

# Personal Health Care and Record System Using Android

Mrs. Pavithra A C<sup>1</sup>, Mr. Manjunath K<sup>2</sup>, Mrs. Harshitha N<sup>3</sup>  
<sup>1,2,3</sup> Assistant Prof., ATMECE, Mysuru

**Abstract-** The project discusses development of an efficient medical record with a unique patient identifier. This is to enable hospitals, physicians and individuals in India to efficiently share their records. As electronic medical record keeping system coming into the market, two problems still remain outstanding, one of them being a need to connect all this data to a unique patient identifier and second problem is a need for a unified data. With ABMRS patient data is available readily and there is no need to depend on patients to bring their previous records. All the relevant medical history is recorded and sorted by the software and is available at a single screen all linked to the patient's unique identifier.

**Index Terms-** AUA: Authentication User Agency, ASA: Authentication Service Agency, ABRMS: Aadhar Based Medical Record System, ADT: Android Development Tool, ART: Android Runtime, CIDR: Central Identification Data Repository.

## 1. INTRODUCTION

The system is to enable hospitals, physicians and individuals in India to efficiently share their records. As we see electronic medical record keeping system coming into the market, two problems still remain outstanding, one of them being a need to connect all the data to a unique patient identifier and second problem is a need for a unified data. With Medical Base patient data is available readily and there is no need to depend on patients to bring their previous records. All the relevant medical history is recorded and sorted by the software and is available at a single screen all linked to the patient's unique identifier. Proper delivery of patient care is important and depends on the flexibility to retrieve relevant data regarding the patient as quickly as possible. The accessibility of complete healthcare data must be accessible to everybody concerned within the delivery of patient health care from researchers making an attempt to search out causes, treatments, and cures for diseases to the patient themselves. The

ability to universally access all patient healthcare data in an exceedingly timely fashion is of utmost importance.

A. Biometrics

Biometrics has Scope in various fields of science. The science and technology of measuring and analyzing biological data for authentication or identification purpose is called as Biometrics. The system that successfully identifies and measures the biological data from the human body is called as a biometric system.

Biometric Systems are computerized methods of verifying or recognizing the identity of an individual on the basis of some physical features or appearances, like a fingerprint or face pattern or some traits of behaviour, like handwriting or keystroke patterns. In the present hi-tech world, there is an ever growing need to authenticate and identify people for security purposes. A wide variety of modern systems requires consistent personal recognition schemes to either confirm or determine the identity of an individual requesting their services. The objective is to ensure that the rendered services are accessed only by a legitimate user and no one else, to discourage fraud and enhance security and to specifically identify individuals in corporate areas.

The biometric identification method consists of three operations, they firstly capture biometric sample of the person and make a digital representation of the sample, then extract unique features from the digital representation using feature extractor, and then compare the extracted feature set against the template set in the database.

Biometrics can measure both physiological and behavioural characteristics. The measurements and data derived from direct measurement of a part of the human body contribute to physiological biometrics. And the measurements and data derived from an action contribute to behavioral biometrics.

Biometric identification technology uses automated methods to recognize the identity or verify the

claimed identity of an individual based on physical or behavioral characteristics. A biometric identification device is capable of measuring individual biometric information, comparing the resulting measurement with one or more stored biometric reference templates, deciding whether they match sufficiently to indicate that they represent the same person, and indicating whether or not a recognition or verification of identity has been achieved. Devices differ according to the type of biometric information they collect and the algorithms they use to process the information and detect matches.



Fig. 1.1 Pattern of finger print

#### A. Aadhar

The Unique Identification Authority of India (UIDAI) introduced a scheme called AADHAR which was aimed at issuing identity cards for every citizen across India. It involves a registration procedure which involves linking of a person's individual credentials, which consists of his biometric and demographic data, to a 12 digit number which is exclusive to that particular person and will thereafter be a proof of identity for that person. The scheme is being regarded by the government as an ambitious step towards the vision of 'Digital India', on the rationale that it is an exhaustive digital database of those enrolled under the scheme.

According to the Unique Identification Authority of India (UIDAI), which issues Aadhar numbers, Aadhar represents a potentially transformative way for citizens, governments, and businesses to interact with each other yet, for an identity programme that is action. Increasingly central to India's economy and development efforts, there are gaps in our understanding of Aadhar's coverage and performance in key areas. There is little publicly available data on Aadhar's use-cases. As a starting point, a comprehensive catalogue of Aadhar's public and private sector use-cases did not previously exist. A

systematic, multi-disciplinary, and large-scale research effort is critical to build a meaningful understanding of whether, where, and how Aadhar might advance the public good.

Aadhar's uses are increasingly being taken up in other sectors as well. In healthcare, Aadhar is being linked to a Unique Health Identity (UHID), a digital identity issued by healthcare providers to track patients and help secure relevant health documents. The government is trying to improve governance through initiatives like monitoring staff attendance using Aadhar authentication. In the telecommunications sector, Aadhar-based e-KYC is being used for real-time and digital verification of subscribers. Private sector start-ups are also beginning to use India Stack elements for uses such as background verification of prospective employees. The Unique Identification Authority of India (UIDAI) is responsible for providing the basic identification and authentication services. It provides a unique identifier (Aadhar number) to each resident and maintains their biometric and demographic data in a Central Identities Data Repository (CIDR). The UIDAI manages the CIDR and provides identification and authentication services with yes/no answers. An Authentication User Agency (AUA) who provides services to users that are successfully authenticated. Thus, an AUA connects to the CIDR and uses Aadhar authentication to validate a user and enable its services. Examples of AUAs and services are banks, various state and central government ministries providing services such as the Public Distribution System (PDS), the National Rural Employment Guarantee Scheme (NREGS), and even private agencies like mobile phone operators. The responsibility of logistics of service delivery rests with the AUAs. In this federated model an AUA may choose to use only Aadhar identification, or also authentication in conjunction with their own legacy identification and authentication systems.

#### II. BLOCK DIAGRAM

- As an android application is being developed in the project the first block will be the mobile application.
- With the support of the fingerprint sensor becoming a native part of android and fingerprint

sensor becoming a standard fare in the flag ship phone so inbuilt fingerprint scanner is used.

- Authentication is the process of recognizing the user's identity. It is the mechanism of associating an incoming request with the set of user's identity. The credentials provided are compared with the database.
- Preloaded database contain the patients basic information's and health care information's. The database will be in the excel sheet format.
- Corresponding to the matched finger print data, the data which has been stored will scan and fetch all the information's.
- The information obtained in the data base can be retrieved and can be displayed on the smart phone screen under 2 main cases such as in the emergency case and in the general purpose case.

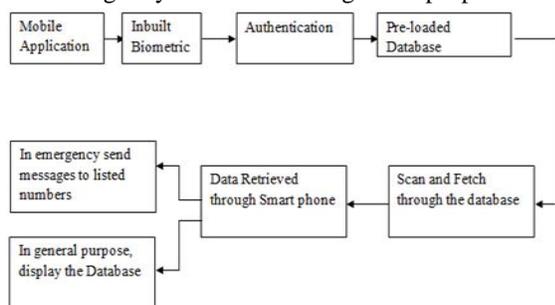


Fig. 1.2 Block diagram of Aadhar Based Record System

### III. LITERATURE SURVEY

Paul Carpenter and Christopher Chute, “The Universal Patient Identifier- A Discussion and Proposal”, Proc Annu Symp Comput Appl Med Care. 1993: 49–53.

Carpenter mentioned that the department of Health and Human Services in 1973 reported that they are object to shift forward toward “Standard Universal Identification”. The proposed Universal Patient identifier (UPI) ought to have the subsequent features: singularity, verifiability, dependability, and trailing. The proposed UPI consists of seven digit date code, six digit geographical code relate to the place of birth, five digit sequence code to spot born on a similar date within the same geographical area, and one single check digit, that make the total size is nineteen digits.

For examples, 9930301^044273^00047^2 represent an individual born in March 1, 1993 in Minneapolis,

MNUSA. The proposed UPI is used as Universal provider Identification (UPI) by adding one digit refers to P (provider), or MD, or RN etc. The author also said that the proposed UPI is reasonable and versatile and might be easily adapted using the accessible infrastructure. The proposed UPI codes using base 34 digits bit base and check digit algorithm used to defend against miskey and digit inversion.

D. C. Leonard et al. Realization of a Universal Patient Identifier for Electronic Medical Records Through Biometric Technology IEEE Transactions On Information Technology In Biomedicine, Vol. 13, No. 4, July 2009.

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We do have EMR record concepts in India, but the concept is not widely adopted. More and more hospitals are adopting it. Most of the Tier 1 cities based tertiary care and specialty hospitals have Patient and Healthcare Management's systems - but not a comprehensive EMR.

State of Aadhar Report 2016-17, May 2017 Authors: Ronald Abraham, Elizabeth S. Bennett, Noopur Sen, Neil Buddy Shah, San Francisco. One-seventh of humanity has an Aadhar number, a biometrically enabled unique digital identity issued to Indian residents.

- With more than one billion enrollees, Aadhar is the world's largest national digital identity system.
- Today, about 140 million enrollees use their Aadhar number every month to digitally authenticate themselves, up by three times from the past year.
- The Unique Identification Authority of India (UIDAI), which issues Aadhar numbers, would like to use Aadhar's scale and growth in usage to have a far-reaching impact on India's governance capabilities and socioeconomic prosperity.
- For example, it enables individuals to open basic bank accounts with only their Aadhar number and biometrics. By lowering the barriers to account opening, Aadhar can potentially help Indian residents gain access to India's financial system.
- Introduction to Biometric Identification Technology: Capabilities and Applications to the Food Stamp Program December 1999.

An individual's identity can be established based on an object or token that the person possesses, something that the person knows, or a physical characteristic of the person. Keys, identification cards, and credit and debit cards are all examples of objects that can be used to establish our identity and authorize our access to our homes, cars, workplaces, funds, and credit. Although physical objects are often effective means of identification, they can be lost, stolen, copied, or counterfeited. Information an individual knows can be a combination, an account number, a password, or some other information. This information can increase security when it is used properly, but it is often forgotten, or it is written where it can be copied or stolen. An individual physical and behavioral characteristic, which we will term biometric information, has often been used to supplement other types of information to increase security. Pictures, physical descriptions, and signatures are examples of biometric information that has been used to establish identity. Use of biometric information can avoid some of the problems that are present with physical tokens or specific knowledge. However, because biometric information is complex and may change over time, the process used to judge

whether two biometrics come from the same individual is difficult and may be prone to error.

#### IV.SOFTWARE DESCRIPTION

The following features are provided in the current stable version:

- Gradle-based build support
- Android-specific refactoring and quick fixes
- Lint tools to catch performance, usability, version compatibility and other problems
- ProGuard integration and app-signing capabilities
- Template-based wizards to create common Android designs and components
- A rich layout editor that allows users to drag-and-drop UI components, option to preview layouts on multiple screen configurations
- Support for building Android Wear apps
- Built-in support for Google Cloud Platform, enabling integration with Firebase Cloud Messaging (Earlier 'Google Cloud Messaging') and Google App Engine
- Android Virtual Device (Emulator) to run and debug apps in the Android studio.
- Android Studio supports all the same programming languages of Intelli J, and PyCharm

#### C.Android Libraries

This category encompasses those Java-based libraries that are specific to Android development. Examples of libraries in this category include the application framework libraries in addition to those that facilitate user interface building, graphics drawing and database access. A summary of some key core Android libraries available to the Android developer is as follows –

- Android.App – Provides access to the application model and is the cornerstone of all Android applications.[9]
- Android.Content – Facilitates content access, publishing and messaging between applications and application components.
- Android.Database – Used to access data published by content providers and includes SQLite database management classes.

- Android.Opengl – A Java interface to the OpenGL ES 3D graphics rendering API.
- Android.Os – Provides applications with access to standard operating system services including messages, system services and inter-process communication [10].
- Android.Text – Used to render and manipulate text on a device display.
- Android.View –The fundamental building blocks of application user interfaces[11].
- Android. Widget – A rich collection of pre-built user interface components such as buttons, labels, list views, layout managers, radio buttons etc.
- Android.Webkit – A set of classes intended to allow web-browsing capabilities to be built into applications.
- Android Apps Working

There are different ways the programs run on various platforms. The lowest level software can be written in machine code that runs directly on the microprocessor. This is shown in Figure 4.1 since it is difficult to develop complex applications in machine code, operating systems are used. Operating systems provide a communication and control layer between the application software and the hardware as shown in Figure 4.2 If we want to develop a native application for running on a specific hardware/operating system; we have to do this using a compiler and linker. Compiler and linker takes the source code and creates the executable file that actually runs on the operating system as shown in Figure 4.3 For example, if we want to develop an application in C++ programming language, we have to utilize the compilation/linking process.

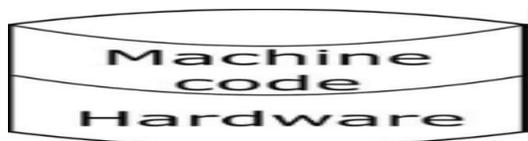


Fig. 4.1: Machine code – hardware relation

The main advantage of native applications is their speed. However, the disadvantage is the incompatibility across different platforms. For example, we cannot run a native Windows application on Ubuntu and vice versa. Virtual machine concept is developed to overcome this limitation. Virtual machine is software that runs on the operating system and provides an abstraction to

the developer as shown in Figure 4.4. The application software runs on top of the virtual machine.

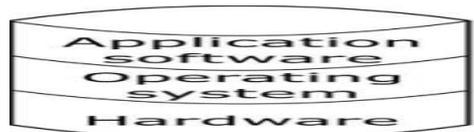


Fig. 4.2 Operating system layer between the hardware and the app

The obvious advantage of developing apps that run on virtual machines can then be stated as: “develop once and run on all platforms”. However, applications running on virtual machines are slower than native applications. General development process of virtual machine applications is summarized in Figure 4.5



Fig. 4.4 Virtual machine between the app and the operating system

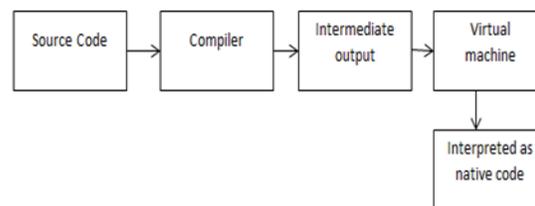


Fig 4.5: Creating an intermediate code from the source code – intermediate code is interpreted by the virtual machine

Similar to Java applications, Android applications also run on a JVM. There are two special virtual machines used in Android: Dalvik Virtual Machine (DVM) and Android Runtime (ART). These are specialized JVMs which can run on low system resources. The .apk files (executable of Android apps) actually run on these virtual machines. DVM has been the default runtime environment (~ virtual machine) until the Lollipop release (Android 5.0). ART is introduced by Android 4.0 and has been the default VM as of Android 5.0. DVM and ART basically do the same job: running Android apps independent of the platform. The main advantage of ART over DVM is the utilization of a concept called Ahead of Time (AOT) compilation instead of Just in

Time (JIT) approach. In AOT, apps are compiled during installation hence they load faster with lower CPU usage. On the other hand, JIT compilation provides lower storage space consumption with relatively longer loading times.

#### D. System Requirements

- [1] 64-bit distribution capable of running 32-bit applications
- [2] 3 GB RAM minimum, 8 GB RAM recommended; plus 1 GB for the Android Emulator
- [3] 2 GB of available disk space minimum, 4 GB Recommended (500 MB for IDE + 1.5 GB for Android SDK and emulator system image)
- [4] 1280 x 800 minimum screen resolution
- [5] Java Version: Java Development Kit (JDK)

### V. RESULTS

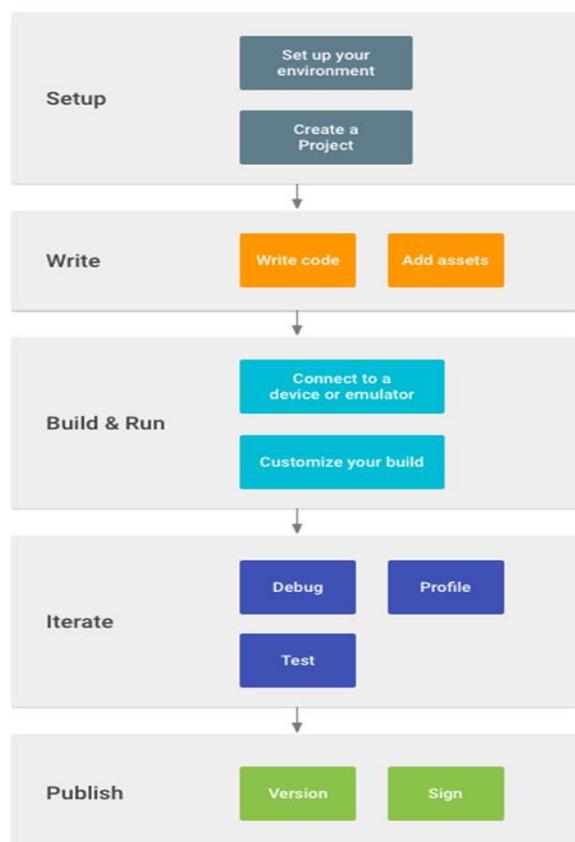


Fig. 4.7 Developer Workflow

1] Set up your workspace

This is the phase you probably already finished: Install Android Studio and create a project.

For a walkthrough with Android Studio that teaches some Android development fundamentals, also check out the guide to Building Your First App.

2] Write your app

Now you can get to work. Android Studio includes a variety of tools and intelligence to help you work faster, write quality code, design a UI, and create resources for different device types. For more information about the tools and features available, see Write Your App.

3] Build and run

During this phase, you build your project into a debuggable APK package that you can install and run on the emulator or an Android-powered device. For more information about how to run your code, see Build and Run Your App.

You can also begin customizing your build. For example, you can create build variants that produce different types of APKs from the same project, and shrink your code and resources to make your APK file smaller. For an introduction to customizing your build, see Configure Your Build.

4] Debug, profile, and test

This is the iterative phase in which you continue writing your app but with a focus on eliminating bugs and optimizing app performance. Of course, creating tests will help you in those endeavors. For information about basic debugging tasks, read Debug Your App and Write and View Logs. To view and analyze various performance metrics such as memory usage, network traffic, CPU impact, and more, see Performance Profiling Tools. And for an introduction to building tests, see Test Your App.

5] Publish When you're ready to release your app to users, there are just a few more things to consider, such as versioning your app and signing it with a key.

### VI. CONCLUSION

- The system would find wide variety in the medical fields. This system helps the hospitals to monitor the patients easily. This system transforms the future hospital systems.
- It will be helpful to many users to maintain their health related data and to review it efficiently.
- The analysis use of android system has been done to realize and implement in order to allow the user to access the data.

## VIII. FUTURE SCOPE

Patient care is important and depends on the flexibility to retrieve relevant data regarding the patient as quickly as possible in Emergency Cases. The accessibility of complete healthcare data must be accessible to everybody concerned within the delivery of patient healthcare from researchers making an attempt to search out causes, treatments, and cures for diseases to the patient themselves. The ability to universally access all patient healthcare data in an exceedingly timely fashion is of utmost importance.

ABMRS plays an important role in providing patient's medical histories, which include one or more computerized clinical information system that collects, stores, and displays patient's information. Furthermore, ABMRS consists of clinical information repository, order entry, processed provider order entry, pharmacy, and clinical documentation applications.

The adoption of ABMRS system brings each positive and negative problem that requires to be mentioned. It is necessary to analyze the problems to confirm that the adoption of the ABMRS system process is successful and economical. Few of the advantages of this system are, it is simple and provides remote access to patient's information. Also it improves administrative tasks and is time and space saving. Lastly it brings legibility, is up-to-date and conjointly decreases medical errors.

- It can be implemented to upload files with a huge amount of size with the support of various file formats.
- This System being web-based and an undertaking of Cyber Security Division, needs to be thoroughly tested to find out any security gaps.
- A console for the data Centre may be made available to allow the personnel to monitor on the sites which were cleared for hosting during a particular period.
- Development of Local Language Interfaces: As India is a multilingual society, e-Governance initiatives need to provide citizen interfaces in the respective local language. Thus, displays and keys should be based on localized interfaces and multi-media instructions should be commonly used to make the interface accessible in rural

areas, where low literacy rates can be an obstacle.

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