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CURE IT- THE MEDICAL ASSISTANT APPLICATION

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Abstract - *Serving a population of over 1.3 billion, India's healthcare sector is a far cry from such a colossal task. We can cite many reasons for this drawback, amongst those, the most remediable is the inefficiency of the existing medical records handling system. Manual storing and fetching of the medical records will lead to unavoidable time delay and also not dependable at times of emergencies. Reconstructing the whole system digitally is the only way forward. Medical records that are in digital format provide a more reliable and faster access to the Data. The Application provides two different types of accounts, one for the 'Patients' and the other for the 'Doctors'. Through our Application a 'Patient' can upload the images of his medical records into the Firebase database. The Firebase authentication ensures a very strict data privacy. 'Doctors' have permissions to access patients' data but only after being validated by the User. A Doctor also has the provision to add his professional comments regarding a medical consultation. The Application also provides an automated medicine ordering system. Once the 'Patient' uploads a valid prescription we analyse it with the help of Google Vision API. We extract the medicines' name and dosage, place an order through one of the online pharmacy merchants. The application also reminds the User with timely notifications to consume medicine as prescribed. It also keeps a track of the Users' personal stock of medicine and notifies the user to replenish his medical cabinet accordingly. It provides a list of hospitals and clinics nearby the Users' location. By providing all these facilities through the Application we are moving a step closer towards a constructive healthcare.*

***Key Words*: Healthcare, Firebase, Google App Engine, Google Cloud Vision, Database.**

1. INTRODUCTION

Everybody knows the importance of health. They also know about the consequences of maintaining a poor health status high rate of absenteeism, industrial discontent and indiscipline, low productivity and more accidents, poor performance. On the other hand, the natural outcomes of a fit body are reduction in the rate of absenteeism and turnover, accidents and occupational diseases.

Cure IT focuses on providing efficient and easy access to healthcare. It provides a platform for both the patients and the doctors. The entire medical history of the patient just a touch away. Say goodbye to the tedious work of carrying loads of papers, reports, prescriptions, and other documents. All the required medicine at your doorstep as and when they get over. A personal reminder telling you to take the medicine at the proper time. An application that works to keep you healthy.

1.1 Google Cloud Vision API

This is an interface which helps developers to analyze the content of the given image by encapsulating machine learning models in a got-to, user-friendly REST API. It rapidly classifies the given image into hundreds of categories, also detecting individual faces and objects present in that image. This also analyzes and reads the printed words that are enclosed in the image. Google cloud vision API is used here for the digitalization of the prescriptions by the doctors. This reduces the usage of paper, helps the patient to keep all the prescriptions in a single place without losing any of it and most importantly makes the prescription legible and easy to understand.

1.2 Google Firebase

The proper syncing of data between all the devices and users at a global level, using a cloud hosted or a NoSQL database is done with the help of Firebase. Live synchronization and offline support with data queries are given by the Cloud Firestore. It's seamless integration with other related products enables us to build true serverless

applications. Here the firebase is used to record and store the detailed information, medical history and various other important and necessary data of every patient.

1.3 Android Studio

One of the most useful developing environment for android is the android studio. Officially badged as the integrated development environment (IDE) for Android operating system (OS). Android studio is built tantamount to the JetBrains' IntelliJ IDEA software and is handcrafted particularly for Android development. This IDE is useful in bringing together the overall development of the proposed application.

1.4 Google maps API

This interface enables us to build customized, user friendly and agile experiences which converts the real world into static and dynamic maps, gives live location, enables street view imagery along with 360° viewable formats. Google maps API is used to locate the nearby hospitals and clinics along with important crucial information such as their timings, consultation fees and specialization.

2. RELATED WORK

The manual legacy systems used in the hospitals these days involves in taking down the observations and reports of the patients in the paper files. This paper file process is extremely slow, require a lot of space for storage and highly prone to error. Processing and retrieval of patient details often tend to be inefficient. Insufficient and incomplete information available due to various reasons and illegible handwriting which might be difficult to understand, may lead to fatal medical accidents. The accessing and sharing of the patient's information and their previous diagnosis amongst the doctors and the hospitals is difficult due to poor information management infrastructure. This in turn leads to the doctors and hospitals having to redo the tests and note down the observations of the patient from the beginning, in the case of patient choosing to switch or change the place of treatment.

3. SYSTEM DESIGN

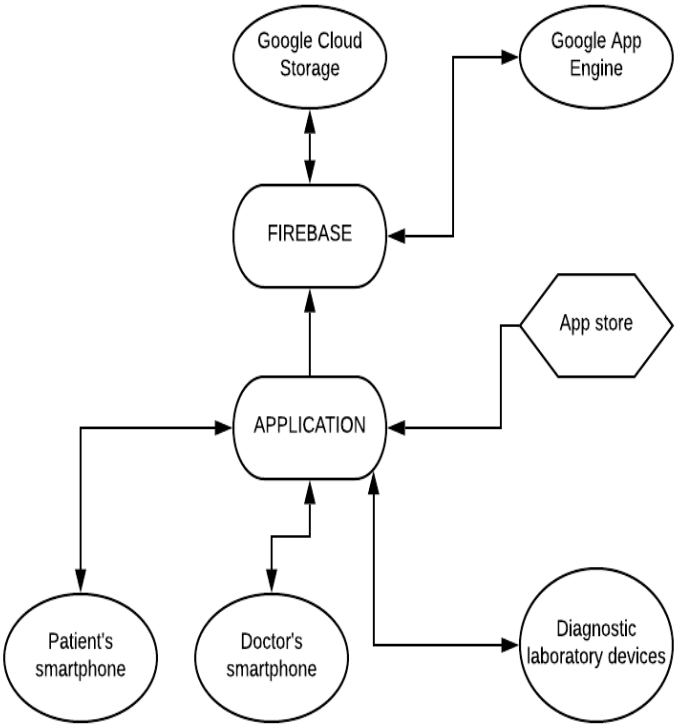

Fig -1: System architecture

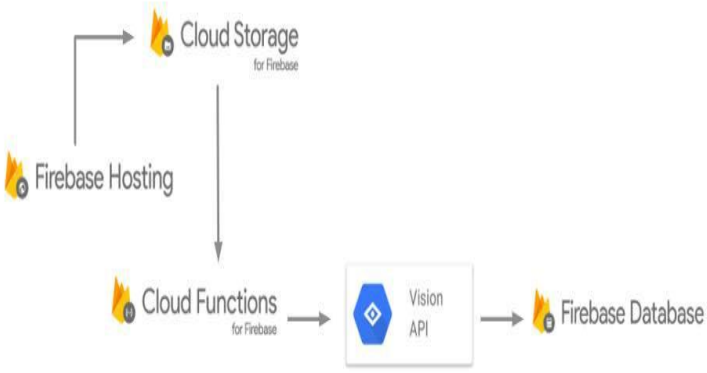

Fig -2: Text extraction architecture

The app revolves around the accessibility of data with ease and should be reliable enough to depend on it at crucial situations. Google Firebase is used for this purpose. Firebase offers immediate and steadfast querying of data.

The App, which is the interface part of the system allows users to upload and retrieve data. These requests are taken up with firebase and the required functionalities are carried out and the requests are serviced. It is responsible for raising timely notifications reminding the User to consume the prescribed medicine. It also keeps track of the quantity of the medicine the User has Purchased and Consumed, and raising timely notifications reminding him to replenish his medicine cabinet.

The Google App Engine offers a wide range of functionalities on their platform. Google Cloud Vision API is used for Handwriting Recognition. URL of the images stored on the Firebase are sent to the Google Cloud Vision API and computations are done on the Cloud Engine. The API returns the results of the analysis carried out on the image and it is stored in Firebase.

The application can be downloaded into various diagnostic devices based on the requirements. It is also available on the play store so that doctors and patients can download it into their smartphones.

4. IMPLEMENTATION

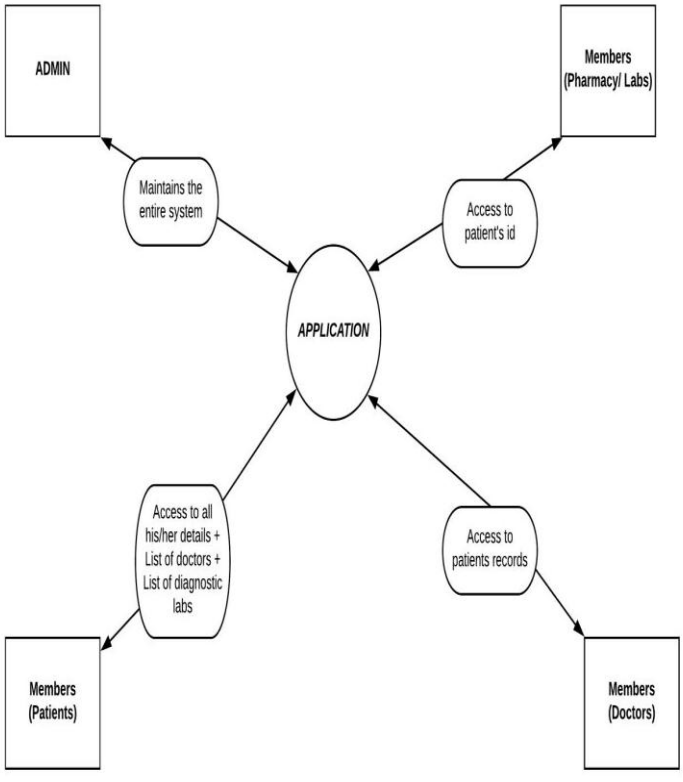

Fig -2: Work flow diagram

Multiple User Accounts:

The app will support two types of user accounts, i.e. Doctor and Patient. Each user will register in our app by filling in the required credentials. All the user accounts and details are stored in the firebase database. Each user is authenticated using Firebase Authentication.

Medical History and Doctor Feedback:

It is tedious to carry all the reports and prescriptions when consulting different doctors. The app has the provision to include the medical history of the user. The user has to enter the necessary details in the app and just has to give permission for a particular doctor to view his/her data. Every doctor can provide his professional comments on the patient's situation that can be viewed by other doctors for the better diagnosis of the problem.

Prescription Analysis:

The user will upload the image of the prescription in the app that is further uploaded to Cloud Firestore. On upload, the cloud function in firebase triggers the prescription analysis and training process. The image is sent to AutoML Vision for the continuous training and the image is also sent to Vision API to perform the analysis of the prescription, post which the details are stored in the Firebase Database and the data is available in the app.

Smart Alarm and Medicine Ordering System:

The results of the prescription analysis will provide with the details of each medication advised by the doctor, time and the number of days for which the medicine needs to be consumed by the patient. This data is used to set alarms at specified times of the day for the advised number of days to remind the user for timely intake of the medicine and thus help in the speedy recovery. The same data is also used to place an order for the prescribed medicine through an online pharmacy merchant. The app also reminds the user to replenish the medicine stock as and when required.

Nearby Hospitals and Clinics:

Google Maps has been integrated in the app which provides details regarding the hospitals and clinics near the user.

4. FUTURE ENHANMENTS

The future enhancements of the project is to focus on discreetly protecting and securing the patients personal information, their details and medical history. This can be achieved by implementing a finger print scanner or a facial recognition module to the app. During emergencies, the doctors can access this information about the patient which are specific to that emergency rather than accessing the complete details. This should be possible without the patient having to manually validate the access. Hence, it serves two purposes. Firstly, it will not bombard the doctor with complete information of the patient which can be voluminous but rather give specific details. This proves to be efficient for the doctors and safe for the patients at the same time.

5. CONCLUSIONS

Efficient and easy access to healthcare has been paid more and more attention, with the development of CureIT,. Accessing and sharing of medical records between doctors, latency in giving out lab reports, digitalizing the medical records have not been well considered in existing Medical History Management and Monitoring System. The aim is to provide solution to easy access and sharing of medical records between doctors, which can enhance treatment given to patience based on the medical history. This solution proposed can be further incorporated into the various existing management and administration systems at hospitals.

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