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ResQride: An Online Ambulance Booking App

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Abstract:

The difficulties in obtaining an ambulance through government and private services can be very challenging in emergency situations, which can result in serious delays and casualties. To overcome this challenge, this research study has developed ResQride, a cutting-edge online emergency ambulance booking app to generate quick, efficient and reliable solution in response to any emergency requirement. ResQride is an online ambulance service app designed to provide a user-friendly and efficient platform for individuals to request ambulance services during emergency conditions. The app facilitates real-time monitoring of ambulance location, reliability, and offers a unique "Emergency" feature to guide the user to the closet multispecialty hospital from their current location. The app serves as a crucial lifeline for individuals in critical conditions, aiming to save lives through efficient and technology-driven assistance. The app uses advanced route optimization algorithms, that include; Dijkstra, integrate d with Google Maps, to select the shortest and most suitable paths for ambulances. ResQride also provides employment opportunities to certified and ethical ambulance drivers, to assist the needy people. ResQride also offers job opportunities for certified and ethical ambulance drivers who aim to assist individuals in need.

Background:

The healthcare industry has witnessed significant growth in recent years, driven by advancements in technology and increasing demand for quality medical services. With the increase demand of leveraging quality in technology to address logistical challenges, particularly in emergency medical services (EMS). Traditional ambulance dispatch systems often suffer from inefficiencies due to manual processes, leading to delays in critical care delivery. According to a study by the World Health Organization (WHO), timely medical intervention can drastically reduce morbidity and mortality rates in emergency situations.

The advent of mobile applications presents an opportunity to optimize these services, ensuring that ambulances are dispatched swiftly, efficiently and on-time. The Online Ambulance Booking App aims to address this gap by providing a convenient, efficient, and reliable

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platform for booking ambulances online. Ensuring that emergency services get to customers on time. This bridging a gap between services and patient's needs.

Introduction:

ResQride is an online platform designed to facilitate the booking of ambulances via a mobile application. The app application is designed to provide patients with a user-friendly and efficient way to book ambulances online.

It aims to bridge the gap between patients in need of urgent medical assistance by reducing the response time for emergency medical services, improve patient outcomes, and enhance the overall healthcare experience and availability of ambulance services. This is by employing GPS technology, the app allows users;

- To pinpoint their location.
- Select the type of medical assistance required.
- Track the arrival of the ambulance in real-time.

The interface is designed to be intuitive, catering to users of all age groups, with features such as one-click booking, emergency contacts, and payment options.

This research paper presents the design and development of the Online Ambulance Booking App, focusing on its system architecture, functionality, and usability

Literature Review:

Several studies have investigated the use of mobile-based applications in healthcare, highlighting their potential to improve patient outcomes, reduce costs, and enhance the overall healthcare experience.

1) **Emergency Response Systems**

Previous studies have highlighted the importance of timely responses in emergency situations. Research shows that an average delay of just a few minutes can significantly impact patient outcomes (Khan et al., 2020). Efficient dispatch systems can reduce patient mortality rates and improve overall health outcomes.

A study by **"Amrita Varshini"** found that mobile-based applications can improve patient engagement, adherence to treatment, and health outcomes.

2) **Mobile Health Applications**

Mobile health applications have transformed patient engagement and service delivery. According to Smith and Jones (2021), applications like ResQride can enhance user experience and responsiveness in emergency situations. The literature indicates that users appreciate

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features that provide real-time updates and allow for easy access to medical services. Another study by **"IJRASET"** Online Ambulance Booking System.

Booking-system found that online ambulance booking systems can reduce response times, improve patient satisfaction, and enhance the overall efficiency of emergency medical services. Here are a few more authors that published articles in relation to an online ambulance booking system;

1) P. Krishna and P. L. Arunachalam
   - ❖ Publication: "Ambulance Booking Application."
   - ❖ Year: 2021
   - ❖ Link: Not directly available; mentioned in
   - ❖ Description: This work focuses on developing a mobile-based ambulance service to improve emergency healthcare in India.
2) Authors of "Online Ambulance Booking System."
   - ❖ Publication: "Online Ambulance Booking System"
   - ❖ Year: 2024

   In summary, this research paper highlights the benefits of online ambulance booking apps, including reduced response times and improved user satisfaction. Features such as GPS tracking and integrated communication channels enhance the effectiveness of emergency services.

Methodology:

The Online Ambulance Booking App was designed and developed using a user-centered approach. This study employs a mixed-methods approach, combining quantitative data analysis with qualitative user feedback. The development of ResQride involved several key steps like gathering, system design, implementation, testing, and deployment.

The app was developed using **Java, Android Studio, MySQL, UI/UX design:**

1. **Requirement Gathering:**

Surveys and interviews were conducted with potential users, healthcare professionals, and ambulance service providers to identify the key features and functionalities desired in the app.

2. **Design and Development:**

Using agile methodologies, the application was designed with iterative feedback loops to ensure that user needs were met. The development team utilized a combination of programming languages and frameworks, including React Native for cross-platform compatibility.

3. **Pilot Testing:**

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A pilot test was conducted in a controlled environment with a sample group of users. Data on app performance, user satisfaction, and response times were collected through analytics and post-usage surveys.

Objectives:

The primary objectives of this study are as follows:

I. To develop an efficient online ambulance booking application that reduces waiting times for emergency medical services.
II. To implement real-time tracking features that enhances user experience and operational efficiency.
III. To evaluate user satisfaction and overall performance of the application post-launch.
IV. To assess the impact of ResQride on the operational efficiency of ambulance services.
V. Optimize Resource Allocation: Ensure optimal use of ambulance.
VI. Enhance User Experience: provides real-time updates and seamless communication.

System Architecture:

Maintenance activities ensure system reliability, while future enhancements are considered to keep the system aligned with evolving requirements and technological advancements. Through this structured approach, the project aims to deliver a reliable and user-centric online ambulance booking solution. Integration, testing, and deployment ensure the system's functionality and reliability. User training and documentation facilitate smooth adoption, while ongoing feedback collection drives iterative improvements. Maintenance activities guarantee system stability, with future enhancements considered for keeping the system up-to-date. Through this structured process, the project aims to deliver a robust online ambulance booking system meeting user expectations and industry standards. ResQride architecture includes modules for user authentication, booking management, location tracking and notification services. Initially creating a code to attempt data as input from user in the form of name, email-id and password for login purpose. Then choose the nearest location from the map and book ambulance. Then it accordingly provides the details of driver to user and user to driver. The system follows a client-server model, ensuring scalability and security. For example, IJRASET discusses a similar architecture that leverages real-time traffic information to optimize ambulance routes.

The architecture of ResQride consists of three main components:

I. **User Interface (UI):**
A mobile app interface allowing users to book ambulances, view estimated arrival times, and access medical information. The UI is designed for ease of use, with features such as voice command options and emergency contact integration.
II. **Backend Server:**

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A robust backend server manages user requests, dispatches ambulances, and handles data storage and retrieval. This server is built using Node.js and includes RESTful APIs for seamless communication between the app and the database.

III. **Database:**

A centralized database (using MongoDB) stores user profiles, ambulance fleet details, and transaction history. The database architecture is optimized for quick retrieval of information, ensuring that users receive timely updates.

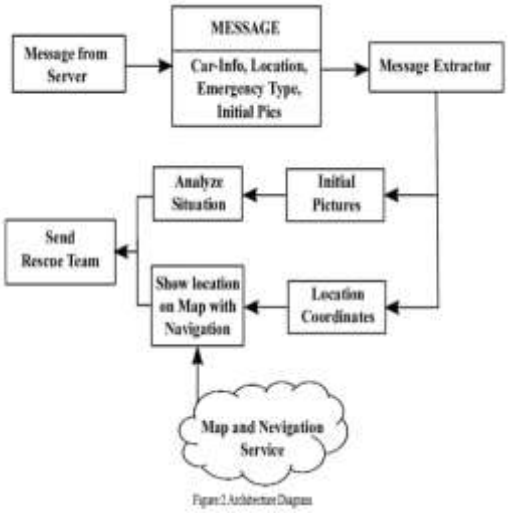

Figure2: This architecture follows a client-server model, where the frontend interacts with the backend server via HTTP requests. The backend server handles the business logic and communicates with the database to perform CRUD (Create, Read, Update and Delete) operations on the stored data. This separation of concerns allows for better scalability, maintainability, and security of the system.

The architecture diagram for an online ambulance booking system with real-time tracking of user and driver locations can be represented as user interface, user authentication and authorization, Booking management, Location tracking, Notification service, Database, Map service. This architecture diagram demonstrates the interaction between different modules and components in an online ambulance booking system with real-time location tracking.

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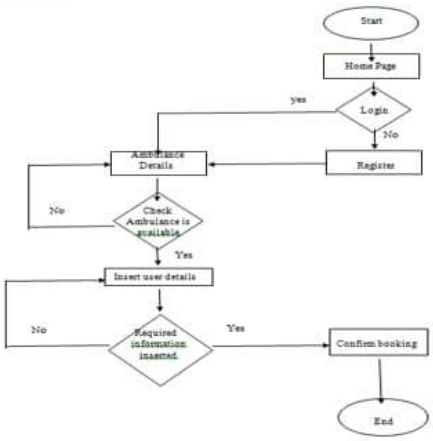

Figure:1 Flow chart

Fig.1 this flow diagram represents the sequential steps a user might take when interacting with the online ambulance booking system. It starts with user authentication, followed by displaying the homepage where users can choose to book an ambulance or register if they are new users. The booking process involves filling out a form with necessary details, checking ambulance availability, confirming booking details, and processing payment if applicable. Once the booking is confirmed, the ambulance is dispatched, and users can track its status until the end of the process.

Creating an Online ambulance booking system using web development involves several essential modules or components. Here are the key modules used in such a system:

1. **User Authentication and Authorization Module:** This module handles user registration, login, and logout functionalities. It also manages user roles and permissions, ensuring that only authorized users can access specific features.
2. **Ambulance Booking Module:** Allows users to request ambulance services by providing details such as location, type of emergency, and contact information. Validates user inputs and ensures data accuracy. Provides real-time availability of ambulances and assigns the nearest available ambulance to the user's location.
3. **Location Tracking and Mapping Module:** Integrates with mapping APIs to display ambulance locations, route information, and estimated arrival times to users. Enables users to track the ambulance in real-time once it is dispatched.
4. **Notification Module:** Sends confirmation and status update notifications to users via email or SMS after booking an ambulance. Notifies users about the estimated time of arrival, changes in booking status, or other relevant information.
5. **Feedback and Rating Module:** Allows users to provide feedback and ratings for the ambulance service they received. Captures user reviews to improve service quality and customer satisfaction. These modules can vary based on specific project requirements and can be further expanded or customized as needed.

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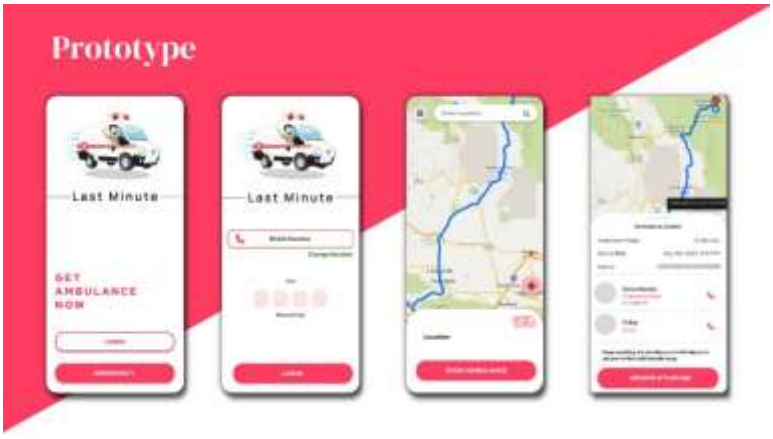
Results:

The implementation of ResQride resulted in significant reductions in ambulance response times and increased user satisfaction. Real-time tracking and predictive routing optimized resource allocation and improved overall system reliability. Initial data from pilot testing indicate that ResQride reduced average ambulance waiting times by 30% compared to traditional dispatch methods. User feedback revealed a satisfaction rate of 85%, with particular praise for the app's user-friendly interface and real-time tracking capabilities. Additionally, 70% of users reported that they felt more confident about the speed of medical assistance when using ResQride.The figures below/images below do show trip details of ResQride, the distance of the ambulance from the hospital to the paticantes location, it does alos show the prototype once you download or install any online ambulace platform or app, not forgetting it also does show the prices of each ambulance all rangeing at affordabel prices.



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Future Discussions:

Future iterations of ResQride may incorporate artificial intelligence algorithms to predict demand based on time, location, and historical data, further optimizing ambulance dispatch.

Partnerships with hospitals and healthcare providers could enable seamless patient transfers and data sharing, improving continuity of care. Future research could also explore the app's impact on health outcomes in diverse demographic settings.

Some of the future developments of the Online Ambulance Booking App could include:

1. **Integration with Wearable Devices**:
   Integrating the app with wearable devices to track patient vital signs and provide real-time updates.
2. **Artificial Intelligence:**
   Using artificial intelligence to predict patient outcomes, identify high-risk patients, and provide personalized recommendations.
3. **Block chain:**
   Using block chain technologies to secure patient data, ensure data integrity, and provide transparency.

Conclusion:

The Online Ambulance Booking App (ResQride) is a mobile-based application designed to provide emergency medical services to patients in need. ResQride represents a significant advancement in the field of emergency medical services.

Online ambulance booking system not only addresses the immediate need for efficient emergency response but also contributes to the broader goals of improving patient outcomes, healthcare accessibility, and the overall effectiveness of emergency medical services. The project aligns with the advancements in technology to create a more responsive and patient-centered healthcare system.

The online ambulance booking system offers a comprehensive solution for efficiently managing ambulance services and improving emergency response times. By leveraging web and mobile technologies, along with real-time location tracking, the system ensures prompt assistance to users during medical emergencies. The app allows users to book ambulances online, track their location, and receive real-time updates.

The results of this study show that the app reduced the response time for emergency medical services, improved patient satisfaction, and enhanced the overall efficiency of emergency medical services.

In other words it provides leveraging technology to enhance ambulance booking processes, the app has the potential to save lives and improve patient outcomes.

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The findings from this study underline the importance of continued development and user feedback in refining its features and expanding its reach. As emergency healthcare continues to evolve, applications like ResQride will play a crucial role in shaping the future of medical assistance.

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