

Centralized and Secured Electronic Voting System

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ABSTRACT

Elections are the routine part of our political system. Here we thought about the current voting system, where a person needs to go to their own constituency to vote for the particular participant, which is used in whole world. This project is being designed to reduce rigging in the voting system as well as maxim voting in each and every election could be registered. Today, we are in digital world of integrated systems in terms of hardware, memories and database utilization. We already are working on and unique Identification system in the country or may be in the world. So, we thought that the current voting system should be updated to centralized voting system where a person could vote from any place. Also we can reduce the rigging by biometric authentication and centralization of voting system. For centralization of voting system we need to manage the database system that can be managed through oracle or sql server. Voting machine will be directly connected to a computer system which will have a GUI. This GUI will contain the details of that particular voter as he / she will process for vote. But it will not show that the candidate has voted for which candidate because it will be confidential. That particular vote will directly be updated to the excel sheet on that computer which will be shared in centralized server.

Keywords: Authentication, Biometric, Centralized Database, Eye – Retina, Security.

1. INTRODUCTION

In the past a few decades from independence to till now, our governments have begun and tried to introduce modern technology our voting system. At the time of independence there was manual kind of voting system where voter mark a sign on their candidate on the paper in which all the candidate's names were printed. Then they fold the paper and put that in the box. After that it improved so many times and now we have an electronic voting system which is less expensive and paper saving scheme to save the environment. In electronic voting system or e-voting system, we use the computerized voting machines which are high speed less cost and result accuracy rather than the classic paper based voting system. As none of the system can be perfect and always have the possibilities of improvement, we saw this system is better than earlier but not best. The reason we have taken is that it is not having centralized database. If any person who wants to vote, He need to go to his own constituency. There is no way of voting from another constituency if he is not able to be there in his own. Due to which less number of voters participate for the particular election which is leading to loss of a precious vote that can change the results.

In terms of security, current voting system has completely manual method. So, if a person comes for the vote, he shows the voter ID and sometimes doesn't show the ID and goes to the voting machine and votes for the desired candidate. It may happen that any non-eligible person also can vote or a person can vote for twice.

To make improvisation in this existing system, we thought of centralizing of data for maximum participation as well as security to reduce the rigging in the elections. This paper is the solution of those problems we face in the elections. Here, the system will take input from the UID card through QR Code Scanner and this input will be fed to the Computer machine which will be accessed by the MATLAB Code for authenticity verification. In MATLAB Code we will compare it with the records and find the details of the person. After that system will check the eye retina of the person for the biometric verification of the person. If the person clears the verification then he will be allowed for the voting process and the actual voting machine will be activated for the selection of candidate by the voter. Once the candidate is selected, machine will send data to the system for centralized database which can be accessed from anywhere.

2. MOTIVATION

India, being renowned as the largest democracy in the world follows the ideology of 'Government by the people, for the people and of the people' and grants Right to Vote to its every citizen who is above 18 years of age[1]. But the Electronic Voting System being followed in our Country is quite old and needs to be replaced if we want the Campaign 'Digital India' to be successful. At present, the Casted Votes get stored in the database of the Electronic Voting Machine thus employing a large amount of human resource for ferrying the Voting Machines from distributed places to a Centralized environment. Hence, with an objective to make this system more economically feasible, this Project aims at providing a centralized database to the various distributed databases. The Centralized database will ensure that the ward databases from various locations get updated either dynamically or after a certain delay thereby making the calculation of the votes against a particular candidate a very simple task.

Recently, Lok Sabha election process conducted in India. For effective and smooth elections, Electronics Voting Machines were used everywhere. Though the election commission took extreme care and strictness in election but here and there rigging and malpractices were reported. Actually, it is not any fault in work of election commission who handled these election processes. It is really difficult to identify the authenticity if the voter to stop the rigging by the polling officials. If the sophisticated Centralized and Secured Electronic Voting System is developed to verify the authenticity of the voter by their UID QR Code scanning and biometric verification i.e. eye-retina scanning then malpractices and rigging can be reduced to minimum and it will also help the election officials in their work.

3. PREVIOUS WORK

There are so many systems and machines already designed for the voting in elections. These machines are used for voting in their own databases and all the results are stored in those machines only. There was a lot of security was done in those machines like:

3.1. Israeli e-Voting Scheme

With the reference [2] voting scheme, it was the idea to save paper, reduction in manpower as well as to make the counting process transparent. To register their votes, the voters write their choice among the candidates into the smartcard using the computer terminal and then put that smart card in the ballot

box. After the completion of voting process, the election commission committee manually counts the votes. They probably count the smart cards by feeding into another computerized counting machine. That means they also electronically counts the votes. Then results of manual counting and electronically counting are being compared.

There are so many problems with this system of e-voting. As stated in reference [2] there are following problems in this system:

- 3.1.1. Voters write their choice on the given smart card but it is difficult of checking what is written on that smartcard.
- 3.1.2. An insider also can change the choice on smart card and it is harder to detect.
- 3.1.3. In order of mismatch, there is no way to find the possibility of candidate to whom he has voted.

3.2. Computerized Counting Machines

Sensor based or card punching systems still rely on the paper ballots. Generally, voters mark the vote through some physical modification or mark with carbon ink. Then the final voting is counted by computerized machines.

The problem with these systems is that those operate manual verification and authentication of the voter.

3.3. RFID and GSM Based Voter Identification System

As stated in [3] after receiving the voter ID from RFID card reader, microcontroller will compares that ID with its database. If matched, it will send five digits OTP to registered mobile number through GSM Modem. Then the person will enter the particular OTP in the voting machine to verify the authenticity.

The problem in this system is that if the contact number of person changed or lost by chance on the same day. In that case person will not be able to vote which will lead to loss of precious vote for any of the candidate.

4. METHODOLOGY

This Paper mainly contains the following modules:

- 4.1. Input Module**
- 4.2. Authentication Module**
- 4.3. Voting Machine**
- 4.4. Central Database**

4.1. Input Module

The input module consists of QR code scanner. There are so many QR Code scanners in the market by the companies like Data logic, Honeywell, Motorola, etc. QR code is actually 2D barcode and we have used QR code of our Aadhaar Card i.e. provided by the Unique Identification Authority of India (UIDAI) which contains Unique Identification (UID). In reference [4] Aadhaar is a 12 digit individual identification number issued by the Unique Identification Authority of India on behalf of the Government of India. This number will serve as a proof of identity and address, anywhere in India. Each Aadhaar number is unique to an individual and will remain valid for life. Aadhaar number helps

to provide access to services like banking, mobile phone connections and other Govt. and Non-Govt. services in due course.

4.2. Authentication Module

Authentication Module consists of two layers of security. These two layers are as follows:

4.2.1. UID (Unique Identification) Scanning System

UID is the Aadhaar Card ID Number which is stored through QR Code on our Aadhaar Cards. To get UID, we require QR Code Scanners. QR Code scanners are actually 2D Bar Code scanners. There are so many scanners for this purpose. Aadhaar is a unique 12 digit number issued by the government in India. It is the database of finger print, iris (uniqueness of human eye patterns) and signature. In future government is planning to use it as identity card at every possible place like airport, courts, criminal activities etc.

First of all the person will scan the QR Code of his Aadhaar Card and this number will directly fed to the computer system where it will be checked in database for its availability. If it is found there, the complete record will be fetched and displayed on the screen along with the photograph. It will complete the first authentication as the election official can get details of the person along with his photograph which will verify the authenticity of the voter.

4.2.2. Biometric Recognition System

After verification of authenticity of the voter, Biometric recognition system is required to verify the identity of the person. We can have so many parameters those are unique in any person like finger print, face, eye-retina etc. We can use eye retina scanning because it is the most secure way to identify the person. Even in our daily life we use to say that any person can be judged and identified by their eyes. This kind of biometric recognition system is also known as IRIS. The idea for retinal identification was first conceived by Dr Carleton Simon and Dr Isadore Goldstein and was published in the New York State Journal of Medicine in 1935 [5]. Today, this is well known but least deployed technology.

In Retina scan technology, we use the retina which is actually a surface on the back of eye that processes the light entering through the pupil. It is based on the blood vessel's pattern in the eye retina. The blood vessels at the retina provide the unique pattern and this same pattern is used as the tamper-proof identifier in this technology [6].

Retina scan devices are exclusively for high end security applications for physical access. So, this is used for the identification of the person. Our UID (Aadhaar) details also contain the eye retina pattern. We will compare the current scanning with that database which will be a fare identification system. Once it will authenticate the person for vote after this two layer security check, the hardware voting machine will be activated for registration of vote to the desired participant.

4.3. Voting Machine

After completing the verification of identity of the voter, Electronic Voting Machine (EVM) will be activated to vote. This EVM is a microcontroller based machine which will serially fetch the data from the system and show the candidate list of that particular constituency from the voter belongs to. List will be shown on the LCD which is connected through the microcontroller. Once the list displayed, voter will be able to choose the desired candidate for his vote. When the voter will press the switch corresponding to the desired candidate machine will again send the data to the system so that the registered vote could be updated in the centralized database.

4.4. Central Database

For centralization of database sql server is used. Data is centralized on the server and distributed the different nodes or machines. The complete database is merged and distributed through the sql queries like select, insert, update, delete etc. The database we are using is containing all the details of voter i.e. available through the Aadhaar Card. It contains an extra column i.e. voter registration check. This feature is used to get whether that particular had voted or not till now for this election. If he hasn't voted he will be cleared for vote and update the data as he will vote. Once he will vote the system will get the marked voter and will send to the system that person already voted. It will prevent from re-voting by any voter and other kind of rigging during the election process.

5. FIGURES

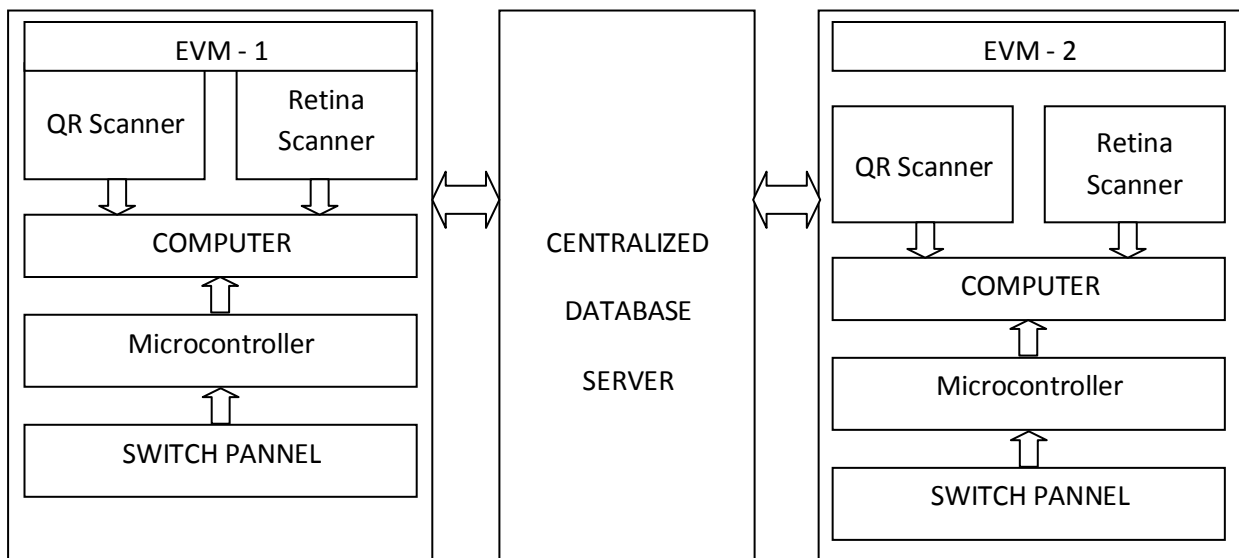


Figure 1: Block Diagram of Electronic Voting System

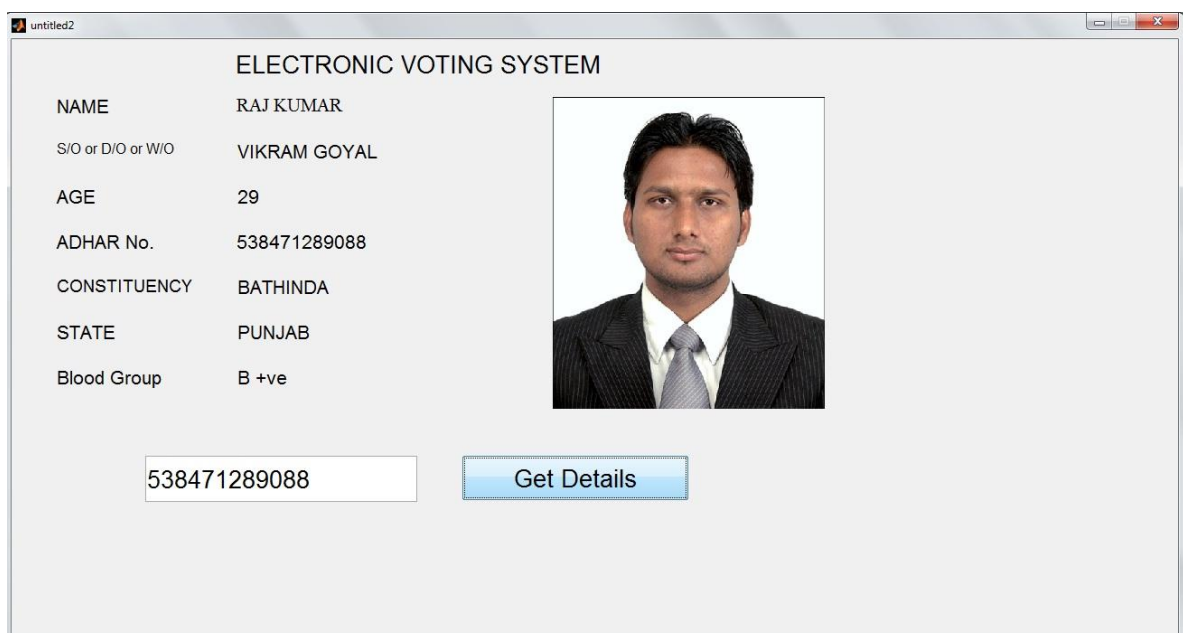


Figure 2: Graphic User Interface of Electronic Voting System

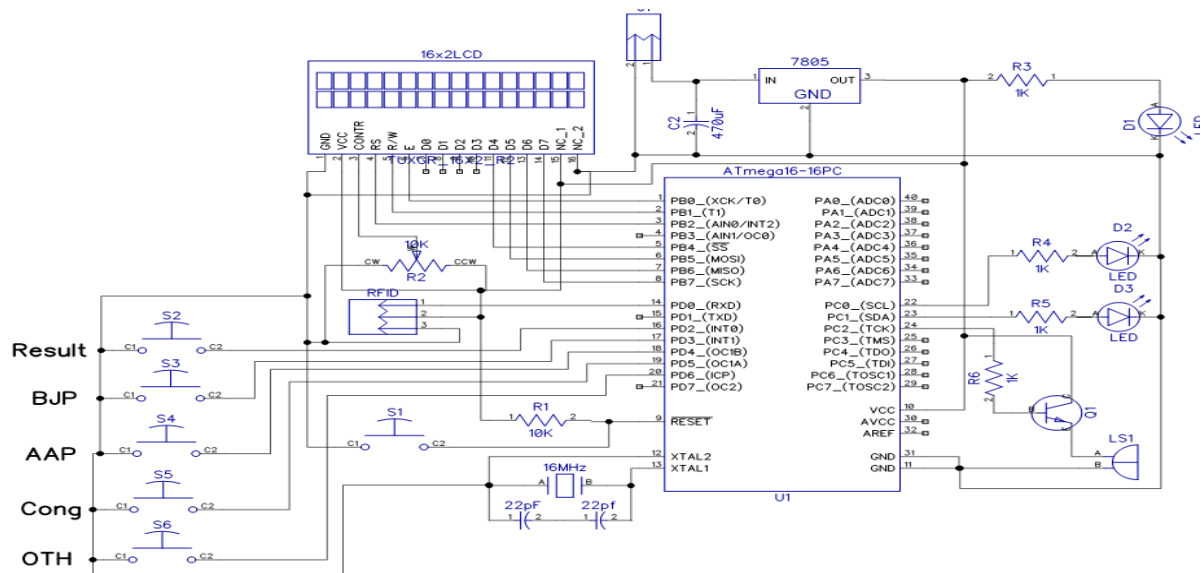


Figure – 3: Circuit Diagram of Electronic Voting Machine

6. CONCLUSION

This EVS (Electronic Voting System) is designed for fair electing by preventing rigging and re-voting by any voter. It will result as least manpower for election as well as actual verified voting. It also results as maximum voting as voter can vote from any voting machine because of centralized database. Although the installation cost is high for this due to high cost scanners for retina scanning but security of voting system as well as reliability and transparency in election will be high. Installation cost is one time cost for any of the system rest is always maintenance cost which will be least as compare to cost of elections these days. Centralized database allow the voter to vote for his constituency candidate from anywhere in the country which will prevents the loss of a valuable vote. It will also reduce the requirement of polling booths. Biometric system will provide the highest security as well.

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