

# RIGGING LESS FINGER PRINT BASED VOTING MACHINE USING IOT

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**ABSTRACT:** Electronic voting (E -voting) means, casting and counting votes electronically. This technology used for punch cards, optical scan voting systems, Direct-Recording Electronic (DRE) voting systems and private computers. Electronic voting systems have much more advantages compared to other voting techniques. An electronic voting technology can speed the counting of ballots and can provide improved accessibility for voters. In order to fulfill the need of E- voting, propose an Electronic Voting Machine. This machine works on the data present in the AADHAAR. AADHAAR is a 12 digit individual identification number issued by the Unique Identification Authority of India on behalf of the Government of India. The number serves as a proof of identity and address, anywhere in India. The proposed method acquires the information from AADHAAR and it is used to prevent and alert the authorities against fake voting rigging during election. In this method two prototype kits are implemented using arduino-uno, finger print and Node MCU modules. Both are in mutually communicating with each other will note down entire voters list and voted persons list in each constituency. The main advantage of this proposed method is voter can utilize his/her voting from anywhere in the state, however his/her vote will cast at respective constituency only.

**KEYWORDS:** AADHAAR, Arduino-UNO, Biometric, E-Voting, Node MCU.

**INTRODUCTION:** Voting process is known as a process for a group by means of a meeting or democratic vote in orders to take a free decision. This manner consider as the best normally found in republic and democratic governments (IDEA international, 2012) Common elections systems are already exist since hundred years ago. All those earlier election systems, however they had been considered being acceptable in past days, they started to reveal its disadvantages, day after day. These disadvantages, lead to a huge development in the design and style of electronic voting machine. Previously back to 1960, the election systems used were all run manually. This involves, the election system that use paper, were the voters' votes casted and counted by hands. During 1961, the design of voting systems developed from manual base to electronic base where the first electronic voting system was the electronic punch card system (Giovanni, 2008 Electronic voting machines consist of three actors: people who will make the votes, registration authorities and tallying authorities. All the Voters have the right for voting; have to be register before the Election Day in order to be eligible voters. These authorities make sure of only authorized people give their

vote and they must vote only one time during the election and then all the votes will be casted and show the final results of the voting (Cetinnkaya, 2007). Thus this system provide complete security, accurate polling and easy counting. The main advantages of this systems are reduction of polling time, resulting in fewer problems in electoral preparations, law and order, candidates' expenditure and provide easy and accurate counting without any mischief at the counting centre. It is capable of saving considerable printing stationery and transport of large volumes of electoral material. In earlier days for elections process different methods are implemented. They are: a) Ballet voting, b) Postal voting, c) Proxy voting and d) Internet voting. Most of these methods start with the first step verification of voter details and checking his/her identity proof. In Ballot voting [5] after the verification of voter identity he/she will be given a ballot paper and allowed to cast their vote. The ballot paper is printed with all the candidates contesting for poll with party name and symbol of the party for which he/she is representing. The voter has to give their vote by marking on one of the columns using a stamp. One voter is allowed to mark one of the columns. If more than one mark found at the time of evaluating the ballet papers it will be considered as an invalid vote. Postal voting [6] is used by people who are on election duty and attending other special duties. When any one of the person who is unable to attend voting process they will be given an application to give their vote through post. Proxy voting [7] is something in this the other person will give vote behalf of the person who is sick and unable to go to the polling booth. But there must be a mutual understanding between the one want to give their vote and the one who is going to do that on behalf of other person. To do proxy voting special permission is to be taken from respected concern officials in the voter's area. The person who is going to vote instead of the actual voter must be a trusted one by him. Internet based voting [8] is not used in India because lack of awareness and less literacy. In this method voting will take place using a client-server based technique. The voters will log on to website to give their votes. Currently this method is using in corporate sector to for the election of chairperson. The above discussed methods have their own limitations and difficulties in terms number of staff to conduct elections, lots of paper work, less voting percentage, inaccessibility to internet, time consuming, delay in announcing the result and error in counting the votes, to name a few. India is the largest democracy in the world. But India faces a huge threat

of rigging in election, due to the population of over a billion in which many of the voter fails to authority to vote. This is used as an advantage by some political parties to impersonate the absentee voters to rig the elections to their advantage.

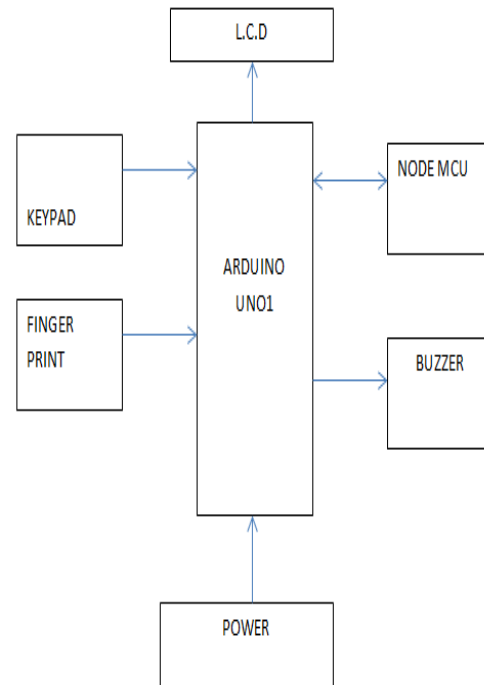
**LITERATURE SURVEY:**

The first Indian EVMs were developed in the early 1980s by ECIL. They were used in certain parts of the country, but were never adopted nationwide. They introduced the style of system used to this day, including the separate control and ballot units and the layout of both components. These first-generation EVMs were based on Hitachi 6305 microcontrollers and used firmware stored in external UV erasable PROMs along with 64kb EEPROMs for storing votes. The smart e voting system has been done on fingerprints in humans. There are two fundamentally main goal that have risen from voting process (1) A person's fingerprint will not change the structure naturally after about one year after birth and (2) e fingerprints of individuals are different. Even the twins in fingerprints are not the same. In practice two humans with the same fingerprint have never been found. Electronic Voting Machine was introduced to replace Ballet boxes from 1998 in India [4]. The voting machines used in India are a combination of two components namely the Balloting unit and Control unit. Balloting unit on which the voters press the button. Control unit gives the polling officer stationed at the poll booth to supervise the process. An EVM runs on 6v batteries and removes the requirement of an external power source. It is designed to record 64 candidate names and 3,840 votes at the max. The 64 candidate names can be split across 4 units connected in parallel, with 16 names on each of the unit [5]. The first ever vote in record took place in Rome in 139BC and used simple hand written paper ballots. [3] This system was further modernized and the existing system was first used in Australia in 1858. The system incorporated the use of a set of ballots that were provided by the government. The ballots contained the list of candidates and voters showed their preference by placing a mark on the provided area using pens, stamps and other specified markers. [5] The voter received privacy to place their votes after which the paper ballot was returned and kept in safeguard until the time of tally[6]. During the counting of tally, ballots may be displaced and often marks on ballots are hard to identify and distinguish [7] [8]. Therefore we would like to simplify the tedious job of tally counting with the help of modern technology. Keeping count of the tallies should be digitalized, to save time and of course increase reliability. To eliminate the confusion of distinguishing between improperly marked ballots we plan on using digital buttons systems. The advantage being that pressing on the button means.

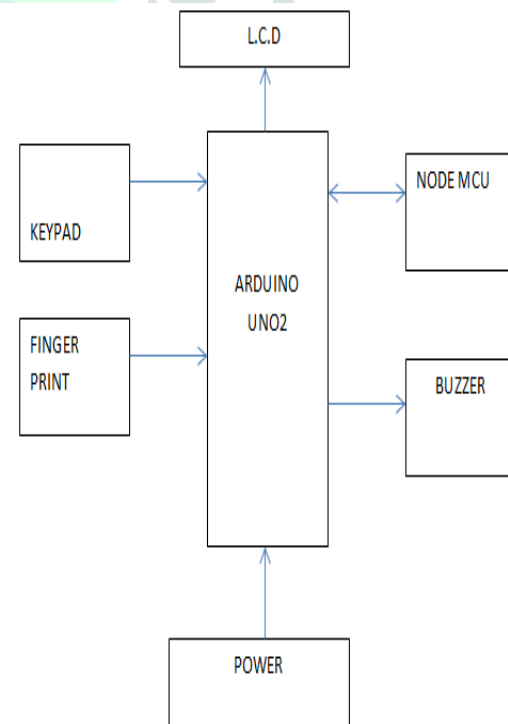
Electronic Voting System[9] that will automatically perform authentication validation and counting with the help of UIDAI. The proposed electronic voting system can be implemented along with the traditional election system. The proposed an approach that will use the information provided by UIDAI in electronic voting system. Is a Project Director

at Contain Southampton, United Kingdom. His generation on Biometric technology such as fingerprint. The finger prints are more secured technology. The information provided by UIDAI in smart voting system[10]. The proposed system procedure is carried out in mainly few stages: registration, verification and validation. These stages of proposed system are illustrated.

**PROPOSED METHOD**



**Fig 1: Proposed prototype 1**



**Fig 2: proposed prototype2**

Two proto type kits are designed as shown in Fig 1 and Fig 2 to show different constituencies. Keypad is provided for entering AADHAAR and voted party. Finger print module is for checking corresponding aadhaar user finger print in live.

Node MCU is used to upload number of votes, to intimate about rigging information. NODE MCUs are mutually in communication among themselves for voted persons list. If anyone already voted at one constituency, again he/she tries to vote at another constituency; automatically this hardware mechanism will detect that person and will not allow that person for voting.

#### ARDUINO:

The Arduino Software (IDE) allows you to write programs and upload them to your board. In the Arduino Software page you will find two options: 1. If you have a reliable Internet connection, you should use the online IDE (Arduino Web Editor). It will allow you to save your sketches in the cloud, having them available from any device and backed up. You will always have the most up-to-date version of the IDE without the need to install updates or community generated libraries. 2. If you would rather work offline, you should use the latest version of the desktop IDE. Code online on the Arduino Web Editor.

To use the online IDE simply follow these instructions. Remember that boards work out-of-the-box on the Web Editor, no need to install anything.

#### FINGER PRINT MODULE:

In today's secure world biometric safety is on the top. Unlike other techniques which make use of passwords and numbers, that are needed to be remembered, biometric techniques make use of human body parts like fingerprints or even iris of your eyes and as we know that these things are unique to all thus it makes biometric systems the most effective over others. In this project I have interfaced a very popular fingerprint scanner R305 with AtMega 16 microcontroller. This module communicates over UART protocol with microcontroller i.e. it makes use of Rx and Tx pin of microcontroller to interact with it. This is a fingerprint sensor module with TTL UART interface for direct connections to microcontroller UART or to PC through MAX232 / USB-Serial adapter. The user can store the fingerprint data in the module and can configure it in 1:1 or 1: N mode for identifying the person. The FP module can directly interface with 3v3 or 5v Microcontroller. A level converter (like MAX232) is required for interfacing with PC serial port.

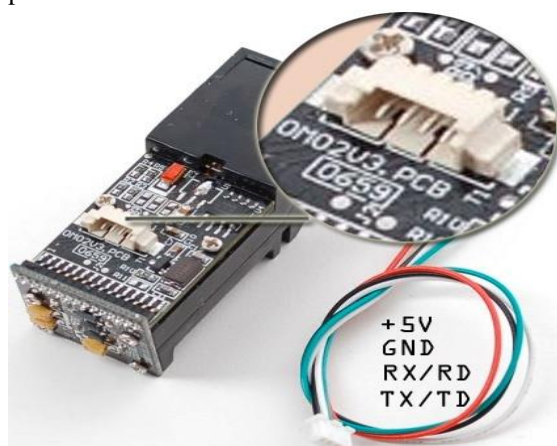


Fig 3: R305 Module

now as shown in fig 3, R305 module comes with preloaded with scanner as well as detection section and we are left with 4 pins for connections. These 4 pins are: VCC, GND, Rx and Tx. It works over 3.3 to 5V supply and its Rx and Tx pin is connected to Tx and Rx pin of the microcontroller respectively. The mode is semi duplex asynchronous serial communication and the default baud rate is 57600bps but it can be changed between 9600~115200bps.

At power on, it takes about half a second for initialization, during this period the module can't accept commands. The system sets aside a 512-bytes memory (16 pages X 32 bytes) for user's notepad, where data requiring power-off protection can be stored. There is an image buffer and two 512-byte-character-file buffers within the RAM space of the module. This buffer serves for image storage and the image format is 256\*288 pixels. Two character file buffers can be used to store both character file and template file. System sets aside a certain space within Flash for fingerprint template storage, i.e. fingerprint library. It is non volatile in nature.

#### LIQUID CRYSTAL DISPLAY:

The LCD is used for the purpose of displaying the words which we are given in the program code. This code will be executed on microcontroller chip. By following the instructions in code the LCD display the related words. Below Figure4 shows the LCD display.



Fig 4: LCD Display

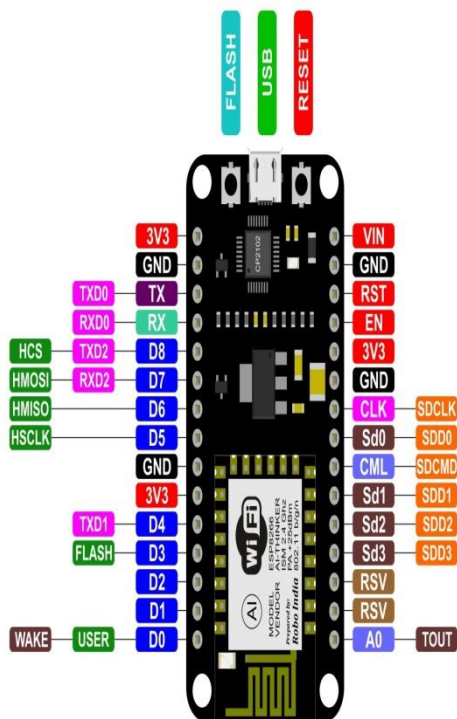
The LCD display consists of two lines, 20 characters per line that is interfaced with the PIC16F73. The protocol (handshaking) for the display is as shown in Fig4. The display contains two internal byte-wide registers, one for commands (RS=0) and the second for characters to be displayed (RS=1). It also contains a user-programmed RAM area (the character RAM) that can be programmed to generate any desired character that can be formed using a dot matrix. To distinguish between these two data areas, the hex command byte 80 will be used to signify that the display RAM address 00h will be chosen Port1 is used to furnish the command or data type, and ports 3.2 to 3.4 furnish register select and read/write levels. A liquid crystal is a material (normally organic for LCDs) that will flow like a liquid but whose molecular structure has some properties normally associated with solids. The Liquid Crystal Display (LCD) is a low power device. The power requirement is typically in the order of microwatts for the LCD. However, an LCD requires an external or internal light source. It is limited to a temperature range of about 0°C



to 60°C and lifetime is an area of concern, because LCDs can chemically degrade. EN line is used to tell the LCD that it is ready to execute an instruction that prepared on the data bus and on the other control lines. Note that the EN line must be raised/lowered before/after each instruction sent to the LCD regardless of whether that instruction is read or write, text or instruction. In short, someone must always manipulate EN when communicating with the LCD. EN is the LCD's way of knowing that someone is talking to it. If one doesn't raise/lower EN, the LCD doesn't know that someone is talking to it on the other lines.

#### NODE MCU:

The Node MCU is an open source firmware and development kit that helps you to prototype your IoT product with ArduinoIDE or in few Lau script lines. It includes firmware which runs on the ESP8266 Wi-Fi SoC. And hardware which is based on the ESP-12 module. In this tutorial we explain how to use NodeMCU with Arduino IDE.



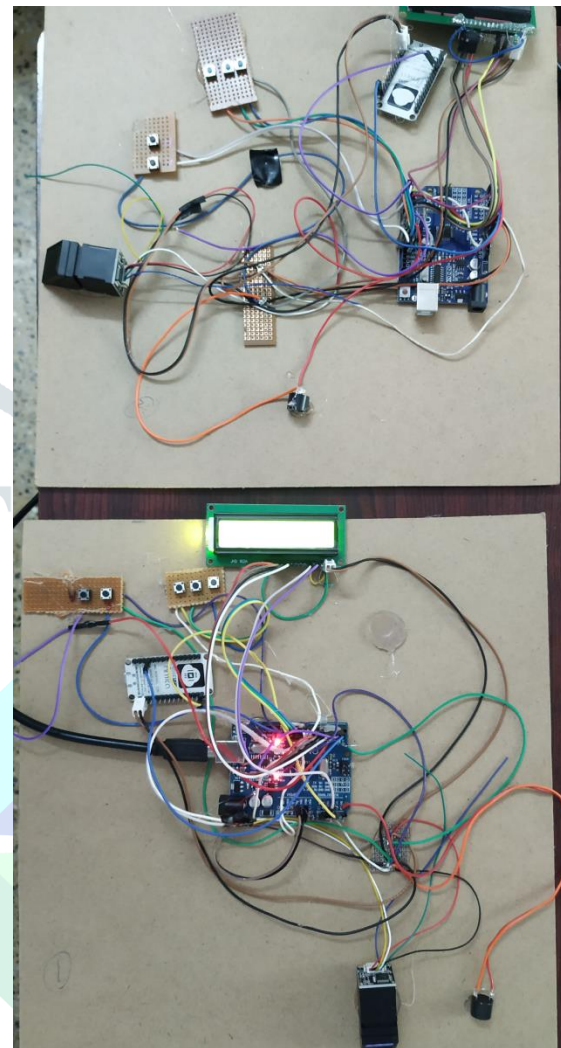
**Fig5: NODE MCU module with ESP8266 WIFI  
Connection of Node MCU with ARDUINO IDE**

1. Open up the Arduino IDE.
2. Go to File -> Preferences -> Additional Boards Manager  
URLs: [http://arduino.esp8266.com/stable/package\\_esp8266com\\_index.json](http://arduino.esp8266.com/stable/package_esp8266com_index.json) -> click OK
3. Close the IDE and open it up again.
4. Go to Tools -> Board (where you'd select your version of Arduino) -> Boards Manager, find the ESP8266 and click Install. You now should be able to use the ESP8266 as an Arduino. Simply select

the NODEMCU 1.0 as your board with Port and you should be ready to code.

Now, with ESP8266 board installed to Arduino IDE, we can program NodeMCU using Arduino IDE directly.

#### RESULTS:



**Fig6: Proposed hardware kit**

Two kits in fig.6 shows two constituencies hardware voting modules. Those two are in mutually communicating with NODE MCU modules for fraud less voting.

#### CONCLUSION

This paper suggest that the EVM system has to be further studied and innovated to reach all the levels of community, so that the voter's trust to the election process will increase and election officials will make more involvement in purchasing the innovated EVM's for conduct efficient, secure, corruption free Elections . Further innovations can be made so that the voter can vote wherever they are during the election, getting to choose the candidate competing in their home constituency without the necessity of travel. The described model consisting of fingerprint sensor can also be modified to be used with Retina scanner which provides even more secure and technologically advanced solution to fake voting and impersonation. This concludes that the Aadhaar based EVM will useful to avoid rigging in election by impersonation, to avoid time

consumption and all the while keep the voter's information more secured. The conventional paper ballot method also consumes lot of man power and security issues to the Electoral Commission which can be reduced by this system. This system can be implemented in a few years, with recent development in technology. A fingerprint scanner is neither too expensive nor too complicated to use on daily basis

#### **FUTURE SCOPE:**

Memory of finger print module can be expanded .We can use a 1mb flash memory finger print module for increasing the capacity. External memory can be provided for storing the finger print image, which can be later accessed for comparison. Audio output can be introduced to make it user friendly for illiterate voters.

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