Android Based Online Voting System

Submitted in partial fulfilment of requirements

For the degree of

Diploma

By

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Batch 2016 -2019

Certificate

This is to certify that the Dissertation entitled **Android Based Online Voting System** is Bona-fide record of the dissertation work done by Husain Lokhandwala, Burhanuddin Naguthanawala and Masarrat Panjwani in the year 2016-19 under the guidance of Mrs. Rupali Patil of Department of Computer Engineering in partial fulfilment of requirement for the Diploma degree in Computer Engineering.

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Certificate of Approval of Examiners

We certify that this project report entitled **Android Based Online Voting System** is bona-fide record of project work done by Husain Lokhandwala, Burhanuddin Naguthanawala and Masarrat Panjwani.

This project is approved for the award of Diploma Degree in Computer Engineering.

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Dedicated to

My Family and Friends.

PREFACE

In the app, the voters can vote very easily irrespective of their location, health conditions. The Android Based Online Voting System registers the user in the Firebase Database and then stores its details in the storage and then the authentication of the user is done. After the user is authenticated and verified at the physical centre, the user can login into the app by the Aadhar number and the phone number. The OTP will be generated through Firebase, and the user will receive it through SMS and the enter the OTP.

The user can then select its preferred choice and then caste the vote in the app. The app will notify the user that they have voted successfully and then they can see the results for the voting done till that period of time.

It helps the voting process to be smooth, swift and transparent. The Online Voting System is a revolutionary idea for the voting process if configured properly.

ABSTRACT

Voting is essential for modern democratic societies. It is becoming very important to make the voting process easy and efficient. Android based application for online voting should be technically implemented in such a way that ensures authenticate user requirements. The proposed system is implemented to allow each and every voter to actively participate in the election process. This is done by the android application which will accept the votes of different voters using the application. Online voting through android based application will make the voting process reliable and more efficient. This system allows each and every voter to actively participate so that they can get familiar with the candidates and select the appropriate candidates. The aim is to provide convenient, easy and safe way to capture and count the votes. The main goal of the project is to denote a voting process, which enables voters to cast a secure and secret ballot over a network as the traditional voting process is time consuming and prone to security breaches. Despite all these mobile voting and internet voting are on a peak of popularity, whereas mobile voting can lead to overcome from the voting station scarceness particularly in rural areas, when it comes to internet voting more globally convenient as mobile phones still in emerging emplacement, provides the easier access and high voting ratio. In “ONLINE VOTING SYSTEM” a voter can use his\her voting right online without any difficulty. Registration is mainly done by the system administrator for security reasons. Citizens seeking registration are expected to visit the registration centre physically to submit their details. After the validity of them being citizens has been confirmed by the system administrator by comparing their details submitted with those in existing databases such as those as the Aadhar number, the citizen is then registered as a voter.

OVS includes:

- Voter's info in database
- Voter's vote in database
- Calculation of total number of votes
- Voting candidate details form
- Voting candidate register form
- Voting confirmation

Key-Words: Android, Firebase, Online Voting. Authentication, Aadhar Number, OTP, Registration.

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Chapter 1

Introduction

This chapter presents the overall introduction of the project. This includes the project objective, idea and motivation behind the project and also basic information technologies used in the project. This also includes the features of our project.

Introduction

There's a huge utilization of computerized information towards public administration from the emerging moments of internet period from 1990's and played a vital role for government organizations towards its operations for fruitful task executions in very less time. However, on time it got useable to private organizations and citizen due to its contrivance and convenience, and so on of its versatilely it set forth almost on everywhere. This provided flexibleness towards physical approachability of voting stations allowing cushy task of entire voting system.

This system is geared towards increasing the voting percentage in India since it has been noted that with the old voting method (the Queue System), the voter turnout has been a wanting case. With system in place also, if high security is applied, cases of false votes shall be reduced. The individual votes are submitted in a database which can be queried to find out who of the aspirants for a given post has the highest number of votes.

1.1 Mobile Voting

With the "ONLINE VOTING SYSTEM", a voter can use his\her voting right online without any difficulty. He\She has to register as a voter first before being authorized to vote. The registration should be done prior to the voting date to enable data update in the database.

However, not just anybody can vote. For one to participate in the elections, he/she must have the requirements. For instance, he/she must be a registered citizen i.e. must be 18 and above years old. The project 'Online Voting' provides means for fast and convenient voting and access to this system is limited only to registered voters.

Internet voting systems are appealing for several reasons which include; People are getting more used to work with computers to do all sorts of things, namely sensitive operations such as shopping and home banking and they allow people to vote far from where they usually live, helping to reduce absenteeism rate.

1.2 Vote Image

1.1 Problem Statement and Need Behind the Project.

In the current scenario where internet has brought almost all the ease to our living room, be it replacing physical banking to internet banking, ordering food online, buying movie tickets, buying any kind of clothes or house hold items to consulting your doctor for minor issues, bill payments of any kind etc. Still since quite long time going to the polling booth and standing in long queue to cast vote has been persistent and it was challenging for the Government to motivate the public to participate in the election system and cast their vote, as there was no such online voting system available.

The ONLINE VOTING SYSTEM shall reduce the time spend making long queues at the polling stations during voting. It shall also enable the voters to vote from any part of the globe as explained since this is an online application available on the internet. Cases of vote miscounts shall also be solved since at the backend of this system resides a well-developed database using FIREBASE that can provide the correct data once it's correctly queried. Since the voting process shall be open as early as possible, the voters shall have ample time to decide when and whom to vote for.

- **Comparison with the existing system.**
  The current system which is present now is a machine and paper based voting system which needs much man power and requires lot of resources. The present voting system finds difficulty during the counting also because it is counted manually. To overcome this as we said earlier the e voting system provides an efficient way to complete the whole voting system. The e voting system is an android application which enables user to vote in his smart phone. This is more advanced compared to the present system because it doesn't need any man power. And voter doesn’t need to visit the polling booth. The application also reduces the complexity of counting since it is automatic.

- **Problems with the existing(present) systems.**
  a. Machine can be easily DAMAGED.
  b. Cannot check ELIGIBILITY of Voter.
  c. Installation of Individual machine set & Transportation is More TIME Consuming.
  d. Cost of complete system is very HIGH.
  e. The voting take place where Machine is LOCATED.
  f. Possibility of Re-Election is more.

1.2 Significance and the Main Purpose of the Project.

This project is based on an idea which aims to solve the major problems faced by people while elections.

The main purposes of OVS include:

- Provision of improved voting services to the voters through fast, timely and convenient voting.
- during voting time in paying the very many clerks employed for the sake of the success of the manual system.
- Check to ensure that the members who are registered are the only ones to vote. Cases of "Dead People" voting are also minimized.

Therefore, crucial points that this (OVS) emphasizes on are listed below.

- This system is a lot easier to independently moderate the elections and subsequently reinforce its transparency and fairness.
- Less capital, less effort, and less labour intensive, as the primary cost and effort will focus primarily on creating, managing.
- Increased number of voters as individual will find it easier and more convenient to vote, especially those abroad.

1.3 Features of the Project.

There are many features of the project based on the user convenience and the making of the application. The Advantages of The Android Based Online Voting System are many because of the remarkable features of the Android Studio. The features are listed below:

- **The system can be used anywhere by the voters.**

  The users can vote from anywhere irrespective of their location. Say, the person is not present in the country or his hometown, HE\SHE can vote using the Android Based Online Voting System

- **It excludes the use of manual voting process.**

  The manual voting process will be not used after the invention of this online voting system. After the development of the android based application, the voting process will be fully based on technology. So, there will be no need of manual voting systems.

- **No one caste votes on behalf of others and multiple times.**

  In the app, the user logins through the Aadhar number which is a Unique Identification Number and also requires the phone number of the user. Through this, the user will be able to vote only if he receives the OTP on his phone number, So, no false votes will be made. If the user has completed voting the app notifies that 'voting successful'. So, the user cannot caste the vote second time.

- **Saves time and reduces Human intervention.**

  It saves time of the individuals to physically come to the centre and then stand in the queue for a really long time. With this app, the users only need to come one time for the registration and its done. It also saves Man Power, there will be no need of security or investigators to ensure secure voting and also the persons requires to count the votes and then the man power required to manage and administer.

- **View the result Instantly.**

  The users can view the result immediately after casting their votes. The result of the voting done till that period of time is displayed in. So, the users can lookout for their results and no need to wait for the time being for the current result.

Chapter 2

Literature Survey

This chapter presents the literature survey of the project. This chapter consists history, overview and the previous work done by the people.

Literature Survey

Literature survey may also be known as a literature review. This segment the existing and established theory and research in your report range. You are giving a context for your work. This area can be used to indicate where you are filling an apparent hole in the current hypothesis or learning, or you are proposing something that conflicts with or is questionable to existing ideas. You should precisely reference all sources said here and give a full reference in the Reference List.

2.1 Overview.

This application provides is a new technique of casting votes using mobile phones. Android voting system is an application developed for android devices to deploy an easy and flexible way of casting votes anytime and from anywhere. The application is especially developed for organizations to get employees votes for any new policy regulation or issues. The issues or arguments are fed into the system by the admin.

We are not having an effective method to stop the fake votes that's being casted and in current election system more amount of work is being allotted to the election officers and other staffs in order that the election to be taken place effectively. OTP can be an effective mode to prevent fake vote.

Likewise, if a person is out of his Constituency he is not able to cast his vote. So, we proposed a system where we are able to help the people in any constituencies to cast their respective votes in any of the booths it would help in increasing the number of voters.

When smart systems are implemented effectively in our election system that will facilitate the voters to believe in the system that they are using. A transparent and easy way to express their views.

Main aim of online voting system is to develop an online application like online reservation system, for citizens who are above 18 years of age to vote through online. Using these system citizens of can vote through online without visiting polling booth. A centralized database is maintained where citizens information is maintained. Whenever citizen is using online voting system his/her information is authenticated with the data present in database if user is not in the list he cannot use online voting system.

Android e-Voting application on smart phone user gives user to vote. There is a DATABASE which is maintained in which complete information about voter is stored. Admin can update various voters' information and handle complete data of voters and candidates. Information about voters like their name, phone number, address can be maintained by the admin. Even though the system allows voters to vote any candidate from anywhere, but the voters should have to authenticate themselves and get access to their account. This technique is imposed to ensure that only the valid person is allowed to vote in the elections. The aim of this project is to design and develop a voting application for the Android platform that will help people to vote securely from anywhere from the country. The application aims towards being compatible with different devices and running different versions of the operating system. Electronic voting using android application refers to the use of smartphones to vote and use computerized voting equipment to vote.

2.2 History.

Predecessors of online voting can be identified in the use of voting machines, which date back to the late 19th Centruy in England and the US. The controversies surrounding online voting today are mirrored in the controversies surrounding this early use of voting machines. In the 1980s developments around the term teledemocracy made voting possible making use of tv sets via teletext. The discussion about electronic voting picked up momentum in the early 1990s through the increasingly popular access to the internet and the rapid development of the world wide web. The USA and Switzerland, relying on their experience in direct democracy, voting machines and postal voting, were among the forerunners of developing online voting. Somewhat surprisingly, Estonia was the first country to employ online voting in national parliamentary elections in 2007.

2.3 Expectations.

A worthy e-voting system must perform most of these tasks while complying with a set of standards established by regulatory bodies, and must also be capable to deal successfully with strong requirements associated with security, accuracy, integrity, swiftness, privacy, auditability, accessibility, cost-effectiveness, scalability and ecological sustainability.

2.4 Concerns.

It has been demonstrated that as voting systems become more complex and include software, different methods of election fraud become possible. Others also challenge the use of electronic voting from a theoretical point of view, arguing that humans are not equipped for verifying operations occurring within an electronic machine and that because people cannot verify these operations, the operations cannot be trusted.

Furthermore, some computing experts have argued for the broader notion that people cannot trust any programming they did not author. Many insecurities have been found in commercial voting machines, such as using a default administration password Cases have also been reported of machines making unpredictable, inconsistent errors.

2.5 Study and Survey.

Sr. No	Title	Author	Published Year
1.	Efficient E-Voting Android Based System.	Dr. Aree Ali Mohamed, Ramyar AbdolRahman Timour.	2013
2.	Smart Voting System with Face Recognition.	Niranjan Malwade, Mahesh Talware, Akshay Kamble, Anirudh Kakrambe.	2014
3.	E- Voting with Captcha.	Aditi Rane, Richa Singh, Shweta Pawar, Asmita Deshmukh.	2014

2.1 Survey Table

1. Jambhulakar, chakole and pradhi [3] proposed a novel security for online voting system by using multiple encryption schemes. Provide security for cast vote when it is submitted from voting poll to voting server. Multiple encryptions to avoid DOS attack. Security provide submissive as well as active interloper.

2. Pashine, ninave and kelapure [4] proposed an android platform for online voting system. This application provide diversion of long process also provide security to the voter and its voter comfort system voter no need to go polling booth easily vote for candidate in hometown itself. And also provide the option of gesture recognition but authentication is the problem of android platform.

3. Khasawneh [2] Proposed An E-Voting System For Biometric Security Is Providing A Two Sided Solution Such As Server And User Side. After Casting The Vote System Will Generate Hardcopy For Voter And Also Generate Unique Number. This Unique Number And Voter Name And Identification Number Is Secured. All Content Are Stored In Special Box This Box Is Secured Box, This Information Is Used For Verifying The Vote Before Stored In Final Database. This Side Copy Is Printed With Unique Barcode That Can Be Easily Readable Automatically And Scanned Then Randomly Choose One Copy, Then This Copy Is Tested
4. Shridharan [1] Implemented three models such as, Authentication model, franchise excising model, distributed database and central server model. In authentication model voter with smart card and voter identification number and also gives the biometric information this all information is used in future election voting process. After verification and validation voting interface means candidate name and sign are displayed, this is verified by vote casting database, and then votes are counted and declared the result. In this system security and traceability also ensures to auditing the vote and voter information.

5. Firas I. Hazzaa, Seifedine Kadr [6] This paper deals with the design and development of a web-based voting system using fingerprint in order to provide a high performance with high security to the voting system also we use web technology to make the voting system more practical. The new design is proposed an election for a university for selecting the president of the university. The proposed EVS allows the voters to scan their fingerprint, which is then matched with an already saved image within a database. Developed Web-based Voting System using Fingerprint Recognition. This system has provided an efficient way to cast votes, free of fraud, and make the system more trustable, economic and fast. We have used Minutiae-based fingerprint identification and matching with high accuracy.

6. Shivendra Katiyar, Kullai Reddy Meka, Ferdous A. Barbhuiya, Sukumar Nandi [7] Using Cryptography and Steganography at the same time, we try to provide Biometric as well as Password security to voter accounts. The scheme uses images as cover objects for Steganography and as keys for Cryptography. The key image is a Biometric measure, such as a fingerprint image. Proper use of Cryptography greatly reduces the risks in these systems as the hackers have to find both secret key and the template. The basic idea is to merge the secret key with the cover image on the basis of key image. The result of this process produces a stego image which looks quite similar to the cover image but not detectable by human eye. The system targets the authentication requirement of a voting system.

7. Himanshu Agarwal and G.N.Pandey [8] proposed aadhar id based online voting system for Indian election is proposed for the first time in this paper. The proposed model has a greater security in the sense that voter high security password is confirmed before the vote is accepted in the main database of Election Commission of India. The additional feature of the model is that the voter can confirm if his/her vote has gone to correct candidate/party. In this model a person can also vote from outside of his/her allotted constituency or from his/her preferred location. In the proposed system the tallying of the votes will be done automatically, thus saving a huge time and enabling Election Commissioner of India to announce the result within a very short period.

8. K. P. Kaliyamurthie1, R. Udayakumar, D. Parameswari and S. N. Mugunthan [9] The aim of this paper is to people who have citizenship of India and whose age is above 18 years and of any sex can give their vote through online without going to any physical polling station. Election Commission Officer (Election Commission Officer who will verify whether registered user and candidates are authentic or not) to participate in online voting. This online voting system is highly secured, and its design is very simple, ease of use and also reliable. The proposed software is developed and tested to work on Ethernet and allows online voting. It also creates and manages voting and an election detail as all the users must login by user name and password and click on his favorable candidates to register vote. This will increase the voting percentage in India. By applying high security it will reduce false votes.

9. Gianluca Dini [10] This proposed system is based on replication and tolerates both benign and fully arbitrary failures of servers. If enough servers are correct, service availability and security are ensured despite the presence of International Journal of Computer Applications (0975 – 8887) Volume 134 – No.13, January 2016 21 faulty servers and any number of faulty voters. A voter that suffers a crash failure can vote after recovery.

Chapter 3

Analysis

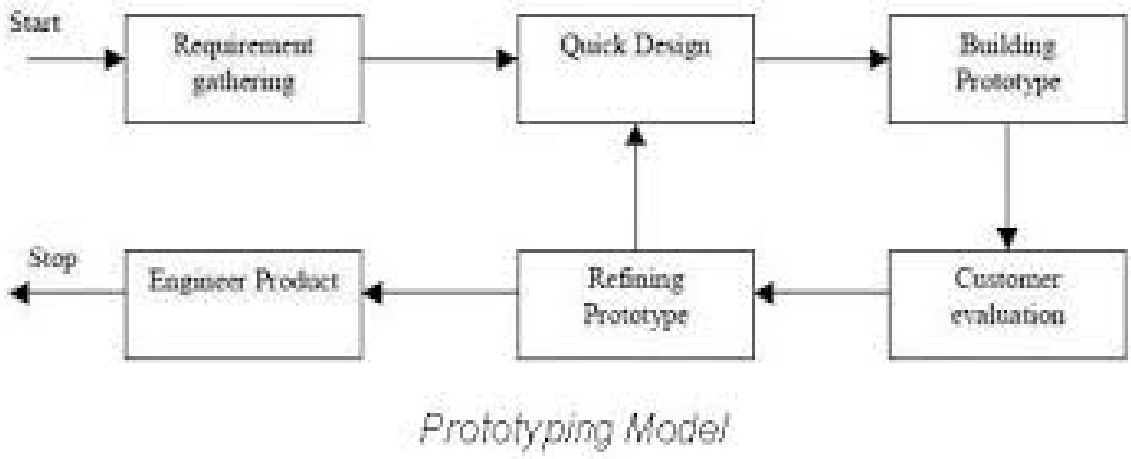
This chapter consists the detailed information about the model used in the project and the merits and demerits f the model.

Prototype Model

The basic idea in Prototype model is that instead of freezing the requirements before a design or coding can proceed, a throwaway prototype is built to understand the requirements. This prototype is developed based on the currently known requirements. Prototype model is a software development model. By using this prototype, the client can get an "actual feel" of the system, since the interactions with prototype can enable the client to better understand the requirements of the desired system. Prototyping is an attractive idea for complicated and large systems for which there is no manual process or existing system to help determining the requirements.

The prototype are usually not complete systems and many of the details are not built in the prototype. The goal is to provide a system with overall functionality.

Diagram of Prototype Model.



3.1 Prototype Model

3.1 Advantages of Prototype Model.

- Users are actively involved in the development.
- Since in this methodology a working model of the system is provided, the users get a better understanding of the system being developed.
- Errors can be detected much earlier.
- Quicker user feedback is available leading to better solutions.
- Missing functionality can be identified easily.
- Confusing or difficult functions can be identified Requirements validation, Quick implementation of, incomplete, but functional, application.

3.2 Disadvantages of Prototype Model.

- Leads to implementing and then repairing way of building systems.
- Practically, this methodology may increase the complexity of the system as scope of the system may expand beyond original plans.
- Incomplete application may cause application not to be used as the full system was designed. Incomplete or inadequate problem analysis

3.3 When to use Prototype Model.

- Prototype model should be used when the desired system needs to have a lot of interaction with the end users.
- Typically, online systems, web interfaces have a very high amount of interaction with end users, are best suited for Prototype model. It might take a while for a system to be built that allows ease of use and needs minimal training for the end user
- Prototyping ensures that the end users constantly work and provide a feedback which is with the system incorporated in the prototype to result in a useable system.

Chapter 4

Project Study

This chapter consists the feasibility study with its factors like technical, economical, operational, legal and scheduling. It also details the benefits of performing the feasibility study.

4.1 Feasibility Study

Introduction

As the name implies, a feasibility study is used to determine the viability of an idea, such as ensuring a project is legally and technically feasible as well as economically justifiable. It tells us whether a project is worth the investment—in some cases, a project may not be doable. There can be many reasons for this, including requiring too many resources, which not only prevents those resources from performing other tasks but also may cost more than an organization would earn back by taking on a project that isn't profitable.

A well-designed study should offer a historical background of the business or project, such as a description of the product or service, accounting statements, details of operations and management, marketing research and policies, financial data, legal requirements, and tax obligations. Generally, such studies precede technical development and project implementation.

4.2 Areas of Project Feasibility

A feasibility study evaluates the project's potential for success; therefore, perceived objectivity is an important factor in the credibility of the study for potential investors and lending institutions. There are five types of feasibility study—separate areas that a feasibility study examines, described below.

1. Technical Feasibility - This assessment focuses on the technical resources available to the organization. It helps organizations determine whether the technical resources meet capacity and whether the technical team is capable of converting the ideas into working systems. Technical feasibility also involves evaluation of the hardware, software, and other technology requirements of the proposed system. As an exaggerated example, an organization wouldn't want to try to put Star Trek's transporters in their building—currently, this project is not technically feasible.

2. Economic Feasibility - This assessment typically involves a cost/ benefits analysis of the project, helping organizations determine the viability, cost, and benefits associated with a project before financial resources are allocated. It also serves as an

independent project assessment and enhances project credibility—helping decision makers determine the positive economic benefits to the organization that the proposed project will provide.

3. Legal Feasibility - This assessment investigates whether any aspect of the proposed project conflicts with legal requirements like zoning laws, data protection acts, or social media laws. Let's say an organization wants to construct a new office building in a specific location. A feasibility study might reveal the organization's ideal location isn't zoned for that type of business. That organization has just saved considerable time and effort by learning that their project was not feasible right from the beginning.

4. Operational Feasibility - This assessment involves undertaking a study to analyse and determine whether—and how well—the organization's needs can be met by completing the project. Operational feasibility studies also analyse how a project plan satisfies the requirements identified in the requirements analysis phase of system development.

5. Scheduling Feasibility - This assessment is the most important for project success; after all, a project will fail if not completed on time. In scheduling feasibility, an organization estimates how much time the project will take to complete.

4.3 Benefits of conducting a Feasibility Study.

The importance of a feasibility study is based on organizational desire to "get it right" before committing resources, time, or budget. A feasibility study might uncover new ideas that could completely change a project's scope. It's best to make these determinations in advance, rather than to jump in and learning that the project just won't work. Conducting a feasibility study is always beneficial to the project as it gives you and other stakeholders a clear picture of the proposed project.

Below are some key benefits of conducting a feasibility study:

- Improves project teams focus.
- Identifies new opportunities.
- Provides valuable information for a 'go/no-go' decision.
- Identifies reasons to not proceed.

The feasibility study depends on 3 major questions.

1. Does the user system meets the user requirements?
2. Is the problem worth solving?
3. What will be the impact of system on Management System?

4.4 Cost Analysis

The cost incurred by our application only includes software cost.

Chapter 5

Technology required

This chapter has the detailed information about the technologies required and the levels used for the application.

5.1 Hardware

- Smart Phone.
- Internet Connectivity.
- Computer.

5.2 Software

- **Android**

  Android, every week there's hundreds of millions of mobile devices with operating system as android, developed by Google introducing in more than 190 countries round the world. Android is the largest operating systems for mobile computing devices as a platform and growing fast with every upcoming day, there is an addition of another million users who turn on their computing devices with this Android powerful OS for the first time to explore for apps, games, and other digital content.

  Providing a world class platform for application development and as well as games for its users everywhere, while offering as an open marketplace for distributing them instantly.

  The term has been derived from the Greek word andr-, which means "man or male" and the suffix - eides, used to mean "alike or of the species". This together means nothing but as "being human".

  This is a software stack for the mobile devices which includes operating system, middleware along with other key applications towards its complete modular installation package. Further this is platform is based upon the Linux operating system which was developed by Google and the Open Handset Alliance (OHA).

Google Incorporation purchased the initial developer of the Android software i.e. Android Incorporation in August 2005 making Android Incorporation. Android operating system is fully based on a modified version of the Linux kernel system, which are most notable examples of free and open source software. Google and other members of Open Handset Alliance cooperatively organized on the Android's development and release. The Android Open Source Project which also popularly known as A O S P is tasked with the maintenance and further development of Android development.

The Android studio version used is: 3.1
Minimum API level required for the application is MARSHMALLOW. API level 23

5.1 Android Studio

Features of Android.

1. **Dalvik Virtual Machine**
   It is the core integral module of the Android based on extremely low-memory virtual machine functioning at software level for computing systems working on embedded systems providing faster performance ideally tuned towards CPU attributes creating a unique file format called .DEX through build time post processing with a Conversion option from Java classes and .DEX format by using “dx” tool.

2. **INTEGRATED Web Browser.**
   Android operating system uses open source web browser as on Web Kit which is of into two pass layout and frame flattening, this two pass layout loads the requested data content with absence of holding block elements, like external CSS file or external JavaScript with a spell of providing all the resources in porting to the device. Frame flattening are block of individual single loads embedded into rafts for processing block which in turn loads into web browser leading to higher browsing speed with an entire sophistication of cache for faster processing towards browsing

3. **SQLite.**
   This is similar to SQL database with a lower version requirement towards its functioning while providing the faster and efficient performance, of which it is integrated a one of the core module of entire android operating system which is into typical a 500kb enormously belittled sizing and completely grounded on function calls and a single file of which digital content is stored.

4. **Connectivity.**
   Beside its advance colligate with the sub modules of the operating system, it supports an efficacious connection towards telecom technologies as such GSM, CDMA, Bluetooth, GPRS, NFC, 4G technologies etc.

5. **Messaging**.
   As such with above mentions it does offer additional features as SMS, MMS, and other communication protocol connection systems along with its sophistication.

6. **Media Support**.
   In aspect of the operating system performance it does provide additional application packages towards media system.

7. **ADDITIONAL Hardware Support.**
   In context to its operating system along with its software sub modules, it does support all the GPS, touch screen, accelerometers, HDMI, graphics, and so on with its drivers and its software packages.

8. **MARKET.**
   The Android operating system does have an application package installation where in which a vast variety of applications can be installed of which it is into entertainments, songs, games, etc.

9. **MULTITASKING.**
   This is thread-based operating system supporting much higher-level multitasking for a several concurrent functioning along with faster performance and does have a
   competitive CPU, GPU, Memory modules and so on with its architecture.

- **Firebase**

Firebase is a mobile and web application development platform developed by Firebase, Inc. in 2011, then acquired by Google in 2014. As of October 2018, the Firebase platform has 18 products, which are used by 1.5 million apps.

5.2 Firebase

Features of Firebase

Analytics

Firebase Analytics**.**

Firebase Analytics is a cost-free app measurement solution that provides insight into app usage and user engagement.

Develop

Firebase Cloud Messaging**.**

Formerly known as Google Cloud Messaging (GCM), Firebase Cloud Messaging (FCM) is a cross-platform solution for messages and notifications for Android, iOS, and web applications, which as of 2016 can be used at no cost.

Firebase Auth

Firebase Auth is a service that can authenticate users using only client-side code. It supports social login providers Facebook, GitHub, Twitter and Google (and Google

Play Games). Additionally, it includes a user management system whereby developers can enable user authentication with email and password login stored with Firebase.

Realtime database

Firebase provides a real-time database and backend as a service. The service provides application developers an API that allows application data to be synchronized across clients and stored on Firebase's cloud. The company provides client libraries that enable integration with Android, iOS, JavaScript, Java, Objective-C, Swift and Node.js applications. The database is also accessible through a REST API and bindings for several JavaScript frameworks such as AngularJS, React, Ember.js and Backbone.js. The REST API uses the Server-Sent Events protocol, which is an API for creating HTTP connections for receiving push notifications from a server. Developers using the real-time database can secure their data by using the company's server-side-enforced security rules. Cloud Firestore which is Firebase's next generation of the Realtime Database was released for beta use.

Firebase Storage

Firebase Storage provides secure file uploads and downloads for Firebase apps, regardless of network quality. The developer can use it to store images, audio, video, or other user-generated content. Firebase Storage is backed by Google Cloud Storage.

Chapter 6

Design

This chapter presents the preliminary design of the project. It includes the requirement, design, basic architecture and levels of the project.

6.1Requirements of the Online Voting System

The proposed project contains following modules:

- Administrator.
- User.
- Account.

Administrator:

- User Information: Consists of all information of the user those who are eligible for voting.
- User Verification: Verify the user during registration and user Login.
- Voting Information: Storage for storing the vote information casted by the user.

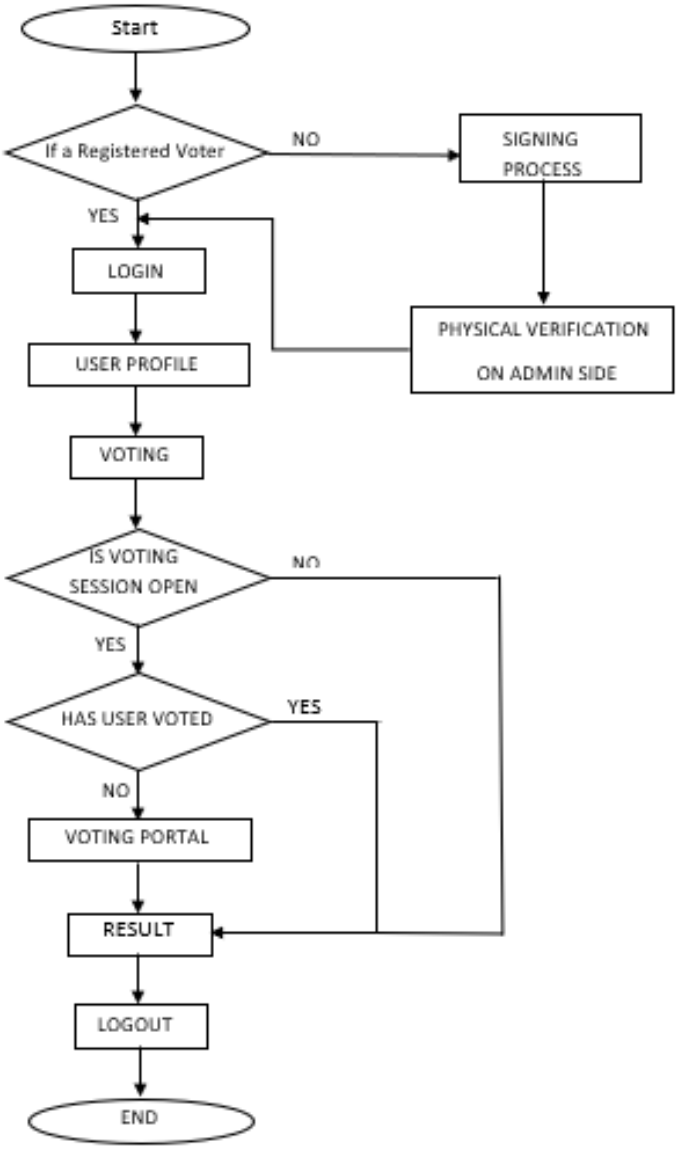
Account:

- Registration: The user should register before using the application.
- Login: Logging into the application using Aadhar number and phone number.

6.2 Online Voting System Design

Like most of the systems in the world, the security consideration is very important. We are taken into account this part through sending OTP to user phone number. It is clear that the user information should be stored in the database, so that the valid users can register themselves to get the authentication. It is also possible to get information of user who doesn't participate in voting process.

When user chooses registration option and provides required details those details are compared with the information at the physical centre. If user provided data is found to be correct the user is verified.



6.1 Basic Architecture.

Android e-Voting application on smart phone user gives user to vote. Admin can see the voting results according to vote options. System can maintain the data about the voter like Name, phone number

and other relevant data. Even though the system enables voters to poll their vote from anywhere, initially the voters should register themselves at the physical centre for the authentication for voting purpose. This constraint is imposed to ensure that only the genuine person is allowed to vote in the elections. The aim of this work is to design and implement an electronic voting application for the Android platform that will enable people to vote securely from anywhere. The application as a whole is aimed at being compatible with devices from many manufacturers and running different versions of the operating system. The application is also aimed at being localized.

6.3 Registration Phase

In the home page registration category will ask you to enter the following details.

- Phone number.
- Aadhar number.

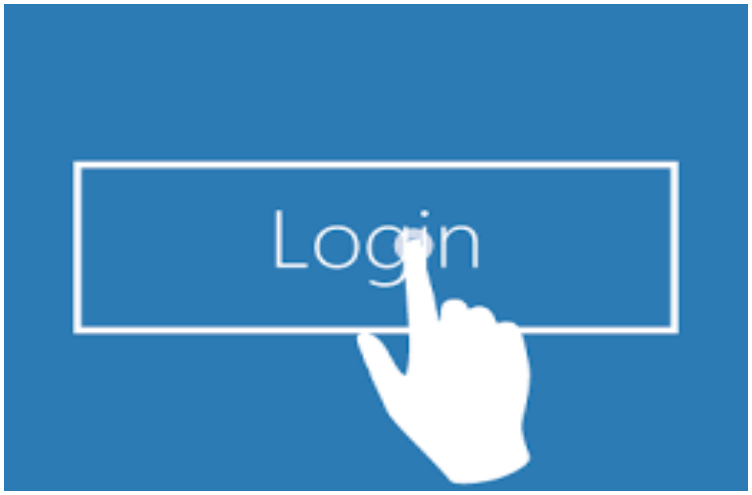
It is clear that in the registration form the user need to provide valid details. Whenever the valid details are matching the registration procedure becomes successful. Else the user does not allow for registration. After you submit the details asked by the registration the application will give you a toast message whether your registration is successful or not.

6.2 Register

6.3 Login and Voting process

You need to login for voting by giving the below details

- Aadhar Number
- Phone Number
- OTP



6.3 Login

Once user submits the details the application checks the details given by the user in database at the server side. If the details provided are proper then login successful status is shown as a toast message. After this the user can choose voting option to cast the vote. A list of candidates contesting in the election along with their details is displayed in users Smartphone. The candidate list is updated from the server. Now it's the right time to select a candidate from the available list. When user taps against a candidate the application asks for confirming the vote. When user confirms the candidate selected the information is sent to the server. Now vote count against the selected candidate is updated. The database checks if the user once user casts the vote so if the same user tries to vote again then the application should not allow for it

6.4 Security Levels

For the security, we use OTP generation service to provide OTP to the user. The most security part lies on securing the vote casted by the user. However only the admin has the permission to access the database. At any moment only the admin has the permission for accessing and updating data in the server. To avoid fraud voters the aadhar-id which unique number uniquely identifies the user. The possibility is that any user may try to revote again once after voting. Some node indicating that the user status (voted or not) is maintained at the server. Whenever user casts the vote the node is updated and can be referred for future analysis.

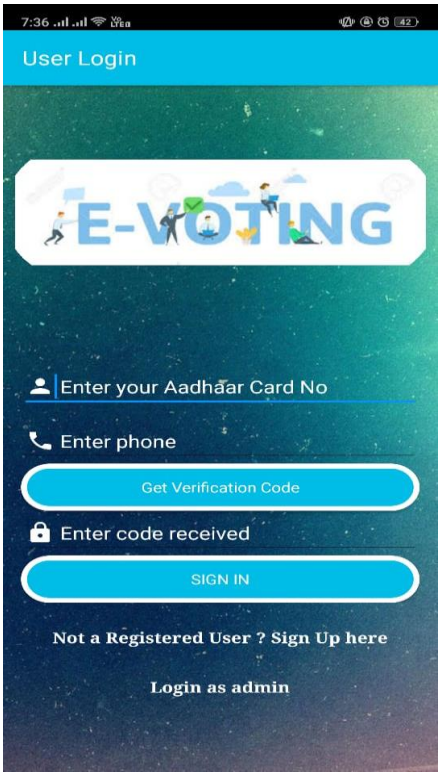
6.4 Security

Chapter 7

Implementation

This chapter presents the working of the application. It includes pictures of actual application and the database we have used along wit the description of how it all works together.

7.1 Android Application

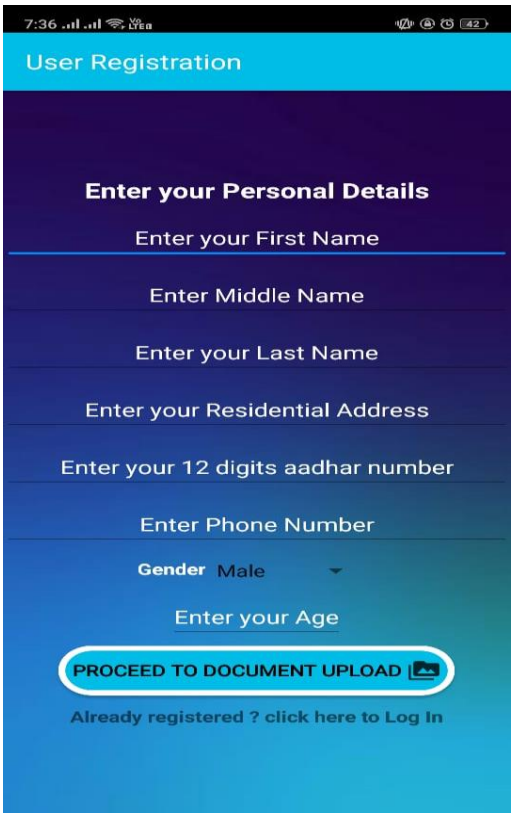


7.1 Home Page

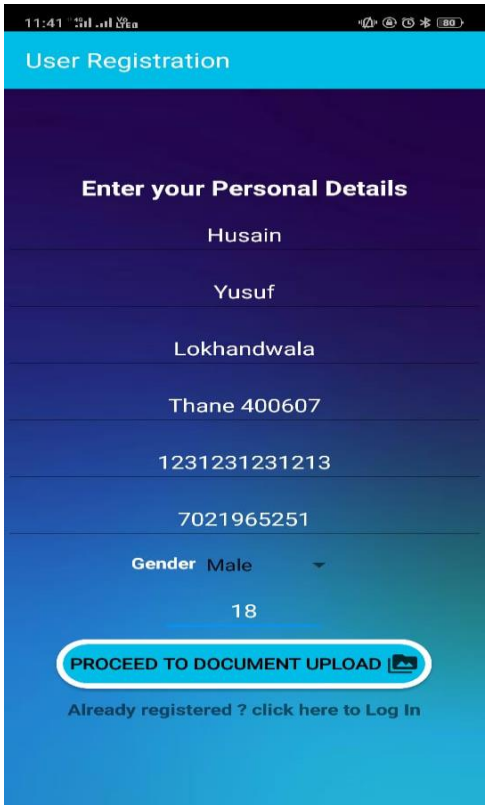
Welcome to the Application. After opening the App you will be asked to enter your AADHAR NO and PHONE NUMBER.

If you are a registered user the enter the details and click on GET VERIFICATION CODE. After receiving the verification code, input the code in the ENTER CODE RECEIVED box and click on SIGN IN. If you are not a registered user then click on NOT A REGISTERED USER? SIGN UP HERE.

If the admin wants to login the he\she has to click on LOGIN AS ADMIN



7.2 User Registration



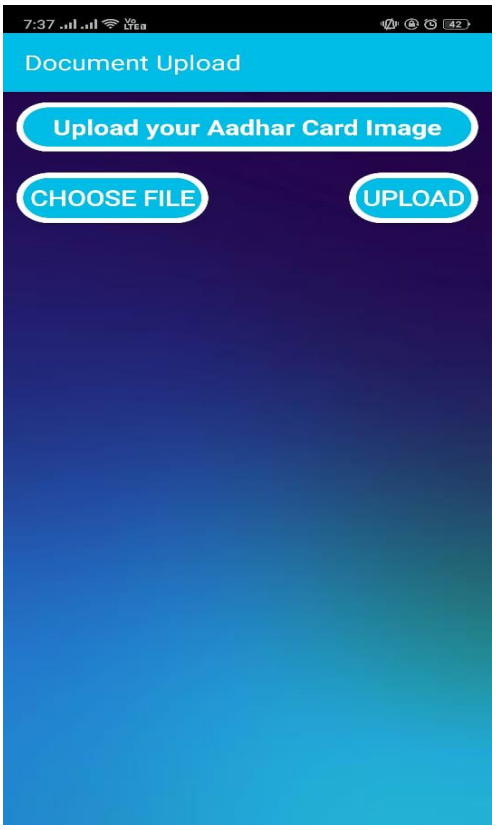
7.3 User Registration with Details.

After clicking on NOT A REGISTERED USER, the User Registration window is opened. It will ask you to enter your personal details like:

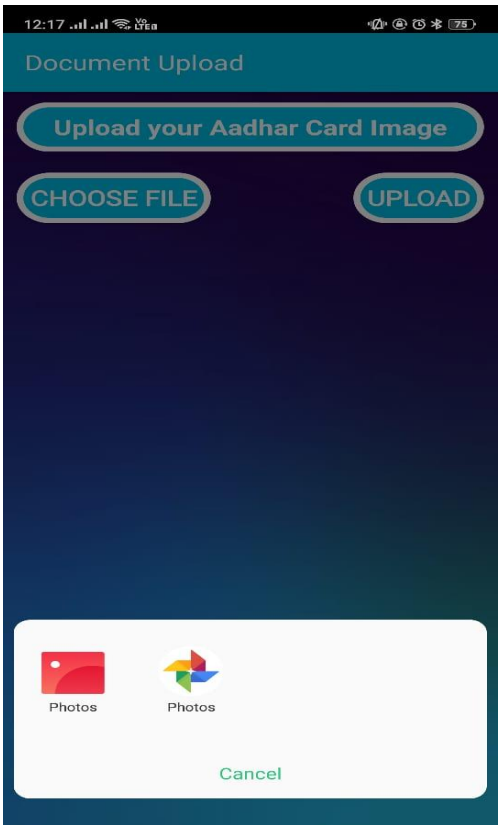
a. First name
b. Middle name
c. Last name
d. Address
e. Aadhar number
f. Phone number
g. Gender
h. Age

It will still give you the option of ALREADY REGISTERED? CLICK HERE TO LOG IN in case you forgot that you are registered.

The user will enter his/her personal details. After that it will ask you to upload your document for the registration. For that you have to click on PROCEED TO DOCUMENT UPLOAD.



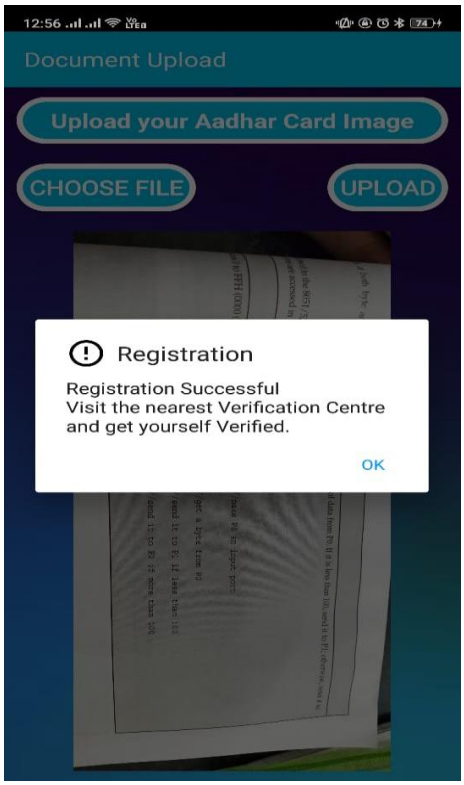
7.4 Document Upload



7.5 Document upload options

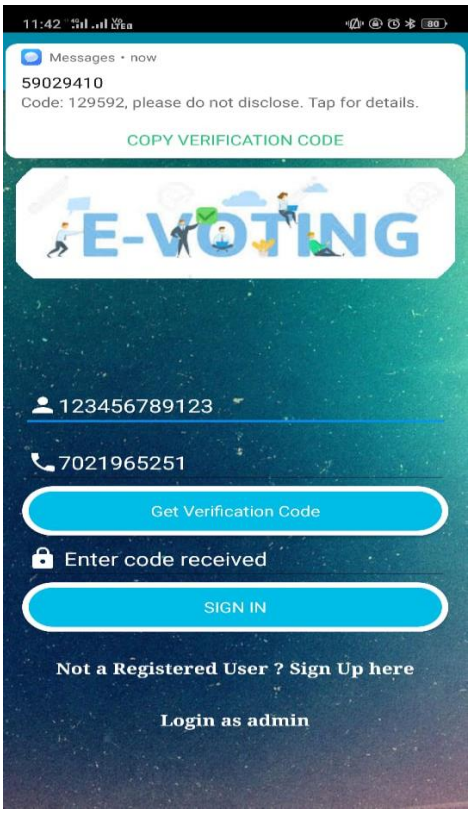
After clicking on PROCEED TO DOCUMENT UPLOAD it will open the window in which you have to Upload your Aadhar Card Image. You have to click on CHOOSE FILE to upload the document.

After clicking on CHOOSE FILE it will give you options to select the document from the desired location. After selecting the document click on UPLOAD.

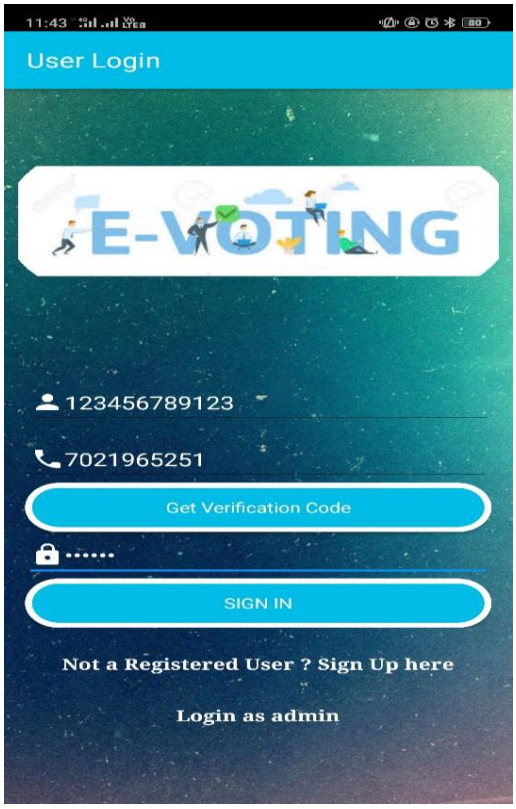


7.6 Registration successful

After uploading the document, the user will receive a alert message of successful Registration.



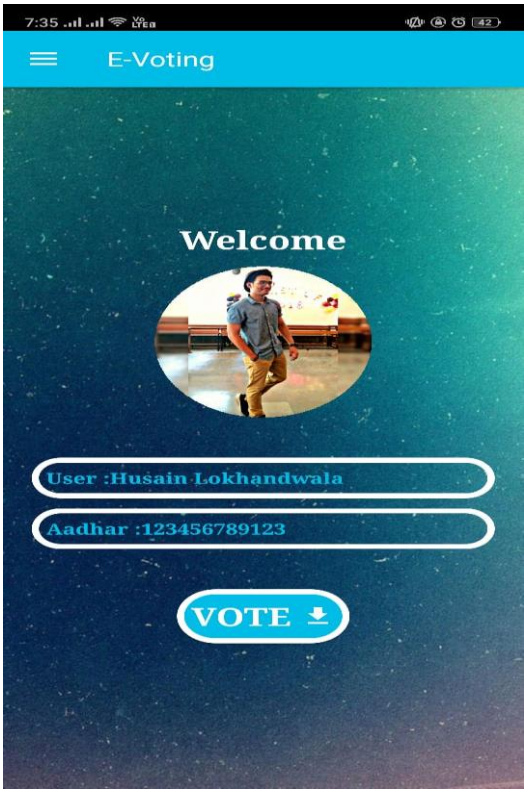
7.7 OTP via SMS



7.8 Signing in

Now, if you are a registered user then Enter the Aadhar number and your Phone Number and click on GET VERIFICATION CODE. You will receive an OTP via SMS.

Enter the OTP in the ENTER CODE RECEIVED section and then click on SIGN IN.

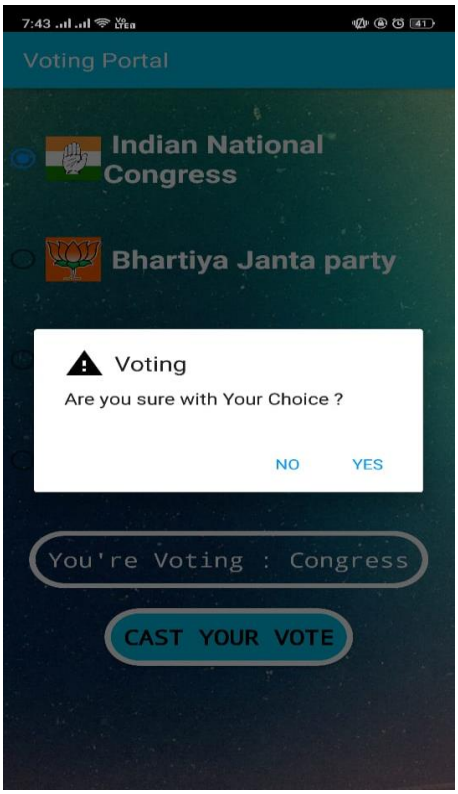


7.9 Voting Page

7.10 Voting Portal

After clicking on SIGN IN it will give you your NAME and AADHAR NUMBER and an option to vote. You have to click on VOTE.

After clicking on VOTE it will open the VOTIN PORTAL page in which you will have options to select your choices. After you select your option it will portray that YOU'RE VOTING: the option and then to submit you have to click on CAST YOUR VOTE.

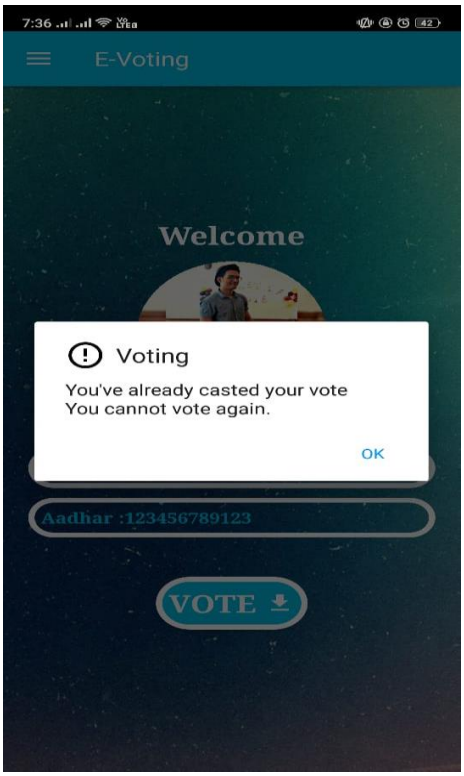


7.11 Submit Vote

7.12 Vote recorded

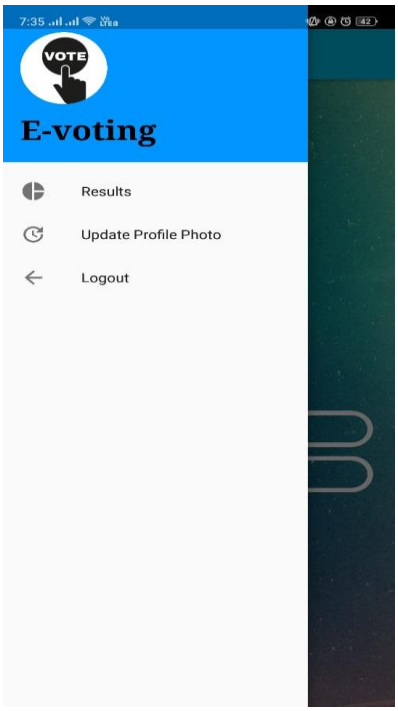
After you click on CAST YOUR VOTE it will the dialogue box will ask you whether you are sure with your choice or not.

After casting you vote, you will be redirected to the page that has your details and display a toast message that shows YOUR VOTE HAS BEEN RECORDED.

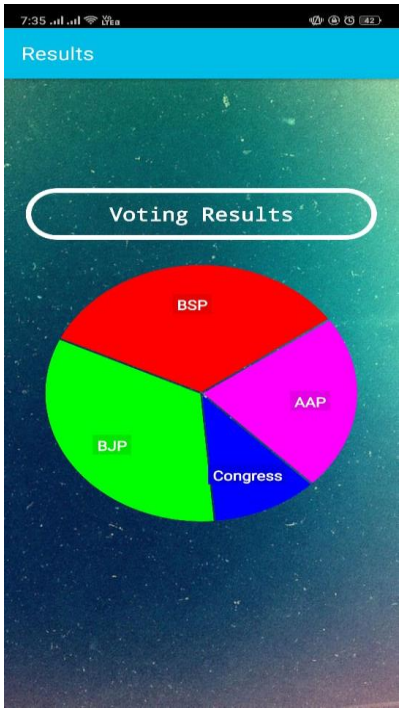


7.13 Cannot Vote again

If the same user tries to vote again, the system generates a dialogue box which says that the user has already casted their vote. So, no user can cast their votes 2 times.



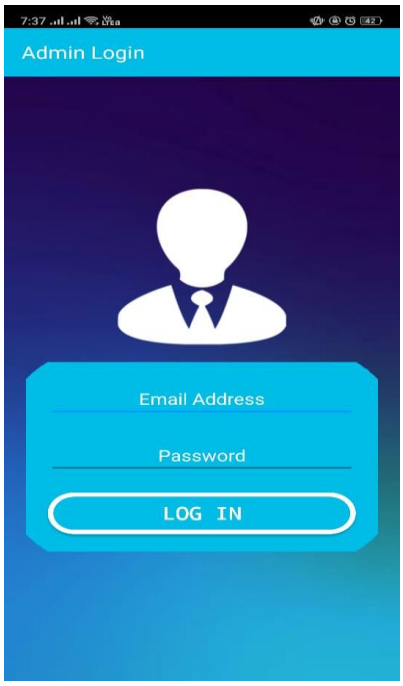
7.14 Profile Managing



7.15 Results

The user can maintain a profile. He/she can update a profile photo also and when done, can also logout. For viewing the results, the User has to click on Results.

The RESULTS window will be opened and the users can view the current result of the voting.



7.16 Admin Login

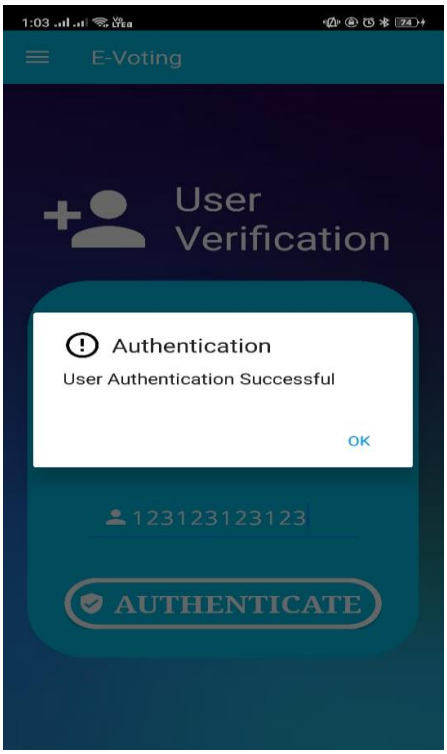
After clicking on, LOGIN AS ADMIN the ADMIN LOGIN Page will be opened in which the admin needs to input the EMAIL ADDRESS and the PASSWORD.

7.17 User Verification

7.18 User Verification with Details

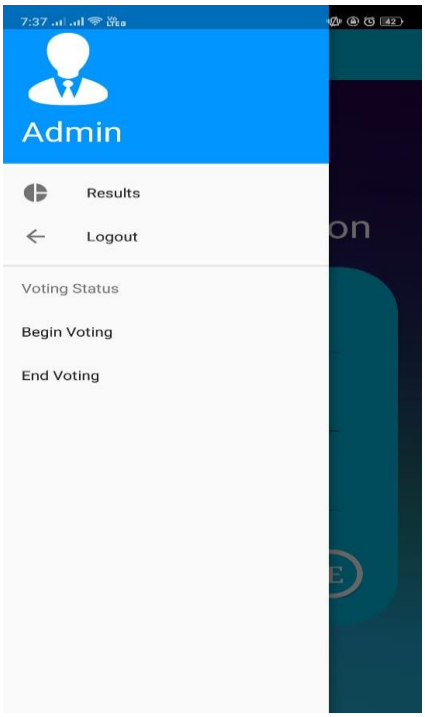
After the admin logins, the user verification takes place. It authenticates the user by the name, phone number and Aadhar card number.

The admin enters the details and clicks on AUTHENTICATE.



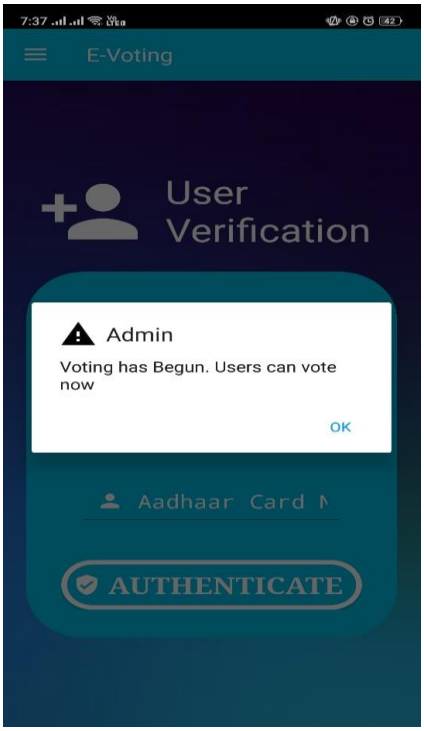
7.19 Authentication

The user is authenticated here.

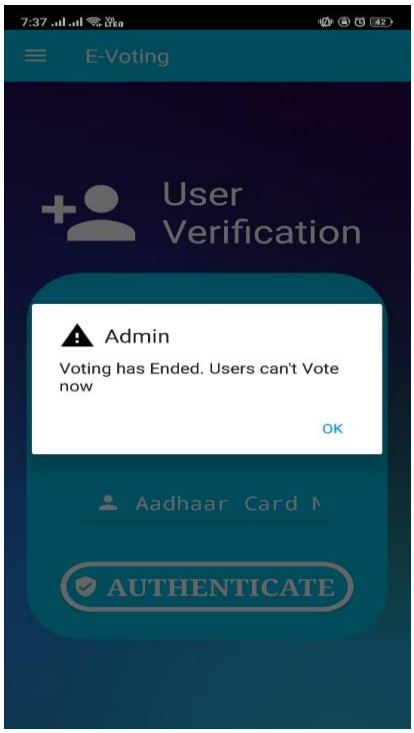


7.20 Admin Profile

The admin can set the voting status. BEGIN VOTING will start the voting and END VOTING will stop the voting.



7.21 Start voting

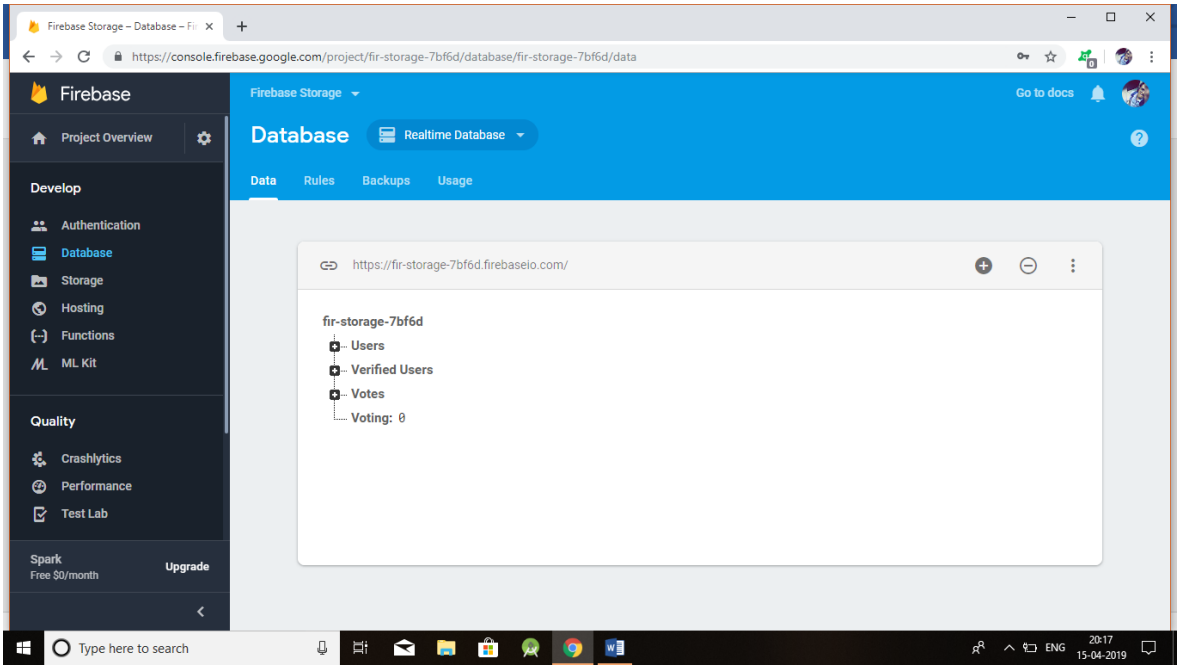


7.22 End voting

BEGIN VOTING will start the voting and the notification will appear that voting has begun. The users will be able to vote now.

END VOTING will stop the voting and a notification will appear that users cannot vote now. The voting will be stopped and the users will be unable to vote.

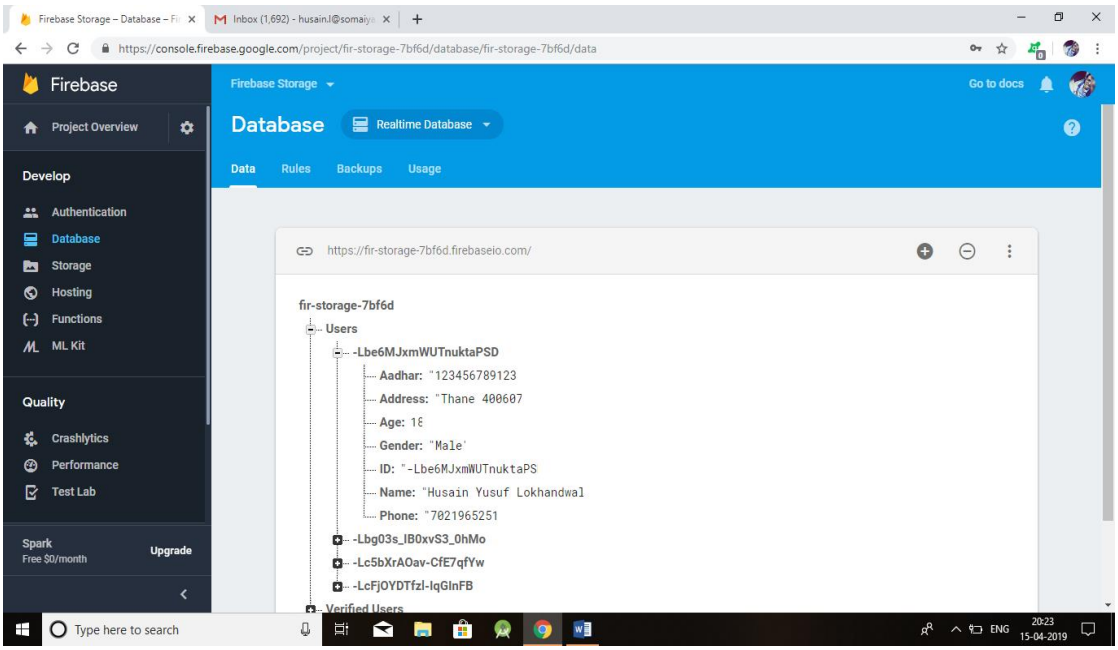
7.2 Firebase Realtime Database



7.23 Main Nodes.

Has all the nodes of Database that has users in one node, verified users in another node, votes in another node.

While signing up the users data will be input in this nodes. In Verified users the authentication will be done and then the counts will be displayed in the votes node.

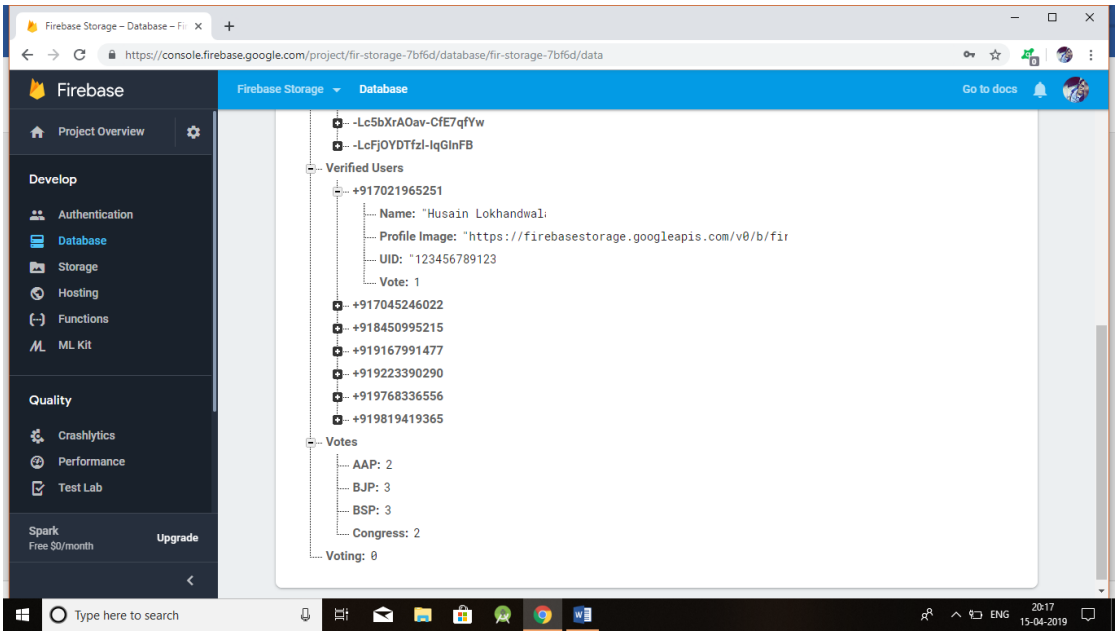


7.24 Verification in Database.

While signing up, the details you enter in the application it is stored in the Firebase database. A unique key is generated(parent key)

Child key: (Aadhar, Address, etc.)

User is the main node has detailed information. Has parent node id.

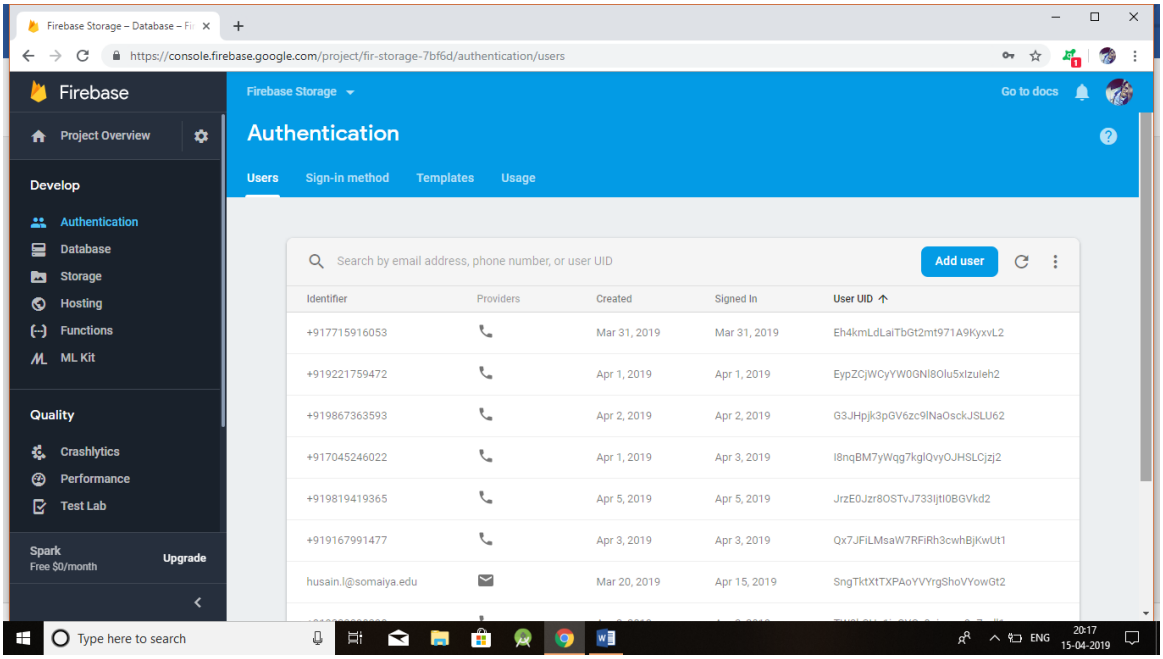


7.25 Details in the nodes.

When user visits the verification centre, in the admin side the admin will verify the users entry in a separate main node for verified users. The main node will have parent node that will be identified by the phone number and then details like name, profile photo, UID(Aadhar number) and the voting status(that is once the user is done voting the flag will be set to 1 and if the user is remaining to vote then the flag will be 0.) that is the status of the voting node will be either 1 or 0 and then accordingly the user will not be able to vote again will be displayed.

The users that are verified will be provided the access.

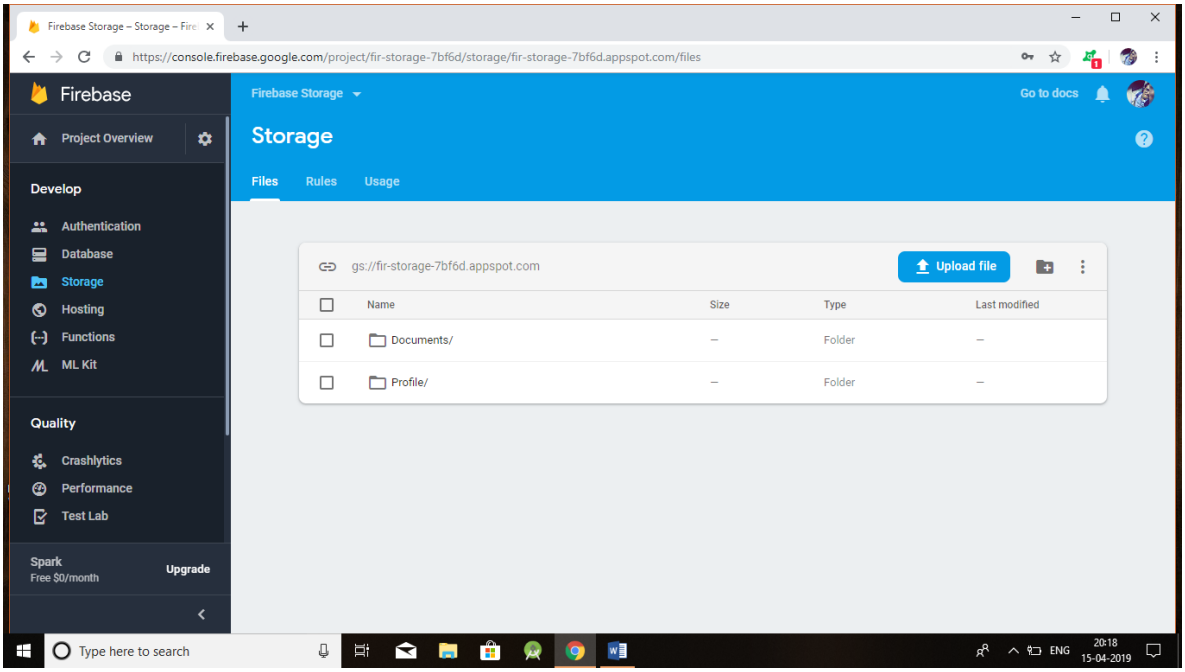
7.3 Firebase Authentication



7.26 Firebase Authentication.

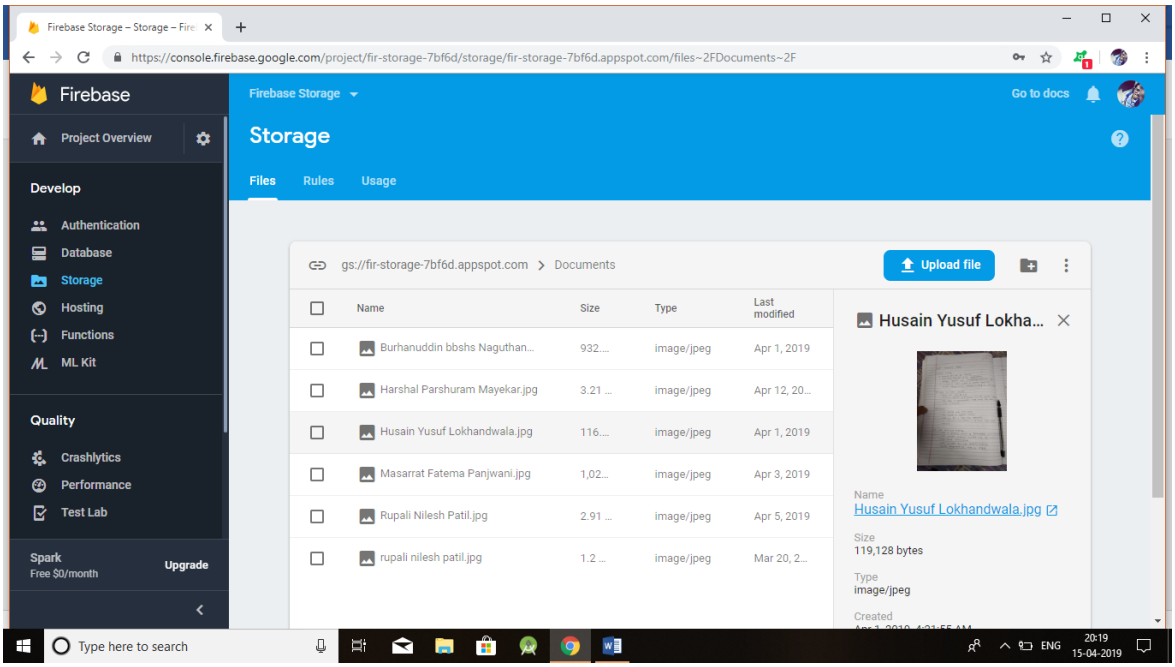
While logging in from the number the phone number is the sign in method. The number will be input in the Firebase Authentication and the admins login is from Gmail, so the Gmail and the password method.

7.4 Firebase Storage



7.27 Firebase Storage.

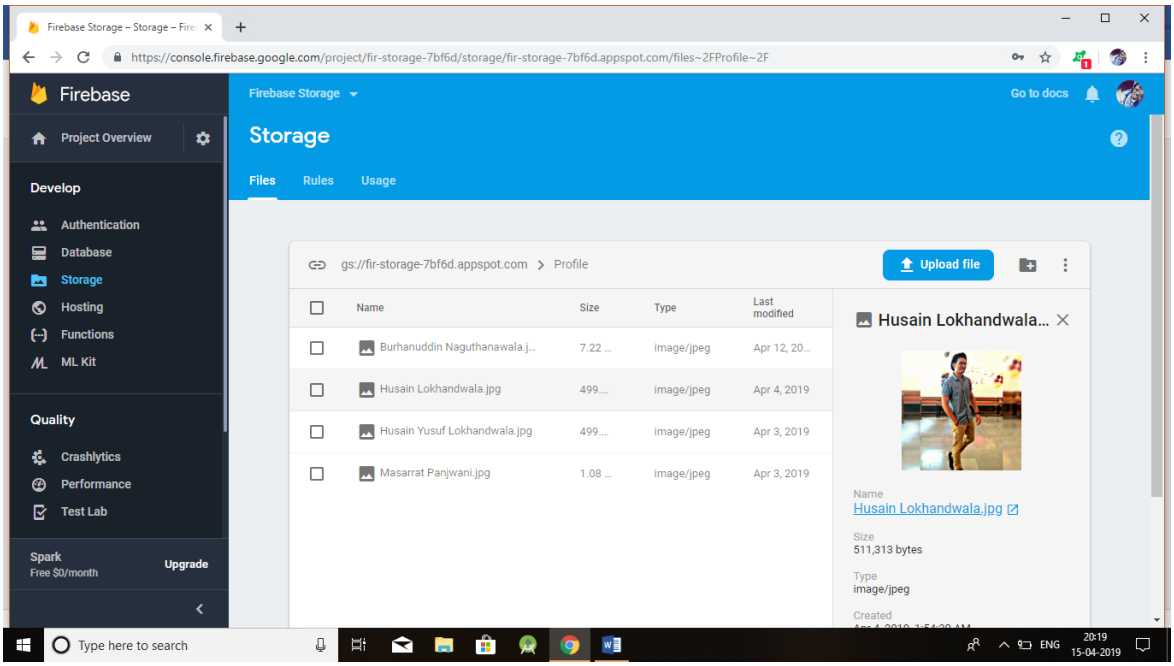
Images are stored here. While signing up when the user uploads the Aadhar card that will be input in the documents folder and if the user uploads the profile photo then it will go in the profile folder.



7.28 User File Creation.

In storage, while the Aadhar that is uploaded is stored in the documents folder will be displayed here. When the user will sign up a file of the users name will be created and the image will be stored.

At the verification centre, the admin will verify the users document with the uploaded document.



7.29 User File Creation with Image storing.

If the user updates the profile, the image will be stored in the profile folder and a file will be created of the users name and the photo will be stored in it.

Chapter 8

Conclusion and Future Scope

This chapter presents the final conclusion of the project. It also has the future scope that is the work that can be done in future to improvise the application.

Conclusion

From study we proposed a secure online voting system and user-friendly system using biometric authentication. We can provide security and only authenticated person is cast their vote. A system provides strong security of the online voters and protects them. against various security attacks. It is reliable system for casting votes.

Online Election systems have many advantages over the traditional voting system. Some of these advantages are less cost, faster generation results, easy accessibility, accuracy, and low risk of human and mechanical errors. It is very difficult to develop e-voting system which can allow security and privacy on the high level. Future development focused to design a system which can be easy to use and will provide security and privacy of votes on acceptable level by proper authentication and processing section. By online voting system percentage of voting is increases and cost and time of voting process is decreases. It is easy to use and it is less time consuming. It is very easy to debug.

The usability of this system is very high if it will be used in real life election process. It will definitely be helpful for the users who wish to vote and the voting process will be made very easy by using this application. Advantages of the proposed e-voting system: e-voting minimizes the risk of ambiguities as the voter makes his choice by touching the screen. Also, the user can cast vote without visiting the polling booth. It saves a lot of time and many resources. The results show that system is very efficient and easy to use.

In Present time, OTP (one time password) applications are increased. Security is an important issue for handling such services. Current system provide security card based facility to authenticate user but this is not secure enough and may not be available on any time or situation. To overcome such type of issues we propose online e-Voting authentication system using OTP with Aadhaar id.

Aadhaar based voting system has many advantages compared to the existing voting system. The advantages are less human error, less cost, quick publication of result and soon. An ideal e-voting system should provide high security. In future we focus on building a system which is much more secure and provides privacy for the voters and can include large databases.

We are provided with the advantages of having our system over the traditional voting system. Illegal voting is the main problem faced by the existing system, with our

system illegal voting's can be removed completely. Our system also prevents multiple votes by the same person and checks the eligibility of the voter. A person can vote from anywhere provided they should be above age 18.

Future Scope

The practicable future scope of the project includes the improvement in the security level of the system. In annexation to that it would be interesting to meet some other confidential primitives to improve the security level of online voting system online voting systems have many advantages over the traditional voting system. Some of these advantages are less cost, faster generation results, easy accessibility, accuracy, and low risk of human and mechanical errors.

The Online Voting System (OVS) platform can be made more secure by using the following methods

- Fingerprinting
- Cornea Detection

As the technology has advanced a lot, the possibility of attack by hackers is a threat to our system. To ensure security we can make use of cryptography such that encryption can be used to secure the database and the integrity of the data. In future, databases that can accommodate large data can be incorporated.

There exist various methods to secure the Voting process. In future complex Grid Matrix can be used and make it complex for hacking and related issues. It can be extended to more Security Using various level of Authentication and Verification. More Security and Privacy Issues can be maintained by using various aspects.

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