Design and Development of Algorithm for the Online Ambulance Booking Service

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Abstract

In a country such as India, a person dies on every second so, a web based application has been suggested by us forthcoming deliver accident fitness retaliation extending to pathological needy person. The ultimate objective of this work is to minimize the distance in the middle of pathological needy person and rescue squad retaliation time. Rescue squad are a virtual segment of accident pathological assistance. By means of this work, it is bring forward that the solicitation authorizes title the clinically needed person to fix a manage to the health center. The work further venture to provide blood line description-shipmen kindness to the health center. Meanwhile, the rescue squad driver would receive a evoke with respect to the booking made by the patient. The rescue squad driver has to confirm the booking made and the supplication will escort the conductor toward the landing place. The administrant bid get all the inner direction and intend control the inspection and calling activity. It will be vital undertaking for us from which we can diminish time and convey patient on schedule. In our work, there will be two supplications in which one will be for client/patient and other will be for accident vehicle driver. It diminishes the time, which is devoured by third individual. In our work, information will be kept securely and in efficient manner which will simple to track patient and drivers. In our work, we can without much of a stretch find driver just as client or patient Before servilely through which it will lessen the hour of calling tone another.

Keywords:-Web-based application, Response time reduction, Patient–driver tracking, Accident assistance, Rescue squad.

1. Introduction

Pathological field has been a gift to live on the planet. Any basic medically needed person with insignificant likelihood of recuperation can be medicated along with an extreme wellbeing reaction. In any case, during a crisis, a pathologically needed person should be immediately handled. Clearing a victim to the clinic looks

reasonable however, in concrete, it is significantly confounded; additionally, it becomes intricate in rush hour gridlock ways. Metro Politian cities such as Mumbai, Delhi, Bangalore, Jaipur etc stands with high density, among a rushed development in the bounty of vehicles, transportation quandaries, absence of trails and unsafe roads for one self to drive or to pass. It has been seen that setbacks concerning pathological reaction have prompted basic wellbeing concerns or even demise.

This was because of the intricacy inside the reaction framework, on the other hand the specialized fiver. A viable, basic and easy to use crisis reaction framework with vital offices could be shelter [1].

Two major categories of Location-Based Services (LBS) have been the subject of ongoing research on environment-based services [2][16]. LBS detection techniques frequently use dynamic, real-time plotting algorithms to track a customer's device. In general, the corresponding graph-based system can be used to identify a specific situation [14]. Along with their mode of operation (e.g., push vs. pull, minor vs. central), LBS can also be categorized based on the type of intended recipient (human or device). The two primary categories of these that are described are push- and pull-based LBS.

ICT integration and use have been extremely beneficial and praiseworthy globally from a healthcare standpoint. Their influence is still minimal in many rural areas, though. Healthcare systems must adapt their offerings to these communities' unique needs in order to address this. The supply and demand for healthcare in many rural areas are currently out of balance, which is made worse by poor transportation infrastructure. The best use of limited human resources has been severely limited by this challenge, especially in South India (SI). According to statistics, only 12% of doctors and 19% of nurses serve the roughly 46% of SI's population that lives in rural areas. Furthermore, there are still significant obstacles in these areas due to concerns about the availability, affordability, and dependability of transportation.

Therefore, rescue teams frequently find it difficult, if not impossible, to reach patients in need of urgent care during both emergency and non-emergency situations [2]. Many rural areas lack structured address systems, which makes the issue even worse. In these circumstances, it could take two to three hours for a rescue squad to arrive after a patient referral [2]. Tragically, this delay has resulted in the loss of numerous lives that could have been avoided had proper infrastructure and procedures been in

place to promptly attend to patient needs. This paper's primary motivation is to address this enduring challenge.

2. Literature Review

People's lives can be greatly enhanced by online accident response services like medicine delivery and rescue squads. Clients will be able to access the services as needed after registering on the web application with basic personal data. They can indicate their emergency scenarios, and the closest rescue team in that area will be alerted right away, guaranteeing quicker reaction times. In a similar vein, the medication delivery system will guarantee prompt access to critical medical assistance by enabling clients to obtain their prescribed medications at any time of day. This means the services will be available 24/7. Since such situations often arise in daily life, this online accident assistance system is expected to help reduce their negative consequences. In addition to wireless sensor networks, E-MAC, the Ant Colony Optimisation Algorithm, and packet combining protocols, Omkar Udawant et al. used Signal Control Algorithms. Data transmission in wireless sensor networks can cause congestion, but different protocols, like packet retransmission, can help [2].

The Rapid Assistance System (RASUS), created by Huber Nieto-Chaupis, is mainly used in peri-urban regions. This system seeks to deliver dependable and timely pathological services through the use of pathological image processing [3].

Furthermore, in this field, the Mobile Computing Lending Program (MCLP) and the Location Set Covering Model (LSCM) have been proposed. With an emphasis on dispatch policies, Cheng Siong Lim et al. reviewed dynamic rescue squad resituation models. Their research emphasises how theoretical dispatch models relate to actual, workable policies [4]. Past study on customer thought and input for the development of web based facility of taxi in specified area. [1] reviewed the improvement history of a portion of the main pinnacles of taxi rental applications like ola and Uber. The paper likewise centered around the gathered information of Uber and ola customers. Information was gathered from neighbouring experts. Scientific examination clarified that clients favor Uber over ola over charging as a worry. Unexpectedly with wellbeingolas picked over Uber. Numerous studies on pathological services in the form of rescue squads [8] [9] [11] have detailed attempts to save patients' lives in a more effective and efficient way. Because the application tracks and communicates

the patient's location, these systems enable the rescue vehicle to arrive at the patient's location in a timely manner. Furthermore, the car can be furnished with the necessary medical supplies to promote the patient's health. Moderate exploration on Situation-based administrant [2] [14] [16] concentrated on two general classifications of LBS.To follow the area of a client’s gadget, the LBS identification strategy can utilize a dynamic and constant plotting calculation.A specific area is extensively recognized by rehearsing the comparing chart framework.A few LBS can be ordered by the fluctuated sorts of the planned beneficiary, regardless of whether gadget or human, push versus pull, optional versus essential, etc.

One of the beforeliminary exploration on the Influence of rescue vehicle office on asset use in the crisis division (ED) held a goal toserve how the rescue squad are related with the assets which were utilized in ED [12]. A survey was made to the review authoritative information base to guarantee whether the assets, which were to be utilized in rescue squad, were according to the request for the ED. In multivariate ideal models that set for the impacts old enough, sex, accident, reality, and transient determinants, rescue vehicle transportation protected its association with more complete asset use. Thus, a beforeliminary examination assigns that victims coming to offices by the Accident Desegmentment by crisis vehicle use significantly surpass upgraded sources than anticipated counter segments.

We looked online after deciding to create this web application, but we couldn't find a platform that was exactly like ours. None of the current apps offer a comprehensive solution, even though some of them have features that are comparable to ours. Our application stands out from the others because it allows users to track rescue squads in real time.

Here we have listed a few android apps that we have found after searching online

1. BD Police Helpline: 999
2. Bangladesh Accident Numbers
3. Bangladesh Fire Service

We looked up similar projects online when we first started planning to create this web application, but we couldn't find any platforms that were as thorough or efficient as ours. The 999 (BD Police) helpline lacks an automated, technology-driven approach,

despite offering excellent manual services. On the other hand, a lot of other nations have already set up effective online pathological services. Our goal is to develop a more user-friendly, responsive, and efficient platform specifically for our nation.

3. Methodology

3.1 Business Process Model (BPM)

The logical examination of an organization's business procedures is known as a business process model (BPM). BPM helps to improve the efficiency of a web application by representing its underlying business workflows.

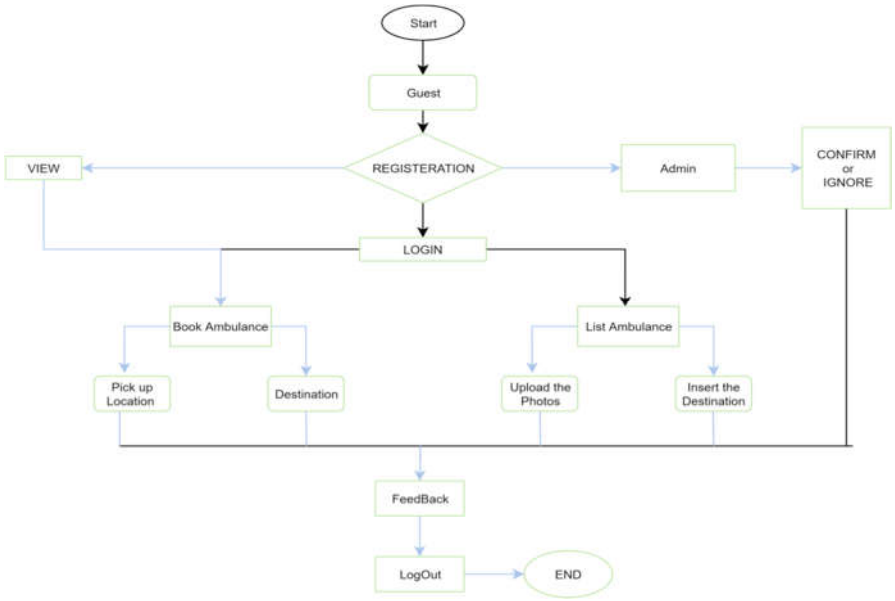

Figure 3.1 Business Process Model

3.2 Patient Description

Table 3.1 Patient Diagram for whole system

Patient name	Whole System
Central impersonator	Customers, administrant
Minor impersonator	Medicine shop, Rescue squad
Before-state	Sign in

Structure	Sign in, Select service Service confirmation Sign out
Afterstate	Null

3.3 Rescue squad booking

This figure demonstrates the rescue squad booking system of our website. The customer provides his pickup situation, destination, rescue squad type and then confirms the booking.

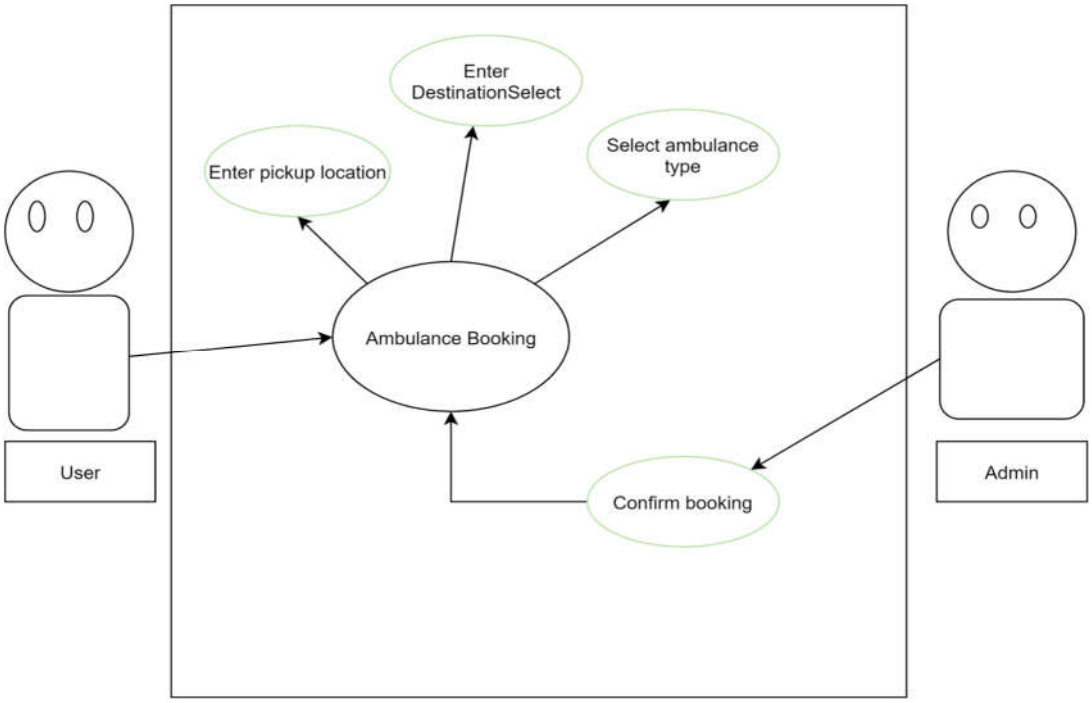

Figure 3.2 Patient model for Rescue squad booking

3.4 Medicine order

The way the website handles medication orders is illustrated by this patient model. The client uploads a soft copy of the prescription, enters the name of the medication, indicates the dosage, and completes the payment.

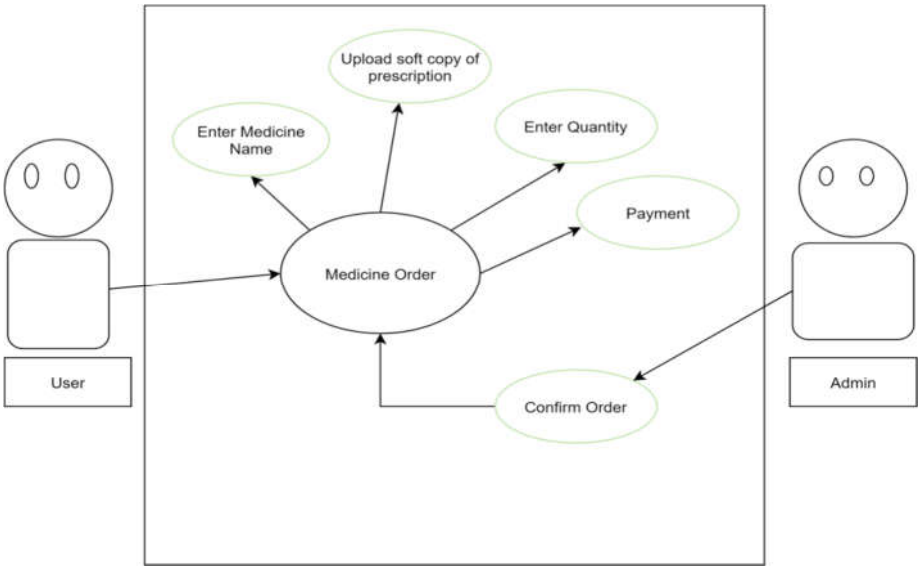

Figure 3.3 Patient model for medicine order

3.5 Logical Data Model

To build the database we used MySQL. The figure of SQL structure is given below:

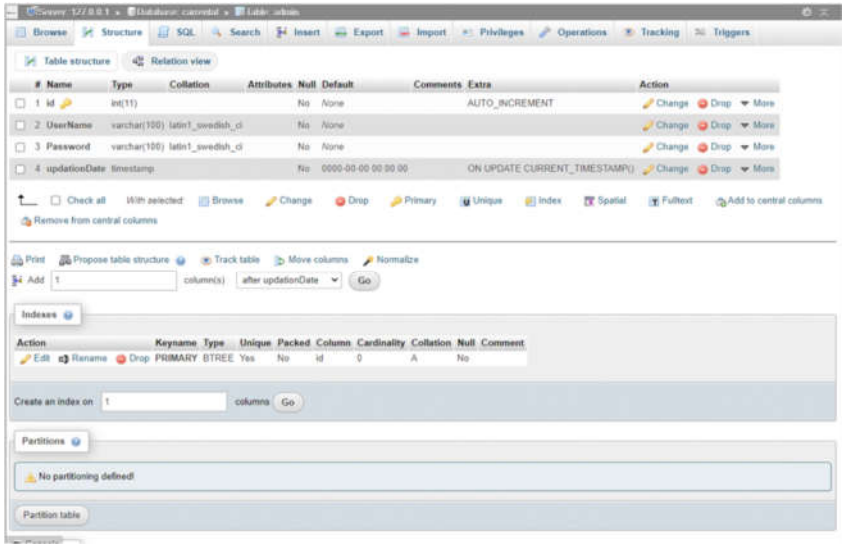

Figure 3.4 Design Requirements

One of the most important stages of any development project is the analysis of customer requirements, which served as the foundation for the design of our entire

system.

- We build a login page because in our system there is an authentication for the customer.
- We have three types of customers, Administrant, Customer and Guest. Administrant and registered customers can use all features but Guests can view only.
- Registered customers can book an rescue squad and place an order for medicine after logging in. They can also update their profile.
- Guests can view selected sections and also can create new profiles.

4. Design Specification

The entire system's development process is described in the design specification. Both the front-end and back-end designs are covered, along with the tools and design-related factors that are involved.

4.1 Front End Design

In essence, the user interface (UI) is represented by the front-end design. It incorporates elements of both web development and web design. We used PHP, JavaScript, CSS, and HTML to implement this. Our goal was to maintain robustness throughout the design while simultaneously guaranteeing scalability, extensibility, and flexibility.

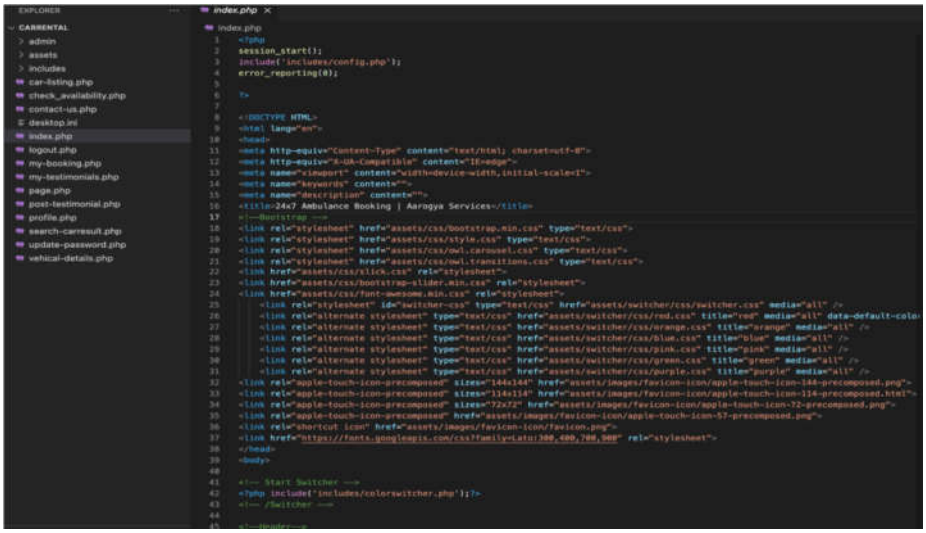

Figure 4.1Front End Code

4.2 Back-end Design

The project's backbone is the back-end design. We developed the system using MySQL as the database and PHP as the server-side scripting language.

```
-- phpMyAdmin SQL Dump
-- version 5.1.1
-- https://www.phpmyadmin.net/
--
-- Host: 127.0.0.1
-- Generation Time: Dec 07, 2021 at 12:01 PM
-- Server version: 10.4.22-MariaDB
-- PHP Version: 7.3.33

SET SQL_MODE = "NO_AUTO_VALUE_ON_ZERO";
START TRANSACTION;
SET time_zone = "+00:00";


/*!40101 SET @OLD_CHARACTER_SET_CLIENT=@@CHARACTER_SET_CLIENT */;
/*!40101 SET @OLD_CHARACTER_SET_RESULTS=@@CHARACTER_SET_RESULTS */;
/*!40101 SET @OLD_COLLATION_CONNECTION=@@COLLATION_CONNECTION */;
/*!40101 SET NAMES utf8mb4 */;

--
-- Database: `carrental`
--

-- --------------------------------------------------------

--
-- Table structure for table `admin`
--

CREATE TABLE `admin` (
  `id` int(11) NOT NULL,
  `UserName` varchar(100) NOT NULL,
  `Password` varchar(100) NOT NULL,
  `updationDate` timestamp NOT NULL DEFAULT '0000-00-00 00:00:00' ON UPDATE current_timestamp()
) ENGINE=InnoDB DEFAULT CHARSET=latin1;

--
-- Dumping data for table `admin`
--

INSERT INTO `admin` (`id`, `UserName`, `Password`, `updationDate`) VALUES
(1, 'admin', 'admin', '2020-04-24 11:12:49');

--
-- Indexes for dumped tables
```

Figure 4.2 BackEnd database

5. System Architecture

Aarogya Rescue squad Booking System is an application for booking tours for a patient in trouble. The patient chooses his/her suitable tours by looking at the citations and distance of each tour over a locale. Finally,billing toward the end. The stage used to assemble the framework would be PHP, SQL information base and Google Maps API. The framework will have highlights like Rescue squad/Special rescue squad subsequent to booking. The framework will have clients like patients, Rescue squad and Hospitals.

5.1 Hospitals Role:

The SQL database would be connected to the data gathering calculation, meeting information, REST, reactions and the solicitation interaction. The CRM will hold logical information about the drivers, and leads produced from the patients. driver needs. The application will facilitate following and reaction from Google Map API.

This comprises of the components found in the local segment of the dispensary. They typify the web application that is interconnected to the SQL data set in the cloud. The product framework is joined with GPS common sense exploitation Google Maps API to figure specific space inside the subject (casualty) and the crisis vehicle or dispensary, centers and thusly the ideal ways. Moreover, administration work force handle the activity to satisfy impersonal adroitly program open crisis vehicles and pathological help all through crises.

5.2 Patients Role

This is a web based software system that's put in upon an individual client's smart phone browser. With this application, patients will demand basic crisis administration, book their tours towards the accident clinic, and get speedy pathological help on its appearance, correspondingly moving further .The situation of a patient canbe achieved by the patient at the time of the booking to access the exact situation of the person to pick up for the accident.

5.3 Administrant Role

All the data such as customers, Rescue squad listings and Booking can be moderated by the administrant. He can choose whether this should be listed on the website or not. Which helps in avoiding spam and hence is reliable to use for the patients in an accident.

6. Proposed System Architecture

We combined cloud computing and mobile technologies in this system to give patients and healthcare service providers in India's cities and rural areas an affordable means of communication. Through the use of a mobile (web-based) application and GPS services, the system allows patients who require accident assistance to schedule hospital consultations and even request a rescue squad. When in operation, the system can decrease delays in scheduling and preparation, enhance communication between patients and transport providers, and alert patients to the rescue squad's anticipated arrival time. By making it possible to quickly identify the accident scene and guaranteeing a quicker response, the system is also intended to improve patient and rescue squad operator safety.

While travelling to the rescue site, the system also enables patients to speak with medical professionals or paramedics. Additionally, it reduces lengthy lines and wait times in hospitals that require appointments.

The figure below shows the architecture of the suggested system. A 3G/4G wireless network, a cloud-based server, client software on smartphones, and the computer system at each hospital's local unit are some of its essential parts.

Figure 6.1 System Architecture

The system components at the hospital's local unit are represented by this component. In order to provide the required interfaces for efficient system operation, a web-based application is installed on the computer and a computer is connected to the cloud-based server through the Internet. In order to determine the best routes and the distance between the patient and the hospital or rescue team, the software is integrated with GPS functionality via Google Maps. In order to effectively schedule available paramedics and rescue squads during emergencies, an operator—also known as the administrator—manages the system.

6.1 Algorithmic Design

To ensure the good before prestation of the framework and to give the customer’s necessities, we united the current planning calculation of First Come First Serve and Dijkstra's calculation. This choice comprising of the pseudo code gives the application and the possibilities of controlling rare holding in addition a few crises where different rescue squad are required be that as it may, scarcely any are open Besides the First Come First Serve calculation, the long tail of victims can

be settled by the idea of LILo or FIFo lines, which implies, the first to book is quick to be served. In this methodology, the patient's directions, course, distance and cost are not thought of. This Approach Implications on extended, broadening and hold time further influence the movement cost.

Dijkstra's calculation then again observes the briefest way between the source and objective chose by the client; in the event of traffic, a backup course of action is related to another term. Dijkstra's calculation is a merged technique that distinguishes the patient, crisis vehicle inside every one of the accessible assets. For instance, in the event that scarcely one crisis vehicle is available on a very day and every quiet's interest is taken care of comparable for nuclear understandings, It's essential too versee before referenced states ideally. Dijkstra's calculation is utilized by Google Maps API to direct a GPS gadget to assist us with going over an objective over each conceivable course, method of transport, traffic, and time.

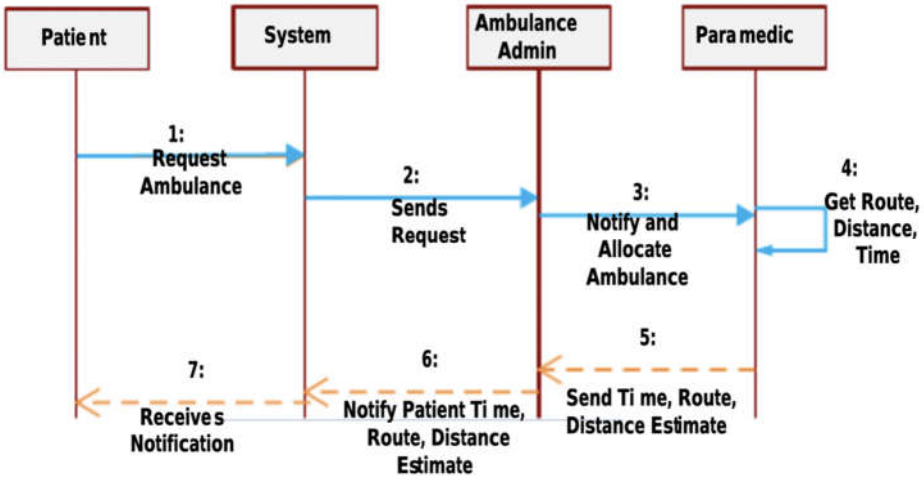

Figure 6.2 Rescue squad Request Sequence

6.2 System operation

The administrator, paramedics, and patients are the three main users of the system. Patients can use the system to schedule a hospital consultation or call for a rescue squad once they have the application installed on their phone. Patients give information like their name, physical address, and the type of accident when requesting a rescue squad. Upon receiving the request, the administrator notifies the designated paramedic or driver right away and uses the data stored in the cloud to assign the best and most available rescue squad.

After receiving the notification, the paramedic estimates the time needed to get to and pick up the patient, determines the best route, and calculates the distance between their current location and the patient's location using Google Maps integrated with GPS. The patient module describes the potential user-system interactions. The intended framework's users, who fall into two application client categories—drivers and patients—are intended to receive pertinent information and features. While drivers manage and create data pertaining to Availability Status, Alerts, Payments, and Analytics, patients have access to features like Payments, Trip History, Service Channel, Accident Booking, Settings, and About Us.

Three primary user roles are used by the system: paramedics, administrators, and patients. Patients can request a rescue squad service or schedule a hospital consultation via the web application on their phone browser. Patients give information like their name, physical address, and the type of accident when requesting a rescue squad. The administrator immediately notifies the appropriate paramedic or driver and assigns the patient to the most appropriate and available rescue squad after receiving the request by accessing the data stored in the cloud.

7. Implementation and testing

Although there are a number of database management systems available, we decided to use MySQL for our project due to its open-source nature, popularity, security, and ease of use.

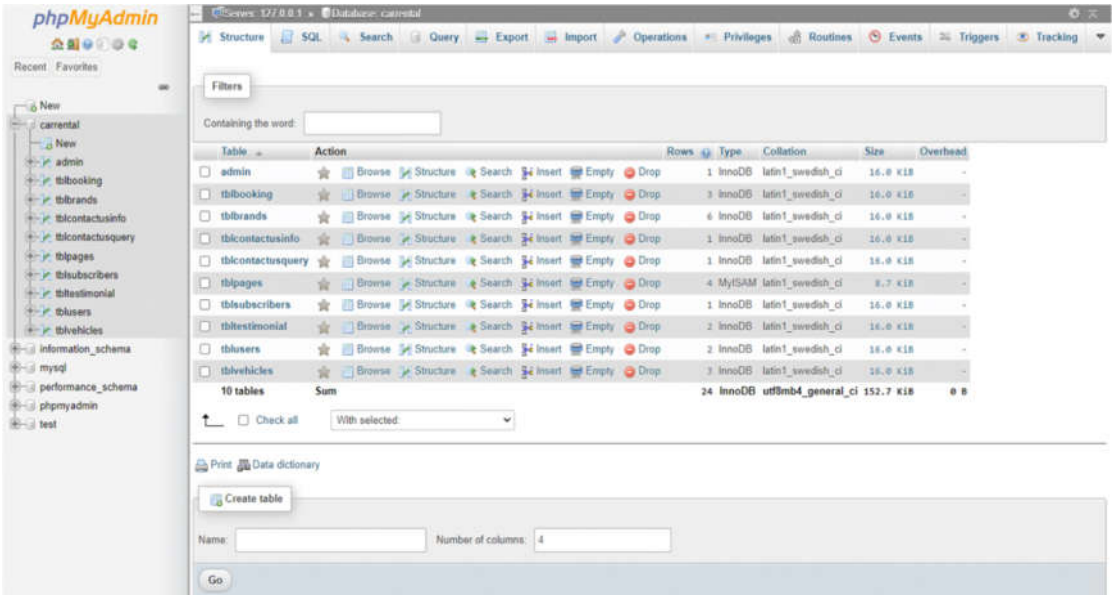

Figure 7.1MySQL

7.1 Implementation of Front-End design

We sought to make our design straightforward, aesthetically beautiful, and user-friendly, steering clear of any colour schemes that might strain the eyes, since an attractive front-end design can draw clients at first glance.

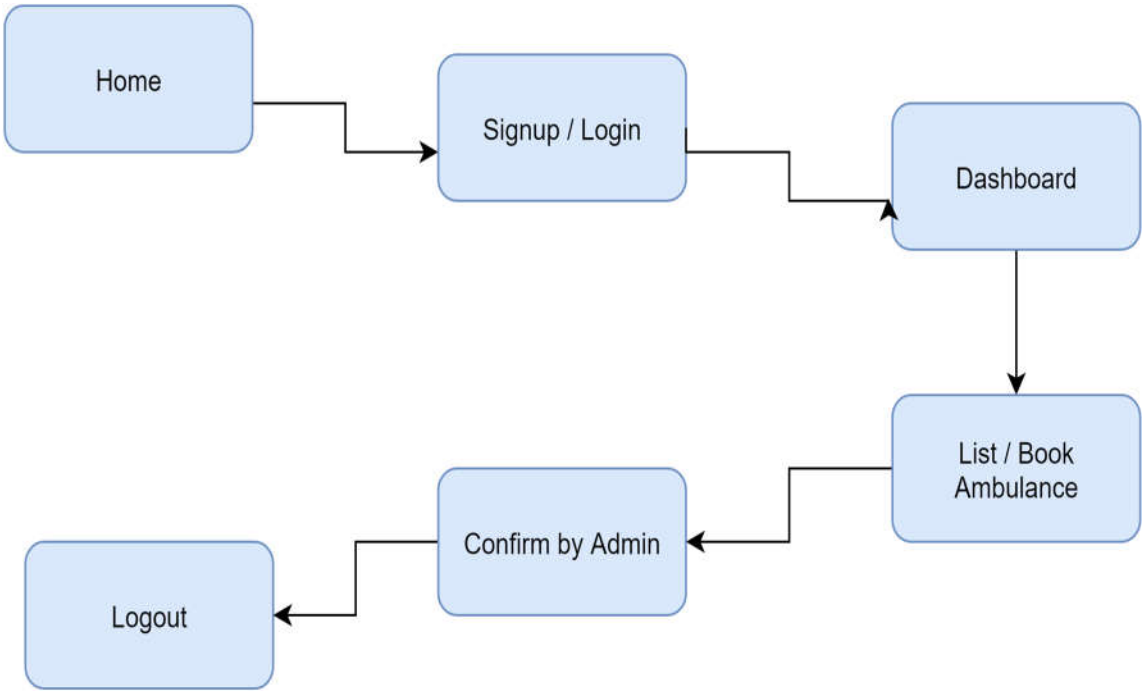

Figure 7.2 Implementation of Front-End

There is interaction practically everywhere in the modern world. It is crucial in figuring out how appealing and interesting a system is to users. A system needs to be interactive to be well-liked and easy to use. As we have mentioned before, we added some unique features that make us different from others. With the Contact option, every customer can easily talk with the system administrator. our system has been successfully implemented to ensure interaction.

In addition to shielding data from unwanted access, a secure system guards against data deletions that are unintentional or incorrect. Only registered customers are allowed access, and the system administrator must approve all customer activity in order to guarantee this.

The collection of precautions taken to keep a database safe from attacks, threats, and unauthorized access is known as database security. The database of our system contains a lot of important data and information, so protecting it from unwanted access is crucial. System crashes can also happen during transaction processing, so appropriate safeguards against unintentional loss and data consistency must be in place.

8. Conclusion

There are currently very few projects that assist those in need by supporting rescue squads and accident response services. An improvement on these efforts is the Aarogya Rescue Squad Booking Service, which provides a blood inventory facility and an easy-to-use interface. In conclusion, this project was created to handle medical emergencies resulting from accidents and guarantee that patients are promptly transported to adjacent hospitals. By offering quicker and more effective rescue services—which are essential in situations where every second counts—this strategy seeks to save lives. With the help of this Project, the accident vehicle will meet the client or patients as the position is followed or supplied within the web based application furthermore can produce the essential tools that are expected for the pathologically needed person well-being.

The difficulties people encounter in obtaining public healthcare facilities, especially those for pathological accidents, were recognised and discussed in this thesis. Specifically, in accident situations, patients frequently find it difficult, if not impossible, to access pathological rescue squad transport, which ultimately results in avoidable deaths. During accident situations, patients frequently find it difficult, if not impossible, to access pathological rescue squad transport, which ultimately results in avoidable deaths. In order to show how the system works and assess its efficacy in comparison to other solutions, this paper examined, designed, and implemented a prototype. Given its functionality, we think it has a great chance of being adopted in rural areas, both inside India and in places without access to contemporary hospitals or other cutting-edge medical facilities.

Additionally, this system could save thousands of lives in need of accident services and greatly improve people's quality of life. We intend to improve the system in the future by incorporating IoT and machine learning technologies, which will allow it to grow and establish connections with surrounding hospitals. In this manner, the system can immediately recommend a different hospital if a service is unavailable at one,

along with information about the facility's location, expected time of arrival, and the presence of paramedics, physicians, and other critical resources to manage the emergency.

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