

## SECURE E-VOTING SYSTEM

**Bhuvanesh E<sup>1</sup>, Purushothaman B<sup>2</sup>, Shyam sundar K<sup>3</sup>, Vanitha V<sup>4</sup>**

<sup>1, 2, 3</sup> Students, Department of ECE, Jeppiaar SRR Engineering college, Padur, Chennai -603 103

<sup>4</sup> Assistant professor, Department of ECE, Jeppiaar SRR Engineering College, Padur, Chennai-603103

\*\*\*

**Abstract** - Voting is the most pivotal process which is carried out to reveal the opinion of the people in selecting government or in any issue that is under consideration. So the conventional voting systems based on paper voting are being replaced by electronic voting machines. This project is used for providing sophisticated voting system using RFID and Finger print technologies. Each user is provided a RFID Tag instead of manual voter ID card. The hardware design has a Finger print scanning sensor which is used to compare the finger print of the user with the pre-stored finger print of the user. During voting, both the finger prints are checked for matching and if it does not match, then an alert is given using buzzer. LCD is used to display the corresponding nominated candidates and parties and Logo. The user can select the particular nominators via touch screen device. Thus illegal voting cannot be done since finger print is unique for each person. The voting process is carried out only if the finger print matches with the stored value. Each and every vote updated to the main server through IOT. By using this system multiple vote casting has been avoided. Results are can be declared on the day of Election.

**Index Terms**— Fingerprint, RFID (key words)

### 1.INTRODUCTION

India's general elections with 814 million eligible voters broaden the vision of all conducting equitable elections neutralizing the malevolent tendencies. Due to a result of rampant corruption in this exercise, the people have been raising dubious eyebrows about it and the general expression has prevailed that the democratic system has proved to be a boon only to a handbreadth of people having capital. The success of elections largely relies upon enlightened masses, scrupulous citizens. The common populace relapses indolence after the elections are over. On 9th Nov2015, the former Chief Election Commission of India SY Quraishi stated that – “Booth capturing and other poll violations are history”. The Election Commission has taken measures through vulnerability mappings to endeavor smooth elections. During the polls, several paramilitary forces are employed across India, surveillance cameras are placed at polling station. Despite of all these efforts, the coverage headlines reveals event different as chalk and cheese. During 2014 General

Elections in India, there were reports allegedly indulged in booth-capturing, proxy voting, missing names from the voters list, voter turnout to be greater than 100%. In Assam, miscreant polling officers were arrested after caught in rigging exercise and booth capturing. In Nagaland more than 40booths, the voter turnout was more than 100%. In Haryana, Orissa and Maharashtra, there was report on missing names from the voter's list i.e. approximately 6 million. In recent past, Bihar was related with the employment of manpower in elections for malicious frauds, but now cash inundates to lure voters. SY Quraishi has mentioned the use of currency in his book “Undocumented Wonder- the Making of Great Indian Elections” where he highlighted that politician's camouflage the use of black money to increase votes. Also during Jan 28, 2015, in Chhattisgarh Panchayat polls, 50% of the candidate selected unopposed as the rebels looted ballot boxes from around 30 booths. There is a need to curb such menace and the evil of corruption secured voting ambience that the people can entrust upon. Also the technology used should be solve to be able to contemplate supporting every citizens need.

### 2. RELATED WORK

The Election Commission of prominent countries has long acknowledged the requirement to embolden safeguards against malevolent frauds and argued for the introduction of a voting paradigm to discard the security loop holes of the existing system that ensures a secured should be strongly battled out so that elections should be impartial and tumult free. Still there is requirement for pretexts of political vengeance and the elections have never been complacent and fair. There was rigging reports in UK elections according to a survey on May, 2015. The electoral process of UK was embroiled into debate in 2015 General Elections as on 9th Nov, 2015 there were reports allegedly accusing surreptitious radicals belonging to particular community, not to loop holes of the existing system that ensures a secured environment for the citizens to vote. In many countries, campaigns to counter balance corruption have become participate in the voting franchise. And also there were safeguards against malevolent frauds and argued for the introduction of a voting paradigm to discard the security Pamphlets and flyers warning people not to cast their vote. VAAs (Voting Advice Applications) have been widely used in elections

across Europe and America termed as Election Compass UK and whatever data is being collected is covered and any voter's identity is not revealed. The Canadian Elections are all set to transform their laws through the House of Commons but was contested. There were reforms in bill C-23 'Fair Election's Act', to empower voter turnout. Canada's ministry of State for democratic reforms -Pierre Poi Lievre investigated the changes with a knack of argot of lawyers and also The Election Commission of Canada introduced 'vouching' and others to stringent safeguard . But the Fair Elections Act proved to be unfair in the ways like – Allowing elite class of people and banks to the SMS to the user to acknowledge the proper registration of the give more currency. Political parties coveted millions of dollar of spending in the election campaigns. Allowing the ruling party to pick from who runs the polling stations. More ID is required to cast a vote. Requiring secrecy by Election watchdogs i.e., The Election Commission of prominent countries has long acknowledged the requirement to embolden Election Commission of Pakistan was also marred by accusations and witnessed that it was not able to give semblance for an unprejudiced elections. There were also rigging reports in the African Presidential Elections. On April16, 2015the AVS Win Vote Machines that were used in the presidential elections in Virginia would get an 'F-minus' in terms of security issues, reported in a formal inquiry by the state of Virginia. The touch screen voting machines were also hacked with a small modicum of technical skills. The Diebold vote - TSX used in more 20 states by 26 million people and also Push Button Sequoia AVC Voting Machines used by 9 million voters was hacked by Roger Johnston .this demonstrates that Elections across the globe are also contentious and ultimately leads to ebbing of voters.

### 3. ARCHITECTURE OF THE PROPOSED SYSTEM

In this proposed system, fully electronic and automated secured voting technology is implemented. The hardware module consists of a microcontroller, Finger print sensor, RFID reader and Buzzer. Candidates are provided with RFID smart voting IDs. During voting process, the tag is read by the reader in the voting module, and finger print sensor is used to obtain their finger print value and check with the pre-stored value of the user. It both the values match, then, they can select the required party for voting using LCD display. If the fingers print value do not match, then buzzer rings and voting cannot be count any more. After putting vote which will be displayed and take a count then transfers to the PC. Then the registered vote automatically updated in website through IOT. This process is fully done by a microcontroller. Results are announced on the day of Election it self

### 3.1 Block Diagram of the proposed scheme

The schematic building block which composes the design is shown below:

At the initial point the fingerprint database and the RFID library contains information about the authorized user and it is stored in the microcontroller. It will send

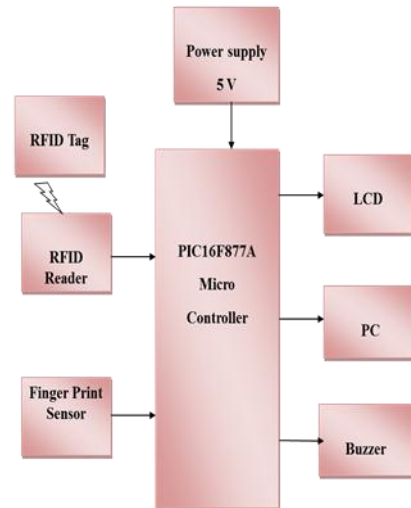
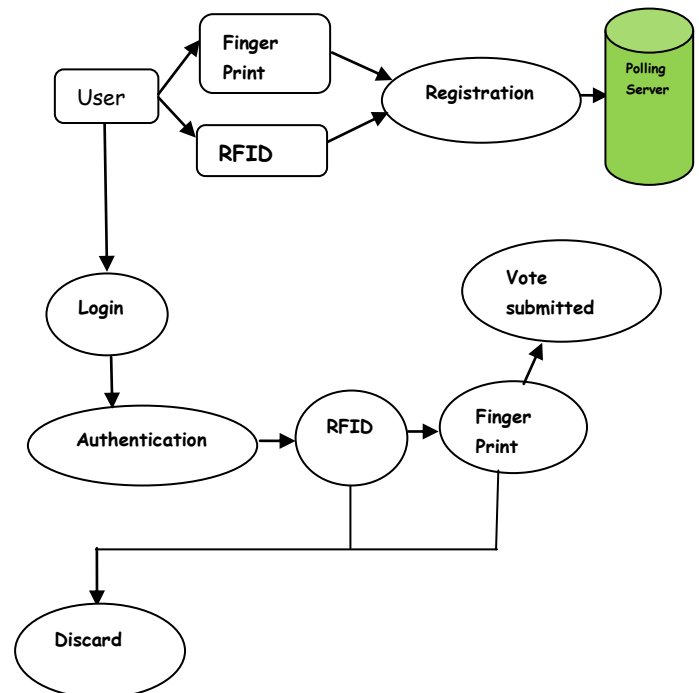


Fig1. Block Diagram of the proposed scheme

### 3.2 Flowchart

The working procedure of the device is discussed explicitly. The schematic description provides a detailed outline of the intermediate steps.



#### 4. HARDWARE REQUIREMENTS

This section explains the details of the each component being used.

##### 4.1 PIC16F8A

PIC 16F877A is one of the most advance microcontroller from microchip. This used for experimental and modern application because of its low price, wide range of application , high quality and ease of availability it is ideal for applications such as machine control application , measurement device, study purpose and so on. The PIC 16F877 feature all the components which modern microcontrollers normally have.

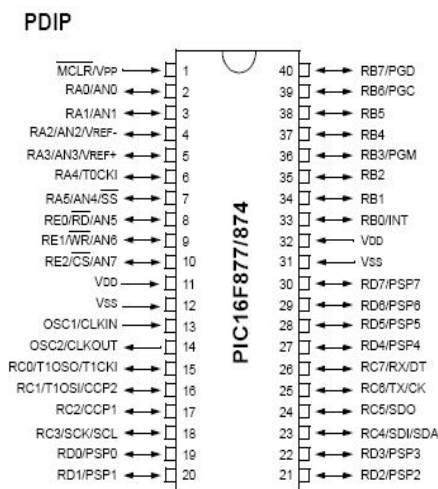


Fig.2 Pin Diagram of PIC 16F877A

##### 4.2 .RFID Reader

RFID systems consist of numerous specialized components, such as tags, RFID readers, edge servers, middle ware, and software. An RFID system allows for data to be transmitted from the tag to the reader, which in turn processes it for a particular use. The data sent can include identification, location information, price, color, and date of purchase. Radio Frequency Identification systems can also be employed for tracking purposes, which some point out as an invasion of privacy. An RFID system works in stages. Items are equipped with a tag, which has a transponder that is assigned a unique electronic product code. The accompanying antenna has a transceiver and a decoder, which emits a signal and activates the tag. Once activated, data can be read and written to the tag. If a reader is in range, it decodes the data being transmitted by the tag’s computer and relays it to a host computer for processing.



Fig.3 RFID Reader

##### 4.3 RFID Tags

As mentioned above, there are three types of RFID tags: **Passive RFID tags** have no internal power supply. Instead, a small electric current is created in the antenna when an incoming signal reaches it. This current provides enough power to briefly activate the tag, usually just long enough to relay simple information, such as an ID number or product name. Because passive RFID tags do not contain a power supply, they can be very small in size, sometimes thinner than a piece of paper. These tags can be activated from a distance of ten millimeters to over 6 meters away.

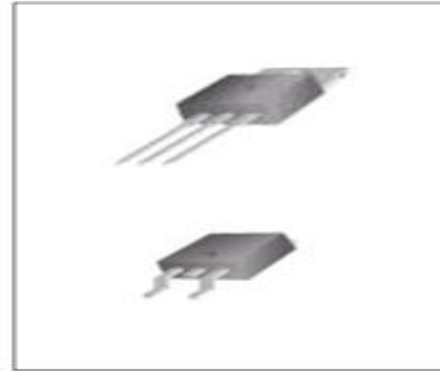
**Active RFID tags** do contain an internal power source, which allows for a longer read-range and for a bigger memory on the tag itself. The power source also makes it possible to store information sent by the transceiver. Active RFID tags are larger than passive tags, usually slightly bigger than a coin. They can be read from many meters away, and generally have a battery life of about ten years. Advantages of active tags include accuracy, reliability, and superior performance in adverse environments such as damp or metallic.

**Semi-passive RFID tags** are similar to active RFID tags in that semi-passive RFID tags have an internal power supply, but they do not broadcast a signal until the RFID reader transmits one first being cheaper to manufacture, most RFID tags are of the passive variety. Analysts predict that ever-lowering costs and growing demand will eventually lead to the widespread usage of RFID technology on a global scale.

The four most common tags in use are categorized by radio frequency: low frequency tags (125 or 134.2 High frequency tags (13.56 MHz) UHF tags (868 to 956 MHz) microwave tags (2.45 GHz).



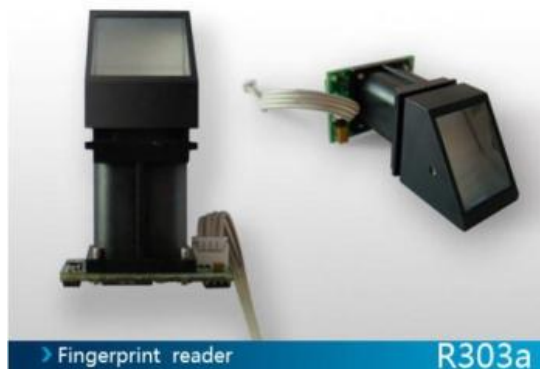
**Fig.4** RFID Tags



**Fig.6** Regulated Power Supply

#### 4.4 RS -303a Fingerprint Module

The fingerprint module provides a secured, quick and user friendly alternative to passwords, PIN's and other methods of authentication. This scanner has the ability of gathering and storing unique fingerprints and then matches each print read by the sensor and compare it to the one stored in the database. It consists of high performance DSP and flash. It boasts of functions such as fingerprint enrolment, deletion, verification, upload and download.



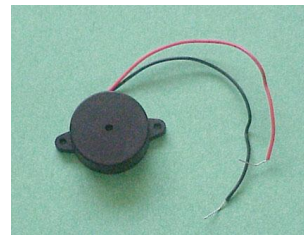
**Fig. 5** Fingerprint Reader (R-303a)

#### 4.5 Regulated Power Supply

The KA78XX/KA78XXA series of three-terminal positive regulator are available in the TO-220/D-PAK package and with several fixed output voltages, making them useful in a wide range of applications. Each type employs internal current limiting, thermal shut down and safe operating area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 1A output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents.

#### 4.6 Buzzer

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or electronic. They uses of buzzers and beepers include alarm, timers and confirmation of user input such as a mouse click or keystroke



**Fig.7** Buzzer

#### 4.7 16x2 LCD

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being: LCDs are economical; easily programmable; have no limitation of displaying special & even custom characters (unlike in seven segments), animations and so on. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data the command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD.



*Specifications*

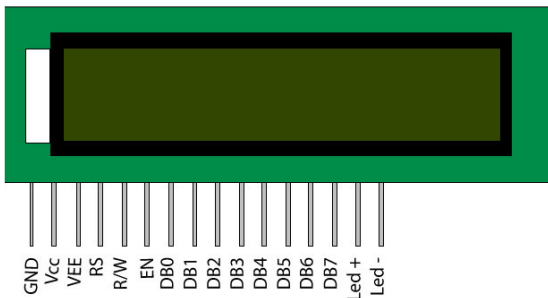
Display: 16 characters x 2 lines

Backlight: Yellow

Operating temperature: 0°C to 50°C

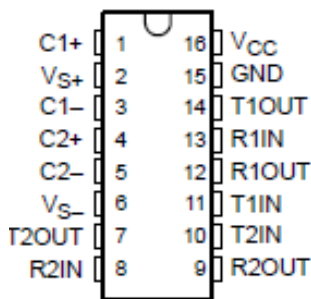
Operating voltage: 4.5V - 5.5V

Backlight voltage: 5.0V (100mA)



**Fig.8** Pin Diagram of LCD

**4.8 MAX 232**



**Fig.9** Pin Diagram of MAX232

The MAX232 is an integrated circuit that converts signals from an RS-232 serial port to signals suitable for use in TTL compatible digital logic circuits. The MAX232 is a dual driver/receiver and typically converts the RX, TX, CTS and RTS signals.

**5. SOFTWARE REQUIREMENTS**

**5.1 MPLAB IDE**

MPLAB Integrated Development Environment (IDE) is a free integrated toolset for the development of embedded applications employing Microchip's PIC® and dsPIC® microcontrollers. MPLAB IDE runs as a 32-bit application on MS Windows®, is easy to use and includes a host of free software components for fast application development and super-charged debugging. MPLAB IDE also serves as a single, unified graphical user interface for additional Microchip and third party software and hardware development tools. Moving between tools is a

snap, and upgrading from the free software simulator to hardware debug and programming tools is done in a flash because MPLAB IDE has the same user interface for all tools.

**5.2 HI-TECH C compiler**

HI-ECH Software is a world class provider of development tools for embedded systems, offering compilers featuring Omniscient Code Generation, whole-program compilation technology, and an Eclipse-based IDE (HI-TIDE™) for 8, 16, and 32-bit microcontroller and DSC chip architectures. New freeware compilers supporting Microchip PIC micro® devices. HI-TECH C® PRO compilers include lite mode - a significant feature sure to impress the students and hobbyists. Lite mode is a free download has NO memory or time restrictions and supports ALL devices. However, the OCG optimizations are disengaged.

**5.3 Software Environment**

The software requirements are the specification of the system. It should include both a definition and a specification of requirements. It is a set of what the system should do rather than how it should do it. The software requirements provide a basis for creating the software requirements specification. It is useful in estimating cost, planning team activities, performing tasks and tracking the teams and tracking the team's progress throughout the development activity.

Platform	:	Windows Xp/7/8
Front End	:	Java-JDK1.7
Back End	:	MYSQL

**5.4 Overview of the mysql database management system**

MySQL, the most popular Open Source SQL database management system, is developed, distributed, and supported by Oracle Corporation. The MySQL Web site (<http://www.mysql.com>) provides the latest information about MySQL software. MySQL, the most popular Open Source SQL database management system, is developed, distributed, and supported by MySQL AB. MySQL AB is a commercial company, founded in 1995 by the MySQL developers. It is a second generation Open Source company that unites Open Source values and methodology with a successful business model. The MySQL® software delivers a very fast, multi-threaded, multi-user, and robust SQL (Structured Query Language) database server. MySQL Server is intended for mission-critical, heavy-load production systems as well as for embedding into mass-deployed software. MySQL is a registered trademark of MySQL AB. The MySQL software is Dual Licensed. Users can choose to use the MySQL software as an Open Source product under the terms of the GNU General Public

License or can purchase a standard commercial license from MySQL AB. The company name was given after co-founder Monty Widenius's daughter, my, the SQL is "Structured Query Language.", AB is Swedish for limited partnership.

Feature	MyISAM	Memory	InnoDB	Archive	NDB
Storage limits	256TB	RAM	64TB	None	384EB
Transactions	No	No	Yes	No	Yes
Locking granularity	Table	Table	Row	Row	Row

Fig.10 MySQL storage engines

### 5.5 Apache TOM CAT

Tomcat, developed by Apache ([www.apache.org](http://www.apache.org)), is a standard reference implementation for Java servlets and JSP. It can be used standalone as a Web server or be plugged into a Web Server like Apache, Netscape Enterprise Server, or Microsoft Internet Information Server. There are many versions of Tomcat. This tutorial uses Tomcat 5.5.9 as an example. The tutorial should also apply to all later versions of Tomcat. To start Tomcat, you have to first set the JAVA\_HOME environment variable to the JDK home directory using the following command. The JDK home directory is where your JDK is stored. On my computer, it is c:\Program Files\jdk1.6.0\_24. The apache tomcat server is an open source, java-based web application container that was created to servlets and java server page (JSP) web applications. It was created under the apache-Jakarta subproject; however, due to its popularity, it is now hosted as separate apache project, where it is supported and enhanced by a group of volunteers from the open source java community.

### 6. ADVANTAGES AND FUTURE SCOPE AND APPLICATION

- 1) It satiates the need for fair and tumult free election.
- 2) As 3 layers of security is enforced, the scheme is compelled to remove all malevolent tendencies.
- 3) The scheme is spoofing proof as encapsulation is adorned.
- 4) It obliterates the security loop-holes of the existing voting paradigm.
- 5) The design is economic and cheap.

The future works including aadhaar card.

The application are it can be used as a control access for any security validation process, toll parking, student's attendance system.

### CONCLUSION

This paper presents the design and development of a secured voting based on fingerprint and RFID diminishing

the possibilities of fraud and voter deception. The encryption method diminishes the security loop holes and adorns the system to be more robust, accurate and efficacious.

### REFERENCES

[1]<http://www.un.org/africarenewal/webfeatures/africanpresidential-elections-2015-nigeria-leads-way>

[2]<http://www.independent.co.uk/news/uk/politics/general-election/why-your-vote-matters-more-than-ever-at-this-election-even-if-you-re-voting-fornohoper10230796.html>

[3]<http://www.theguardian.com/usnews/2015/apr/15/virginiahacking-voting-machines-security>

[4]<http://arstechnica.com/tech-policy/2015/04/meet-the-e-voting-machine-so-easy-to-hack-it-will-take-your-breath-away>

[5]<http://www.popsci.com/gadgets/article/201211/how-i-hacked-electronic-voting-machine>

[6] Olaniyi Olayemi M, Arulogun Oladiran T, Omidiora Elijah O, Okediran Oladotun, "Performance Assessment Of an Imperceptible and Robust Secured E-Voting Model", International Journal Of Scientific & Technology, Vol 3, Issue 6, 2014.

[7] Amer A and El-gendy H, "Towards a Fraud prevention e-voting system", International Journal of Advanced Computer Science and Applications, Vol 4 No 4, pp147-149, 201366723

[8] A. Villafiorita, K. Weldemariam, and R. Tiella, "Development, Formal Verification, and Evaluation of an E-Voting System with VVPAT," IEEE Transactions on Information Forensics and Security, vol. 4, no. 4, 2009.

[9] S. Lavanya. "Trusted secure electronic voting machine" International Conference on Nanoscience, Engineering and Technology (ICONSET), pp.505 - 507, 2011.

[10] D. Chaum, P. Y. Ryan and S. Schneider S. De Capitani di Vimercati, P. Syverson and D. Gollmann "A practical voter-verifiable election scheme", Proc. Comput. Security (ESORICS 2005), vol. 3679, pp.118 - 139, 2005.

[11] Vaibhav Bhatia, Pawan Whig, "Performance Analysis of Multi Functional Bot System Design using Microcontroller", International Journal of Intelligent Systems and Applications, Vol. 6, no. 2, pp.69-75, January 2014.

[12]. B. H. Kwan and M. Moghavyemi "PIC Based Smart Card Prepayment System" In Proc. of 2002 Student Conf. on Research and Development. pp. 440-443, 2002

[13]. Vaibhav Bhatia, Gavish Bhatia, "Room Temperature Based Fan Speed Control System using Pulse Width Modulation Technology", International Journal of Computer Applications, Vol. 81, no. 5, pp.35-40, November 2013.

[14]. A. Drumea, P. Svasta, "Universal electronic module for industrial control based on system on chip device," 30th International Spring Seminar on Electronics Technology, ISSE 2007, Cluj-Napoca, Romania, pp. 232-235, May 2007

[15]. Microchip, "28/40/44-Pin Enhanced Flash Microcontrollers," PIC16F877A datasheet, Revised 05 Feb 2013.

## BIOGRAPHIES



**E. BHUVANESH** was born in **INDIA**, Tamil Nadu, 1995. Presently, pursuing final year B.E., of E.C.E in JEPPIAAR SRR engineering college.



**B. PURUSHOTHAMAN** was born in **INDIA**, Tamil Nadu, 1995. Presently, pursuing final year B.E., of E.C.E in JEPPIAAR SRR engineering college.



**SHYAM SUNDAR K** was born in **INDIA**, Tamil Nadu, 1995. Presently, pursuing final year B.E., of E.C.E in JEPPIAAR SRR engineering college.