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Design and Implementation of Real Time Online E-Voting Prototype System with IOT

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ABSTRACT: In democratic societies, voting is an important tool to collect and re-act people thinking's. Traditionally, voting is conducted in centralized or distributed places called polling booths. Voters go to polling booths and cast their votes under the supervision of authorized parties. Then the votes are counted manually once the election has completed. With the rapid growing development of computer technology and cryptographic methods. The electronic voting systems can be employed that replace the incident and most importantly error-prone human Component. Our project proposes and implements a simple and secured method of polling vote by using biometric. Due to the change occurred in the technology, so many advancements were introduced in the field of voting. The improvisations aim at increasing the flexibility security, reliability, scalability of the model and provide less time consumption to announce the result. Nowadays, the voting procedure was held by manually operating machines and even through SMS also. But this electronic voting machine is a unique and new concept which saves a lot of time and avoids the false voting by a false person. In this system, the user has to use his fingerprint to poll the authenticated vote. The finger print module was already stored in the government database. Hence this project provides a best solution to avoid the false voting. The electronic voting machine was connected with the computer. The computer is having the full database list of the peoples who is having the eligibility to vote. For each polling the corresponding person identity was deleted. So it avoids the false voting.

KEYWORDS: E-Voting, System Security, Arduino, IOT.

I.INTRODUCTION

Voting is most pivotal process of democratic society through which people determine its decision. Nowadays electronic voting machine has become an effective voting tool compare with traditional paper-based voting schemes. Flawless voting is ensure by electronic voting machine. This is the reason it became more widespread. People are make sure that their vote is secured. One more feature is that it avoids any kind of malpractice or invalid votes. Besides that, talking about economic benefits, this system is more economical than traditional paper-based voting schemes since the expenditure incurred on manpower is saved. It is also make voter feels convenient because he or she has to press only one button of the respective candidates to vote. Thus, we are decided to design an electronic voting machine to replace the traditional paper-based voting schemes due to several advantages like security, automatic counting, economic etc.

Various types of Voting Methods:
1.Ballot Papers: A ballot is a device used to cast votes in an election. In that method they may used a piece of paper or a small ball for secret voting. Which was originally a small ball- see blackball – that is used to record decisions made by voters. Each one of the voter uses one ballot, and that ballots are not shared. In simplest elections ballot may be a simple scrap of paper on which each voter writes in the name of a candidate. In general body or governmental elections use pre-printed to protect the secrecy of the votes. The person who votes they can casts his/her ballot in a box at a polling station. The word "ballot" is used for an election process within an organization. Such as a trade union "holding a ballot" of its members. **Drawbacks:** Need more paper to vote, Need more time to vote, Not suitable for blind peoples, Need more time for counting, Need more man power for security. **lever voting machines:** The voter enters the machine and pulls a lever to close the curtain to unlocking the voting levers. The pollers then make his or her selection from a list of switches denoting the appropriate candidates or measures. The machine is configured to prevent over votes by locking out other candidates when one candidate's switch is flipped once the voter is finished and the lever is pulled which opens the curtain and increments the appropriate



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counters for each candidate and measure also the results are then hand written by the precinct officer at the conclusion of voting. **Drawbacks:** Complex voting procedure, More time to vote, Recount of voting is not possible, Expensive to test, complete tests are extremely rare, Expensive to move and store, Difficult to test, Complex to maintain, Far from secure against vote fraud. **punched cards:** Punched card systems employ a card (or cards) and a small clipboard-sized device for recording votes. Voters punch holes in the cards (with a supplied punch device) opposite their candidate or ballot choice issue. After voting, the voter may place the ballot in a ballot box or the ballot may be fed into a computer vote tabulating device at the precinct. **Drawbacks:** Candidate names are not specified in the machine, Confidential polling is not possible, More security is required. Electronic Voting Machines Had been developed machine to replace these traditional voting schemes due to several advantages like security, automatic counting, economic etc.

Literature survey : [1] Khasawneh, M., Malkawi, M., & Al-Jarrah, O., “A Biometric-Secure e-Voting System for Election Process,” Proceeding of the 5th, International Symposium on Mechatronics and its Applications (ISMA08), (2008), Amman, Jordan. It is needless to mention that India is the largest democratic country in the world. Elections are conducted at various levels to choose their representatives by the people of the nation. The elections should be conducted in a right manner to ensure that the term “Democracy” should not lose its value. It is observed that there are so many problems associated with conduction of elections in the country such as percentage of voting is at most 60% in most of the cases, rigging in the elections..etc. In order to overcome these kinds of problems, it is proposed to use Aadhar Card and Biometric means to conduct Elections in India. The main idea is to introduce the biometric voting system with the linkage of UID. Nowadays UID became inevitable and all the data of the people like finger prints and irises are already collected at the time of enrolment. By using this database in the main server, with the help of IOT (Internet of Things), we can introduce this voting system at the booth level to ensure transparency in the polling process. The voter can utilize their vote in anywhere in the country for their respective constituency.

[2] Prasad, H. K., Halderman, A. J., & Gonggrijp, R., “Security Analysis of India’s Electronic Voting Machines,” International Journal For Research In Emerging Science And Technology, Volume-2, Issue-3, E-Issn: 2349-7610, March-2015. The objective of voting is to allow voters to exercise their right to express their choices regarding specific issues, pieces of legislation, citizen initiatives, constitutional amendments, recalls and/or to choose their government and political representatives. Technology is being used more and more as a tool to assist voters to cast their votes. To allow the exercise of this right, almost all voting systems around the world include the following steps: voter identification and authentication, voting and recording of votes cast, vote counting, publication of election results. Voter identification is required during two phases of the electoral process: first for voter registration in order to establish the right to vote and afterwards, at voting time, to allow a citizen to exercise their right to vote by verifying if the person satisfies all the requirements needed to vote (authentication). Security is a heart of e-voting process. Therefore the necessity of designing a secure e-voting system is very important. Usually, mechanisms that ensure the security and privacy of an election can be time consuming, expensive for election administrators, and inconvenient for voters. There are different levels of e-voting security. Therefore serious measures must be taken to keep it out of public domain. Also, security must be applied to hide votes from publicity. There is no measurement for acceptable security level, because the level depends on type of the information. An acceptable security level is always a compromise between usability and strength of security method.

II.SYSTEM MODEL AND ASSUMPTIONS

PROPOSED APPROACH: With the aim of conducting democratic election, we proposed the system to Endeavour to improve the easy usage of the voting machine with authentication and an acknowledgement slip will provide for every polling which occurs. And a touch screen is used to give input so it is so highly easy to overcome the button problem. GSM module is used for sending result to the corresponding authority. The following are the advantages of secure voting machine using biometric: **Security:** The system is free from intentional tamper. It is not possible to hack the machine. Though this factor depends on the personnel integrity, attempts should be made to make the model as secure as possible. In this machine every user uses his/her finger print. The votes will be successful only after successful verification of their finger print. **Reliability:** The machine registers the votes faithfully. A vote is never altered. A valid vote is never eliminated, from the final tally and an invalid vote is not counted. Vote counting is flawless. The final vote tally must be perfect. Most important think the votes are stored in EEPROM memory, where the numbers of votes are stored permanently.



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Scalability: It is easy to use the basic design for any number of voters. A touch screen is also used to improve the scalability. The model is able to handle increasing voter participation without any stress on performance. **Flexibility:** In this method the design of the system is such that it can be put to use in various polling systems, with different requirements and mechanisms. **Super sensitive circuitry(No invalid votes):** Inside the control unit, hidden from the person is an extremely sensitive circuitry that takes care of common election errors or malpractices like duplication vote. For instance, if one were to press two or more buttons simultaneously, then no votes supposed to be cast. Even if there was a micro-second difference in the pressing of the switches and the EVM is sensitive enough to trace and identify the twitch that was press first. **Hi-tech Simplicity:** To commence polling, the polling officer activates the "Ballot" switch on the control unit. The voter then has to press the button of his choice on the ballot unit. This is followed by a short beep sound, indicating that the vote has been cast. Once again, the polling officer has to press the "Ballot" switch to clear the machine for the next voter to cast his vote.

III.HARDWARE DESIGN

“ONLINE VOTING SYSTEM” is an online voting technique. It is based on the other online services like “ONLINE RESERVATION SYSTEM” .In this system people who have citizenship of INDIA and whose age is above 18 years of any sex can give his/her vote online without going to any polling booth. There is a DATABASE which is maintained by the ELECTION COMMISSION OF INDIA in which all the names of voter with complete information is stored. In “ONLINE VOTING SYSTEM” a voter can use his/her voting right online without any difficulty. He/She has to fill a registration form to register himself/herself. All the entries is checked by the DATABASE which has already all information about the voter. If all the entries are correct then a USER ID and PASSWORD is given to the voter, by using that ID and PASSWORD.

Block diagram:

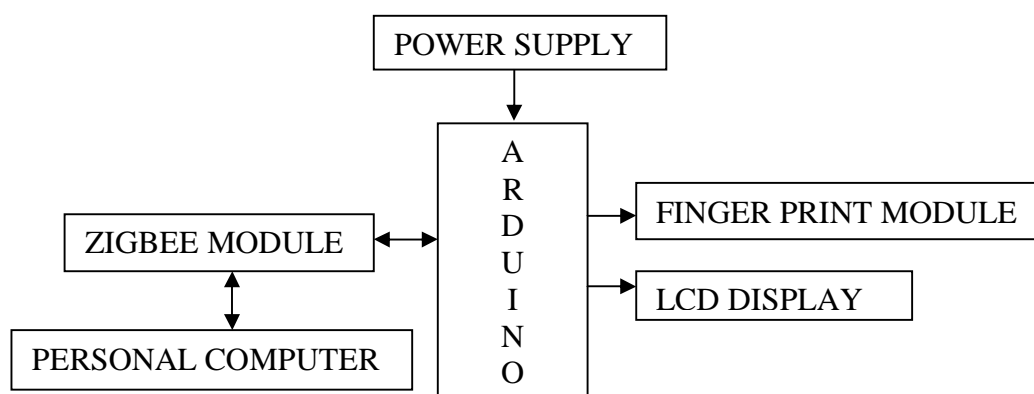


Fig: Hardware prototype.

The above figure shows that the hardware prototype consists mainly two modules Finger print module to recognize voter's thumb and nominees too and the second important module is ZIGBEE module which is used for wireless communication and it can transmit the data which is scanned by finger print module through ARDUINO to Personal computer. The LCD display can be used to display successful scanning of finger print and also ask the next voter to register thumb and registered vote also.



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Flowchart:

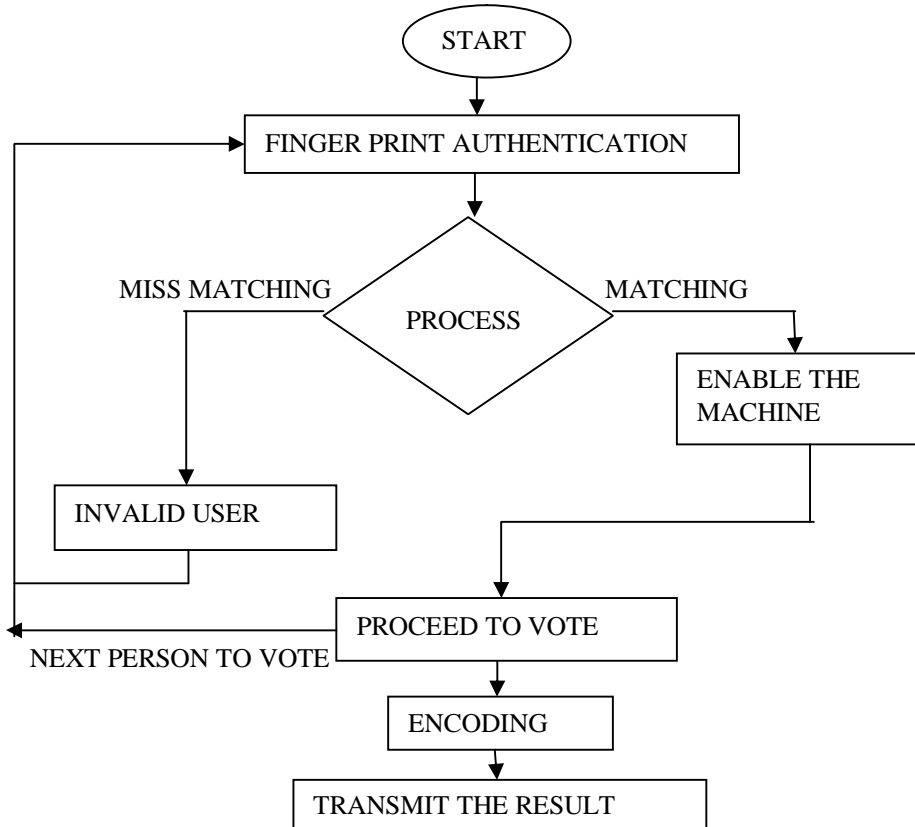


Fig: Prototype Working

Receiving side:

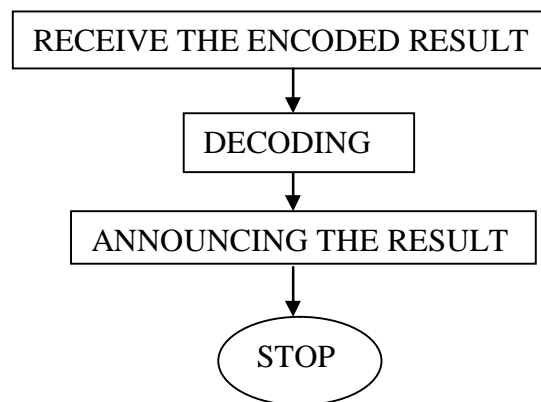


Fig: prototype Receiver.

Scope: The scope of the project that is hosted on the server. There is a DATABASE which is maintained by the ELECTION COMMISSION OF INDIA in which all the names of voter with complete information is stored. **Overview:** Project is related to Online Voting System. The project maintains two levels of users:-1.Administrator Level, 2.Voter



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Level. Main facilities available in this project are:-1.Maintaining voter's Identification,2.Providing online voting management,3.Providing Updating of voter's information,4.Provide voter information to ELECTION COMMISSION OF INDIA,5.ELECTION COMMISSION OF INDIA maintains the complete information of voter, 6.Voter can give his\her vote from any part of India.

IV.SOFTWARE IMPLEMENTATION

Arduino Software :Make sure you have the right item selected in the **Tools > Board** menu. If you have an Arduino Uno, you'll need to choose it. Also, newer Arduino Duemilanove boards come with an ATmega328, while older ones have an ATmega168. To check, read the text on the microcontroller (the larger chip) on your Arduino board. For more information on the board menu items, see the [guide to the Arduino environment](#). Then, check that the proper port is selected in the **Tools > Serial Port** menu (if your port doesn't appear, try restarting the IDE with the board connected to the computer). On the Mac, the serial port should be something like /dev/tty.usbmodem621 (for the Uno or Mega 2560) or /dev/tty.usbserial-A02f8e (for older, FTDI-based boards). On Linux, it should be /dev/ttyACM0 or similar (for the Uno or Mega 2560) or /dev/ttyUSB0 or similar (for older boards). On Windows, it will be a COM port but you'll need to check in the Device Manager (under Ports) to see which one. If you don't seem to have a serial port for your Arduino board, see the following information about drivers. **Drivers** : Drivers provide a way for software on your computer (i.e. the Arduino software) to talk to hardware you connect to your computer (the Arduino board). In the case of Arduino, the drivers work by providing a virtual serial port (or virtual COM port). The Arduino Uno and Mega 2560 use standard drivers (USB CDC) provided by the operating system to communicate with the ATmega8U2 on the board. Other Arduino boards use FTDI drivers to communicate with the FTDI chip on the board (or in the USB-serial convertor). The easiest way to check if the drivers for your board are installed correctly is by opening the **Tools > Serial Port** menu in the Arduino software with the Arduino board connected to your computer. Additional menu items should appear relative to when you open the menu without the Arduino connected to your computer. Note that it shouldn't matter what name the Arduino board's serial port gets assigned as long as that's the one you pick from the menu. On Windows 7 (particularly the 64-bit version), you might need to go into the Device Manager and update the drivers for the Uno or Mega 2560. Just right click on the device (the board should be connected to your computer), and point Windows at the appropriate .inf file again. The .inf is in the drivers/ directory of the Arduino software (not in the FTDI USB Drivers sub-directory of it). If you get this error when installing the Uno or Mega 2560 drivers on Windows XP: "The system cannot find the file specified", you might try [this suggestion](#) (about adding a "RunOnce" key to "HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion"). On Linux, the Uno and Mega 2560 show up as devices of the form /dev/ttyACM0. These are not supported by the standard version of the RXTX library that the Arduino software uses for serial communication. The Arduino software download for Linux includes a version of the RXTX library patched to also search for these /dev/ttyACM* devices. There's also [an Ubuntu package](#) (for 11.04) which includes support for these devices. If, however, you're using the RXTX package from your distribution, you may need to symlink from /dev/ttyACM0 to /dev/ttyUSB0 (for example) so that the serial port appears in the Arduino software. **Access to the Serial Port** : On Windows, if the software is slow to start or crashes on launch, or the Tools menu is slow to open, you may need to disable Bluetooth serial ports or other networked COM ports in the Device Manager. The Arduino software scans all the serial (COM) ports on your computer when it starts and when you open the Tools menu, and these networked ports can sometimes cause large delays or crashes. Check that you're not running any programs that scan all serial ports, like USB Cellular Wifi Dongle software (e.g. from Sprint or Verizon), PDA sync applications, Bluetooth-USB drivers (e.g. BlueSoleil), virtual daemon tools, etc. Make sure you don't have firewall software that blocks access to the serial port (e.g. ZoneAlarm). You may need to quit Processing, PD, vvvv, etc. if you're using them to read data over the USB or serial connection to the Arduino board. On Linux, you might try running the Arduino software as root, at least temporarily to see if fixes the upload.

V. SECURITY

Finger Print Module: Finger print module is an input device used for Fingerprint processing which includes two parts: fingerprint enrolment and fingerprint matching (the matching can be 1:1 or 1:N). When enrolling, user needs to enter the finger two times. The system will process the two time finger images, generate a template of the finger based on processing results and store the template. When matching, user enters the finger through optical sensor and system will



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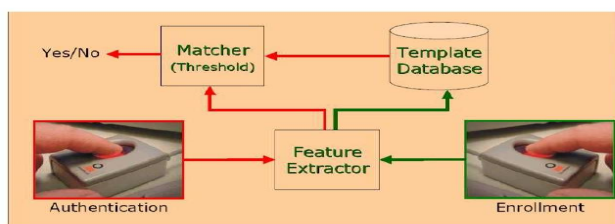
Website: www.ijareeie.com

Vol. 6, Issue 4, April 2017

generate a template of the finger and compare it with templates of the finger library. For 1:1 matching, system will compare the live finger with specific template designated in the Module; for 1:N matching, or searching, system will search the whole finger library for the matching finger. In both circumstances, system will return the matching result, success or failure. Fingerprints are graphical flow like ridges present on human fingers. Fingerprints are believed to be unique to each person and also for fingers. So fingerprints have being used for identification and forensic investigation for a long time. A fingerprint consists of many ridges and furrows. Basically there are 3 types of fingerprint patterns.



However shown by intensive research on fingerprint recognition, fingerprints are not distinguished by their ridges, furrows and patterns but by minutia, which are some abnormal points on their Edges. Among the variety of types, two are most significant. They are termination and bifurcation



Fingerprint module's processing, shown in fig includes two parts: fingerprint enrolment and fingerprint matching (the matching can be 1:1 or 1:N). When enrolling, user needs to enter the finger two times. The system will process the two time finger images, generate a template of the finger based on processing results and store the template. When matching, user enters the finger through optical sensor and system will generate a template of the finger and compare it with templates of the finger library. For 1:1 matching, system will compare the live finger with specific template designated in the Module; for 1:N matching, or searching, system will search the whole finger library for the matching finger. In both circumstances, system will return the matching result, success or failure.

VI. RESULT

“ONLINE VOTING SYSTEM” is an online voting technique. It is based on the other online services like “ONLINE RESERVATION SYSTEM”. In this system people who have citizenship of INDIA and whose age is above 18 years of any sex can give his/her vote online without going to any polling booth. There is a DATABASE which is maintained by the ELECTION COMMISSION OF INDIA in which all the names of voter with complete information is stored.



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In “ONLINE VOTING SYSTEM” a voter can use his\her voting right online without any difficulty. He\She has to fill a registration form to register himself\herself. All the entries is checked by the DATABASE which has already all information about the voter. If all the entries are correct then a USER ID and PASSWORD is given to the voter, by using that ID and PASSWORD. The following figures shows that user registration process, finger print ID recognition and storing in the web page. Transmitting side will be the designed kit prototype will send the data through ZIGBEE module to receiver using IOT.

Receiving Side:

Form1
Online Voting System CLEAR DATA LogOut
Select COMport COM4
Registration
 Nominees
 Voter
ID:
Name: PARVATEESAM
Party Name: ECE
Adhar Number: 1234
Finger Print
Submit
RESULTS
Waiting for Finger Print ID

Fig: Waiting for user finger print

Form1
Online Voting System CLEAR DATA LogOut
Select COMport COM4
Registration
 Nominees
 Voter
ID:
Name: KISHORE
Party Name: ECE3
Adhar Number: 5678
Finger Print
Submit
RESULTS
Got Finger Print ID

Fig: system recognized the user's finger print

Form1
Online Voting System CLEAR DATA LogOut
Select COMport COM4
Voting
 ECE
 ECE3
 No Party
 No Party
Submit
RESULTS
CONGRATULATIONS .. YOUR VOTE REGISTERED

Fig: Successful registration of voter



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Transmitting Side:

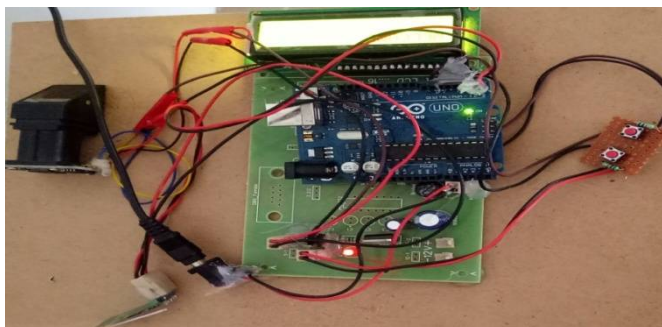


Fig: Designed prototype kit (Transmitter)

VII.CONCLUSION & FOTURE SCOPE

CONCLUSION: This project show that we can use a microprocessor to design an electronic voting machine with IOT, which is more secure, simple, convenient and economic compared with the traditional paper based voting scheme. We successfully build up an electronic voting machine which can be used for school and college level council elections or any voting purpose events. The function of the circuit is working according to what we predicted. This show that our program code and circuit design can be implemented to a real life.

FUTURE SCOPE: This project can further be extended to use in mobile phones, i.e every person can vote from their own mobile phones and also can see results by using secured finger print authentication.

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