

Fingerprint Based E-Voting System

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Abstract:

To provide securing voting without any fraud and manipulation with the help of authentication and in a clear way that there will be no rigging and no manipulation in casting votes.

Keywords: Fingerprint, Biometric Voting, LCD, Bridge Rectifiers and EVM.

1. Introduction:

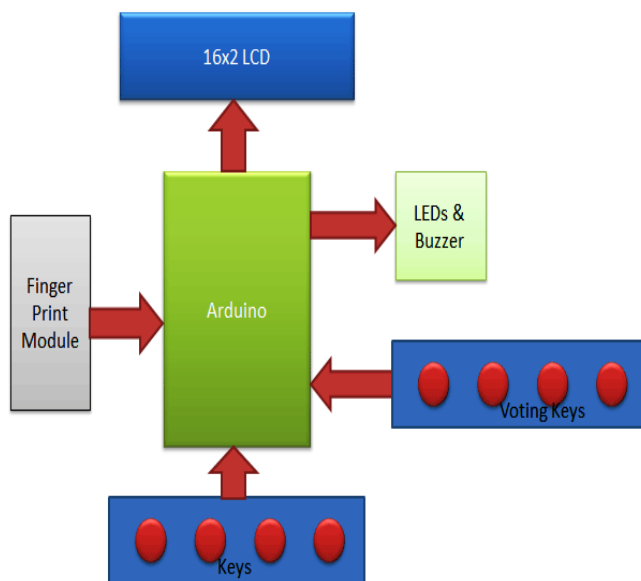
Fingerprint Based Voting Project is a application where the user is recognized by his finger pattern. Since the finger pattern of each human being is different, the voter can be easily authenticated. The system allow the voter to vote through his fingerprint. Finger print is used to uniquely identify the user. The finger print minutiae features are different for each human being. Finger print is used as a authentication of the voters. Voter can vote the candidate only once, the system will not allow the candidate to vote for the second time. The system will allow admin to add the candidates who are nominated for the election. Admin only has the right to add candidate who are nominated. Admin will register the voters name by verifying voter. Admin will authenticate the user by verifying the user's identity proof and then admin will register the

voter. The number of candidate added to the system by the admin will be automatically deleted after the completion of the election. Admin has to add the date when the election going to end. Once the user has got the user id and password from the admin the user can vote for the candidate who are nominated. The system will allow the user to vote for only one candidate. The system will allow the user to vote for one time for a particular election. Admin can add any number of candidates when the new election will be announced. Admin can view the election result by using the result button.

Working of this Biometric Voting System for Election is a little bit complex for beginners. First of all, user needs to enroll finger or voters (in this code max limit of the voter is 25) with the help of push buttons/keys. To do this user need to press ENROLL key and then LCD asks for entering location/ID where finger will be a store.

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So now user needs to enter ID (Location) by using UP/DOWN keys. After selecting Location/ID user needs to press an OK key (DEL key). Now LCD will ask for placing finger over the finger print module. Now user needs to put his finger over finger print module. Then LCD will ask to remove the finger from finger print module and again ask for placing the finger. Now user needs to put his finger again over finger print module. Now finger print module takes an image and converts it into templates and stores it by selected ID in to the finger print module's memory. Now voter will be registered and he/she can vote. By same method all the voter can be registered into the system.



Now if the user wants to remove or delete any of stored ID then he/she need to press DEL key, after pressing DEL key, LCD will ask for select location means select ID that to be deleted. Now user needs to select ID and press OK key (same DEL key). Now LCD will let you know that finger has been deleted successfully.

2. System Analysis

2.1 Existing System:

Paper based Voting System: Before 2004 voting system was based on paper. Voter had to go to polling booth on the day of election. For casting his vote, he had to mark seal in front of the symbol of any candidate for which he wanted to cast his vote on ballot paper. For results, all votes were counted and maximum vote gainer was declared as winner. India has population more than 120 crores so if ballot paper voting is used then it will be very hard to count the vote and there are also problems like replacement of ballot paper boxes with duplicate, damage of ballot paper, marking stamp seal for more than one candidate hence it was mandatory for India to overcome this problem.

Electronic Voting System: In 2004, India adopted Electronic Voting Machines (EVM) for its elections [4] (e-voting). EVM is called Direct-Recording Electronic (DRE) voting system. Votes are recorded correctly and no problem is there in counting, scalability and robustness of system. Problem lies in authentication, the person who is voting may not be the legitimate person. There are other problems like booth capturing by political parties, voting done by less aged children and fraud voting. A person is identified by voter list provided by the Election Commission of India and Voter ID card issued by Indian government. There are a lot of problems in voter ID card like name misprinting, missing of name, no clear photo on photo id card, etc.

DRAWBACKS :

- Requires large paper work.

- Authentication problem
- Fraud Voting

PROPOSED SYSTEM:

The proposed system electronic based fingerprint voting system using Arduino. In this system use fingerprint verification and the interface accepts voters id number, provides an interface to vote and display confirming status or error message. The fingerprints for authentication because fingerprints processing is faster and better than other biometric data and internationally very popular in the im - migration system.

**2.2 System Specifications:
System Requirements and Hardware Requirements:**

Rectifier Circuit

A Bridge rectifier is an Alternating Current (AC) to Direct Current (DC) converter that rectifies mains AC input to DC output. Bridge Rectifiers are widely used in power supplies that provide necessary DC voltage for the electronic components or devices. They can be constructed with four or more diodes or any other controlled solid state switches. Depending on the load current requirements, a proper bridge rectifier is selected. Components' ratings and specifications, breakdown voltage, temperature ranges, transient current rating, forward current rating, mounting requirements and other considerations are taken into account while selecting a rectifier power supply for an appropriate electronic circuit's application.

2.3 Types of Bridge Rectifiers

Bride rectifiers are classified into several types based on these factors: type of supply, controlling capability, bride circuit's configurations, etc. Bridge rectifiers are mainly classified into single and three phase rectifiers. Both these types are further classified into uncontrolled, half controlled and full controlled rectifiers. Some of these types of rectifiers are described below.

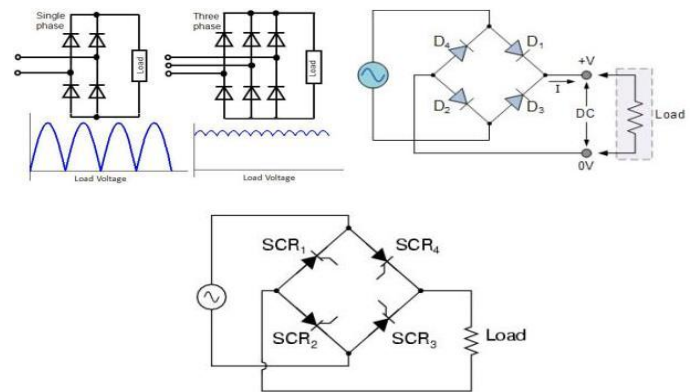


Fig 2 Single Phase and Three Phase Rectifier, Uncontrolled Bridge Rectifiers and Controlled Bridge Rectifier

Arduino Development Board

Arduino provides open-source electronics prototyping platforms based on flexible, easy-to-use hardware and software. Arduino prototyping platforms are intended for artists, designers, hobbyists, and anyone interested in creating interactive objects or environments. Arduino's prototyping platforms can sense the environment by receiving input from a variety of sensors and can affect their surroundings by controlling lights, motors, and other actuators.

3. SOFTWARE REQUIREMENTS

ARDUINO IDE

Arduino IDE is an open source software that is mainly used for writing and compiling the code into the Arduino Module.

It is an official Arduino software, making code compilation too easy that even a common person with no prior technical knowledge can get their feet wet with the learning process.

It is easily available for operating systems like MAC, Windows, Linux and runs on the Java Platform that comes with inbuilt functions and commands that play a vital role for debugging, editing and compiling the code in the environment.

A range of Arduino modules available including Arduino Uno, Arduino Mega, Arduino Leonardo, Arduino Micro and many more.

- Each of them contains a microcontroller on the board that is actually programmed and accepts the information in the form of code.
- The main code, also known as a sketch, created on the IDE platform will ultimately generate a Hex File which is then transferred and uploaded in the controller on the board.

This environment supports both C and C++ languages.

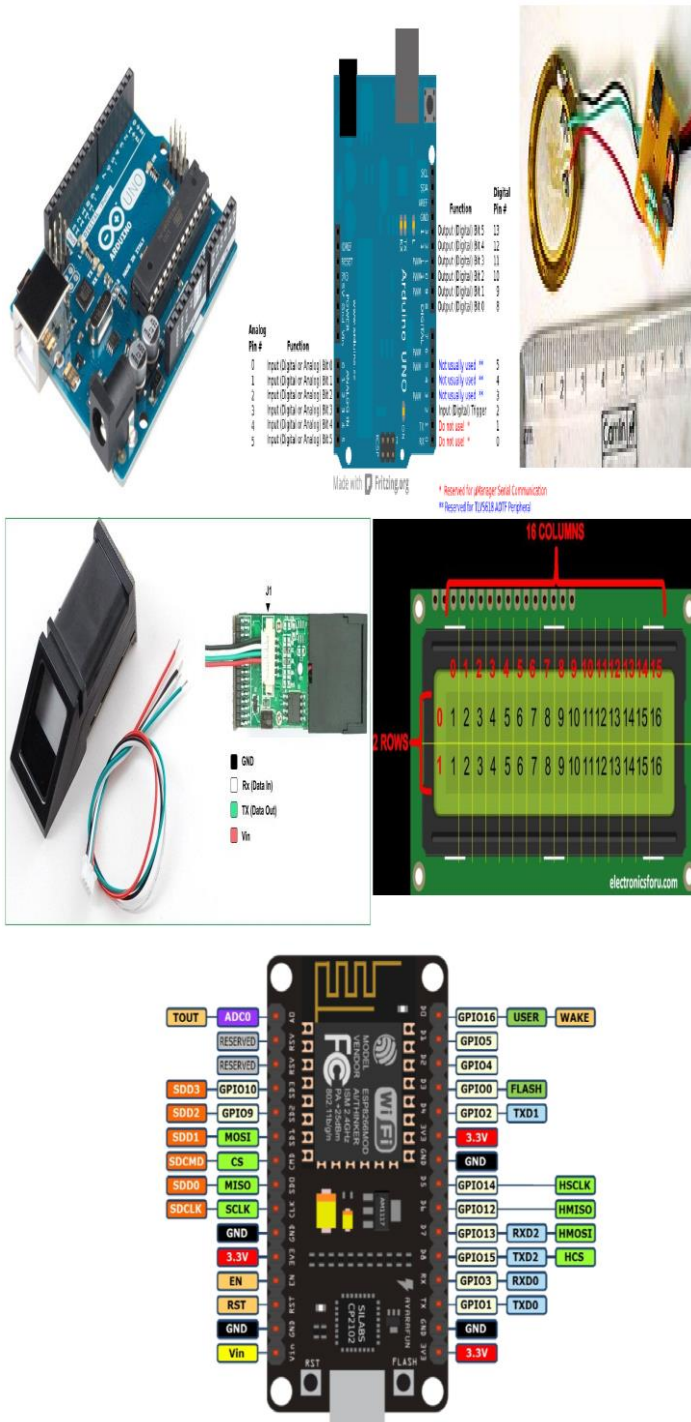
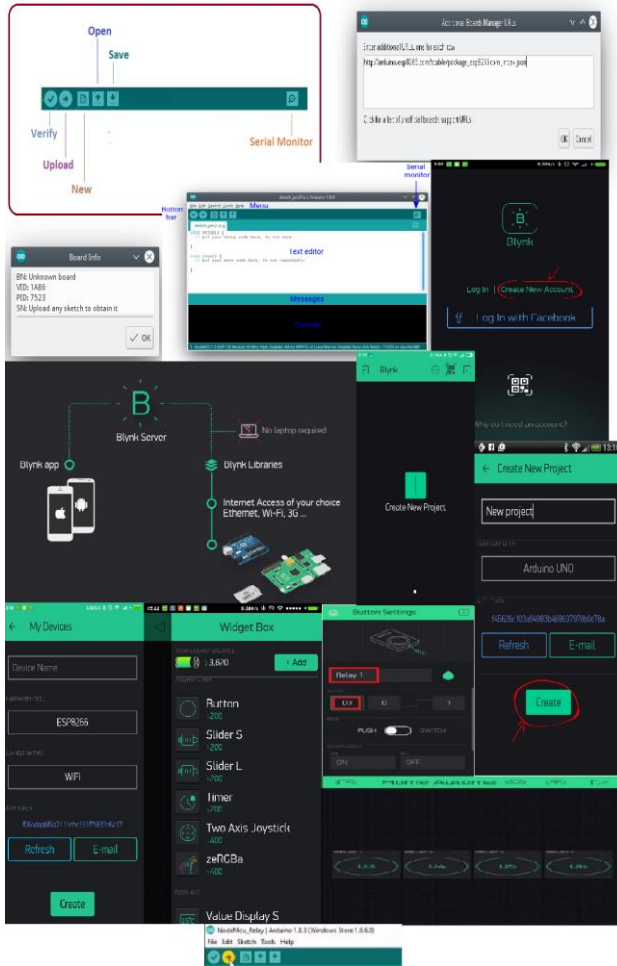


Fig. 3 Arduino Uno Microcontroller Board, Fingerprint Sensor, LCD Display, Buzzer Indicator and NODEMCU ESP8266 Module



That's really all the code that we need to write! We are now ready to upload this code to the NodeMCU. So directly hit upload button at the top (besides the button that has a checkmark), and wait for it to process

4. FEASIBILITY STUDY:

An electronic voting system is voting system in which the election date is recorded, stored and processed primarily as digital information. E-voting may become the quickest, cheapest and the most efficient way to administer election and count vote since it only consists of simple process and procedure and requires a few workers within the process.

SYSTEM DESIGN:

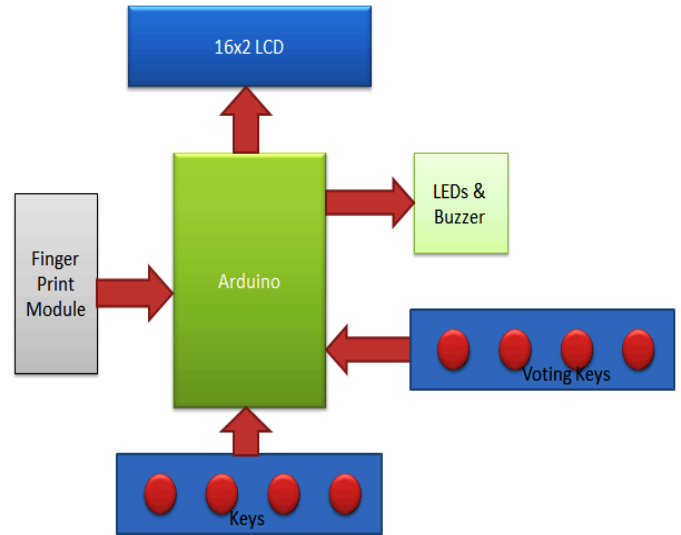


Fig: block diagram of fingerprint based e-voting system.

S. NO	TEST CASE	EXPECTED OUTPUT	OBTAINED OUTPUT	REMARKS
1.	Fingerprint miss match.	Fingerprint matched .	Fingerprint Mismatched.	Should place finger properly.
2.	Validation of vote.	Checking the database for that particular identity and if valid display on led screen	Showing valid voter as invalid and invalid voter as valid.	Should have stable database and able to check accuracy in valid and

		as valid. If not in valid identity.		invalid votes.
3.	Enrolment of new voter.	Successfully enrolled a new voter and added to the database.	After enrolment the new voter details are not linked with the database.	For every new enrolment the data must be added to the database.
4.	Deletion of invalid votes.	Successfully deleted the desired vote.	After deletion also details may not be erased.	For every new deletion of votes database must be updated.
5.	Up and down buttons.	Should scroll up in database when up button is pressed. Should scroll down when down button is pressed.	Results when up and down buttons may not be as desired.	Must scroll up and scroll down when there is usage of up and down buttons.

6.	Wi-Fi module	Wi-Fi module should be able to connect blink app with the module.	Due to some issues wifi may not be supportable.	Accurate internet should be available.
7.	Blink app performance	Working of blink app is as desirable.	Performance of blink app is not as desirable because of some errors.	Blink app performance should be good.
8.	Casting of votes	Vote should be casted properly.	Error in cast button or code.	Proper functioning of Cast buttons and code.
9.	Result	Count all votes and decide person with highest count of votes as winner.	Wrong counting takes place.	Should count votes correctly and present output.

10.	Reset	Erase all data	All the data no erased	Should erase all the data and ready to accept new data
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5. SYSTEM IMPLEMENTATION:

The Fingerprint based voting system since the basis of any voting is “one person one vote”. It stand to reason that must verify that a voter is who they claim to be and that they have not previously voted in this election at another site. The main purpose of fingerprint voting system is to ‘Preventing Fraudulent Voting’. This system has basically 5 types of modules. They were:

- Fingerprint Enrolment
- Fingerprint Verification
- Cast the votes
- Alert of wrong voting
- Generate final report

How the system is implemented is described here. As previously mentioned all the hardware and software components are connected together in respective to their positions and purposes. Now firstly the user or voter is supposed to place the finger on the fingerprint scanner. Now the voter id id enroled to the new user. Then again he is supposed to place his finger to check whether it is matching with the previous one or not. If matches now he can cast his vote by pressing the buttons and his vote will be casted. If the vote is not matched then the buzzer rings by making an alert that some is trying is cast

invalid vote and sends a message to the voting administrator. If there is trail of double voting or invalid voting it also will be notified by the voting administrator.

6. CONCLUSION:

Now a-days information systems and communications technologies are being integrated into different stages of electoral processes globally and thus it is becoming essential to explore methods for secure electronic voting. Identification of appropriate technology and it extent to use for secure electronic voting is the crime concern in electoral process. Success of electronic voting depends on trust level and thus security issues need to be addressed properly in designed process keeping in mind the social and political implications. Such trust cant be accessed only in terms of political and sociological but also as trusting technology being used. This thesis consider electronic voting mainly as security critical process.

This thesis attempts to identify different issues in electronic voting will focus mainly on security aspects to deploy a voting system in a secure manner satisfying expected assurance at technical and procedural levels.

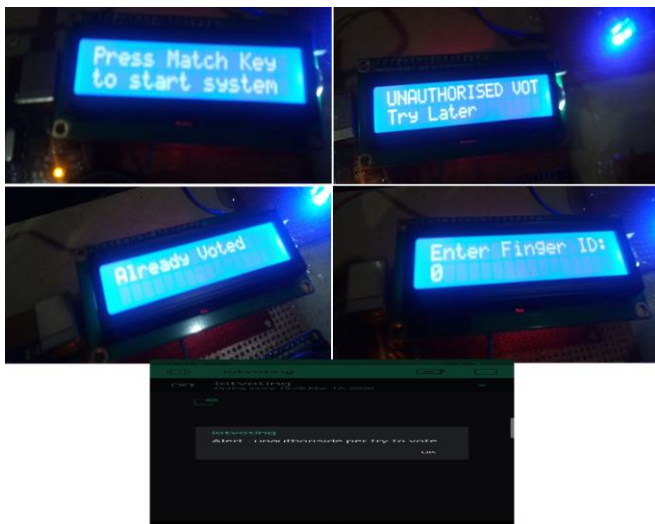
This research attempts to incorporate fast and accurate biometric technique into the e-voting system to prevent an unauthorized person to vote. This work has many advantages over the traditional voting system like reduced pilling time, less problems in electoral preparation, strong authentication mechanism, easy and accurate counting, flexibility for voter to vote cast irrespective of

geographical location and quick publication of results. This concludes thesis summering main contribution and discuss the their extendibility.

The proposed model and framework enhances the security issues into the electronic voting system with respect to eliminating bogus voting and vote reputation, less election expenditure, more transparency and fast results. The context and the validity of the problem space are established through a comprehensive review of relevant search and applications of biometric security issues in EVM. This is followed by a brief description on the terminology of biometric security issues in the context of EVM to establish the problem space.

In brief, the reliable and security mechanism have been presented here. Appropriate terminology in the context of biometric security issues has been defined and applied to observe the behaviour of EVM in this research work.

7. OUTPUT SCREENS



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