Ambuitec: Ambulance Booking Application for Emergency Health Response, Blood Inventory

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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 locate themselves or can upload their current location as well as their destination location into the application. 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. Finally, billing at the end. The project further endeavors to contribute blood inventory-delivery services to the hospitals.

On the other hand, the ambulance driver would get a prompt about the booking made by the patient. The ambulance driver has to confirm the booking made and the application will guide the driver towards the destination. The admin would get all the central information and would control the inquiry and calling functionalities.

I. INTRODUCTION

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. Mumbai stands a cosmopolitan city, among a hurried expansion in the abundance of vehicles, transportation dilemmas, lack of footpaths and hazardous streetsforoneselftodriveortopass.

It is been observed that casualties concerning medical response have led to critical health concerns or even death. This was due to the complexity within the response system conversely the technical flivver. An effective, simple and user-friendly emergency response system with necessary facilities could be a boon. However, a platform is needed which will negotiate between the patients, ambulances and hospitals. With the rapid advancement in internet connectivity, mobilecabbookinghasalreadyproveditsserviceatdoor stepfeature; such services in the health sector are foreseen to make a scoringgoal.

The proposed system aiming to ensure simplicity, effectiveness, and responsive factors, is an android application 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. This project will benefit people, as there are several mishaps on the street, patients

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suffering from Pregnancy, ICU, Blood Pressure, Dialysis, Allergies and, will emergencyhealthresponsefacilitytothesufferers.

National Centre of Immediate Assistance has sketched the G3 method for ambulance superintendence. G3 method is utilized to trace flying bodies and automobiles on a modern map; the aforementioned G3 method was a sequence ofGlobal Positioning and Information System (GPS &GIS), and General Packet Radio Service (GPRS). Thus, the G3 model urged developers to utilize its features within heavily congested cities. Google Maps have implemented this G3 system and is based on a very simple but incredibly effective algorithm: the Dijkstra algorithm. The proposed system uses Google Maps API to direct the ambulance from source to destination.

II. LITERATURE SURVEY

A. Collection of Data from Uber and OlaConsumers

Research on Users' Opinion and Bliss towards Online Cab Service concerning a region[1] recalled the development history of some of the leading peaks of cab rental applications like Ola and Uber. The paper also focused on the collected data of Uber and Ola consumers. Data was collected from nearby professionals. Analytical investigation explicated that customers favor Uber over Ola over billing as a concern. On thecontrarywithsafetyOlaispickedoverUber

B. Effective AmbulanceService

A general thesis on ambulance Service [8][9][11] have developed an idea for saving sufferers' lives in a more agile and potential way. With their Application, the ambulance canreachtotheuserorvictimasthepositionistraced

or delivered by the application and also can accommodate important equipment's which is needed for the patient's well- being

C. Location-Based Services

Progressive research on Location-based services[2][14][16] studied two broad categories of LBS. To track the location of a users' device, the LBS detection technique can use a dynamic and real time plotting algorithm. A particular location is broadly identified by practicing the corresponding graph system. Several LBS can be categorized following the varied kinds of the intended recipient whether device or human, push vs. pull, secondary vs. primary and so on. Push and Pull based LSB were the two categories explained. Another research called Observe Time Difference Of Arrival (OTDOA) [6] method, which considers the data gathered from a minimum of three base–stations is performed. Further Round Trip Time iscalculatedtodeterminethelocation.

D. Global Positioning System

GPS Based Shortest Path for Ambulances [3] explains GPS as a mesh of spacecraft, that transmits instance information about the varying location of a device to and from the satellite the back to the planet, which is then captured by Global Positioning System transceivers, such as navigating objects & are utilized to estimate the location, velocity & duration at the carriers' position.

E. Dynamic Routing for Emergency Vehicle

Dynamic Routing for Ambulances can be done by Col- lecting Real-Time Street surveillance [4] under IGA. IGA makes the ambulance interact among others. IGA also enables the ambulance to get vehicular information from the other cars. The emergency vehicle sends the primary path of the ambulance determined by vehicle navigating tool to those vehicles in the contagious scope of the ambulance including its location, and journey history emergency vehicle broadcasts the query via multi-hop communication. The ambulance sends its path to all the other vehicles in its extreme directions. The vehicle can know the exact traveling path of the ambulance from its current location. The ambulance receives vehicular data for time, route & calculates a novel driving directions by RCA[4].

This concept was further implemented by another technology called LIFI which dispatches vehicular data with the headlights and signal lights. However, the concept is still underresearch.

F. Development of RIS

RIS for Ambulance Services based on GPS and GIS tech- nology provides a Route Construction Algorithm. Ambulance estimates the road data collected by IGA and define the shortest path by RCA. RCA uses the Dijkstra method where a crossroad means one vertex, a street within crossroads means an edge, path comprises the direction, a mediocre corridor of every crossroads becomes the power of the edge, and a map is a labeled chart. For crossings where there is traffic and vehicleare staggered, data is not collected, hence further parameters are not detected. Therefore, road data which was analyzed before traffic is finalized and sent to the ambulance. If the existing path needs a longer duration than the new route, the ambulance estimates the new route.

G. Location Based Push Service With Clustering Method

A position-based push service structure which applies the clustering method [7] simplifies the transmission complexity of emergency data with the help of Push and Pull LBS. Traditionally,whereemergencyresponsesweredonem anually with call centers, latency within response was an overhead keeping human life at stake. Later all manual responses system was replaced with an automated system with algo- rithms on standalone devices either in ambulance or handsets. EMSS(Emergency Medical System Services) is such an algo- rithm that bridges this time gap to dispatch ambulanceservices within 10 to 15 minutes in cities and 20 to 30 minutes in native areas. With EMSS patients need not wait for busy and hold lines. EMSS ensures clear information from the patient, whether it be the location, disease, and billing. Hence, with EMSSthepatientcangetearlyadvancecare.

H. E-Ambulance System

M Bin-Yahyaa, E M. Shakshukib in their research "E- AMBULANCE: RealTime Integration Platform for Hetero- geneous Medical Telemetry Systempaper" [10] 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 sit- uations 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.

I. Ambulance with Emergency Department

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 [12]. A review wasmadetotheretrospectiveadministrativedatabaseto 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 facilities by the Emergency Department by emergency vehicle use consider- ablyexcessenhancedsourcesthanexpectedequivalents.

J. API 2.0 for Java 2 Platform, Micro Edition

Location detection tool - API 2.0 appears to be a promising patron to recent mobile applications developed in Java forlocation[15] mainly uses concepts like LBS, API, J2ME, JSR179, API v1.0, JSR293, API v2.0.

K. Emergency Management System

Emergency Management System (EMS) built usingAndroid Application [17] was an architecture that would alert the rescue team to attend and help people using their handheld devices. It reacts to users' accidents and the EMS system accomplishes the demand for Adhoc interaction among experienced staff for emergency conditions while no separate mode of information deliveryexists.

L. Online Cab Booking

The existing research is based on a cloud server that gets a requestfromtheclientthroughtheirsmartphonedevices which in response tells the taxi driver the current locationcoordinates of the patient. This involves internet-connected smartphones. The taxi driver in return acknowledges the acceptance or rejection. The website then shares the trip details to the users. To update the location information on the server, RFID tags and readers are used on a clustered server. This clustered server will be refreshing the central server after every interval. [18][19][20][21][22]

III. SYSTEM ARCHITECTURE

A. SystemOverview

The system will be called Ambuitec. Ambuitec is an application for booking a ride for a patient in distressed; wherein the patient will selects his/her appropriate rides by comparing the quotations and distance of every ride over a region. Finally, billing at the end. Platform used to build the system would be Android Studio, Firebase and Google Maps API. The system will have features like Ambulances/Special ambulances after booking . The system will have users like Patients, Ambulances, Hospital.

Firebase would be linked to information gathering algorithm, session data, REST, responses and request process. The CRM will hold analytical data about the drivers, and leads generated from the patients.driver'sapplica The application will cate coordinate tracking and response from Google Map API.

B. User Architecture

The primary parts of the system area unit the hospital, the patient mobile application, and the tion.

Hospital'sApplication:

This consists of the elements found in the native section of the dispensary. They embody the mobile application that is interconnected to the firebase cloud. The software system is combined with GPS practicality victimization Google Maps API to reckon particular space within the subject (victim) and the emergency vehicle or dispensary, clinics and therefore the optimum paths. Furthermore, admin personnel handles the operation to adequately program accessible emergency vehicles and medicalassistant throughout emergencies.

Patient'sApplication:

This is the android software system that's put in upon individual client's smartphones. With this application, patients will request imperative emergency service, book their rides towards the hospital, and get quick medical assistance on its arrival, similarly moving further. The aforementioned can be achieved by practicing the merits of the cellular network affiliation in rural and urbanareas.

Driver'sApplication:

This application can get asking from the patient, settle fororrejectit,anddrivetowardsthedestination.

IV. PROPOSED SYSTEM

A. AlgorithmicDesign

To guarantee the favorable performance of the system and to provide user's requirements, we consolidated the present scheduling algorithm of First Come First Serve and Dijkstra's algorithm. This selection consisting of the pseudocodepro-vides the application and the potentials of manipulating infre- quent reserving moreover several emergencies where diverse ambulances are required; however, barely any are accessible.

Besides the First Come First Serve algorithm, the long tail of sufferers can be resolved by the concept of LILO or FIFO queues; which means, the first to book is the first to be served. In this approach, the patients' coordinates, route, distance and costarenotconsidered.Thisapproachismerebutimplications on lengthy, diversifying and hold time further effects the progressedcost.

Dijkstra's algorithm on the other hand finds the shortest path between the source and destination selected by the user; in case of traffic, an alternate route is identified with a new duration. Dijkstra's algorithm is a consolidated methodology that identifies the patient, emergency vehicle within all the available resources. As an example, if barely one emergency vehicle is accessible on a very day and each patient's demand ishandledtheequivalentforatomicunderstandings,It'simpor- tant to manage before-mentioned circumstances in an optimal way. The Dijkstra's algorithm is used by Google Maps API to guide a directing GPS device to help us travel over destination over every possible route, mode of transport, traffic, andtime.

B. SystemOperation

The proposed system would develop information from the functionalities mapped to the users. The system would have two application users viz. patients and drivers; each accessing information with a flow. The patient side would access Payments, Trip History, Service filter, Emergency Booking, Settings and About Us menu from the application. On the other hand, the driver access/generates information like Availability Status, Alerts, Payments and Analytics. These menus and their complete information flow is depicted inthefollowingdiagramFig2

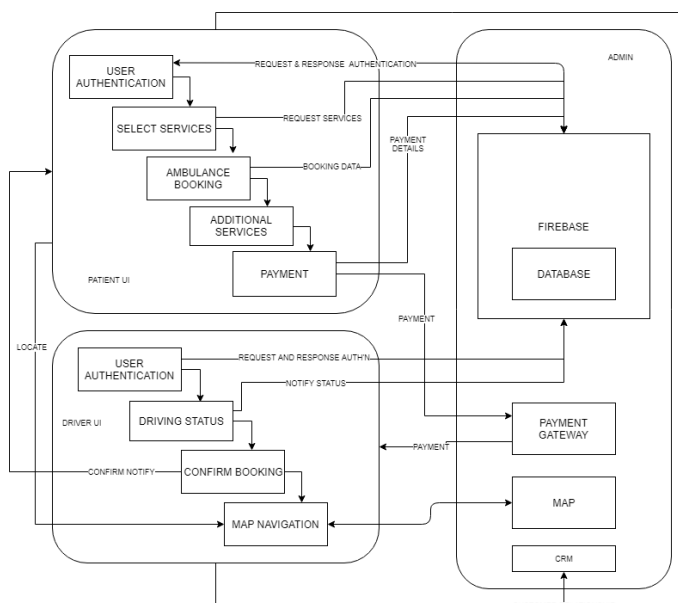The system has primary functionalities like emergency,

Fig. 1. System Architecture.

procedural Booking and blood inventory. However, procedure to book a ride is constant. Following are the steps to book a ride
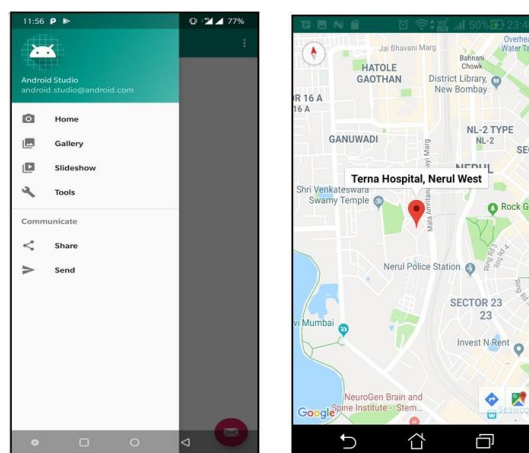
Step1: Login

Step2: Select services

Step3: Enter Location Information Step4: Locate Cab on map

Step5: Estimate Step6: Book a ride

Step7: Select payment method and pay Step8: TripReceipt

V. RESULT

Fig. 2. Result

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VI. CONCLUSION

As of now, there are only a few projects working to aid ambulance and emergency facilities to needy. With India, "Dial4242" has spread its roots in ERA. Ambuitec is an advancement to such existing projects with a userfriendlyand blood inventory facility. Our summing-up is, we have devel- oped our project to handle emergency health situations and to evacuate the patient to a nearby and communicated hospital. In this article, an approach is extended toward rescuing a sufferers' life in a more accelerated approach as feasible. It is extremely essential for sufferers in the matter of crises since it conservestime.WiththehelpofthisProject,theemergen cyvehicle can contact the user or victim as the position is followed or supplied within the application furthermore can produce the essential tools that are expected for the patient's well-being

VII. ACKNOWLEDGMENT

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