# Electronic Voting Machine with Fingerprint and Facial Recognition

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**Abstract - In this work, an attempt has been made to the development of an authenticated electronic voting system using fingerprint and facial images. The two-fold authentication system improves the security of the voting process and reduces the chances of a corrupt election process. The facial recognition process utilizes the Local Binary Pattern Histogram and Support Vector Machine process to scan, store and recognize faces efficiently. The fingerprint recognition involves the capturing of multiple 2D images and Highly Sensitive Pixel Amplifier to improve the quality of those images to scan the fingerprint to provide the primary form of authentication. Visual Basic is used to develop a very easy to use User Interface that enables an easy voting process. A private server is used to store both the user data and the election results separately.**

**Key Words: Fingerprint, Voting machine, Facial recognition, ESP 32, capacitive touch.**

## I. INTRODUCTION

The simple and cold verity is that everyone hates the problems and security excrescencies that are glaring at everyone's face. They are so apparent to ignore, as multitudinous vouchers these excrescencies straight on. Some of these excrescencies can be easily corrected and that is the main ideal of this design, to amend the excrescencies that can be remedied. To list some of these so- called excrescencies, are a polling of deputy votes, polling of illegal votes, polling of votes under a stolen identity, external manipulation of the voting process pre and post election, infelicitous counting of votes.

In our design, we are giving significance to the authentication process of our designed voting machine. The securities that are handed will fully count the fraud in the voting system. As a total number of fraudulent votes that are cast are extensively reduced, the probability of carrying a stable and working government is increased manifold. Also due to this there is truly minimal possibility of manipulation by external forces pre and post- election. When these rudiments are considered together, a nearly working voting system can be developed. Upon the elimination of these excrescencies, we can safely number a safe and secure voting process, which results in the establishment of a stable and working government. The main objects that are encompassed within this design are listed as, point substantiation as the Primary form of Verification, facial Recognition as the Secondary and Final form of Verification, two memory prosecutions for the prevention of manipulation, easy to use and an inviting UI for the better understanding of the voting process.

## II. LITERATURE SURVAY

Hanady Hussein, Hussein A boelnaga, IEEE 2013. "Design of secure DE-voting systems." is suitable to ask with the wide use of computers and bedded systems. Security is the essential problem should be considered in similar systems. This work proposes a newt-voting system that fulfils the security conditions one-voting. It's grounded on homomorphic property and eyeless hand plan. The suggest system is executed on a bedded system which serves as a voting machine. The system workers RFID to store all conditions that misbehave with the rule of the government to check names eligibility.

1. Daniel pet cu, Dan Alexandro stoichescu, The International Symposium on Advanced motifs in electrical engineering; May 7- 9, 2015. "A mongrel mobile Biometric- grounded E- voting system." Information technology changes and gives shape to networked society each over the world moment & its results are getting main motorists in nearly all field of mortal life exertion.

2. M.Venkata Rao, Venugopal, Rao Ravula, Pavani Pala. "Development of Ant rigging Voting System Using Biometrics Grounded on Adhanrcard n now a day's voting process is exercised by using EVM (Electronic advancing machine). In this work we present and use perpetration is to execute the progress of anti-apparel voting system using cutlet print. The purpose of the design and perpetration is to give a safety and good terrain to the guests is to taking the campaigners by using the intelligent electronic voting machine by furnishing arival picking to every stoner using the Cutlet PRINT identification technology. Herein this design and satisfy we're going Force the at most security since it's taking the Cutlet PRINTS as the authentication for EVM.

## III. EXISTING SYSTEM

Electronic Voting Machines ("EVM"), The Chief Election Commissioner proposed electronic voting machines ("EVMs") in 1977. The
Election Commission of India developed and designed the EVMs in collaboration with BharatElectronics Limited (BEL), Bangalore,and Electronics Corporation of IndiaLimited (ECIL), Hyderabad. The above-mentioned companies arenow producing EVMs. An EVM is made up of two parts: the Control Unitand the Balloting Unit. A five metercable connects the two units. ThePresiding Officer or a Polling Officer isin charge of the Control Unit, while theBalloting Unit is located inside the voting compartment.

There are two types of issues with theEVM that is currently in use:

1. Security Issues - It is possible tochange the programme installed in the EVM and tamper with the polling results.

2. Illegal Voting (Rigging) - Rigging isa well-known problem that occurs in allelectoral procedures. Illegally, one candidate casts the votes of all or a small number of members on theelectoral list. This reduces the number of votes cast for the other candidates while increasing the number of votes cast for the candidate who performs this action. This can be done externallyduring the voting process.

## IV. PROPOSED SYSTEM

The colorful technologies used arenamed similar that they're compatible with one other and have no interfacing problems. Also, they must fall within the budget limit similar that negotiations shall not be made. The different technologies and tools used are listed below Python Development Environment, Linux Interfacing Engine and, Visual Basic. The PDE is used to develop the working programfor the verification bias and the paradiddle isused to convert it to Linux compatible law. Then, a development terrain is a combination of a textbook editor and the Python practitioner. The textbook editor allows you to write the law. The practitionerprovides a way to execute the law you've written. A textbook editor can be as simple as tablet on Windows or more complicated as a complete intertwined development terrain (IDE) similar as Pharm which runs on any major operating system. An operation programming interface (API) is a set of specifications that define how one piece of software interacts with another, particularlyan operation program with anoperating system. A primary purpose is to give a set of generally- used functions, similar as to draw windows or icons on the screen, thereby saving programmers from the boredom of having to write law for everything from scrape. The PDE is usedto develop the working program for the verification bias and the paradiddle is used toconvert it to Linux compatible law. Thecapacitive point seeing is the type of point detector used in the design. Rather of creatinga traditional image of a point, capacitive point scanners use arrays bitsy capacitor circuits to collect data about a point. As capacitors can store electrical charge, connecting them up to conductive plates on the face of the scannerallows them to be used to track the details ofa point. The facial recognition uses Original Binary Pattern Histogram and SupportVector Machine algorithms for its functioning. Eventually visual introductory is used to develop the stoner friendly stonerinterface of the design.
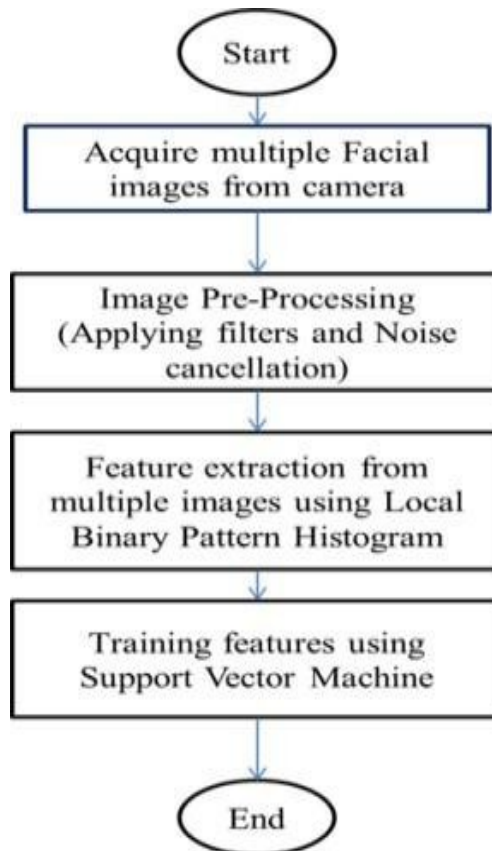
### a. BLOCK DIAGRAM
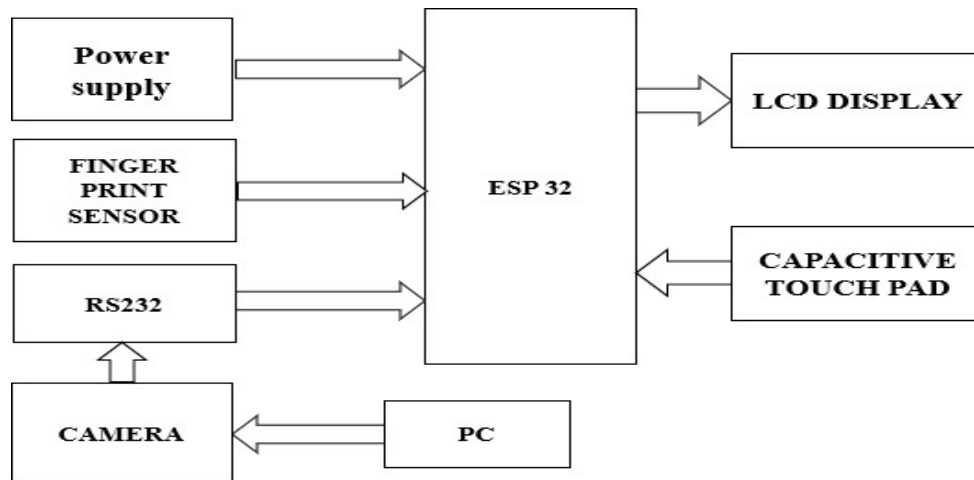
## V. METHODOLOGY
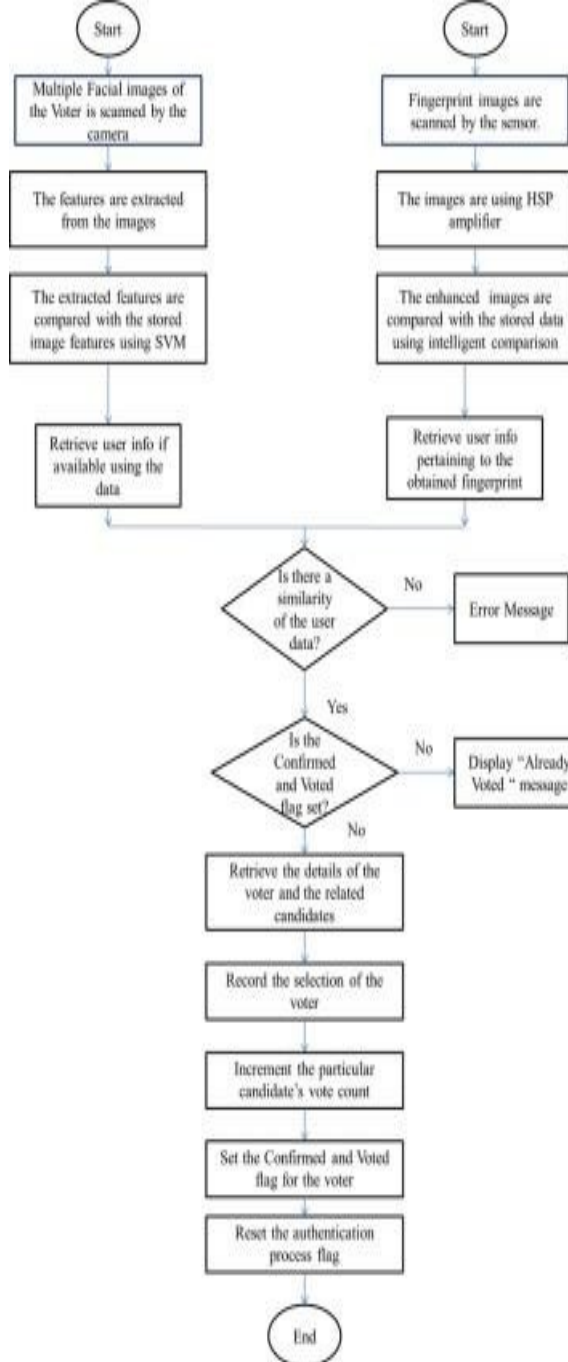
The order of prosecution of the design conditions is done so as to achieve an optimal result within the shortest possible time frame. The overall workflow is similar that the most delicate to execute is done first and foremost, and the easiest is done at the last. This is so that, enough time is available for the testing process and some fresh time, in the case of unforeseen, unknown extremities( 1).

The overall workflow can be classified into two phases; they're the Development Phase and the Testing Phase. In the development phase, the design of the circuit, purchasing of the factors, developing the security detail, Final integration of all the details into one and fabrication of factors to make the final product look charming is completed. Secondly, the testing phase involves the testing of the final, finished product for the colorful contingencies and areas of problems. When these tests are carried out, faults and blights are set up out and they're corrected.

## FLOW CHART

The overall flow of the project can be illustrated and understood from the below flowchart.

Start

Multiple Facial images of the Voter is scanned by the camera

The features are extracted from the images

The extracted features are compared with the stored image features using SVM

Retrieve user info if available using the data

Start

Fingerprint images are scanned by the sensor.

The images are using HSP amplifier

The enhanced images are compared with the stored data using intelligent comparison

Retrieve user info pertaining to the obtained fingerprint

Is there a similarity of the user data? — No → Error Message

Yes

Is the Confirmed and Voted flag set? — No → Display "Already Voted " message

No

Retrieve the details of the voter and the related candidates

Record the selection of the voter

Increment the particular candidate's vote count

Set the Confirmed and Voted flag for the voter

Reset the authentication process flag

End

ACQUISITION AUTHENTICATION

## VI. SYSTEM REQUIREMENTS
### a.      FINGERPRINT SENSOR



Fig 5.1 FINGERPRINT SENSOR

A fingerprint is an impression of the frictionridges on all parts of the finger. A friction ridge is a raised portion of the epidermis on the palmar (palm) or digits (fingers and toes)or plantar (sole) skin, consisting of one or more connected ridge units of friction ridge skin. The ridges assist in gripping rough surfaces, as well as smooth wet surfaces. Fingerprints may be deposited in natural secretions from the ermine glands present infriction ridge skin (secretions consisting primarily of water) or they may be made by ink or other contaminants transferred from the peaks of friction skin ridges to a relativelysmooth surface such as a fingerprint card. The term fingerprint normally refers to impressions transferred from the pad on the last joint of fingers and thumbs, though fingerprint cards also typically record portions of lower joint areas of the fingers (which are also used to make identifications).

## LCD DISPLAY



Fig 5.2 LCD DISPLAY

A liquid-crystal display (LCD) is a flat-panel display or other electronicallymodulated optical device that uses the light- modulating properties of liquid crystals. Liquid crystals do not emit light directly,instead using a backlight or reflector to produce images in color or monochrome. LCDs are available to display arbitrary images (as in a general-purpose computerdisplay) or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and 7-segment displays, as in a digital clock. They use the same basic technology, except those arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

### b.      ARDUINO IDE

Fig 5.3 ARDUINO IDE

The ARDUINO IDE is a modified Harvard architecture 8-bit RISC single chipmicrocontroller which was developed by Atmel in 1996. The ARDUINO IDE was oneof the first microcontroller families to use on-chip flash memory for program storage, as opposed to one-time programmable ROM, EPROM, or EEPROM used by other microcontrollers at the time. The ARDUINOIDE is a modified Harvard architecture machine where program and data are stored in separate physical memory systems thatappear in different address spaces, but havingthe ability to read data items from program memory using special instructions.

c. ARDUINO UNO

Fig 5.4 ARDUINO UNO

Arduino UNO is a microcontroller board based on the ATmega328P. It has 14 digitalinput/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or powerit with an AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again. The Arduino UNO is the best board to get started with electronics andcoding. Arduino is an open-sourceelectronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, afinger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions tothe microcontroller on the board.

## 7. CONCLUSION

The working of this model is veritably straightforward and veritably easy to understand. First, the point anthology scans the point of the names and sends the affair tothe microcontroller. The microcontroller alsodyads the scrutinized data with the data in thedatabase and retrieves the information aboutthe names. The microcontroller also dyads the scrutinized data with the data in the database and retrieves the information about the names. There are numerous fraudulent and illegal conditioning that are passing in respects to the current voting process. Withthese problems in mind, the electronic votingmachine is developed with point and facial recognition. This binary authentication system reduces the chances of the over mentioned problems and so it has improves the security and effectiveness of the voting process.

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