Application For Online Voting System Using Android Device

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***Abstract*— Voting is an important aspect for democratic countries. Elections decide which candidate is capable and also decides the future of that country therefore elections should be as transparent as possible and should have high level of security. But the existing voting system has some flaws like time consuming process because voter has to wait in queue for casting their vote also there is lesser security in present voting system. Due to this, inclination of voters is decreasing towards voting and voting percentage decreases. To overcome these issues and to improve the existing voting system we are designing online voting system using android application which will give better system security and vote casting become less time consuming process and it will provide better results. Voter can cast vote remotely from anywhere in the country with the help of an android device and voting application on his device. Voters must have internet connection on their android device to cast vote from remote place. Android application will be compatible with almost all the android devices so that every voter should get benefit of online voting system. It has higher level of security as it has two stage authentication technique i.e. Facial recognition and One Time Password (OTP). Voter data that is his facial images and voter id will be stored on the database. Verification process is done by server itself. Facial image of voter will fetched by android application which will be then forwarded to server for further verification, also thereafter One Time Password will be provided to the voter on his registered mobile number for further verification process for vote casting. Voter is allowed to cast his vote after successful verification with facial recognition and One Time Password. Results of election will be displayed on individual voter's device in terms of notification and voter will get updates about election to enhance the system performance.**

Keywords*— *Android, Principal Component Analysis (PCA), One Time Password (OTP), Database

I. INTRODUCTION

Voting plays a very important role in any democratic country .Voting is the system where citizens choose and replace government by doing elections. Hence these elections must be accurate and transparent. When elections are happening there is need for lot of man power for completion of elections properly and with desired security. Although lot of man power is used in elections there is no guarantee that elections will be done with no fake votes. Sometimes there are chances that fake votes can be done. Also for voting voter has to go to the voting booth and stand in line for long time. Due to this the percentage of voting reduced in some amount.

Currently used voting system consumes much time and it is a very hectic process. Application for Online Voting System using Android Device (AOVSAD) provides the facility of casting votes without visiting the booth to the voters. The facial recognition secures the system by allowing the authentic voter for voting. One time password (OTP) provides another level of security to the system. To avoid fake voting and for providing voter an extra comfort by doing vote from remote place so that voter inspired to cast his vote and voting percentage will increase phenomenally. A new technique as Mobile based Facial Recognition can be implemented. This system provides extra bandwidth utilization for voting system.

II. LITERATURE SURVEY

Existing voting system is a major issue in our country and researchers have tried to prescribe various techniques to improve the system. The system presented by [1], is the electronic voting system using GSM mobile technology.

When ready to vote, the voter can send a message to GSM modem and can cast their vote after IVR authentication. This also presents a website voting system with system generated OTP and verification of iris. The system designed in [3], gives the overview of the online voting system using mobile application. It provides security keys like mobile face recognition and OTP verification. This approach proposed by [4], use PCA which is a standard method used for recognition of statistical design in order to reduce dimensionality and used for feature extraction from particular object that is it extracts important information in terms of pattern. It is used to preserve the important information of the pattern of the object and used to remove redundant information. The paper proposed by [6], the system utilizes the camera system on mobile devices; system identification can be done by a person using face recognition system. In this system, the facial recognition is done with the use of cloud computing. The paper by [7], one of the ways to prevent the password theft is to avoid using static password and to authenticate a user with One Time Password. Using instant messaging service available in internet, user will obtain OTP after image authentication. The image based authentication method relies on the user's ability to recognize pre-chosen pictures. Some of the above approaches are developed and implemented separately. Some are good in security aspects but are not efficient to use with the current system. Some give an overview of the technologies that can be used to improve the conventional system but not the actual implementation. Available approaches have to be improved in security aspects and simplicity. The system we designed to overcome these flaws will mainly target the urban population.

III. MOTIVATION

The major problem that present in conventional voting system is that voters have to wait in queue for a long time to cast their vote. This is very hectic and time consuming and hence people avoid voting. The system proposed here is to voter can cast vote remotely from anywhere in the country with the help of an android application. To overcome the drawbacks of conventional voting system, we are proposing this project of internet voting with the use of facial recognition and one time password. This makes the current voting system more secure.

IV. PROPOSED WORK

A. AOVSAD Architecture and Working

The each block in the diagram corresponds to a particular function. Following fig.1 gives the architecture of the system,

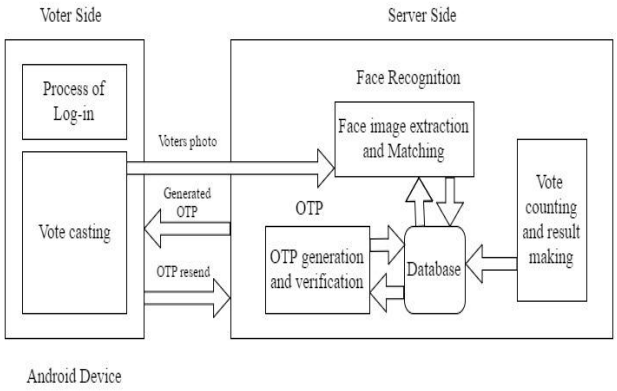

Fig.1. Block diagram of AOVSAD

- The AOVSAD system consists of android application for voting. This application contains block of voter ID for log-in of voter. Also android application contains feature of camera for taking the face image of the user for face detection and recognition.
- All data of the voters is stored in the database, images of the faces of voters are also stored in database .This photos are stored with various angles so that face verification can be done in effective way.
- Voter Id of different users is stored in the database.
- Local server use for AOVSAD system is XAMPP server. XAMPP Server is the part of AOVSAD system where process of face verification takes place. Here photo of voter which is stored in the database while registration of voter will be compared with real time photo of voter which server got via mobile application.
- After successful face verification One Time Password (OTP) will be sent to voter on register mobile or email ID according to choice of voter. OTP is the One Time Password .OTP is used to verify the true voter for avoiding the fake votes.
- If voter enters the correct OTP, then voter will be asked to cast a vote.
- Voter will be then shown a list of the candidates that are there for election and voter will be asked to cast a vote for one of this candidate.
- After vote has been cast by the voter, this vote will be stored in the database and result of the election will be declared and it will be available to voter after entering his correct voter ID.

B. Android Application

Android phones are highly customized and change appearance of device with various launchers and themes. Various applications are available to check your Facebook account, manage your bank accounts and for playing games. With android device you can make list of events in your device calendar and see them on your computer or website. One of the best parts of being owner on an android device is there is store to buy applications named as Google play

store. Various applications for various purposes are available. Users can find apps to help them to stay organized, watch movies, read books and for many other activities. Android apps can be developed by using open source software's available on internet. Android development software's are provided by the Android Inc. The software's commonly used to develop android apps are Eclipse and Android studio. Android studio is the latest software used for developing apps. Android Studio is official integrated development environment (IDE) and it is used for Android platform development. Android Studio was in early access stage starting from version 0.1 and the latest version of android studio is 2.2.1. Android studio had replaced Eclipse Android Development Tools (ADT) as Google's primary IDE for Android application development and it can be downloaded on Windows, Mac OS X and Linux.

The android apps are developed depending on the version of android software being used by the user mobile. Some of the examples are Kit-Kat, Lollipop, and Jelly Bean etc. The various android versions are differentiated on the basis of their application programming interface level (API). A set of routines, protocols, and tools for building software applications is defined by Application Program Interface (API). How software components should interact is specified by API and APIs are used with programming graphical user interface (GUI) components. API providing all the building blocks make easier to development of application is stated as good API.

C. Database and Server

The data of voter has to be stored so that it can be retrieved whenever needed. Also it has to be present on the server side so that the server can upload or fetch the voter's data from there. Hence we have to create database which contains the details of all voters. This can be implemented using XAMPP server. XAMPP is an open source cross-platform web server. To improve flexibility of server XAMPP server has been developed. XAMPP is an acronym for Cross-Platform (**X**, any operating system), Apache (**A**, web server), MySQL Database (**M**), PHP Language (**P**) and PERL (**P**). The goal of XAMPP is to build an easy to install distribution for developers to get into the world of Apache. For convenience of developer, XAMPP is configured with all features turned on .It is extremely easy for developer to create a local web server for testing purpose. It is simple and lightweight. It works equally well on Linux, Mac and Windows. Since many components of XAMPP server are present in actual web servers, it makes transition from a local server to a live server very easy. XAMPP is clean of viruses and malware. It is available in three file formats namely .exe, .7z, .zip.

D. Face Recognition

There are two stages involved in facial recognition process. Those are,

1) Face Detection

This stage detects whether an image represents a face i.e. the general structure of face or not. General structure includes forehead, eyes, nose, lips, chin etc. In other words, this process selects the area of interest for extracting the features.

2) Face Recognition

This stage is a bit complicated as there are number of points involved which have to be taken under consideration while matching the faces. Face detection is easier than face recognition, as face detection is used to detect a face from an image but face recognition is used to find out whose face is this. There are various methods available for the face recognition. It uses techniques such as PCA (principal component analysis), LBP (local binary patterns), ICA (independent component analysis) LDA (linear discriminate analysis). These techniques are used for face recognition. In this process some variations occur that creates difficulties in face detection and those variations are illumination change, pose variation, RST variation, cluttering, occlusion.

V. SYSTEM FLOWCHART

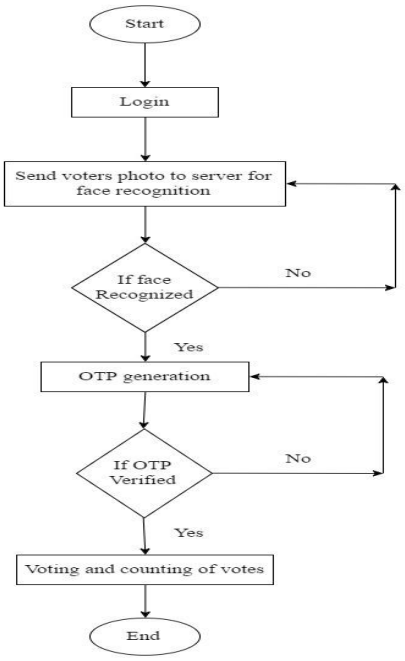

Fig.2. Flowchart of the AOVSAD system

- The process of voting starts with android application which is installed on the smart phone of voter. The voter has to login with voter id which was assigned during registration.
- After proper login, the voter is asked to send his/her photo for face matching which is the first authentication stage.

- Face matching is performed at server side. If the face recognition is successful, the server will generate an OTP and it will be sent on the voter's registered mobile number. Otherwise, if recognition is unsuccessful, the voter is asked to send the photo again and not allowed for further process until voter is authenticated with face recognition.
- Then Voter will be asked to provide the OTP sent on his/her mobile number. If OTP verification is successful, voter will be allowed for the voting process. Else server will send another OTP after some pre-decided time and again the same process will be repeated. This is the second authentication stage.
- At the end, the voter will be allowed to vote and that response will be submitted to the server. Counting of votes and results will happen at server side.

VI. Results and Analysis

We have designed an Android application which has to be used as a GUI for voting system. We have used OTP as an authentication in the application. This system generates the OTP which is done using a pair-based authentication scheme. Then it has to be decipher the OTP encrypted using playfair cipher process and send it to the server. The server checks if the both OTPs are matching or not. And further allows user for voting. A website is also designed for registration of voter and candidate. Voter or candidate can fill up the details through the website form and can register for the voting process. The website also shows the candidate details to the person who has logged in to the site. This website is interfaced with the XAMPP server which is our prototype server for this system. The server has database where all the details of voters and candidates are stored. It also stores the voting details and vote count. Already voted person will not be allowed for voting again because his/her voting history is recorded by the server.

A. Resourse Utilization [CPU, RAM, Server, Database]

For Developing voting application the minimum requirement of hardware devices is 4GB of RAM minimum, monitor of any brand, at least 120 GB of hard disk and Intel processor P4 3.0MHZ.The software requirements are Windows 10/8/7 (32 or 64 bit), Java Development Kit(JDK) 8, Android studio and the languages required are JAVA, JavaScript, PHP and HTML. The XAMPP server is used with database. The backend language used for the server is PHP. The android application will be installed on a smartphone which must have android version of 5.1 or above and RAM of more than 1GB. The size of application is 560Kb. By using above requirements, the application can be developed and used.

B. Android App Layout

Following Fig.3 shows android application layout of AOVSAD system,

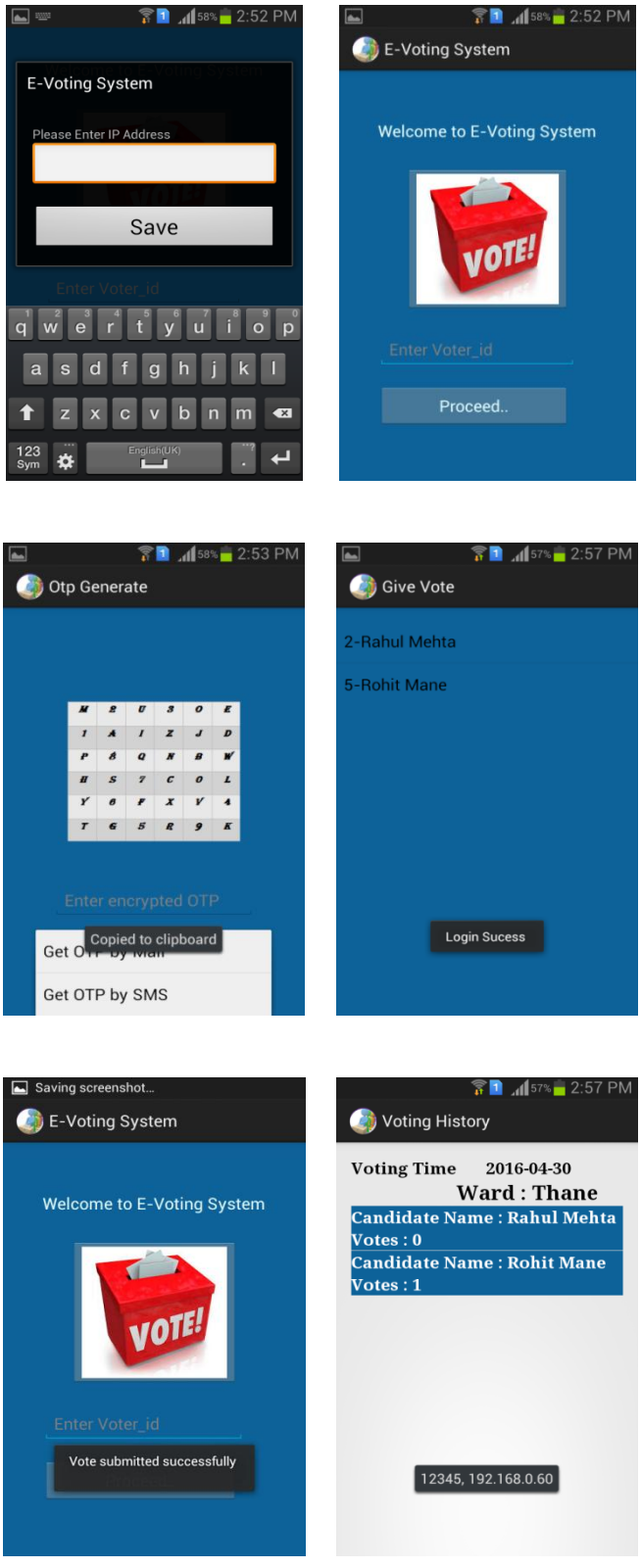

Fig.3. Android application layout

VII. Conclusion

This is a novel technique that will give us best results in terms of security through facial recognition and OTP verification. This voting system helps everybody to cast their votes remotely without any problem. So this will increase the inclination of voters towards voting and will give us the better results.

VIII. Future Work

This proposed system uses XAMPP server which is not real time server. To improve performance of system some real time server may be used. One of such platform is Amazon Web Services (AWS). Also AWS has better user interface and speed. Though the interfacing with AWS is little bit tricky, it will give effective results with better efficiency. In future, for improving the system performance and security, AWS can be used in this system.

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