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Smart Care: Making Health Services more Intelligent

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Abstract: ***These days, Health care has become an enormous issue due to the shortage of health services. This paper is deals with the SmartCare application for smart health services. The patient or client requesting the service first they need to be registers himself within the app. Ambulance takes the patient from his current location. Then ambulance driver sends the request to the nearby hospital showing on their map screen with patient data to check for availability of beds according to patient condition (like ICU beds Oxygen beds etc). The hospital gets the request from the ambulance and sends an acknowledgment. This app provides faster and reliable service to the patient by reducing the processing time.***
Keywords: Android, Firebase, Realtime database, Google maps API, Location.

I. INTRODUCTION

Health care in our time may be a big issue, due to the complexness of services, poor quality of health services, and slow delivery of services to patients. Therefore, researchers and those interested in the health side seek to find alternative ways to provide prompt services and preventive health care. Where one solution to solving health care problems is health monitoring, especially in clinical medicine specialties, nursing, pharmacy, nutrition, therapies such as respiratory, physical, and occupational, and others. Although the previously mentioned disciplines are almost overlapping, each one of them has a specific interest focused on it and providing different care methods. The complexity of each specialty is a challenge for researchers to find techniques that help to ensure excellent health care services and interdisciplinary cooperation adds another level of complexity. In all specialties, the quality of clinical decisions depends on the quality of information available to the decision-maker. This paper is concerned with the SmartCare application which provides faster services and easy to use for everyone. The mechanism of working the system using the model is to provide better health service to everyone. In our system, there are 3 logins i.e. for ambulance driver, Hospital and customer. A customer has to log in to the app before using it. After login customer found a map screen like ola and uber. Where he saw the nearby ambulance on their map screen. After he presses the book ambulance button the app automatically searches for a nearby ambulance using the current location and sends the request. The ambulance near to him gets a request for booking and sends an acknowledgment. After reaching the location driver send the request automatically to the nearby hospital with patient data by pressing a single button. The hospital staff gets the request from the driver and sends an acknowledgment. All this process inside the application can be done in less than 2 or 3 minutes.

II. MAIN MODULES OF THE SYSTEM

A. Ambulance Driver login
B. Hospital Login
C. customer/patient login

III. TECHNOLOGY USED

A. Android
B. Java
C. Firebase
D. Firebase Realtime database
E. Google map API
F. location

IV. PURPOSE

The purpose is to provide proper and faster service to the patient and be a lifesaver.

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V. ARCHITECTURE OF THE SYSTEM:

A. User Characteristics

1) *Ambulance*: Ambulance Picks up the patient and takes him to a nearby hospital from their location through shortest path using Google Maps.
2) *Hospital*: Receives data from ambulance driver through app and sends acknowledgement to the driver if the conditions are fulfilled by hospital.
3) *Patient*: The person who uses the application according to their need.

B. External Interface Requirements

1) User Interfaces: The application will work on any android platform above android version 4.0 Operating System.
2) Hardware Interfaces: Android mobile phone with minimum 2 GB of RAM and having better processing power to execute and run the application smoothly on android.
3) Software Interfaces: Android studio, any windows operating system,

C. General Constraints

1) Delay in data transfer due to heavy traffic on server may be one of the issues.
2) There needs to be a constant internet connection for this system to work.
3) Ambulance may not have a particular service required.
4) Sometimes, GPS may not be able to track the exact location.

D. Modular Design Diagram

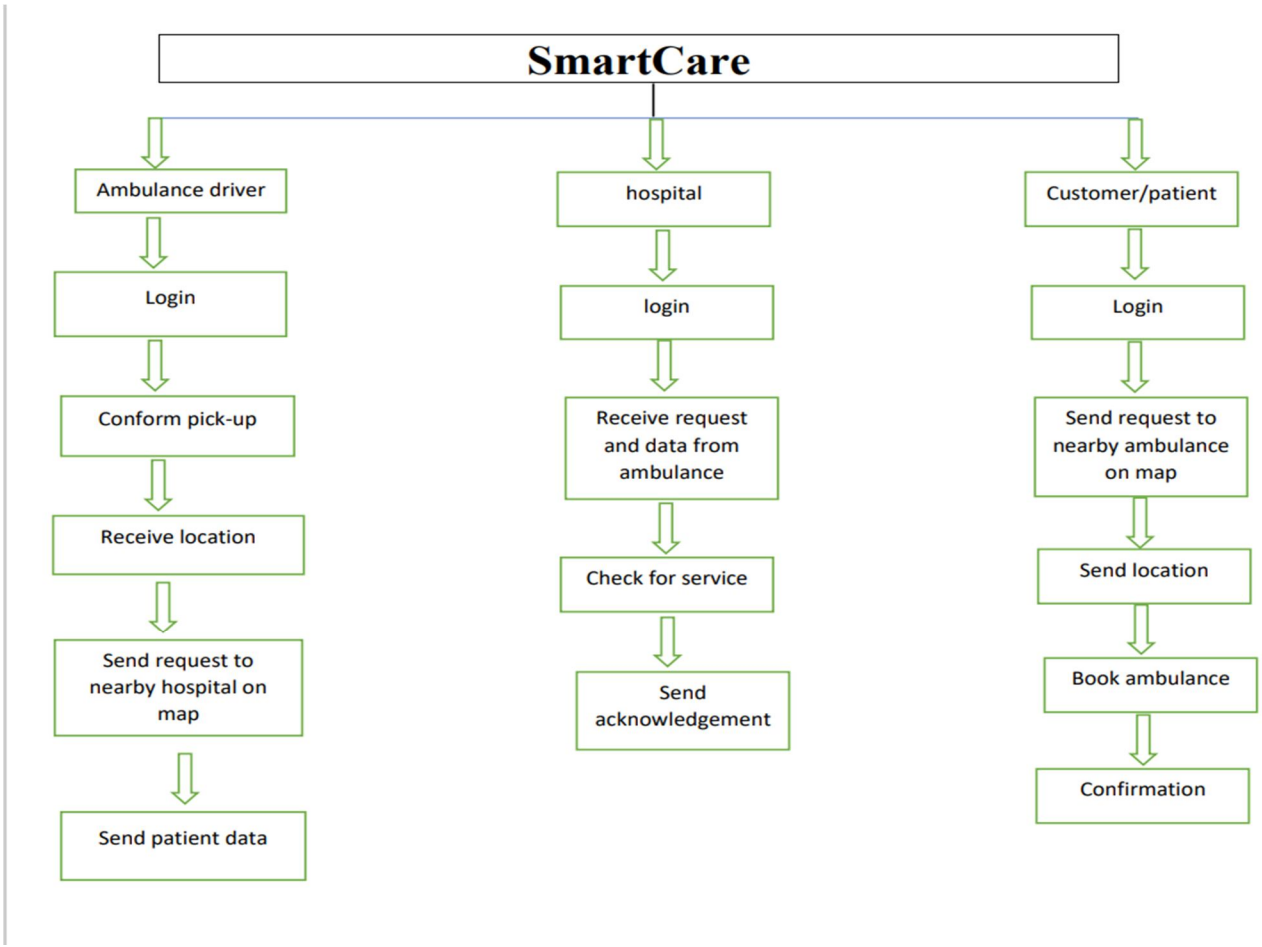

Fig: Modular Diagram

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VI. PROPOSED WORK

SmartCare is an android application that works to reduce the time and help the patient to reach the hospital early. The application works on any android phone version above 4.0 and having location access support. The app consists of three logins 1. For ambulance driver 2. For hospital 3. For customer/patient. The workflow of the app is when customers login with their credentials it will be redirected to the main screen where the google map shows the nearby ambulance on their screen using the current location. Customer/patient send a request for the ambulance.

The app sends requests automatically to the nearby ambulance driver using location. The ambulance driver who is near to them gets a notification on their phone for request. If ambulance driver is not ready to accept the request in some case the app search for the next nearby ambulance and send a request. Otherwise, if the driver accepts the request app sends an acknowledgment to the customer for a successful request.

Driver login also contains google map API after accepting the request from a customer it will automatically redirect to search the shortest path using customer location co-ordinate on the map to reach faster to pick up them. After reaching the pickup point driver sends a request with patient data to the nearby hospital for the availability of beds and emergency services according to patient condition by pressing a single button.

The hospital that is near to them gets a notification for the request. Here also in some Case if the hospital is not ready to take the request app automatically searches for the next nearby hospital and sends the request. Otherwise, if the hospital accepts the request app sends an acknowledgment to the ambulance driver. The driver gets the shortest path to the hospital from their location on their screen.

Hospital login contains the data of a patient, hospital staff, and availability of beds. We use the Firebase Realtime database for storing the data of all three logins. In the real-time database, we have separated the main database into 3 i.e. Driver, Hospital, Customer where data is stored on their own.

VII. PREVIOUS SYSTEM

Previously the patient has to call the various ambulance providing services or the different hospitals in case of emergency and this process takes very much time. In case if customers get an ambulance then he has to provide the accurate address to the ambulance driver to reach the location.

Sometimes ambulance driver failed to get the correct location if he is new to that area and has to struggle more to find the exact location. If he reaches the location and pick up the patient but the problem is to find nearby hospital having emergency services and availability of beds or route with lower traffic density. In some case, we have seen that the hospital denies taking the patient if there is no beds or emergency service available and have to take another hospital due to this sometimes patient have to deal with their lives.

Janani B Saradha et al. [1] developed a system using cloud network to make communication between ambulance and traffic signal controlling system. Smart traffic signal control is achieved by using RFID (Radio Frequency Identification) technology. The idea is whenever the ambulance is reached and found near the signal, RFID reader attached at signal tracks the ambulance attached with RFID tag and sends that data to the cloud.

After sending the data through mobile application, acknowledgment will be sent to ambulance driver, then system will automatically change the signal into green in the path of ambulance

In this concern paper, it provides uninterrupted services to emergency vehicle to reach hospital early. Accuracy of RFID is more accurate compared to other alternative technologies like camera.

Omkar Udawant et al. [2] proposed a smart ambulance system. The basic idea is whenever the ambulance reach to the range of 100m, the signal automatically changes to green for some time. They make use of cloud and GPRS technology. Ambulance contains some sensors like heart rate sensor, blood pressure and ECG etc. These sensors data will be sent to hospital's database at the same time. Treatment procedure and documentation will be planned by the hospital authorities according to patient condition So it saves so much time and become a life saver.

Dr. Zamin Ali Khan et [12] proposed a view of an android app, which is basically a taxi booking app the passenger simply have to register first by providing the information, this application will provide way to the people who are not much familiar with the android phones, through this app they can book their taxi through voice instructions, In this app they use multiple API's for voice recognition like Urdu and English voice recognition API etc.

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VIII. FLOW CHART

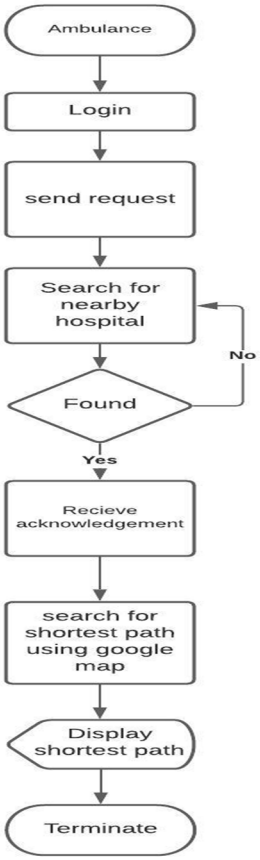

Fig: flow chart of Ambulance login

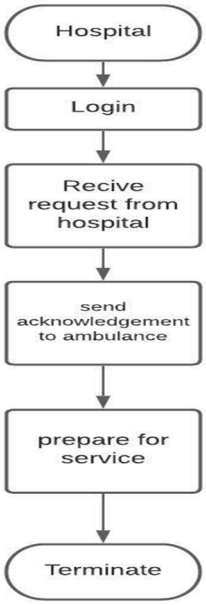

Fig: Flow chart of hospital login

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Fig: Flow chart for patient login

IX. HARDWARE/SOFTWARE REQUIREMENT

A. Android Studio
1) Firebase
2) Laptop/desktop
3) Windows seven or later
4) Android 4.0 or later
5) Internet Connection with minimum 500 KB/s.

X. ADVANTAGES

A. Quick and Secure.
1) Straight forward and simple to use.
2) Time-saving.
3) Anyone can book an ambulance to transport their loved ones from one place to another if they are not capable to travel from public transport.

XI. DISADVANTAGES

A. Because of Network Traffic, sometime it may be Crash.
B. Personal information may be stolen by Admins.
C. Not Works on Low Configurations Devices.
D. Without network connection, it is useless.

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XII. FUTURE SCOPE

A. We can use ML/AI to turn all signals to green on that route.
B. Voice alerts can be used to initiate the various controlling of applications.
C. iOS Application.
D. Providing the facility of online payment for the client.

XIII. CONCLUSION

The original plan for this paper was evaluated from the facts and figures from the daily newspaper, social media and news depicting the number of deaths, because of lack of health services which are shocking these days. This work proposes and focuses on how to make things faster and intelligent to save lives. This system is dominant and user-friendly so that its usage is not restricted or limited to any class of users. A good health care facility is necessary for every individual. Hence, this helps to provide proper services even in rural areas also.

For this project to work, a strong internet connection is compulsorily needed and one person at the hospital end and at the ambulance need to have every time.

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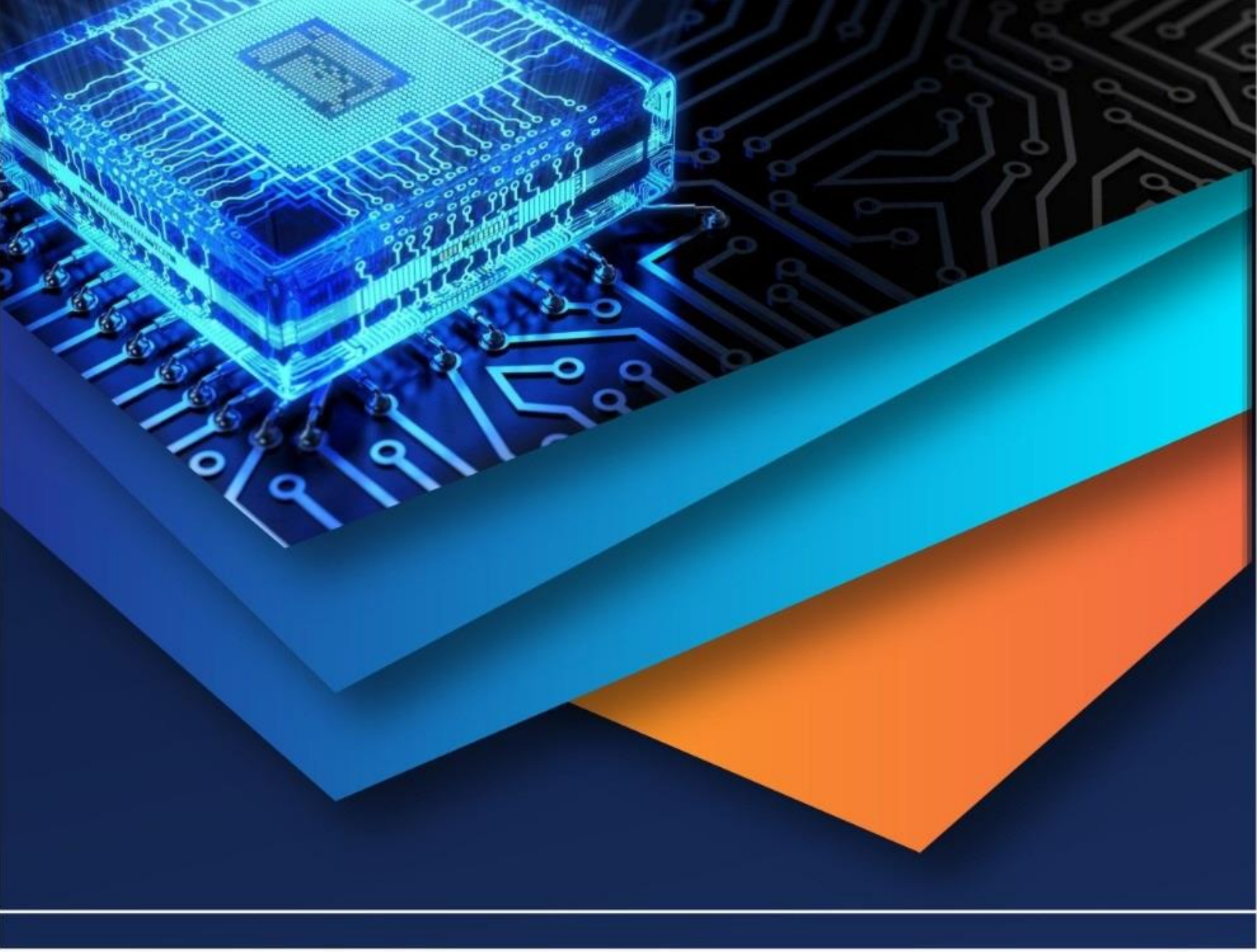

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