

Ubiquitous Web Application Development for Ambulance Assistance

Swagata Katiyar

Department of Information Technology
Dr. Akhilesh Das Gupta Institute of Technology & Management
Delhi, India

Rushali Mahajan

Department of Information Technology
Dr. Akhilesh Das Gupta Institute of Technology & Management
Delhi, India

Sanya Gupta

Department of Information Technology
Dr. Akhilesh Das Gupta Institute of Technology & Management
Delhi, India

Nakshita Malhotra

Department of Information Technology
Dr. Akhilesh Das Gupta Institute of Technology & Management
Delhi, India

ABSTRACT

The COVID-19 pandemic has led to a dramatic loss of human life and presents an unprecedented challenge to public health. Quick and effective access to ambulances is important, especially in emergency situations. This project will fill the gap between the patient and ambulance response time. It will enable the patient to book a ride to the hospital from a list of available ambulances based on their location. With automatic detection of patient's current location, they can simply upload the destination to find out the estimated time and distance the ambulance will take. And then compare the quotations and distance to book the appropriate service. Meanwhile the admin would get all the central information and would control the inquiry and calling functionalities. The main objective of this research work is to make an ambulance system which provides authentic data at a single platform and ensures a smooth delivery of life-saving ambulance services to all people in need.

Keywords: Ambulance Management, Health, Medical Services, Booking, Web Application

INTRODUCTION

The ambulance service is ideally placed to be part of the first line in the continuum of health care, and can significantly contribute to make a huge range of unmeasured contributions to patient outcomes. However, arranging them at the time of need can arise a panic situation and cause perturbation, knowing that every passing second is crucial. Especially during the second wave of pandemic in India, it was nearly

impossible to book an ambulance amidst the abundance of unvalidated data clogging the internet. This project is a website application which aims to ensure simplicity, effectiveness, and responsive factors, that serves the user to discover the nearby ambulances and hospitals, and book them then and there. The proposed system uses Map-Box API to direct the ambulance from source to destination and further uses Razor pay payment integration API for a hassle-free online payment.

Over the last few decades, the world has witnessed the development of the Internet and increased trust and dependence on it. There are thousands of websites which are developed to deliver health information to the general population, each serving a variety of interests. These sites proved to be extremely helpful especially during the dark times of COVID-19. However, considering the amount of information disseminated via the internet, nearly 50% of it was either outdated, false or led to cybercrime. Thus, we propose a platform to retrieve all authentic and validated information with proof verification on nearby available ambulance services, whether public or private, without having to search scattered data on the internet and thus save time.

BACKGROUND

With an unrivaled COVID-19 spike, India surpasses other countries to become one of the most affected countries in the world. During the second wave, the health-care foundation was in complete shambles. Display of bodies stacking up at burial grounds and plenty of diseased waiting in ambulances for nursing

are the defining pictures of the second wave of pandemic in India. From ALS to BLS ambulances, all the healthcare supplies in Delhi were stretched to their maximum capacities. However, with higher revelation of alarming events in pandemic, Indian residency invariably suffered from deteriorating inquiry time, elongated case time and infirmity delays.

LITERATURE SURVEY

The Internet is a popular source of information across a variety of domains, especially health. A large percentage of users highly depend on the internet for general health information and guidelines during Covid-19. Widespread access to the internet, coupled with increasing volume of material availability, raised the issues of quality and reliability of online information. There were numerous reported incidents concerning the authenticity of data on the web, embracing diverse topics such as availability of ambulances, plasma donors, oxygen cylinders, hospital beds etc. According to statistics, approx. 2500 calls from covid patients were carried out to ambulances every day, as the number of cases in Delhi continued to rise. Several state governments claimed to build additional facilities, but experts stated that it would be difficult to keep up with the increased number of infections. A persistent shortage of ambulances was reported and was seen in the urgent pleas for assistance on social media.

Despite the far side of this unceasing chaos, the depiction of humanity, collectively portrayed by the nation as the second wave escalated was commendable. However, amidst all of this decimation as we fight to discover our path through this pandemic, it is important for us to stand as a nation and focus upon ways to remove deflation of the emergency response and avoid any further complications for the future.

RESEARCH METHODOLOGY

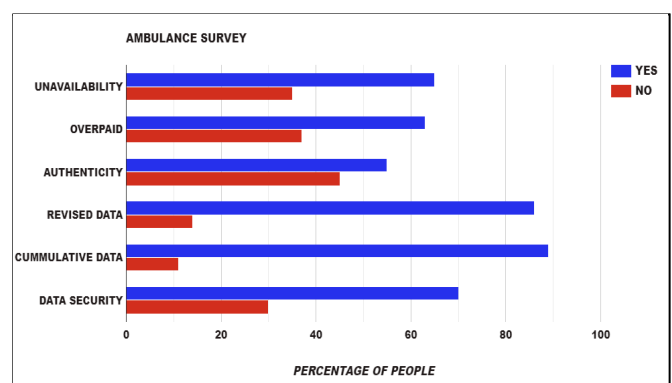
Med-Drive conducted a thorough analysis of the most often encountered concerns, such as availability, accuracy, data security and revised data. This research was based on multiple criterias of decision making approaches, that combines more than one research

methodology to overcome the limitations of data unavailability. The following are the contemplated methods carried out:-

I. Data Analysis

A recent literature survey carried out in Delhi by Med-Drive in the fall of 2021, indicated that the majority of respondents are dissatisfied with the present-day medical infrastructure in Delhi. The disappointment amongst citizens was associated with unavailability of authentic data, technology backwardness, overpaid services and personal data security. When people were questioned regarding evident platforms that provided all the resources in a single click, around 89 percent of them didn't have the knowledge about such facilities. In addition to this, over 57 percent of people experienced ambulance bills to be vague and less defined than in other medical specialties. Furthermore, 85 percent of people acquainted with the infected felt that digitalizing the existing services by inculcating technologies such as live location availability and online payment methods can reduce the response time and provide reassurance to the loved ones.

In the midst of this havoc, the rapid unfurling of false information regarding the health facilities placed a lot of people in a situation where they were deprived of basic sense of security. About 68 percent of citizens felt unsafe as they had to solicit and share their personal data with unauthorized services just to get assistance.



II. Data Evaluation

Considering the current trend & inattentiveness amongst citizens in regards to COVID-19, the third

wave seems inevitable. According to a survey by WHO, in this digital era, false information spreads like wildfire which further creates a breeding ground for uncertainty and fuels up skepticism and distrust, leading to an environment of fear, anxiety & dismissal of proven public health measures — which in turn can lead to loss of lives.

From the data evaluated, about 63 percent of respondents suggested that reply time with a well-connected system of reservation, live-tracking, and ambulance availability is the need of the hour. The preliminary statistics discussed above highlights the importance of introducing new strategies regarding the ambulance management system in response to the upcoming pandemic waves.

III. Data Accomplishment

This project enlightens the above mentioned issues and influences the scope of the project. The above data clarifies the obstacles faced by the existing systems and narrows down the structure of the study. The information acquired through this survey explained and enhanced the motivation towards the project.

SYSTEM ARCHITECTURE

A) System Architecture

The architecture of the proposed system subdivides the system into modules, which can be created independently and used to derive functionalities. This application consists of the following three modules:

1. Admin Panel: Admin coordinates the actions of the entire system. He is responsible for monitoring all the information of the project, from managing testimonials of our users to managing vehicles and service providers, every single information is managed by the admin.

2. Register Vehicle Module: Any ambulance service can register their vehicle by providing some govt. proofs after which their service will be reflected in the list.

3. Patient/Users: Users are the one who can book our ambulance online from our portal by uploading a few documents regarding the patient's details.

4. Mapbox API: The Mapbox API provides some basic functionality to our web application. In the beginning, the user's live location is marked on the map using geolocation and navigator functions. The Search Bar takes the input in text or location coordinates and returns the destination point with little popups. It also features a zoom-out option for India's furthest locations. The function estimates the distance travelled and total time necessary to reach the destination after gaining access to live location and destination coordinates. The latter is calculated based on geolocation, navigator and traffic-free routes.

5. RazorPay REST API: Razorpay API is linked in test mode for payment proceedings after accepting the personal details from the user. It gives you access to all payment modes, including credit card, debit card, net banking, UPI and popular wallets. The main objective of making payments digitally is to have a fair recording of all monetary transactions. The cdn script link is used to make it PHP compatible. The charges are computed based on the distance between the origin and destination points. After deducting the payment, it automatically sends the verification email to the user and the webpage redirects to the home page.

B) External Interface Requirements

1) User Interfaces: The application interface will work optimally on any Windows or Mac Operating System. As a test server, we have used a XAMPP Server with MySQL Database and HTML, Bootstrap, CSS, JS, PHP. Along with that, Mapbox API with Tailwind CSS is also incorporated.

2) Hardware Interfaces: Computer with minimum 4GB RAM, Tablet or Android phone with minimum RAM of about 2GB and decent power to access the application smoothly.

3) **Software Interfaces:** Visual Studio, XAMPP Server, Postman, PhpMyAdmin and MySQL.

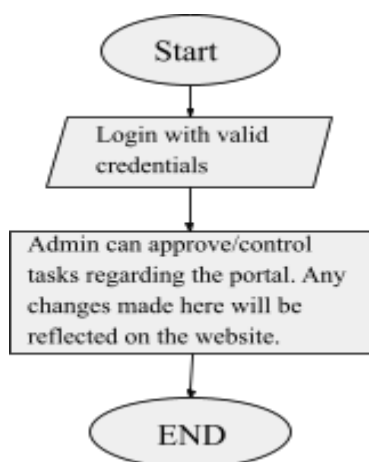
ALGORITHM AND IMPLEMENTATION

A) Algorithm Design

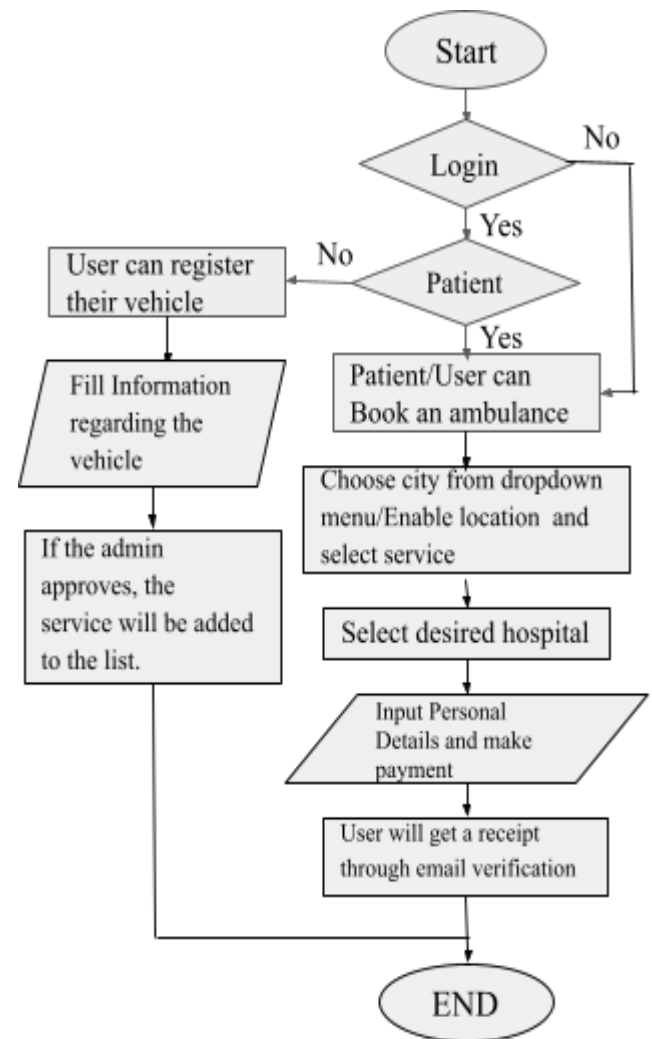
Algorithm:-

- 1) Start
- 2) Switch Case 1: If a user wants to book an ambulance
- 3) Choose city from dropdown menu/Enable location and select service
- 4) Select desired hospital so that Mapbox can Check Optimal Distance, Time
- 5) Book an ambulance by filling in personal details(govt. proof verification) and Make payment through Card/Wallet/UPI/Netbanking
- 6) User will get a receipt through email verification
- 7) Switch Case 2: If a user wants to register their service
- 8) If already a user, login
- 9) Else Sign in with a valid email id
- 10) Fill information regarding the vehicle
- 11) If the admin approves, the service will be added to the list.
- 12) Switch Case 3: Admin Panel
- 13) Login with valid credentials
- 14) Admin can approve/control tasks regarding the portal. Any changes made here will be reflected on the website.
- 15) END

Flowchart 1: Admin Panel



Flowchart 2: User Panel



B) System Operations

In our web application we have provided the facility of booking an ambulance exactly the way we book cabs. The system operates by having three important domains– the users, the administrator and the people looking to register their service. With the application, the user can interact with the system to book an ambulance service. For booking, basic details such as name, physical address, email and phone number have to be filled in.

This platform will act as a single hub providing options to view and select bookings of ambulances in different locations. Through this application, our ultimate goal is to provide a platform which not only consist of the same group of coordinated functions,

tasks, or activities for the benefit of the users but also provide certain functionalities that can be used by Private/Govt. hospitals, local ambulance drivers and all those who want to help in such crucial times.

The proposed system will render full aid for 24X7 Ambulance services with a multi-user port and GPS-based technology staging for quick and secure initial medical attention. It can automatically take live location, total distance and time-taken to reach from source to destination with full zoom-in feature.

Apart from that, they can also give their valuable feedback to this portal which is first validated by the admin to avoid explicit content. They can also check or update their profile settings and update their password as well if needed.

RESULT

We suggested an unconventional Ambulance Management System in the given study. We designed our idea to deal with emergency medical problems and provided transportation for patients to nearby, well-connected hospitals. The emergency vehicle can contact the user after the live location is tracked or provided by the ambulance portal.

This application is a SQL and PHP-based website along with a payment system based on the Razorpay API. With the MapBox navigator, the suggested system finds an optimised and shortest path. This is accomplished through the system's calculating capabilities, which determines the closest and most appropriate ambulance service. As a result, the most appropriate hospital for the patient, considering factors such as geography, speciality, and emergency department availability is suggested.

Other more precise technologies, such as a mobile device with GIS which is more widely available and less expensive, can be used to implement the notion. When compared to a GPS gadget, it is more costly. However, while some platforms make it simple to access location, they do not allow you to be completely precise as GPS or GIS. Although the planned

framework has been shown to be efficient, it is still under progress to meet the expectations of reality.

CONCLUSION

This application was created with the primary feature in mind, demonstrating how it works on a primitive level. Required efforts were put into the making of the GUI, such as the use of fragmented implementation on pages and a few other low-level problems that are yet to be resolved.

The survey conducted was helpful in providing a clear understanding of the problems persisting in existing working systems. It propelled us to make a system that could bring some ease to society. In the future, a feature will be introduced to the user side of the web application platform that will indicate the assigned driver's location and an anticipated time for the driver to arrive at the destination based on traffic and constraints. This will provide the user peace of mind that an ambulance has been dispatched and is on its way.

The usage of a mobile phone is fairly popular and dependable nowadays. As a result, the medium of a web-based application into the mobile application structure will be included. The application's whole format will be identical to that of a mobile browser.

To overcome possible issues, the system's components have been designed and are being tested individually and all together as well. To meet the individual demands for each component and solve any potential obstacles, several consultations and interviews with end users are in progress. There will be an automated system that will be implemented and tested. Hopefully, our application will serve to forge stronger, more trusted bonds between customers and everyone in the health-care sector. The system will be assessed, and its findings and performance will be examined and compared to those of other systems.

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