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Patient Tracking System

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***Abstract*:** Aims: In day to day life everyone is busy; according to schedule we cannot provide more visibility on health related issues. We have to visit doctors and wait for the queue. When we get number we can checkup our self. To remove all this issues we have designed an app that can easily connect to any doctor according to requirement and can checkup our self through doctor without any further delay. This is the main point of our application that we focus to make contactless checkup and provide better option for patients and doctors also.
Methods: This application is android based so we have used GPS system in our system to track patient's activity; data will collect from patients and send on servers. Using data from server medical care team will easily track patients activity and data will collected periodically.
Results: Patient's all record stored on server where patient's doctor can easily fetch the data and inform the patient's status and position.
Conclusion: In this system we are using android device to fetch the patient's data and provide related data to patient's doctor for better diagnosis.
***Keywords*:** Patient tracking system, Android, GPS.

1. Introduction

In the last few decades the technology is emerging tremendously fast that's the result medical sector is boosting widely. If we are thinking of any devices that is related to health sector is we know technology play an important role to design and develop such multitasking devices. More specifically health devices are playing important role for curing human life very easily. Heath devices are developing in large range so human can easily cure and back to work without hesitating. Before few decades ago, the health devices were not that much effectively worked the way working today. This devices that were working was not involved technology that much and were not multitasking also. Today's generations health devices are more compatible with the android devices and work very well.

The patients are increasing in number and the human resources are getting limited. If we consider any disease we need money to get treatment. It is not possible to everybody to get that kind of treatment they want. In the pandemic situation of CORONA it was not possible for everyone to get costly treatment or to get costly health devices easily. The situations of pandemic were very crucial and can't afford the costly treatment also. So to overcome from these situations we have tried to design and develop such a device that will be available on

anybody's device and can access the data easily. As everyone is using android device now a day's it is easy to install the application on any android devices and can access the application easily.

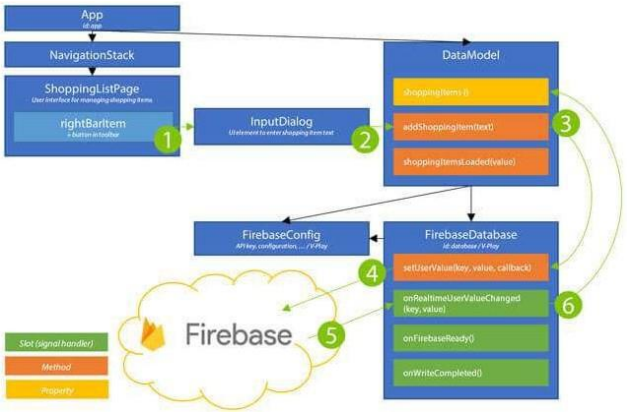
Patients tracking system is based on android device which works on android technology and also works on GPS system to track the record of patients easily. This device will receive information from patient's body wirelessly, this information can also read by medical staff also to monitor patient. This will helpful to fetch the data from server and provide data to doctor easily. As this device is wireless so no need to worry about patients to move anywhere but as there is limitations to everyone so this android device is also.
In this research paper we have investigated the patients' health using medical device that is based on android mobile device. And also tried to track the patient's position using GPS Sensor. This android device help to reads health information of patients. Wirelessly, and store on server via GPRS. There is also included emergency help from server side if device detecting any abnormal activity its guide patients to follow the steps that are added to saves the life of patients.
GPS device help to track patients position and help to send positional information of patients. If any patient is not on bed then it can directly use GPS to get the position of patient and track that patient easily.

2. Related Work

Designing and developing a patient tracking system which requires decision making and selecting technologies that supports those decisions for system. Here is some background information and related research on the technologies.

2.1. Unified Modeling Language

In this UML Diagram we tried to solve the identification of related data and the function that support the system.
We have managed the data in the form of Entity-Relationship Diagram that handle by system and function in the form of dataflow.



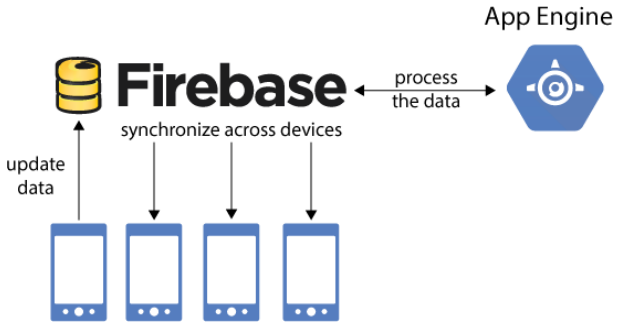
ER-Diagram for Patient Tracking App

It utilizes new design of android development and android studio to design this application. It uses new technology of android devices to map with the GPS system to track record of data.
Unified modeling languages is used to specify and visually model. Documents the artifacts of an android development.

2.2. Component-based programming

Component based programming used for the system to understand the feature of the system to deploy on system and can be fabricated with the component to work on the executable unit in system.
Component for any devices are custom-made according to the requirement of component of system to meet the requirement and can be accessible to the different unit composition in system.
Components are reusable and maintainable in two different compositions. Reusability and maintainability are two main advantages of component-based programming.

In this application we have used GPS component to execute in system to track record of data.



System architecture

Firebase is a Backend Service; it is a real-time database which is designed for mobile applications platform. Firebase can be used for Android, IOS, Web, or Unity. We are using Firebase service for Android. So, it is essential to work on Android Studio. Using basic concept JAVA and XML is required that allows us to understand the concept of Firebase.

2.3. Patient Tracking System

In this system as we have used android technology to easily accessible to anyone who is using this technology. To easily fetch data we have used patient's local data to monitor on patients record that will help to understand the patient's health and treat them carefully.

3. Description of Patient Tracking System

To understand the system we need to design UML diagram to prepare the main objective of any system. To work on any system we need to understand the main complex city of system. Using android technology it is easy to design any application with less effort and consumes more time. Android technology is totally based on android devices that works smoothly on any android device. To design such application we need GPS component to work effectively on any android device. As it is in-built on any android device it gets easy to attach through coding and apply on device.

In the life development cycle of patient tracking system we need to focus on the development process that can reduce time and system can be easily maintained and the module reusability can be improved. The Entity-relationship diagram plays an important role while describing the data of the system. It help to handle data flow of the system.

Patient tracking system application design to reduce the burden of staff and can keep an eye on patients without go anywhere. In hospital it is very difficult to handle patients at a time and it takes long time to visit every patients and check them one by one. So to reduce check-up time and provide better facility we design and develop this android based system. As it is android based system so GPS system can be integrated easily and find the patients position easily. This system record the data of patients in database which sends on server to store and hospital staff can access this database to monitor the patient's activity.

Patient tracking system using UML, Proposed for offering several diagrams to enables new functions need to be updated and should be added easily such as: use case, sequence, class diagrams and user interfaces.

According to requirement of hospital management we tried to fulfill all the related data that are necessary to track record we have added in this system. Such as patient, doctor and pharmacist record we have added in this system.

Mainly 3 actors (Patient, Doctor and Pharmacist) will be interacting with the proposed system; each one can do the following:

- Patient:
  - ✓ Patient can register
  - ✓ Patient can record of medicine
  - ✓ Patient can record of medical treatment

- ✓ Patient can record of doctors
- ✓ Patient can record of reports

•Doctor:

- ✓ Doctor can register
- ✓ Doctor can view record of patients
- ✓ Doctor can view list of staff
- ✓ Doctor can view record of medicine
- ✓ Doctor can edit patient's information.

• Pharmacist:

- ✓ Pharmacist can keep record of medicine
- ✓ Pharmacist can keep record of patient's
- ✓ Pharmacist can keep record of doctor

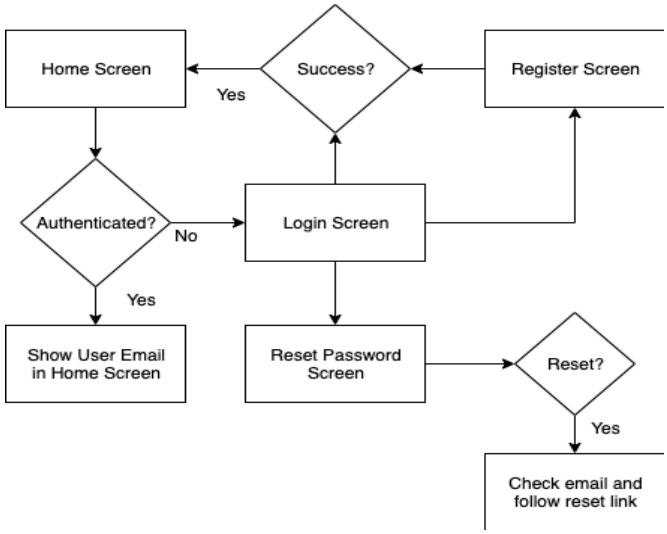


Figure 1: The use case diagram.

4. Patient Tracking System in use

Patient tracking system is basically android technology based system where most of work reduces through this app. This application works for doctors, staffs and pharmacist to fetch the patient's data and maintaining records. In old system most of time was spend on handling single patients and treatment was not up to the mark but using this doctor can diagnose patients before visiting patient's bed and track record of patient's data. It will reduce the complexity of maintaining file record and can provide patient's activity through GPS

5. System Design

System Design and architecture is the process of defining the components, modules, interfaces and data for a system to satisfy specified requirements for the patient tracking system. This is the following is the architecture for the system

Module Description

- User login/registration
- Patient Records
- Pharmacist module
- Doctor module
- Doctor/Physician Management

User login/registration

Users need to first register through app to login into the system and will have to verify user email account by clicking on the verification email which will send on mobile.

Patient Records
In this activity doctor or staff can manage department of hospitals, user, doctor and pharmacist. Using this module doctor can check appointment of patients.

- **Patient Details**
  Patient's module Maintain medical records, Keep records of patients prescribed medicines and status of patient's, Manage medicine categories etc.

- **List Patient**
  In this section will maintain list all patients.

Pharmacist module
Pharmacist can maintain medicine; Keep records of hospitals stock medicines. Also maintain status, Manage medicine categories, Provide medication to prescriptions of doctors.

Doctor module
Doctor module is only for the administration purpose only, will manage List of staff and doctors of hospital.

Doctor/Physician Management
Doctor/Physician can manage all the activity related to staff and patient. Through this process the admin will have the information of all activity and transections made by the doctor/physician with the patients.

6. Future scope

Application like this could be used for future outbreaks and could be support health care industries. Such kind of application creates a supporting platform for new vision of health services that empowers patients and communication. The main goal of improving health outcomes and reduction in cost. This evolves generates new capabilities and sets of data, providing opportunities and challenges at the user, system and industry levels. Health management tools can become useful and effective components of health care system in future. This system is comprehensive solution for all health care departments using common platform. All the modules that serves department of health care institute. This module can be design to simplify all the health care solutions. This system can be used for the different purpose for health sector and can be upgradable according to requirement.

7. Conclusion

In this we have simplified the way of communication between different sections. But we need to focus on the other part of the topic also so we need to design the application that can be upgradable in future. In this we have targeted on the selected users (i.e., clinicians, pharmacists and patients).This application not intended to replace with desktop application, but adding new technologies for better future upgradable healthcare. The new functionalities need to add day by day and new technologies can be upgradable for future purpose with every major release.
Application can be secured as technology is changing and can be protected with the secured featured inbuilt app. Working of healthcare worker is very mobile in nature so using smartphone can add benefits to their work. Using mobile communication between healthcare professionals makes them to available anywhere anytime and provides access to required data of patients including disease diagnosis guides, drug references, medical instruments availability and material at the time of treatment of patients.

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