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Smart Online Voting System Using OTP Authentication

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Abstract: *India being a democracy that too world's largest, still conducts its elections using either Secret Ballet Voting or Electronic Voting Machines (EVM) both of which involves high costs, manual labour and are inefficient. So, the system must be optimized to be made efficient which would not leave room for unwanted means of voting. The most familiar issue faced by the election commission is inappropriate confirmation with respect to the arrangement of casting the votes, duplication or illegal casting of votes. To avoid the problems in the current system, this paper focusses on a system where the user can vote remotely from anywhere using his/her computer or mobile phone and doesn't require the voter to got to the polling station through two step authentication of face recognition and OTP system. This project also allows the user to vote offline as well if he/she feels that is comfortable. The face scanning system is using d to record the voters face prior to the election and is useful at the time of voting. The offline voting system is improvised with the help of RFID tags instead of voter id. This system also enables the user the citizens to see the results anytime which can avoid situations that pave way to vote tampering.*

Keywords: Smart online voting system, RFID, Face recognition, OTP

I. INTRODUCTION

The electoral mechanism is the cornerstone of any democracy. The depth of Democracy is voting. The voting system must be reliable, and the report of vote casting must be accurately and reasonably recorded. The realization of democratic administration is dependent on the election results. The election process gives every citizen of any country the right to choose a good representative from among them who can bring the democratic mechanism closer to the welfare of society. The voting machine has undergone many significant

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changes recently, from traditional balloting to electronic voting [1].

Voting is now closer to online voting. The voting device improves class by the score; the Development of the new machine eliminates the shortcomings of the old system. Each device attempts to overcome the annular holes of the previous device. The first objective of this document is to familiarize the traditional voting machine with the recently proposed voting instrument. In the modern world, many new strategies, including the method of voting, play a vital role in any democratic system. Democracy is supposed to allow people to vote freely and for the results of elections to occur regularly through citizen organizing [2].

The iris contains many collagenous fibers, contraction furrows, coronas, crypts, color, serpentine vasculature, striations, freckles, rifts, and pits. Measuring the patterns of these features and their spatial relationships to each other provides other quantifiable parameters useful to the identification process. Statistical analyses of iris indicate that the IRT process uses 240 DOF (Degree of Freedom), or independent measures of variation to distinguish one iris from another. The availability of these many degrees of freedom allows iris recognition to identify persons with an accuracy that is greater than other biometric systems. When a person wishes to be identified by an iris recognition system, their eye is first photographed, and then a template is created for their iris region. This biometric template contains an objective mathematical representation of the unique information stored in the iris, and allows comparisons to be made between templates. This template is then compared with the other templates stored in a database until either a matching.

II. LITERATURE SURVEY

"Smart Voting" is used to identify people who are trying to vote a second time, and once the fingerprint print and iris are scanned, authentication is complete, and the user is locked into

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login [4]. Face detection, which is the major part of this project is done by using the Haar Cascade method. It is a machine learning object detection algorithm used to identify objects in an image or video. The process of election data is recorded, stored and preceded as digital information. Electronic voting system is used to fling vote as well as counting number of votes. The electronic voting system uses AVISPA technique Canny Edge detection algorithm for localizing the iris and pupils. Iris recognition system consists of five stages, such as, image acquisition, segmentation, normalization, feature extraction and matching [5]. In security of voting system by bringing advanced technologies of neural networks with multimodal biometrics (face recognition, fingerprint scan, retina scan etc).

Iris recognition refers to the automated method of verifying a match between two human IRIS. Iris scanner Capture the iris image and compare or match to database. RFID tags have been used. Each and every tag contains the information related to individual voters. The voter identity card is replaced by smart card in which all the detail of the person is updated. Only the specified person can poll using their smart card. The incorporation of biometric technologies can be as simple as using a single biometric. However, a single biometric measure is always subject to security breaches, if not properly attended and administered.

Human iris possesses genetic independence and contains extremely information-rich physical structure and unique texture pattern which makes it highly complex enough to be used as a biometric signature. Statistical analysis reveals that the iris is the most mathematically unique feature of the human body because of the hundreds of degrees of freedom it gives with the ability to accurately measure its texture. Reliable biometric verification and identification techniques based upon iris patterns have been presented by Johnston [6],

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Daugman ,Wildes et al. Other known iris recognition systems have been introduced by Zhu et al, Lim et al, Noh et al., Tisse et al and Ma et al. Motivated by these works, several researchers worked on enhancing the performance of iris recognition systems. Some researches focus on improving the image acquisition systems, some deals with enhancing the segmentation algorithms, others are devoted to improving the features extraction and encoding process. In biometrics in general, it has been found that using multiple images for enrolment and comparing the probe to multiple gallery samples will result in improved performance. Several papers show that this is also true for iris recognition. Du performed experiments using one, two, and three images to enroll a given iris. The resulting recognition rates are 98.5%, 99.5%, and 99.8%, respectively [7].

Liu and Xie presented an algorithm that uses direct linear discriminant analysis. Their results using 1200 images showed that recognition performance increases dramatically in going from two images per iris to four images, and then incrementally from 4 to 8, and 8 to 10. Algorithms that use multiple training samples to enroll an image must decide how to combine the scores from multiple comparisons [8].

Ma et al. suggested analysing multiple images and keeping the best-quality image. The same authors, reported that the average of a three scores is taken as the final matching distance when matching an input feature vector with three templates of a class [9]. Krichen et al. represent each class in the gallery with three images, so that for each person and for each test image, they kept the minimum value of its similarity measure to the three images. The use of the min operation to fuse a set of similarity scores is generally more appropriate. Considering multiple scans of an iris, Schmid et al. used the average Hamming distance of multi-sample matching. This is compared to using a loglikelihood ratio, and it is found that, in many

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cases, the log-likelihood ratio outperforms the average Hamming distance.

The paper [10] discusses a secure, verifiable, and symmetric-grade online voting system. In this voting machine, each poll must be encrypted using the shared public key of the custom ElGamal cipher system. This device is suggested for personal authorities. The device has the following safe procedures. The first step is to start the election, all authorities must create a common encryption key (PK) that can be used by voters and that allows them to encrypt every poll issued before it is sent. Each authority (Ai) possesses every pair of arcane keys. It is a combination of the public key (PKa) and the name of the game key (Ska). During the generation of the unusual key, each authority (Ai) has to send its public key (PKa). The second step is citizen registration. To register to vote, a voter must present their legitimate ID. The identity is then tested, after successful verification the voter generates the signature key pair. It includes the public key (PKv) and the private key (SKv). The public key can be visible on the public bulletin board. The system requires each voter to sign their ballot using a digital signature algorithm (DSA). The next step is the issuance of the ballot, in which the voter must submit points to all candidates, and finally, whoever has the most points is declared the winner.

III. METHODOLOGIES

ARDUINO UNO: This microcontroller is based on Atmega328p. It is an open-source computing platform. It can operate on 3.3 volts and 5 volts. It has two external interrupts, three SPI pins for SPI communication, RX and TX to receive and transmit TTL serial data, 5 PWM pins to provide 8-bit PWM output and also two pins for TWI communication. It also has flash memory of 32 KB of which 0.5 KB used by bootloader. IT has SRAM of 2 KB , EEPROM of 1 KB and clock speed of 16 MHz. In our project, the Arduino is used as the main microcontroller for receiving the data from the RFID

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module and it also receives the face data using the mat lab and compares it with face of the user. If the data matches, then it allows the user to cast the vote.

LCD DISPLAY: A 16 * 2 LCD is an alphanumeric display module which can display numbers and alphabets in 16 columns and two rows format that is 32 characters totally. It consumes 1mA power when the backlight is in off condition. A 5 * 8-pixel box is used to build each character box. It has operating voltage 4.7 v to 5.3 v. It works on both 8- and 4-bit mode. It can have green and blue backlight. It has 8 data pins, VSS, VDD, contrast pin, register select, Read/Write pin, enable, 8 data pins and LED positive, negative pins. The LCDs are common replacement to cathode ray tubes in screen industries. It is less expensive, simply programmable and has less limitation to display custom characters. The life span of this device is generally less as the power supply is direct current but the power consumption is less and it is generally thin in size. The options for selecting automatic and manual mode of the meter is made available on this LCD Display. Once the RFID reads the data, the LCD will display the user data.

RFID: RFID short for radio frequency identification is a tracking system with the help of radio frequency technology. Barcodes are used to identify any information. Some RFID tags use electromagnetic energy transmitted from the RFID reader as power source while some use battery. The two types of RFID are battery operated and passive RFID tags. The three frequencies used by passive tags to transmit information are 125 - 134 KHz, 13.56 MHz and 865 to 960 MHz whereas the frequencies used by active RFID tags are 433 or 915 MHz. The RFID tags constantly send out signals. RFID tags contain a microchip or integrated circuit, an antenna, a substrate or protective material layer to hold together every component. They are the best choice for supply chain management. Each RFID tag has a unique ID and some tags claim to

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have sequential IDs they are used to identify specific commodities. We can encode RFID tags with our desired data.

PUSH BUTTON: A push button typically stimulates a change in the circuit or produces an output when the button is physically pressed. It is made up of plastic or metal and flat surfaced to be easy to press. These kinds of switches are also called as momentary switches. Based on the usage the size of the buttons varies. For fire emergencies usually a red push button of moderate sizes is used. There are some industrial applications where when one push button is pressed the other pops out. To avoid the situations where the user presses the inappropriate button these buttons are color coded. Here four push buttons are used in the smart online voting system project each having a separate functionality. One is to select a party to vote, the second one is to deselect the party, the third one is to traverse through the list of parties and the final one is to confirm and cast vote to the selected party.

IV. PROPOSED WORK

Our proposed system allows user to vote online instead of going offline procedures. For voting online, user must record their details and face in the system provided. The unique details of each user along with their face image is captured multiple times and stored in the database given. Multiple instances are captured to ensure accuracy at time of voting. Once the voter has registered their face in the system and has provided all their details, he/she is ready to cast a vote. The voting process during the election is completely through the internet and is enabled only during the scheduled time of election. The user must possess a good internet connection, a webcam for face recognition process, mobile phone for OTP authentication process for a smooth process. During the election time goes through two step authentications. The first is through

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otp authentication. The user gets an OTP to his /her registered mobile number. The user is then prompted to enter that OTP in the system and after OTP matches the user is proceeded to the next step of authentication. The second is through facial recognition. When the user authenticates with his face through the webcam the system compares the given face with the images recorded in the database. If the user's face is recognized, then it goes to next step. In the next step, the user can select a party and cast a vote. Thus the voting process is completed successfully. This system allows the whole family members to vote using one system as the process can be repeated n number of times since all requires is a mobile phone and computer. Once the voting process is completed or even before the user has voted anyone can see the results of the ongoing election through website provided. While publishing result, database for voting counts is updated frequently thereby avoiding any mistakes to takes place. This greatly reduces the time taken to publish the results, counting the votes as it is completely handled by the machine in matter of seconds. Thus, the system greatly avoids the chaos going at the time of election and will also reduce labor force, money and time.

SYSTEM ARCHITECTURE

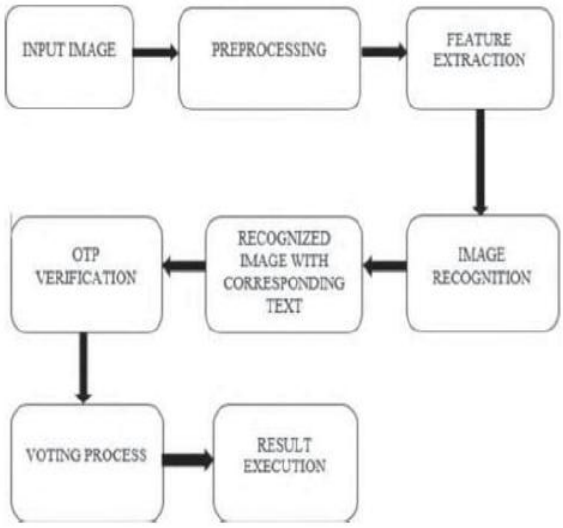

Fig.1 System architecture

V. CONCLUSION

The proposed system is to develop a secure internet voting system based on otp authentication and face recognition which tries to overcome all the drawback which occurs in a traditional or current voting system. It also has many strong features like verifiability, convenience, correctness, etc. For this system, there is no

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requirement of an election officer, paper ballot, or any electronic voting machine only the internet connection, mobile phone for otp authentication and desktop/laptop with a camera for face authentication is required so that one can vote from anywhere securely.

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