E-Voting System Using Facial Authentication

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Abstract- The main aspect of this project is to provide the instant voting result, and to reduce the manpower involved in voter authentication, vote counting and ballot security. The process is done by using facial authentication. The facial authentication process is used to verify whether they are valid user or not and also makes the system to work in online, which will help the voters to cast their vote from their place itself.

Indexed Terms -- PIC16F877A, LCD, ARDUINO NANO, ESP8266

I. INTRODUCTION

Voting is a fundamental right for every citizen. Information technology has greatly affected all aspects of life and it creates greater impact on politics. In order to choose people to various positions different methods have setup to improve the existing method. Voters have to present to the registering agent to get qualify from the agent to vote. Registration agent is responsible for voter's admission and qualification during the registration phase. It includes receiving votes at the polling station and requesting their ID cards to verify if that particular candidate is eligible to vote or not.

During earlier days, voting is a serious action of casting ballots. The candidate goes to the polling station where their names are registered and they have to show their Voter ID to the official for verification. Based on voter number on the card, officials looks for the name of the particular voter. When it is confirmed that no votes have been casted by the candidate, he/she is issued with a ballot sheet and their right index finger is marked with indelible ink to cast their vote. After this, they are provided with an enclosed space, so the candidate can select their choice. The voter then cautiously folds the ballot paper and deposits it into the ballot box provided. The candidate is then supposed to leave. Counting of vote is done manually. It is done through bottom-up process.

Problems associated with electoral process
1. Long voting process
2. Time consumption is high
3. Invalid votes

To overcome the drawbacks of the existing method, E-Voting method is deployed.

Good voting system is based on the following:
1. Anonymity
2. Tamper-resistant

1. Anonymity: The system should be designed in such a way that it should be protected from the actions of the baleful candidate and also to safeguard the voters from the baleful candidate.

2. Tamper-resistant: To overcome a wide range of attacks, E-Voting method is a simple process that can be operated easily by both the polling officials as well the candidates.

- Existing Methodology

In the existing method the result is not known instantly and it's known only after two or three weeks. To overcome this, E-Voting system is used to reduce the manpower involvement and it also reduces the illegal voting process. The main aim of E-Voting is to reduce manpower in voter authentication, vote counting and in ballot security. In the proposed method, nobody can cause any interference and changes in the programming and manipulate the result.

II. LITERATURE SURVEY

[1]   D. Ashok Kumar and et al proposed a system on Electronic Voting System. Among all the system fingerprint is the best method and also it reaches the users easily in the technological world. Each and every person has various fingerprint so it is easy to identify them. However, it will have some complex problems with the impressions because their impressions starts vary when they become aged. So this should be overcome by some other techniques like iris recognition, finger vein recognition etc.

[2]   Mr. Sanjay Kumar and Dr. Ekta Walia proposed Analysis of Electronic Voting System in Various Countries. The present method has various problems like fake voting and so. The government should made Electronic system to overcome various disadvantages and also it is one time investment for the government. Once this process comes to real world, the entire citizen will have confident to cast their vote to their own choice. If voting will be done in online is also most secured and it will help the persons who are away from their mother-lands.

III. PROPOSED METHODOLOGY

In the proposed method voting process is done by three phases
1. Registration phase
2. Log-in phase
3. Authentication phase

During the registration phase, voter's information such as name, emails ID, Aadhar number should be given by the user through the mobile application. Then it captures the user's image and the above all information are stored in the cloud. On the day of election the user have to login by using the mobile application to cast their votes. During the login phase, again it captures the user's image. The third phase is authentication. If the images captured during the login and registration phase matches then it goes for voting page. If the images are not matched then they are considered as invalid user or voter.
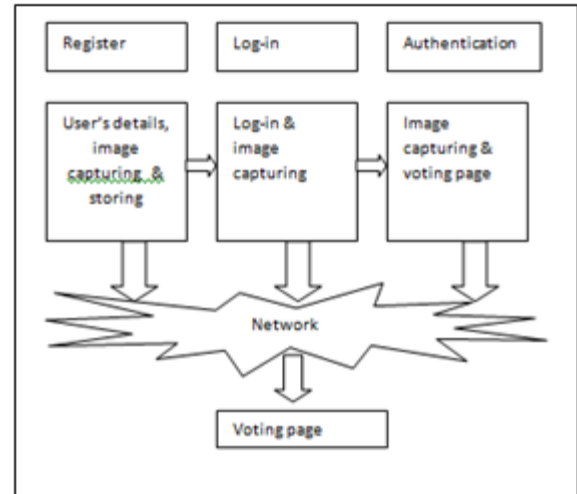

FIG 1: Proposed Method Block Diagram

IV. BLOCK DIAGRAM EXPLANATION

The proposed method having the following phases. First the user/voter has to register with their information such as name, mail ID and mainly the aadhaar number. After this their face is captured. Second phase is log-in. The user has to log-in on the day of election. Third stage is authentication process. Here the user has to capture their images using Android phones. If the face matches with already stored images in the database, the user can consider as valid user/voter. If not, the process will be denied. After the images are matched the voter can cast their votes. During the three phases the information were store in cloud database.

V. COMPONENTS USED HARDWARE USED

A. POWER SUPPLY

The circuit consists of one step down transformer that converts a higher voltage in the order of 230volts into a lower voltage in the order of 15volts. The 15volts obtained from the secondary of the potential transformer. This 15volts is converted into 5volts pure DC signal with the help of rectifier circuitry. For this a bridge rectifier along with the filter circuit is used. The filter is fixed before the regulator. IC 7805 regulates the o/p voltage constant. This regulated5 volts voltage signal is fed into the PIC

microcontroller, LCD display, Arduino NANO and ESP8266.

B. PIC MICROCONTROLLER PIC16F877A

The PIC 16F877A has five ports with 33pins that can be used as input and output pins. The peripherals will communicate with the controller by the pins available in the peripheral interface controller PIC 16F877A. The controller has got the provision for inbuilt clock or oscillator circuit with which the clock frequency is set.

Here PIC16F877A is used only for power supply and to convert 230v to 5v DC power supply and filter in PIC used to remove noise in DC.

- PROPERTIES OF PIC 16F877A

Core Property
1. It's input for operating speed is about DC - 20 MHz clock
2. It has instruction cycle of DC - 200 ns
   Peripheral property
1. It has 8-bit timer/counter for Timer0 with 8-bit prescaler
2. It has 16-bit timer/counter with prescaler, which will be used for incrementing the sleep via external clock for timer1
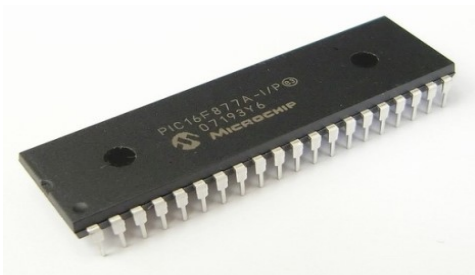3. It has about 10-bit multi-channel converter from AC to DC.

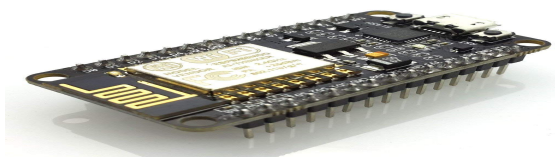FIG 2: PIC16F877A

C. ESP8266 NODE MCU

FIG 3: ESP8266 NODE MCU

Node MCU is an IOT platform which will be available as an open source. It includes permanent software programmed into a read-only memory.

1. Flash memory is 128KB RAM and 4MB and 3V to 3.6V is its Operating voltage
2. It supplies reliable power up to 600mA
3. To load the code serially,UART interface is used.
4. It adds sound to the project with the help of I2S interface.
5. Node MCU has 17 GPIO pins to assign various functions like I2C, I2S and UART.

FIG 4: PIN DIAGRAM OF ESP8266 NODE MCU
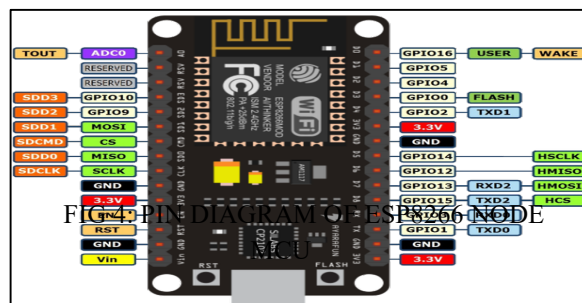
D. ARDUINO NANO

FIG 5: IMAGE OF ARDUINO NANO

The Arduino Nano is a small and user friendly and it is developed before the arise of Arduino UNO It's function is somewhat equivalent or less equivalent when compared to Arduino Duemilanove and also it has different package. It works with a Mini-B USB cable.

E. LIQUID CRYSTAL DISPLAY (20X4)

We used 4X4 LCD to display the candidate list with characters. Characters of 20 in each row and totally 80 characters will be displayed. 8data lines and 3 control lines will be available in LCD. No need for refreshing the LCD because it has a built-in controller. Here the data lines are connected via PORTD of the PIC. Totally 11 lines are used to display the data in between PIC & LCD. The data communicated to the LCD are displayed without any jerk. It displays about 80 characters at a time

FIG 6: LCD

F. WEBCAMERA

Here the web camera is used to capture the users image during the register as well as login phase. It compares the image with the images stored in the cloud. If the image matches with the stored image in the cloud it goes for voting page. Otherwise it will appear an error message by indicating that they are an invalid user/voter

FIG 7: WEB CAMERA

- SOFTWARE DESCRIPTION

A. ARDUINO IDE

The Arduino Integrated Development Environment (IDE) is an application for Windows, Mac OS and Linux which is used to code in various languages. Fi8 shows the initial setup for coding the program.

B. MOBILE APPLICATION

Here mobile application is developed to make the users to cast their votes from their place itself. It has sign-in and sign-up stage. During the sign-up phase the users have to give their details such as name, email ID and IP address. The next is to capturing the image with the help of mobile application and all the data to be stored in the cloud. During the election time, they have to sign-in and it again captures the real images. If the real images matches with the images already stored in the c;oud, it goes for voting page or else it gives an error message that they are an invalid user/ voter. Mobile application is developed so that the user can cast their votes through the mobile application. Web page is coded by usinh HTML language.
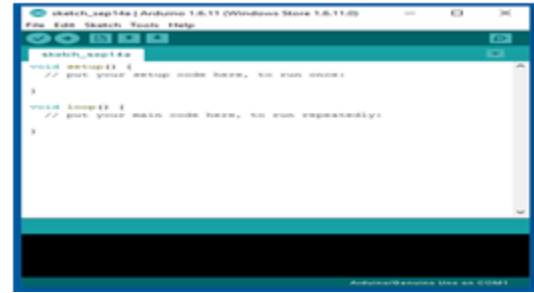
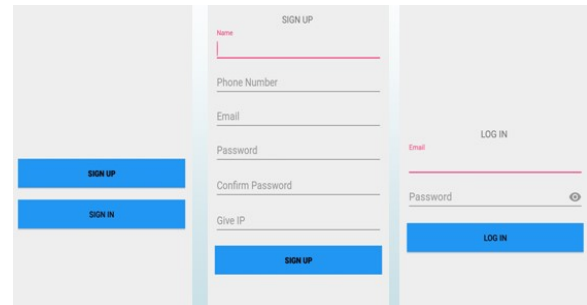

FIG 8: INITIAL VIEW OF THE ARDUINO IDE
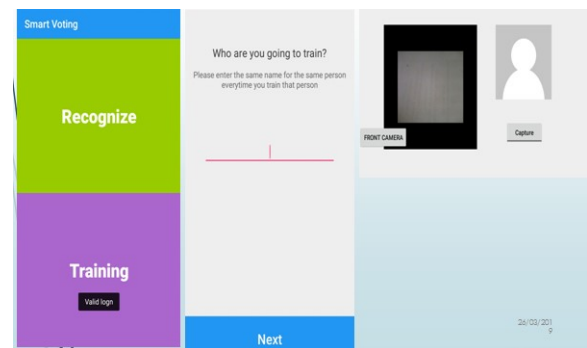

FIG 9: MOBILE APPLICATION

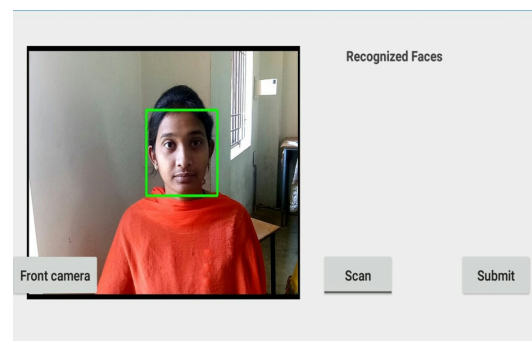FIG 10: MOBILE APP WITH RECOGNIZE AND TRAINING SESSIO

VI. RESULTS

FIG 11: IMAGE DETECTION BEFORE VOTING PROCESS

The image is captured during registration phase and the face data is stored in the cloud. The voter has to capture his/her image using his/her mobile camera on the Election Day and if the image gets matched with the image stored in the cloud, then the process of voting proceeds further. If not, access to the function will be denied.
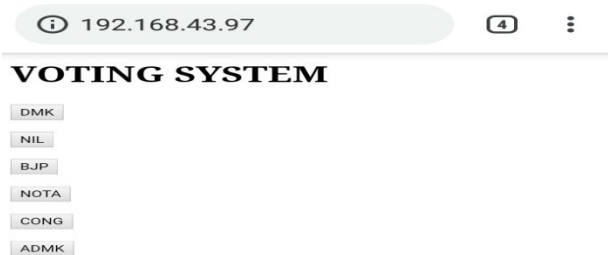

FIG 12: VOTING PAGE

FIG 13: DISPLAY OF CASTED VOTE

VII. CONCLUSION

In the suggested design we used a method of immensely secured system. Facial detection further improves the security level by capturing the actual images of the users. The database to be updated by the user every year to check whether they are alive or dead so that their databases are removed from the cloud.

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