

Smart Ambulance Service System

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Abstract: Emergency medical response in India is lagging behind from other countries so because of lack of technology implementation at ground zero. As in India every minute's one person dies due to severe disease, viruses but one more reason behind the death is that Patients are not able to reach the hospital on time due to lack of emergency response from Ambulance services. To address this issue, we are developing two Android Application, Ambulance Service app for the ambulance driver and Citizen app for the Patients. We have used Global Positioning System (GPS) and uses Google Map Application Programming Interface (API) to plot details of the user and driver on Google Map of the Smartphone. App provides precaution like first aid and preventive measures in case of any natural disaster occurs. It also regulates the alert messages.

Keywords: API, GPS, Ambulance Services, Emergency.

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I. Introduction

In today's era, there are many cities which are working on transforming themselves into Smart Cities. If the city is going to be called Smart City, then it should have all possible advancements in the sector of smart technology. Improving efficiency in the healthcare sector is one of the most difficult and challenging jobs. That includes various aspects such as getting an ambulance within a minimum amount of time, providing proper treatment to the patient so that the chances of surviving increases in critical condition. Traffic congestion is one of the major problems in urban areas, which have caused much problems for the ambulance.

But due to heavy traffic, one can often see the ambulances stuck in traffic for long durations thus causing danger to patient life. Moreover, road accidents in the city have been increased and to bar the loss of life due to the accidents is even more crucial. If an accident occurs at any unknown location like forest, highways etc. A person will not be able to share the exact location where the accident has occurred to the ambulance driver and ambulance drivers will find many difficulties to reach towards the patient as he doesn't know the exact location. Because of such situations a lot of time is wasted and this leads to the death of that patient. We can see that every minute and every hour someone dies because of not reaching hospitals within time. By seeing these we are developing two android application which will easily provide availability of ambulance and decrease extra time which is consumed. In our project there is facility of availing the ambulance within the time. Citizen app is for the patients/users. Users can click the images of the accident and send it to the ambulance driver app. Ambulance Drivers will receive the images with live location and with the help of Google Map Application programming interface (API) and Google Positioning system (GPS) ambulance drivers can locate the patient location and reach towards them as soon as possible. This will reduce time for the patients to reach hospitals. This is the basic idea of our app. Some extra features are added in both the applications like map activity. This feature will provide location of nearby hospitals, fire-brigade, police stations to users as well as ambulance drivers. Natural Disaster feature, this feature will help the users in what preventive measures to be taken during natural disasters. This feature is integrated in both the applications. First aid chatbot using IBM Watson is integrated in the citizen app which will provide suggestions to the users against the diseases. Alert Messages can be generated by the users using the citizen app. Social media feature is integrated in ambulance driver application. In this feature an ambulance driver can upload the images of accidents on social media to spread the awareness amongst the people. As this feature is also helpful to recognize the unknown patients in accident. By sharing the images of accidents on social media, family members of the patient can get to know about the incidents.

II. Literature Review

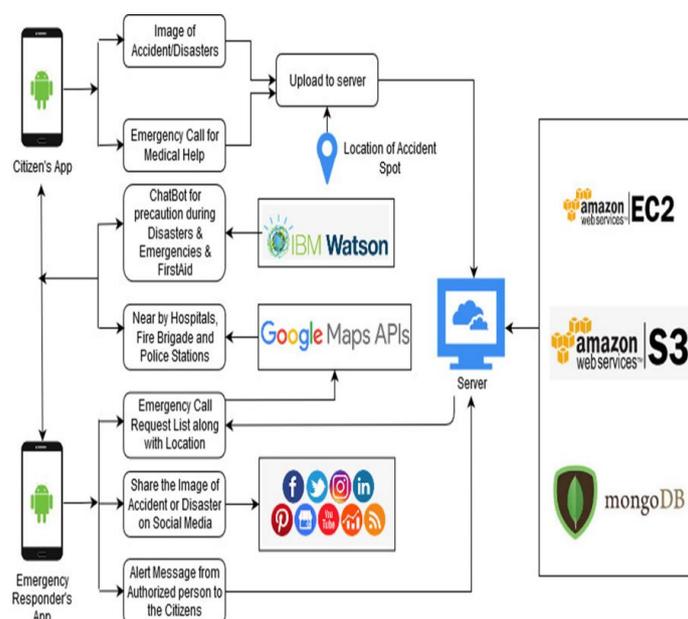
1. The paper presented by Pratik Mohapatra and AnjanKoundinya is about Ambulance Hub: A cloud based solution for ambulance services. Here Ambulance Hub tries to solve all this by a simple solution and that is a cloud connected application. Ambulance Hub has a dedicated SOS button where an ambulance can be requested by just one click. It sends a request using the Microsoft Azure cloud and sends it to the Ambulance Hub server-side application. Once it is send to the server-side application the nearest ambulance gets a notification and he is given the shortest and fastest route to reach the location. Ambulance Hub also has an intelligent bot which understands keywords and the user can ask it for general first aid. The intelligent bot picks up key words and suggests the first aid steps that should be taken. It's extremely fast and there is no delay time. The application is also cloud synced with all the user medical records including emergency numbers which can be called in case one is injured. It also suggests exercises and steps that must be taken to stay. This is done by understanding the users BMI and heart rate.

2. The paper presented by Arsalan khan and his team is all about Accident Detection and smart rescue system using Android smartphone with real time location tracking. It conveys that In order to reduce response time, implementation of enhanced traffic technologies would be necessary, which will help scale back response time and therefore reduce fatalities. The purpose of this research is to design and implement such an automated system that uses smartphone to detect vehicle accidents and report it to the nearest available responders to help counter these emerging problems and reduce casualties as much as possible. The detection system would help reduce fatalities due to vehicle accidents by decreasing the response time of emergency services. The system will also provide other emergency services like Fire Brigade, Police Department and Medical emergency services. In this work we are utilizing android smartphone to detect accidents and report it to the nearest available emergency responders with the exact location of victims in emergency. On an emergency responder side, the system will inform responders about the incidents that occur near to them and provide them with real time tracking of emergency victims on a Google map. This will help emergency responders keep track of victim's location and rescue them as soon as possible

3. The paper presented by Shubhanshusinghpatwal, Rohit kumar, Rishabh Mishra is all about the Smart Band Ambulance System. It can be used seamlessly to strengthen the emergency medical response via smart band ambulance system, as IoT can also be used widely in large number of end system where large amounts of data can be accessed and processed easily and powerfully. IoT and smart devices helps in building a platform which serves every smart device user where a smart band will continually focus on monitoring heart beats of a person wearing this band. This data will be collected through an application and send to a centralized database, where it will get filtered for any irregularities, and if found any then that person will be informed and if needed an ambulance will be dispatched to their whereabouts. User can see the location of dispatched ambulance with the help of Global Positioning System (GPS) and google maps API on their smartphones.

III. Proposed System

BLOCK DIAGRAM



CLIENT SIDE:

1. **CITIZEN APP:** It is a software application that will run on the server. The user has to register themselves in the citizen app in which they have to add their all personal details along with their medical history. They can capture the image of any disaster/accident and upload it to the server, this image will be directly sent to the Ambulance driver app with the live location of the accident spot. Users can also make an emergency call for medical help. We have provided a chatbot for prevention during disasters, Emergencies and First Aid, this chatbot uses IBM Watson computing platform. IBM Watson is an IBM supercomputer that combines artificial intelligence (AI) and sophisticated analytical software for optimal performance as a "question answering" machine. Healthcare remains a primary focal point for IBM as it tries to prove Watson technology. IBM's use of Watson to solve some of the biggest problems around patient care and using data-driven insights to recommend treatment options would prove the value of Watson technologies. After that the citizen app provides features of nearby Hospitals, Fire brigade and Police stations. Using Google Maps API we get the location of nearby hospitals, fire brigade and police stations. Google APIs is a set of application programming interfaces (APIs) developed by Google which allow communication with Google Services and their integration to other services. Examples of these include Search, Gmail, Translate or Google Maps. In our project we have used google maps API. Google Maps API is a robust tool that can be used to create a custom map, a searchable map, check-in functions, display live data syncing with location, plan routes, or create a mashup just to name a few.

2. **AMBULANCE DRIVER APP:** This application will be used by the Ambulance Driver. In this application ambulance drivers will get the request list of accident images along with the live location, As the citizen app will send images of accident spots with live location to ambulance driver app and ambulance driver close to that spot can accept the request and reach towards the location as soon as possible. We have used Google Map API for this facility. Similar IBM Watson chatbot is integrated in ambulance driver applications. Along with chatbot, the feature of nearby hospitals, fire brigade and Police stations is also integrated in the ambulance driver app. It would be helpful to drivers to reach nearby hospitals as soon as possible. The Ambulance drivers can upload the images of the accidents on social media like Whatsapp, Facebook, Instagram etc using the ambulance driver app to spread the awareness amongst the people. Alert messages can also be generated to the citizen app by the ambulance driver.

SERVER SIDE:

1. **AMAZON EC2:** In our project Amazon EC2 is used to host servers. Amazon EC2 is generally a web service that provides secure, resizable compute capacity in the cloud. It is designed to make web-scale cloud computing. Amazon EC2's simple web service interface allows users to obtain and configure capacity with minimal friction. It provides complete control of computing resources. It also provides the feature of networking and security.

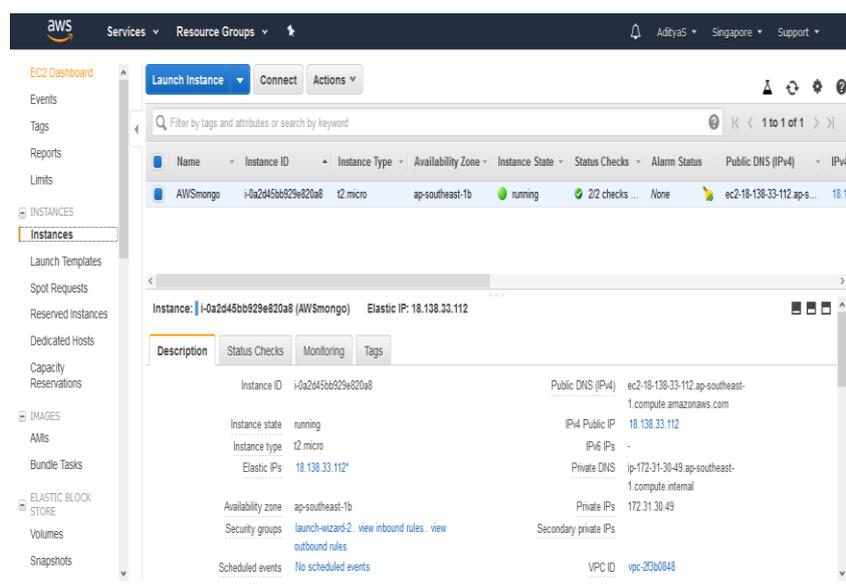


Fig 1. Hosted API

2. MONGODB: In our project MongoDB is used to store the data of the citizen. MongoDB is an open-source document-based database management tool that stores data in JSON-like formats. It is a highly scalable, flexible, and distributed NoSQL database. We have used MongoDB instead of MySQL because MongoDB has the ability to handle large unstructured data and it is easy to use. MongoDB provides high availability with replica sets. A replica set consists of two or more copies of the data. Each replica-set member may act in the role of primary or secondary replica at any time. All writes and reads are done on the primary replica by default. Secondary replicas maintain a copy of the data of the primary using built-in replication.

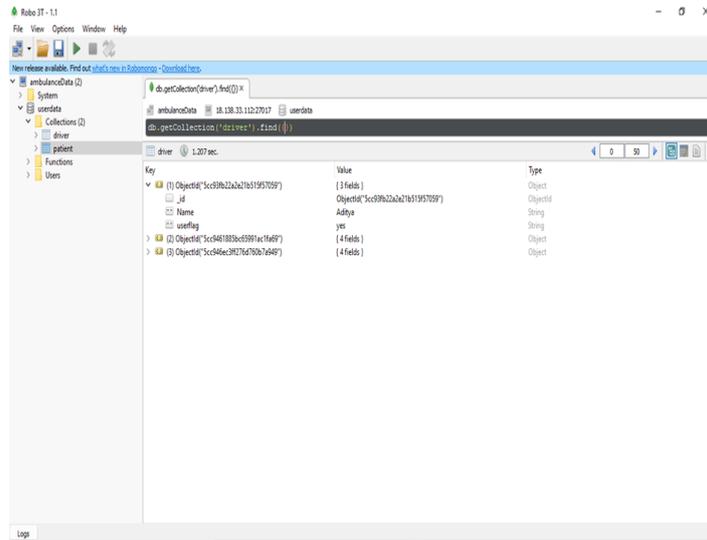


Fig 2. MongoDB Database

3. AMAZON S3: It is used for storing the images sent by the citizens from the citizen app. Amazon S3 stands for Amazon Simple Storage Service. Amazon S3 provides us a bucket in which we stored the images of accident spot. Amazon S3 Bucket size ranges from minimum of 0 bytes to a maximum of 5 terabytes. It is a service offered by Amazon Web Services (AWS) that provides object storage through a web service interface. Amazon S3 uses the same scalable storage infrastructure that Amazon.com uses to run its global e-commerce network. Amazon S3 can be employed to store any type of object which allows for uses like storage for Internet applications, backup and recovery, disaster recovery, data archives, data lakes for analytics, and hybrid cloud storage.

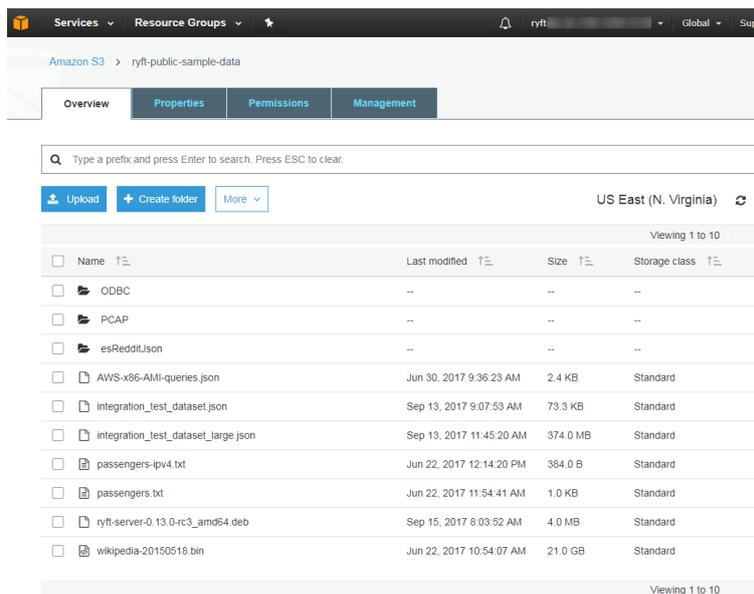


Fig 3. Amazon S3 bucket List

IV. Scope

- Provide the Emergency service to the citizens in less time.
- Two mobile applications one for the citizens and other for the Emergency Responder.
- Citizens can upload the disaster/accidental image with the location where the accident/disaster has exactly happened.
- In case of natural disaster, an authorized person can send an alert message to the citizen app.
- It Will suggest a suitable hospital related to the injury or any emergency.
- It Will also suggest nearby hospitals, fire brigade & police station.
- Application provides IBM Watson Chatbot for Preventive measures to be taken during natural disasters & First Aid steps to be taken in case of emergencies.
- If the identity of the accident person is not known then the authorized person can share the photo on the social media along with the description & the current location of the person.

V. Results

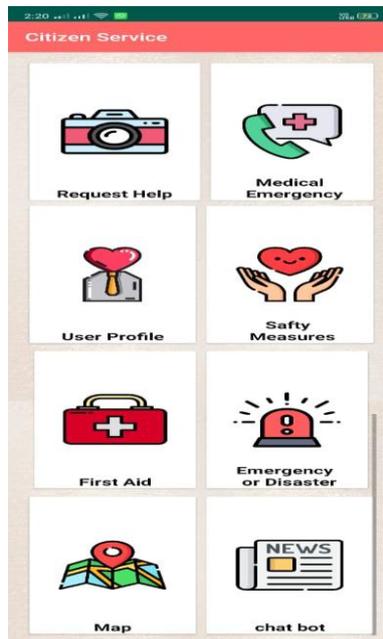


Fig 3. Citizen Application



Fig 4. Ambulance Driver Application

VI. Conclusions

The application is useful not only for hospitals but also for patients. When a user wants to request an ambulance all that he needs to do is just open the application and request and within minutes the nearest ambulance will be located and routed to the location. The best part is that the driver gets the precise location and one doesn't need to call to tell him where to come. In addition to this the user also has access to the bot which in one step will tell you what first aid steps that need to be taken instead of calling or searching the internet for the same query. This whole application is not only useful for calling an ambulance but also has the feature of storing medical data and even informing the right people when the person meets with an accident.

References

- [1]. Mohapatra, P., & Koundinya, A. K. (2017). Ambulance Hub: A Cloud Based Solution for Ambulance Services. 2017 2nd International Conference on Computational Systems and Information Technology for Sustainable Solution (CSITSS)
- [2]. P. Subhashini, "Data retrieval mechanism using Amazon simple storage service and Windows Azure" Computing for Sustainable Global Development (INDIACom), 2016 3rd International Conference 16-18 March 2016.
- [3]. Prajakta Solapurkar, "Building secure healthcare services using OAuth 2.0 and JSON web token in IOT cloud scenario", Contemporary Computing and Informatics (IC3I), 2016 2nd International Conference 14-17 Dec. 2016.
- [4]. Poonam Gupta ,Satyasheel Pol , Dharmanath Rahatekar, Avanti Patil "Smart Ambulance System" International Journal of ComputerApplications (0975 – 8887)
- [5]. Sohini Roychowdhury, Matthew Bihis, "AG-MIC: Azure-Based Generalized Flow for Medical Image Classification", IEEE Access Volume 4.

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