CONTACTLESS VOTING SYSTEM

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Abstract - *In previous times, the voting was done through ballot papers. If the seal is not clear enough, or if it is damaged, it would affect the result. Our proposed system, Contactless Voting System, ensures that there doesn't exist any contact between the voter and the electronic systems. Such a system ensures a safe and hygienic voting process which could be useful during this present pandemic situation. Here in our voting system, the voters go to their voting place and prove that they are allowed to vote. This is done by obtaining the details of the voter by scanning the QR code of their Aadhar card. After the validation of the voter, he is then ready to cast his vote, which is done by, placing the QR code of the candidate to whom he wishes to vote in front of the camera module. By doing so, the camera will capture the QR code of the candidate, will identify the candidate and a vote will be added to the corresponding candidate. Cost and security are the other two important factors that are considered in our voting system. We devised our system in such a way that a low cost is maintained throughout by using the essential components.*

Key Words: Contactless, Electronic Voting, QR Code, Scanning, Identification

1. INTRODUCTION

In a democratic country, the power of decision making is in the hands of its citizen. It is the people of its country that decides who should lead their country through the process called voting.

Till now there are different methods and techniques adopted by the government for the voting process. The design parameters of voting system should be chosen in a secure and precise manner, so that all concerned parties acting as candidates as well as voters that are polling the votes must be satisfied with the announcement of results after elections have been conducted.
There are several types of methods and technologies have been undertaken for the purpose of casting votes like Ballot paper voting system, Electronic voting system, Direct- recording electronic (DRE) voting system, Public network DRE system.

1.1. Ballot Paper Voting System

It is also known as "Paper based electronic voting system". This system counts the votes electronically which are marked by hands on a ballot paper. Punch card voting, mark sense and digital pen voting systems are all examples of this system.

1.2. Electronic Voting System

The term electronic voting, also called e-voting, represents many different types of voting (for both casting and counting of votes) using electronic devices. However e- voting system faced some controversies, especially DRE voting system, that it facilitates electrical fraud.

Traditional voting which has several problems in the real life. Safety and security issues are the major problems which are arising for the traditional voting methods.
In this research, we developed a Contactless Voting System. Our proposed method aims in providing completely contactless voting system which provides a voter to fulfil his duties as a citizen towards his democratic country by providing them with clean, hygienic and safe environment to vote.

2. LITERATURE REVIEW

In this section, we aim to review literature we consider relevant to E-voting system with contactless IC Cards.
Their implementation uses Borland C++ Builder 6 for user interfacing and contactless IC card with contactless IC card reader for accessing. They also utilizes a touch screen technology for the user to use this system by touch.

This E-voting system mainly consist of three parts: ballot card issuing machine, polling machine, and counting machine. Ballot card issuing machine writes all the specific voting information of the voters into a Mifare card, so that polling machine can easily verify that whether the Mifare card is the ballot card for this election or not.

In the next step the polling machine will check if the Mifare card is issued from the ballot card issuing machine or not. Otherwise, the polling machine will reject the Mifare card which is not issued from ballot card issuing machine. The polling machine will check the ballot card is voted or not. The polling machine will reject the all the voted card. This is for the criterion of uniqueness, so that voted ballot card can't be poll again. In order to avoid the ballot being from counting twice, the ballot card verifying will execute during the time when counting machine counts the votes.

Many experiences revealed that they are often confronted by security issues. The origin of this security issues are either from the outside attackers like from the voters itself or from the inside attackers like system developers and administrators.

To hold back these attacks from hacker making incursion into the voting system via network, they designed the system to transmit data without network
and also limiting the voters input on particular data.

3. PROPOSED SYSTEM

We designed and implemented an electronic voting system which is completely contactless so that it provides a safer, cleaner and hygienic environment for the voters to cast their votes. As the number of health issues are increasing day by day due to the interaction of people through direct contact, our proposed method will be a new door for the future.

The basic principle behind our contactless voting machine is 'QR Code Scanning'. This is carried out by appropriate coding using Raspberry Pi module. The QR code of the candidates will be given on a slip. Each party will give their respective slips to the voters in their houses before the election. This slip will include the name of candidate, symbol of the candidate and QR code of the candidate along with the voters name, ward number, booth number and serial number.

Each slip can be divided into three parts through the dotted line. The part which contains the name, ward number, booth number and serial number should be shown to the officials before entering votes. For entering the vote only the part which containing QR code is needed which is then separated from the slip and place it in front of the camera module. In case if the slips given in homes were lost in any ways, we also provide provision for the voters to download and print the slip electronically also.
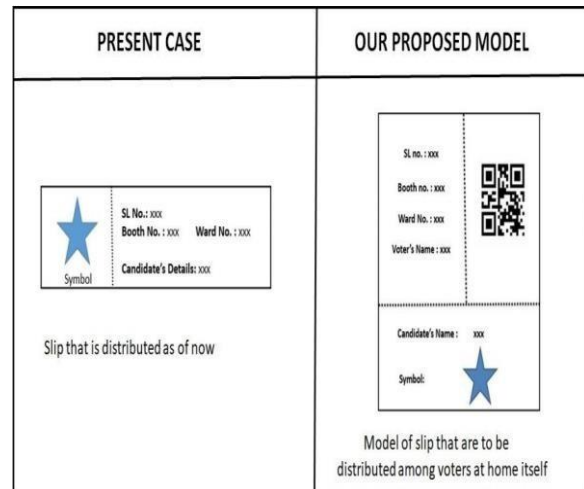

Fig -1: Slip Model

3.1 QR Codes

QR codes are those which is developed in 1994 which consist of black dots arranged in a pattern like a square grid on a white background. These QR codes have significant advantages. First is that the QR code work in both the horizontal and vertical and they can hold upto 350 times the information of a UPC barcodes with finer or higher dpi prints. Second advantage is that, they have built in error correction making them less liable to damage from water, wear and tear etc. Third advantage is that these QR codes can be easily read with a camera versus a specialized reader. By scanning these QR codes it allows the shopper to see more details about the product information.

3.2 How QR codes are built

They are formed with 2D array of pixels which has one colour to represent zero or contrasting colour to represent one. They can range from 21 by 21 pixels upto 177 by 177 pixels. They have distinctive patterns in the corners having the same size, larger versions include smaller alignment structures. The second structure that is seen in the codes is the timing structure. This pattern aligns with the edge of the outer positioning squares and alternates between the two colours of the code at a size of one pixel. Next pattern is used to denote the format of the data in the code. First we have level of error correction used in the code. They can be low that is, which can restore roughly 7% of data. Level M (medium) they can restore 15% of data, High which can roughly restore 30% or quartile which is able to restore 50% of data.

Now the second part of the formatting pattern is the

mask that is applied to the data. Masks are used to break up the large blocks of identical bits to make it easier to read. The remaining part in the formatting pattern are the error correction for the five bits covered so far.

Next part of the QR code is single bit which is relatively the unused part of the code. The data starts in the lower right corner starting with the most significant bit of the data, this then follows a zigzag pattern working its way up to two columns to the top of the data space this then continues back down to the next two columns and the process continues.

The first four bits in the data will specify the type of encoding. It includes numeric, Alpha numeric, kanji, hole bytes and other complicated structures. Our data will be stored as hole bytes. QR code is able to store different data types in the same code. The next byte of the data stores the length of our message. The first byte we are stirring is the ASCII capital j which is represented by certain bits and they are transpose to first byte in the data space. By following the same process we can fill the remainder of the data space with rest of our message.

4. OBJECTIVES

The main objectives of our proposed systems are:

a) To make a contactless voting environment

b) Easiness for casting votes

c) Security

After the first phase, the voter enters to cast their vote by placing the QR code of the respective candidate in front of the camera module. The vote has been entered and the process stops.

5. WORKING

Working of this system is done in mainly two phases .First is "identification of the voter" and the second phase is "entering the vote".

5.1 Identification

Firstly, the voters have to bring their voters' ID, Aadhar card along with the voting slip provided. Then the officials check the respective voters' ID and cross-check with the voters list provided to them (manual validation).If the voter's name is present in the list, then he is able to vote.

Then the Aadhar card scanning is done. It is done for two purposes:

a) If a person comes to vote again, then the system will notify that he has already casted his vote.

b) At the end of the election process the officers will get a complete list of people who came to vote.
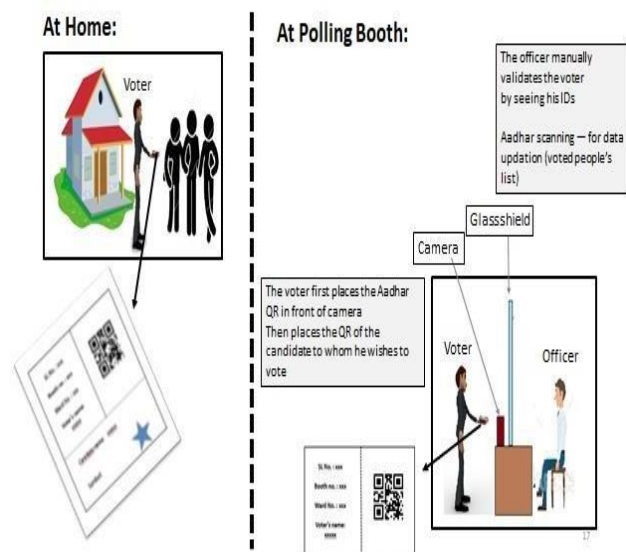
5.2 Entering of vote

Fig -2: Pictorial representation of casting vote

6. COMPONENTS

6.1 Hardwares:

- o   Raspberry Pi 3 (Model B+)
- o   Camera module
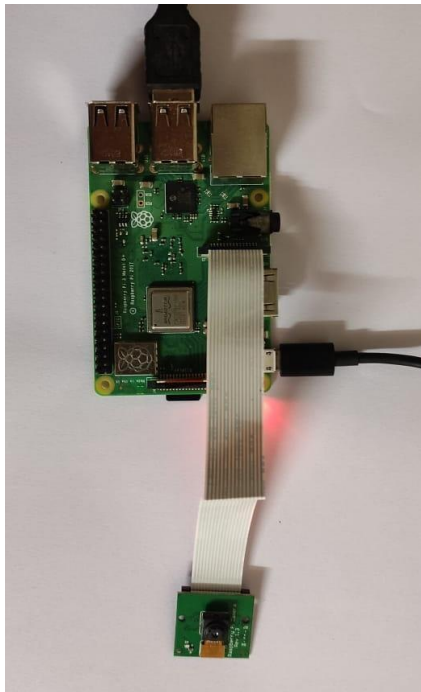
6.2 Softwares:

- o   Spyder (Python 3.6)

Fig -3: Prototype

7. RESULT

The identification of the voters is done by scanning the qr code of the Aadhar card by placing infront of the camera module provided and it's cross checked manually by the officials which is coded through Raspberry pi module and the result is updated in a database. In the second phase vote will be casted and the data is stored in a database when the voter places the slip with the corresponding qr code of the candidate in front of the another camera module. A display screen will also show the picture of the candidate for few seconds so that voter can make sure that he/she voted for the right one, thus we can cast the votes in a contactless manner.

8. CONCLUSIONS

The contactless voting system is implemented successfully and validated from software and hardware point of view. The implementation provides some of the features like accuracy, security of the system and safety for the voter.

The system will check whether the voter is eligible to cast their vote and it make sure that only the legal can vote. This includes the principles of secrecy, integrity and uniqueness. Our system can speed up the electoral procedures, make the counting of the votes efficaciously and secure.

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