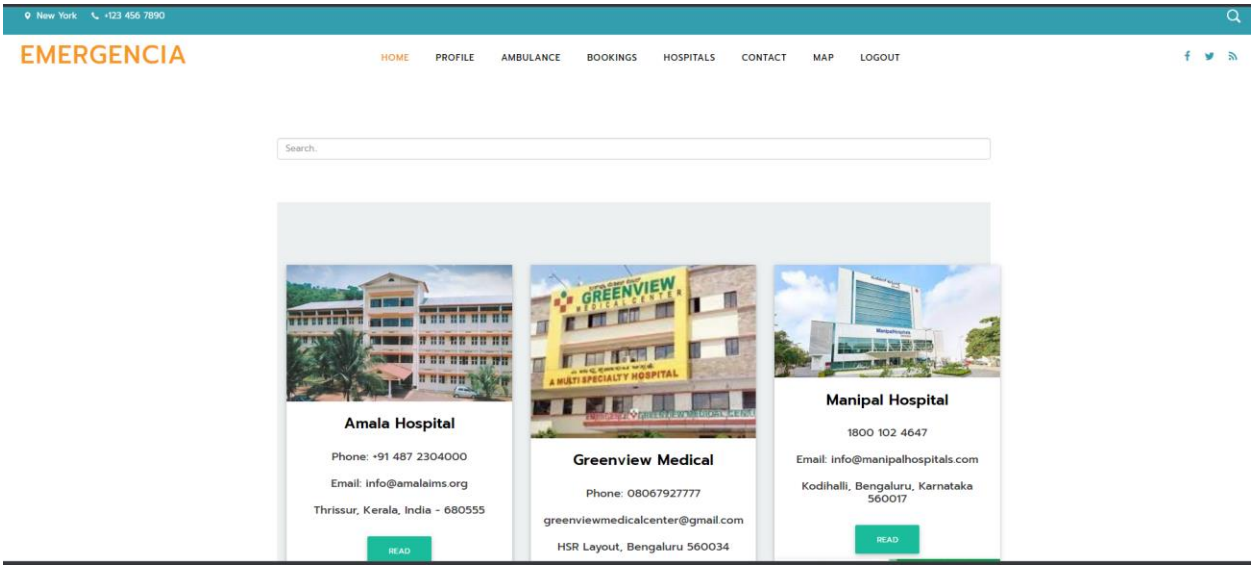
MAP



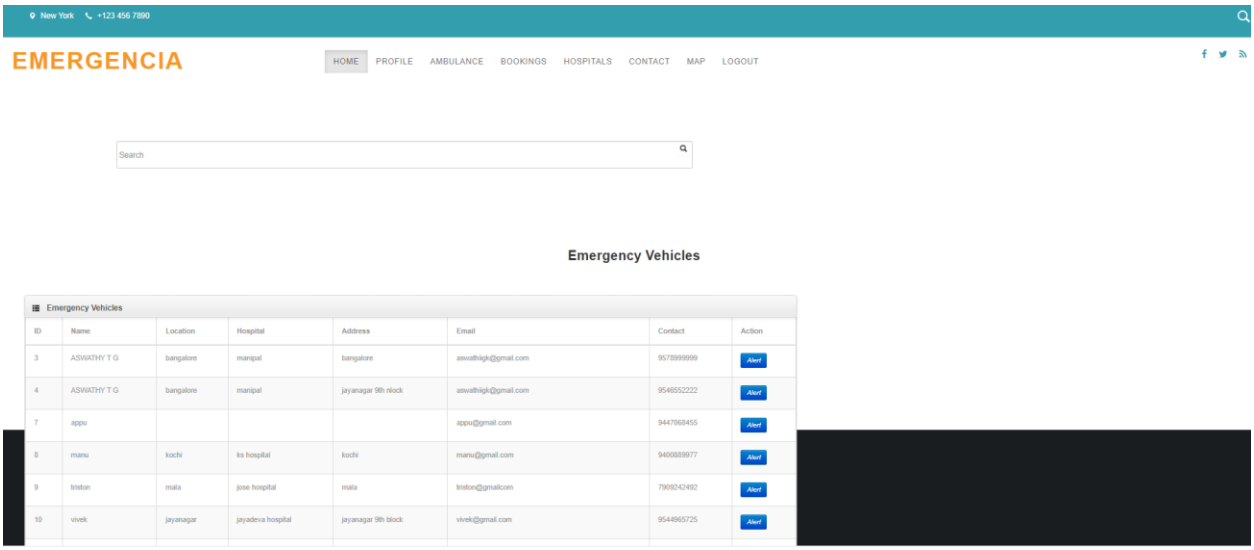
USER PROFILE EDIT



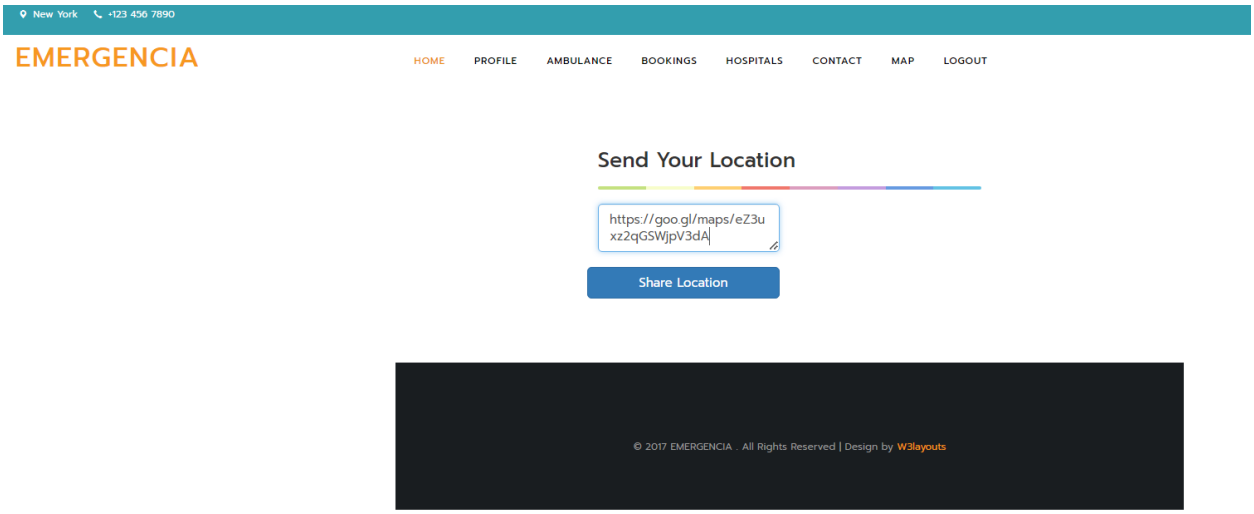
HOSPITAL DETAILS



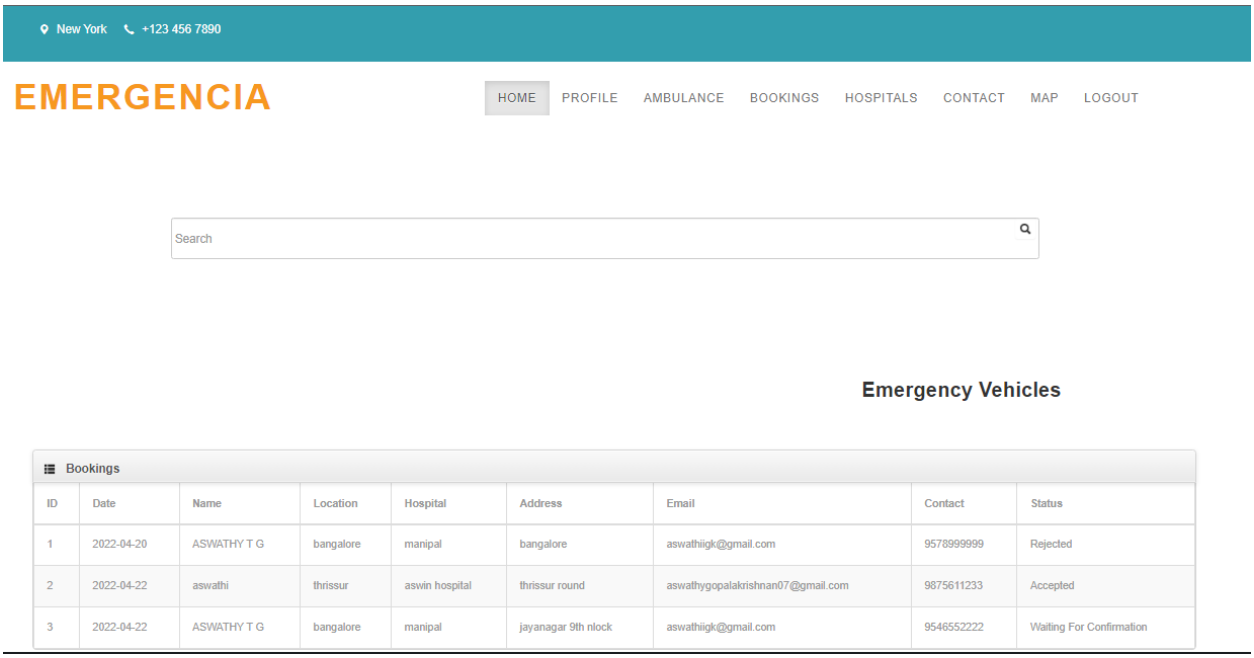
AMBULANCES ALERT PAGE



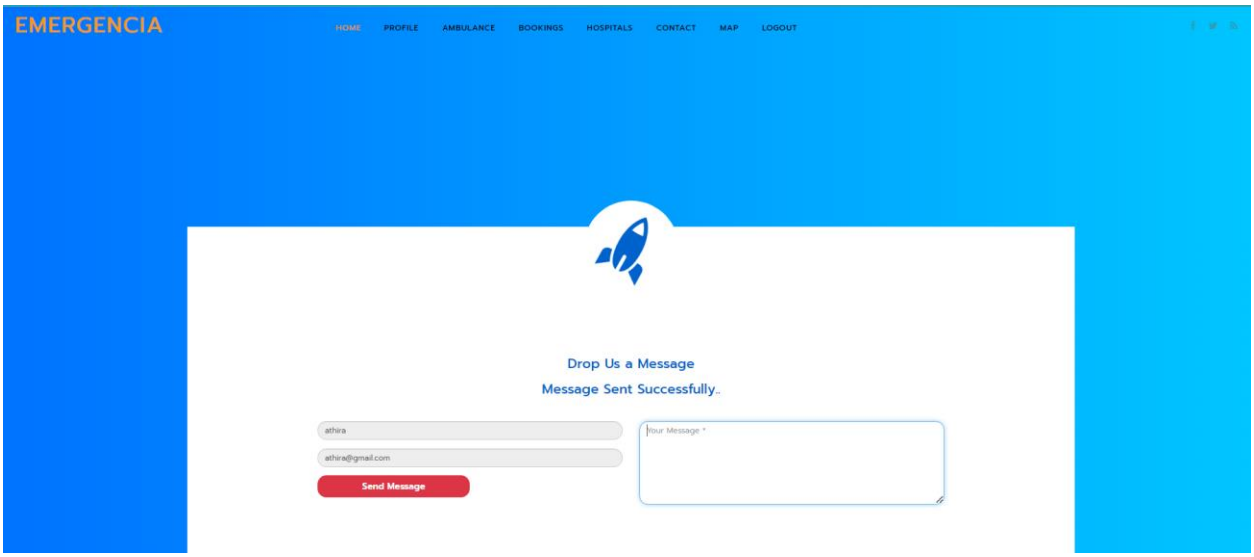
LOCATION SHARING



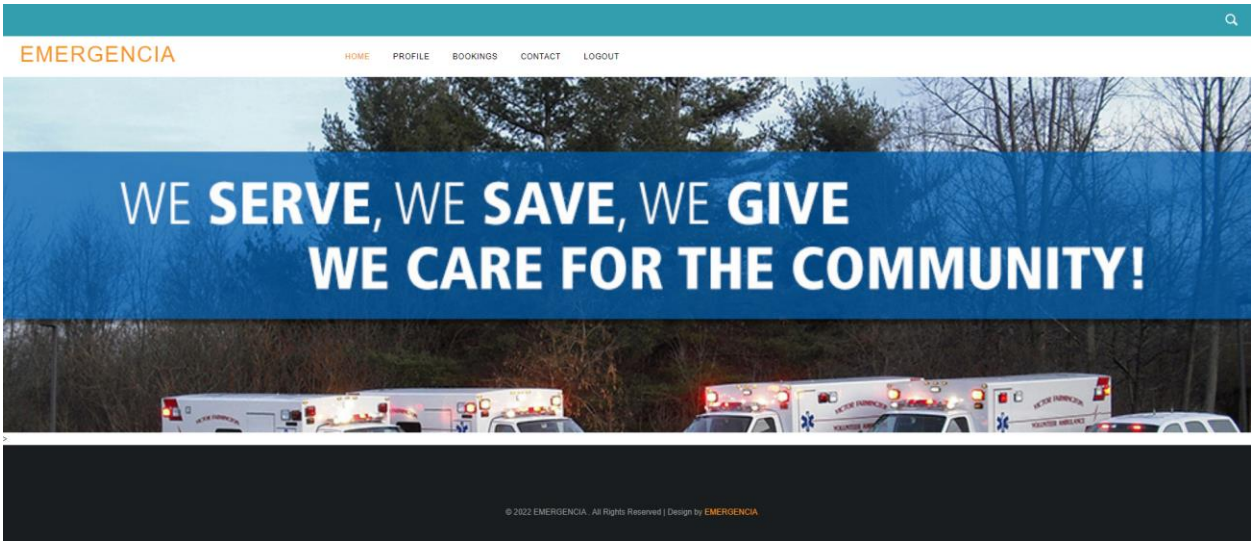
BOOKED DETAILS



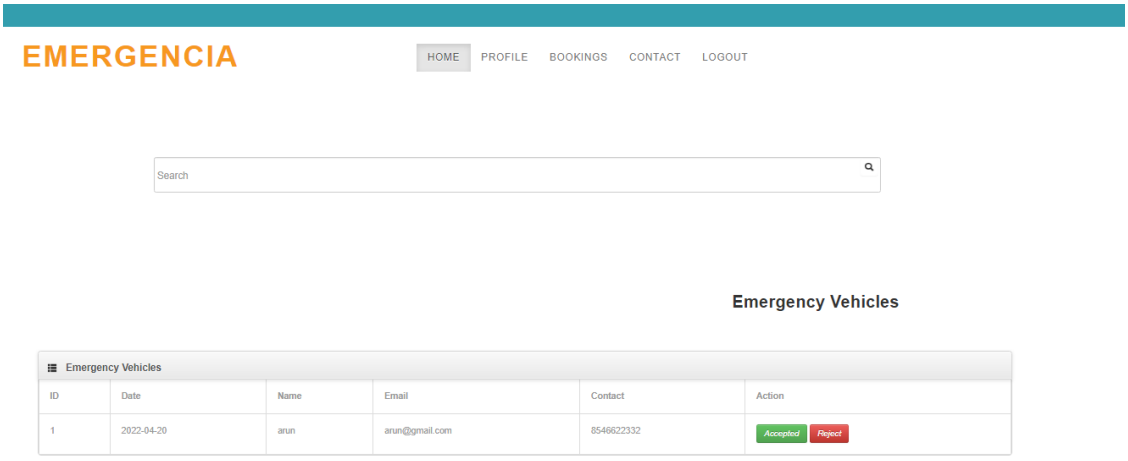
FEEDBACK PAGE



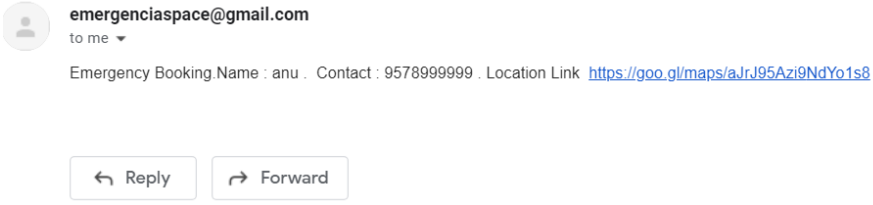
AMBULANCE DRIVER HOME PAGE



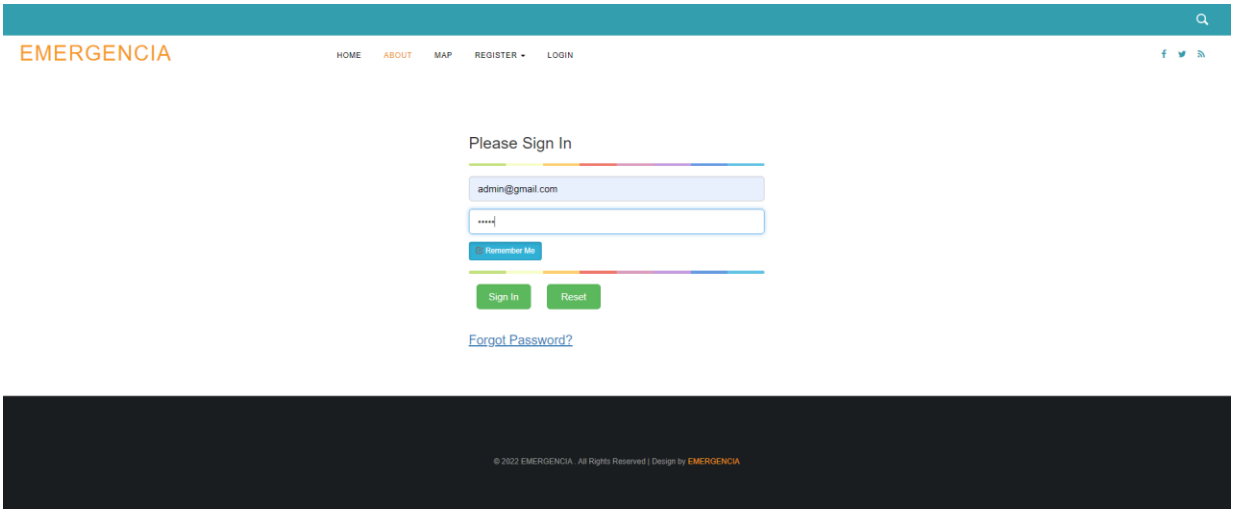
ACCEPT OR REJECT PAGE



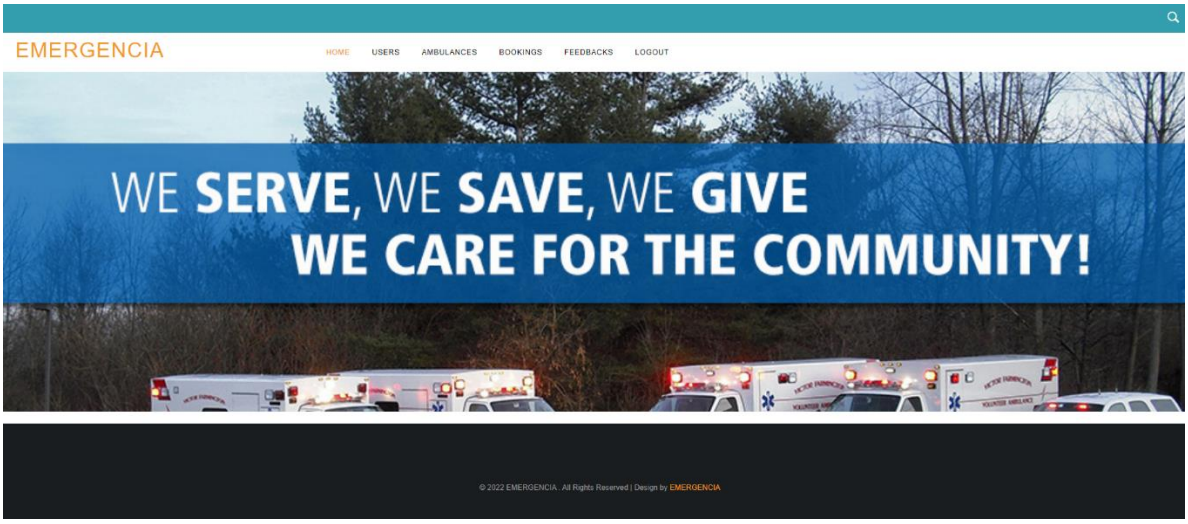
EMAIL



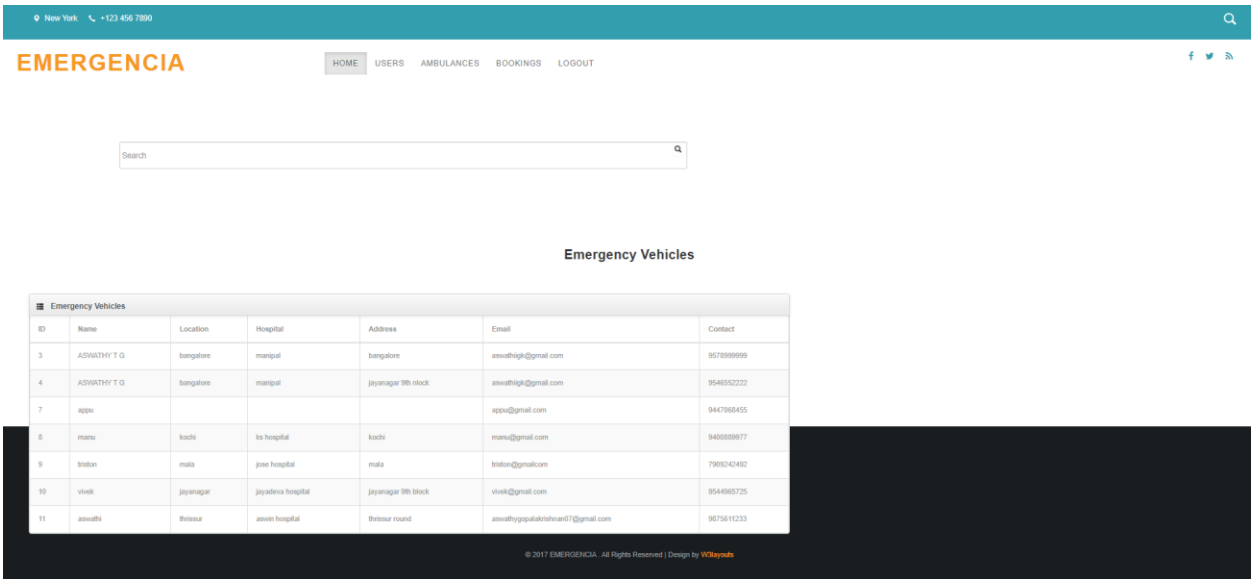
ADMIN LOGIN



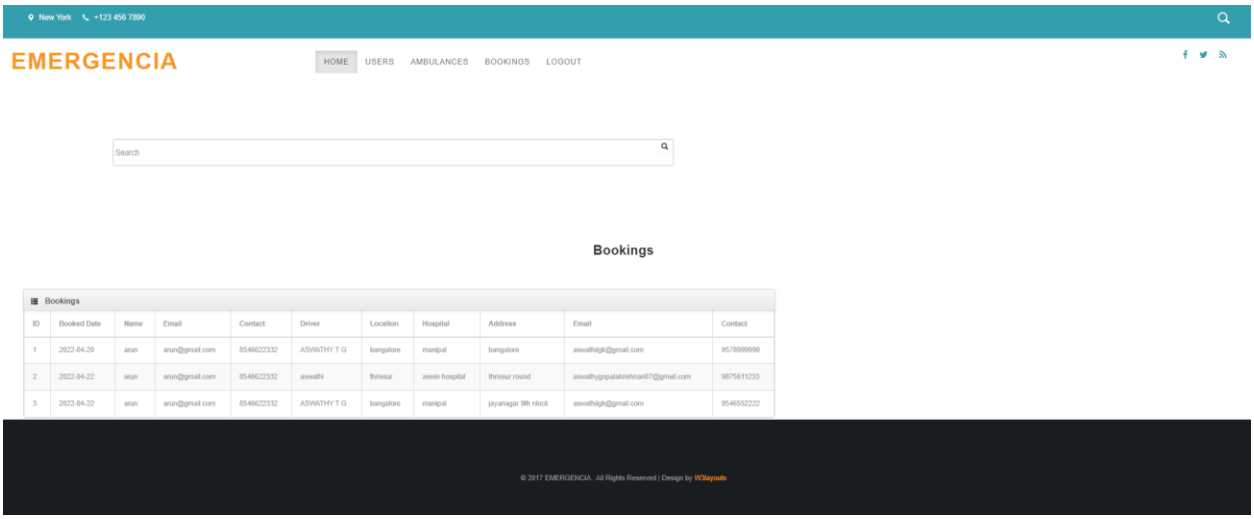
ADMIN HOMEPAGE



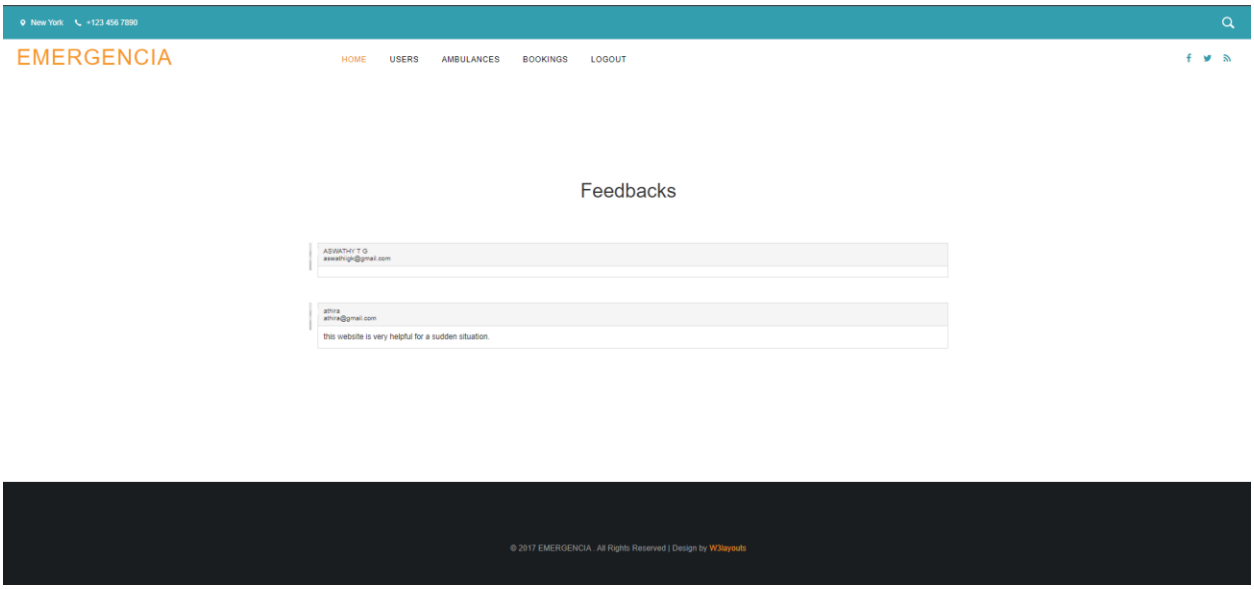
ADMIN VIEW PAGE



BOOKED



FEEDBACK VIEW PAGE



CHAPTER 8

CONCLUSION AND FUTURE ENHANCEMENT

8.1 CONCLUSION

Those old days are gone where they used to call the ambulance and ask them to come to the user's location to take the patient to the hospital. As everything is available at a user's fingertips implementing it would help save a lot of patient life as the ambulance can be tracked at any location from the user's location.

Our conclusion is we have developed our project and if it works as we have expected then it will be a very successful application which will be useful in our day to day life. And according to the smart city project we will be able to go one step forward in the health sector also. In this paper, an idea is developed for saving a patient's life in a faster way as possible. It is very important for users in case of emergencies as it saves time. With this Application, the ambulance can reach the user or patient as location is tracked or given through the application and also can provide necessary equipment which is required for the patient's health.

8.2 SCOPE FOR FUTURE DEVELOPMENT

Furthermore research can be done to capture an image from a live video and detect the ambulance, as videos given as an input by the user. Our model can be embedded with CCTV to track ambulance can and give priority in that road to pass the emergency can. Developing emergency response capabilities during the night and off-nominal weather conditions are challenging and as essential as response during normal weather conditions. In the future this application can be upgrades to the next level by making it more interactive in such a way that during the time of the users registration a form will be given for the user's to fill in all their medical details which can be stored on the cloud, then once the patient is in the ambulance all the medical details that was filled by the patient at the time of their registration along with the present patient condition will be sent to the hospital even before the ambulance reaches the hospital so that the doctors can be ready to treat the patients and same many life.

CHAPTER 9

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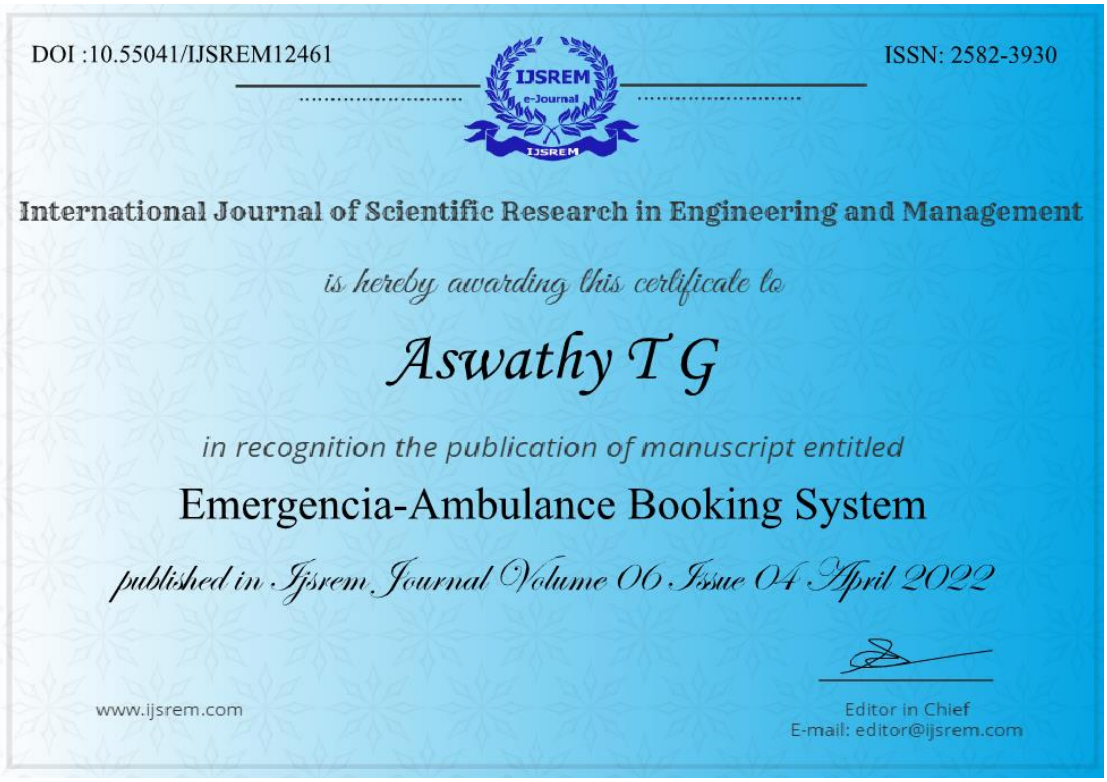
JOURNAL PROOF

SURVEY PAPER



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