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Implementation of IoT Based Voting System Using Fingerprint Sensor

Antony Robinson J¹, Hari Hara Sudhan K², Gomathi Nathan S³, Afzalur Rahman S⁴, Keerthivasan M⁵,

Assistant Professor, Department of EEE, Francis Xavier Engineering College, Tirunelveli., Tamilnadu, India ¹

UG Student, Department of EEE, Francis Xavier Engineering College, Tirunelveli., Tamilnadu, India ^{2,3,4,5}

ABSTRACT: An electronic voting machine is an advanced tool which allows user (voter) to vote over the internet without any restrictions. There are number of voting system adopted all over the world but each at them having its problems and limitations. The main goal of this project is to introduce the idea of election which can also be done using the internet. This system uses fingerprint in order to provide a high performance with high security to the voting system. We can also use web technology to make the voting more practical.

KEYWORDS: ARDUINO, MAX 232, FINGER PRINT SENSOR MODULE, TRANSFORMER.

I. INTRODUCTION

The system that exists currently in Bangladesh is completely paper based and manual that takes many time and therefore the government has got to bear the financial expenses for this purpose. The voters are registered just before the poll therefore the committee gets a while in hand for creating all the required arrangements with during this short period of your time . they only add the new voters with the previous voters in order that the people that have deceased by this point could also be considered because the existing voter if they're not informed. So people might not bestow their faith on the voters list because it contains numerous fake voters. Again the authority itself could also be corrupted and may allow some fake voters to participate. If any voter stays abroad or the registration processes somehow thanks to prior obligations or unavoidable circumstances, he or she wouldn't be considered as a voter unless or until s/he informs the authority and during this case most of the time people don't show any interest upon this process. Any voter may change his place of residence between two elections and regarding this case if the authority isn't informed they're not considered because the voter of that area though he's a voter as per the constitution. Therefore he misses the chance to confer his opinion. albeit he's registered voter of his new locality it's often seen that he's still existing voter of his old area. Thereby he can vote twice which is against the law .

Sometimes people ruin their votes by stamping on two or more signs mistakenly. this is often also a drawback of paper based electoral system . While casting the votes the acting officers present within the centers marks a voter with a black ink on his or her nail but it's removable. So there's an opportunity for casting illegal votes. Again these votes are counted manually therefore the process becomes a gradual one which can be inaccurate also . of these problems together made people believe inventing a replacement system which will reduce corruption, increase accuracy and fast paced.

Vote counting :

There exist various methods through which the ballot cast at an election may be counted, before applying a electoral system to get one or more winners.

Manual counting:

Manual counting requires a physical ballot that represents voter intent. The physical ballots are read and interpreted; then results are individually tabulated. This method is employed in Sweden for instance, and conducted as follows. The voter casts three ballots, one for every of the three elections (national, regional, and local), and every during a sealed envelope. The party and candidate names are pre-printed on the ballot, or the



voter can write them in on a blank ballot. When voting has finished, all envelopes are opened on the counting table, for one election at a time. they're sorted in piles consistent with party, inspecting them for validity. The piles are then counted manually, while witnesses round the table observe. The count is recorded, and therefore the same pile is counted again. If the results do not agree, it's counted a 3rd time. When all piles are counted and therefore the results agree, the results certified and transmitted for central tabulation. The count as received is formed public, to permit anyone to double-check the tabulation and audit the data . There appears to be a high level of confidence during this system among the population, as evidenced by the shortage of criticism of it.

Electromechanical and Optical scan counting:

Paper ballots, typically punched cards or mark sense, are collected and fed into a machine to tabulate vote totals. Tabulation can occur with each individual ballot, or in batches.

Direct-recording voting (mechanical) counting:

Voters selecting switches (levers), pushing plastic chips through holes, or pushing mechanical buttons which increment a mechanical counter (sometimes called the odometer) for the acceptable candidate panot.

Direct-recording electronic counting:

Voting data and ballot images are recorded in memory components. Tabulation of the voting data stored during a removable memory component and as printed copy. The system can also provide a way for transmitting individual ballots or vote totals to a central location for consolidating and reporting results from precincts at the central location. This consolidation are often any subset of machines, like all voting machines during a polling place , or all voting machines during a precinct, etc. The term biometrics has been derived from two Greek roots “bios” meaning life and “metrics” meaning measurement. Biometric technology uniquely identifies a private supported certain characteristics which may be physiological or behavioural. There are mainly nine biometric techniques that are widely used including face, fingerprint, hand vein, hand geometry, iris, retinal pattern, voice print, signature and facial thermo grams. These techniques use data that's unique to the individual and remains so throughout one’s lifetime. Fingerprints are emerging because the hottest biometrics technology thanks to its uniqueness, stability, permanence and simple acquisition. Impression that's left by the friction ridges of a finger is named a fingerprint. Major parts of a fingerprint are ridge, valley and minutiae. Single curved segment of a fingerprint is understood as ridge. Valley is that the space between two adjacent ridges. Local discontinuities within the patterns of ridges are called minutiae. These are often ridge endings or bifurcations as shown in Fig.1.Minutiae provide information about ridge-valley structures.

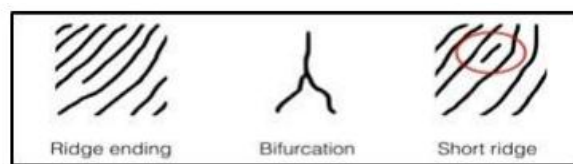


Fig.1 Ridge Endings with various.

A fingerprint recognition based identification system is employed . Fingerprints are considered to be the simplest and fastest method for biometric authentication . they're secure to use, unique for each person and don't change in one's lifetime. Fingerprint recognition may be a mature field to-day, but still identifying individual from a group of enrolled fingerprints may be a time taking process. it had been our responsibility to enhance the fingerprint identification system for implementation on large databases. Biometrics technology can solve these problems and proposed fingerprint based attendance system would be ideal for implementation in universities for identification and also by organizations for attendance monitoring of their employees. Proposed system is meant using Arduino UNO and optical fingerprint acquisition module. There are mainly three sorts of fingerprint sensors:

OPTICAL FINGERPRINT SENSOR: In these sorts of sensors, a digital image of the print is captured using light . this sort of sensor are often considered as a specialized camera . the highest layer of the sensor is understood because the touch surface. Below this layer, there's a layer of sunshine emitting phosphor which illuminates the surface of the finger. Light gets reflected from the finger and reaches solid state pixels array or charged coupled device which is



employed to capture a visible image of the fingerprint. Optical fingerprint sensor provide a high resolution image, electrical durability and highly stable performance.



Fig..2 Finger Print Module

EXISTING METHOD:

Using the last decade old election system to gather votes from the citizens is not any longer considered efficient thanks to the varied recurring errors. So time has arrived that the paper based primordial electoral system which has already proven itself an inefficient and slow procedure is modified immediately. The system that's being followed currently, from data collection procedure to counting of the votes may be a manual process. In existing electronic electoral system , the counting of votes is merely displaying mechanical device .

OLD METHODS OF VOTING:

- **PAPER-BASED VOTING:** The voter gets a blank ballot and use a pen or a marker to point he want to vote that candidate. Hand-counted ballots may be a time and labour consuming process, but it's easy to manufacture paper ballots and therefore the ballots are often retained for verifying, this sort remains the foremost common thanks to vote.
- **LEVER VOTING MACHINE:** Lever machine is peculiar equipment, and every lever is assigned for a corresponding candidate. The voter pulls the lever to poll for his favourite candidate. This type of mechanical device can count up the ballots automatically. Because its interface isn't user-friendly enough, giving some training to voters is important.
- **DIRECT RECORDING ELECTRONIC VOTING MACHINE:** this sort, who is abbreviated to DRE, integrates with keyboard; touch screen, or buttons for the voter press to poll. a number of them lay within the voter pulls the lever to poll for his favorite candidate. this type voting records and counting the votes is extremely quickly. But the opposite DRE without keep voting records are doubted about its accuracy.
- **OPTICAL VOTING MACHINE:** After each voter fills a circle correspond to their favourite candidate on the blank ballot, this machine selects the darkest mark on each ballot for the vote then computes the entire result. this type of machine counts up ballots rapidly. However, if the voter fills over the circle, it'll cause the error results of optical-scan.

PROPOSED METHOD:

This proposed project describes an IOT based electronic mechanical device using Aadhar database. The voting system is managed during a neater way as all the users should login by Aadhar card number and password and click on on on his/her favourable candidates to cast the vote. this technique security level is sweet . The system that exists currently in Bangladesh is totally paper based and manual that takes many times and thus the govt possesses in touch the financial expenses for this purpose. The voters are registered just before the poll therefore the committee gets a while in hand for creating all the required arrangements with during this short period of your time .This digitally generated output of fingerprint sensor is given to the embedded controller for further processing. Atmega328 controller, which acts as a processor for the arduino board. They only add the new voters with the previous voters so as that the folks that have deceased by now could even be considered because the prevailing voter if they're not informed. So people won't bestow their faith on the voters list because it



contains numerous fake voters. Again the authority itself could even be corrupted and should allow some fake voters to participate. If any voter stays abroad or misses the registration processes somehow because of prior obligations or unavoidable circumstances, he or she wouldn't be considered as a voter unless or until s/he informs the authority and through this case most of the time people don't show any interest upon this process.

BLOCK DIAGRAM:

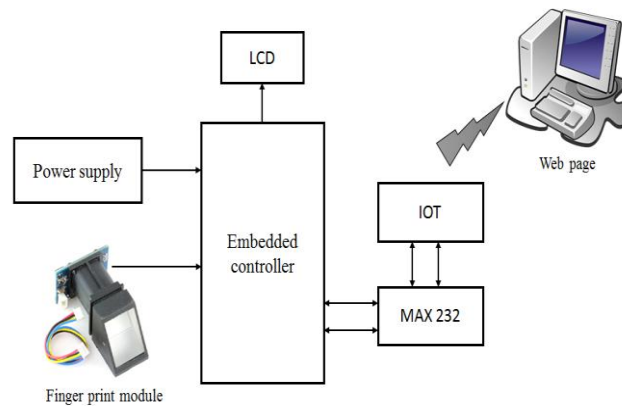


Fig. 3 Block Diagram

BLOCK DESCRIPTION:

Power supply is employed operating voltage for all electronics circuit. Finger print sensor which reads the finger print patterns. Fingerprint sensor scans the unique finger pattern and accordingly generates a digital signal during which is within the sort of ones and zeros. This digitally generated output of fingerprint sensor is given to the embedded controller for further processing. Atmega328 controller, which acts as a processor for the arduino board. Nearly it consists of 28 pins. From these 28 pins, the inputs are often controlled by transmitting and receiving the inputs to the external device. Interfacing circuit is found at the input or output of a switch. It allows the processing of a part of the signaling and supervision of communications. All identity of voters is stored in record database at local center. because the thumb is pressed the controller check and match with the record data base if the info base is match with user figure print then then only the general system allows to voter (user) to vote his/her respective party over the cloud via IOT at that very same time the LCD displays the name of party to whom you're vote. If the fingerprint isn't matched then system displays "Data isn't found" then system Nearly it consists of 28 pins. From these 28 pins, the inputs are often controlled by transmitting and receiving the inputs to the external device cannot allow to vote. A Max232 transmitter is an device utilized in telecommunications to supply radio waves so as to transmit or send data with the help of an antenna.

The transmitter is in a position to get a frequency AC that's then applied to the antenna, which, in turn, radiates this as radio waves. within the controller Port 10(P3.0/RXD) may be a connected to the input Nearly it consists of 28 pins. From these 28 pins, the inputs are often controlled by transmitting and receiving the inputs to the external device of transmitter Port 5(T1N). within the controller Port 11(P3.1/TXD) may be a connected to the input of Port 4(T2N). In Vs+ is connected to the capacitor (C5) then the flows to the facility supply. In Vs- is connected to the capacitor (C4) then the flow through the bottom . within the transmitter output Port 14 (T1 out) may be a connected to computer. This digitally generated output of fingerprint sensor is given to the embedded controller for further processing. Atmega328 controller, which acts as a processor for the arduino board. within the receiver input port 13 (R1 IN) may be a connected to computer. Power supply gives supply to all or any components. it's wont to convert AC voltage into DC voltage. Transformer wont to convert 230V into 12V AC.12V AC is given to diode. Diode range is 1N4007, which is employed to convert AC voltage into DC voltage. AC capacitor wont to charge AC components and discharge on ground. LM 7805 regulator is employed to take care of voltage as constant. This digitally generated output of fingerprint sensor is given to the embedded controller for further processing. Atmega328 controller, which acts as a processor for the arduino board. Then signal are going to be given to next capacitor, which is employed to filter unwanted AC component. Load are going to be LED and resistor. LED voltage is 1.75V.if voltage is above level beyond the limit, then it'll be dropped on resistor. Nearly it consists of 28 pins. From these 28 pins, the inputs are often controlled by transmitting and receiving the inputs to the external device.



CIRCUIT DIAGRAM:

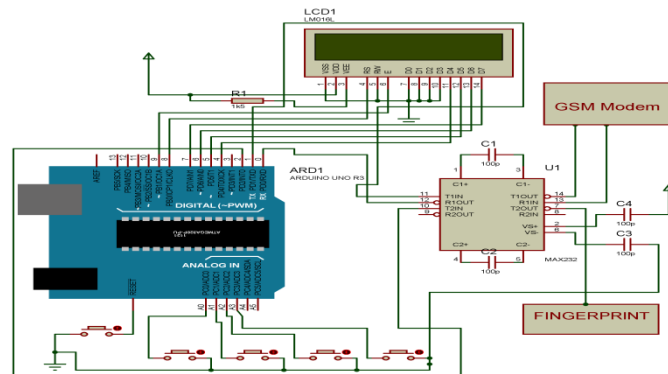


Fig. 4 Circuit Diagram

CIRCUIT DESCRIPTION:

Power supply gives supply to all or any components. it's wont to convert AC voltage into DC voltage. Transformer wont to convert 230V into 12V AC.12V AC is given to diode. Diode range is 1N4007, which is employed to convert AC voltage into DC voltage. AC capacitor wont to charge AC components and discharge on ground. LM 7805 regulator is employed to take care of voltage as constant. Then signal are going to be given to next capacitor, which is employed to filter unwanted AC component. Load are going to be LED and resistor. LED voltage is 1.75V.if voltage is above level beyond the limit, then it'll be dropped on resistor. In 'VCC' may be a connected to the facility supply. In 'GND' may be a connected to the facility ground. within the Atmega 2560 controller has on 100 pins. during this project we are using four switches. within the first switch may be a connected to controller port A0 (PC0/ADC0). within the second switch may be a connected to controller port A1 (PC1/ADC1). within the third switch may be a connected to controller port A2 (PC2/ADC2). within the fourth switch may be a connected to controller port A3 (PC3/ADC3). within the reset switch also a connected to controller. A 4x16 LCD is employed for displaying the message. A liquid-crystal display (LCD) may be a flat-panel display that uses the sunshine modulating properties of liquid crystals. Liquid crystals don't emit light directly. In LCD display may be a module of Register Set (RS) pin may be a connected to the 'Port 9' (PB1) of the controller. In 'VEE' (contrast adjustment) pin may be a connected to the 'Port 8' (PB0) of the controller. In 'VSS' pin is connected to the bottom pin. In data pins (D0, D1, D2, D3) is an ('Port 7, Port 8, Port 9, Port 10') are connected to the bottom . Then the D4 (data pin) 'Port 11' is connected to the 'Port 7' (PD7) of the controller. In D5 'Port 12' is connected to the 'Port 6' (PD6) of the controller. In D6 'Port 13' is connected to the 'Port 5' (PD5) of the controller. In D7 'Port 14' is connected to the 'Port 4' (PD4) of the controller. within the controller (PD3, PD2, PD1, and PD0) is an ('Port 3, Port 2, Port 1, Port 0') are connected to the control switch. A Max232 transmitter is an device utilized in telecommunications to supply radio waves so as to transmit or send data with the help of an antenna. The transmitter is in a position to get a frequency AC that's then applied to the antenna, which, in turn, radiates this as radio waves. within the controller Port 10(P3.0/RXD) may be a connected to the input of transmitter Port 5(T1N). within the controller Port 11(P3.1/TXD) may be a connected to the input of Port 4(T2N). In Vs+ is connected to the capacitor (C5) then the flows to the facility supply. In Vs- is connected to the capacitor (C4) then the flow through the bottom . within the transmitter output Port 14 (T1 out) may be a connected to computer. within the receiver input port 13 (R1 IN) may be a connected to computer. within the transmitter output port 7 (T2 out) may be a connected to fingerprint.

II. INTERNET OF THINGS

The Internet of Things (IoT) is that the network of physical objects or "things" embedded with electronics, software, sensors, and network connectivity, which enables these objects to gather and exchange data.

IOT allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration between the physical world and computer-based systems, and leading to improved efficiency, accuracy and economic benefit. "Things," within the IoT sense, can ask a good sort of devices like heart monitoring implants, biochip transponders on livestock , electric clams in coastal waters, automobiles with built-in sensors, DNA analysis devices for environmental/food/pathogen monitoring or field



operation devices that assist fire-fighters in search and rescue operations. These devices collect useful data with the assistance of varied existing technologies then autonomously flow the info between other devices.

THE STRUCTURE OF IOT

The IOT are often viewed as a big network consisting of networks of devices and computers connected through a series of intermediate technologies where numerous technologies like RFIDs, wireless connections may act as enablers of this connectivity. Internet of Things isn't the results of one novel technology

- Tagging Things: Real-time item traceability and addressability by RFIDs.

- Feeling Things: Sensors act as primary devices to collect data from the environment.
- Shrinking Things: Miniaturization and Nanotechnology has provoked the ability of smaller things to interact and connect within the “things” or “smart devices.”
- Thinking Thing: Embedded intelligence in devices through sensors has formed the network connection to the Internet. It can make the “things” realizing the intelligent control.
- These networks connected with added security, analytics, and management capabilities. This will allow IoT to become even more powerful in what it can help people achieve.
- These users could then be provided with special offers on their favourite products, or even location of items that they need,

IOT AS A NETWORK OF NETWORKS

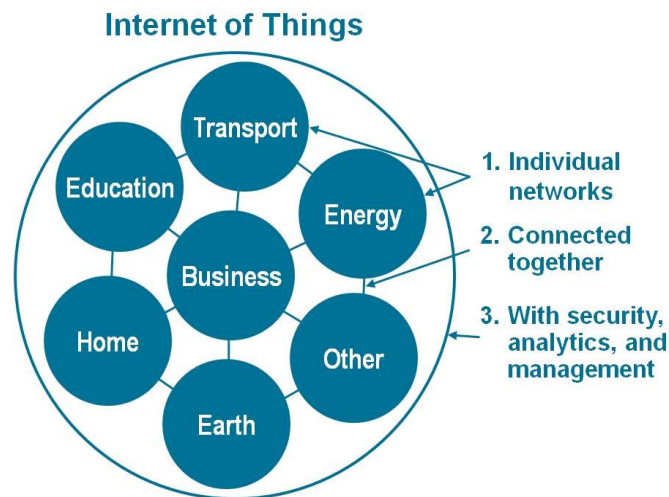


Fig. 6.IIOT as a Network of Networks

Internet of Things is the next stage of the information revolution and referenced the inter-connectivity of everything from urban transport to medical devices to household appliances. Integration with the web implies that devices will use an IP address as a singular identifier. However, due to the limited address space of IPv4 which allows for 4.3 billion unique addresses.. Objects in the IoT will not only be devices with sensory capabilities, but also provide actuation capabilities (e.g., bulbs or locks controlled over the Internet). On the opposite hand, IoT systems could even be liable for performing actions, not just sensing things. Intelligent shopping systems, for instance , could monitor specific users' purchasing habits during a store by tracking their specific mobile phones. These users could then be given special offers on their favourite products, or maybe location of things that they have , which their fridge has automatically conveyed to the phone. Additional samples of sensing and actuating are reflected in applications that affect heat, electricity and energy



management, also as cruise-assisting transportation systems. Other applications that the web of Things can provide is enabling extended home security measures and residential automation.

III. ENABLING TECHNOLOGIES

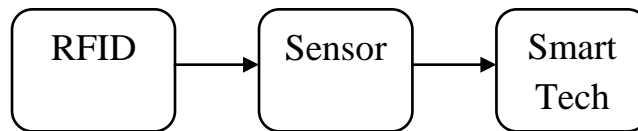


Fig 7 Method of enabling Technologies

RFID

To identify and track the info of things.

SENSOR

To collect and process the info to detect the changes within the physical status of things.

SMART TECH

To enhance the facility of the network by devolving processing capabilities to different a part of the network.

ATMEGA-328 IC

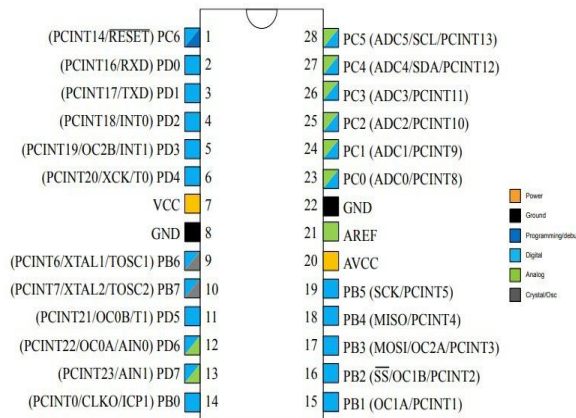


Fig. 8 Atmega IC 328 pin diagram

This ATMEGA-328 integrated chip consists of 28 pins. It consists of 6 analog inputs that are shown within the pin diagram. Analog inputs are often represented as PC0 to PC5. These analogue input pins possess the continual signal which acts as an analogue input for the system. Further it also consists of 12 digital inputs. It are often represented as PD1 to PD11 which act as a digital input ports supported pulse width modulation (PWM). These PWM which transmits the signal within the sort of discredited form. Both analog and digital input ports are often used for various applications for the input power supply, VCC and GND pins are used. Pins PB6 and PB7, which acts as a crystal to get a clock signal. By using these crystal, we will generate the clock signals and by these clock signals, we will use this clock signals for input sources. PC6 pin are the one where it are often used for the reset option. Resetting the program are often done by using this PC6 pin.



BLOCK DIAGRAM FOR POWER SUPPLY:

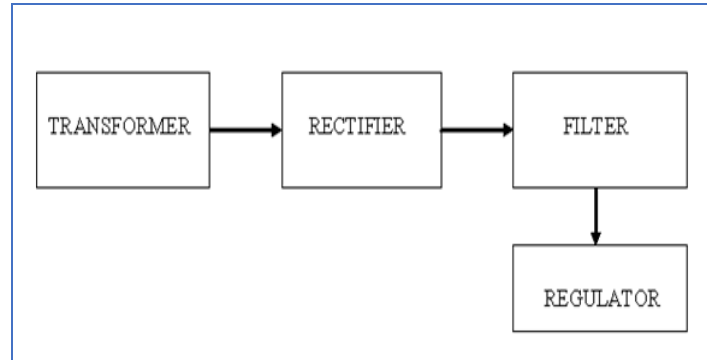


Fig. 9 Block diagram of AC to DC power Supply

1. Transformer: Steps the household line voltage up or down as needed.
2. Rectifier: Converts ac voltage into dc voltage.
3. Filter: Smooth the pulsating DC voltage to a varying DC voltage.
4. Regulator: Fix the output voltage to constant value.

IV HARDWARE AND SIMULATION

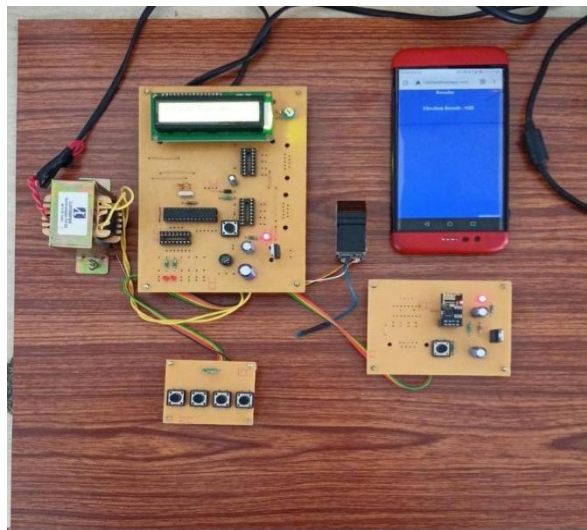


Fig. 10 Proposed voting hardware

Thus The method to do the voting in a very secure manner has been done and the output is verified successfully shown.

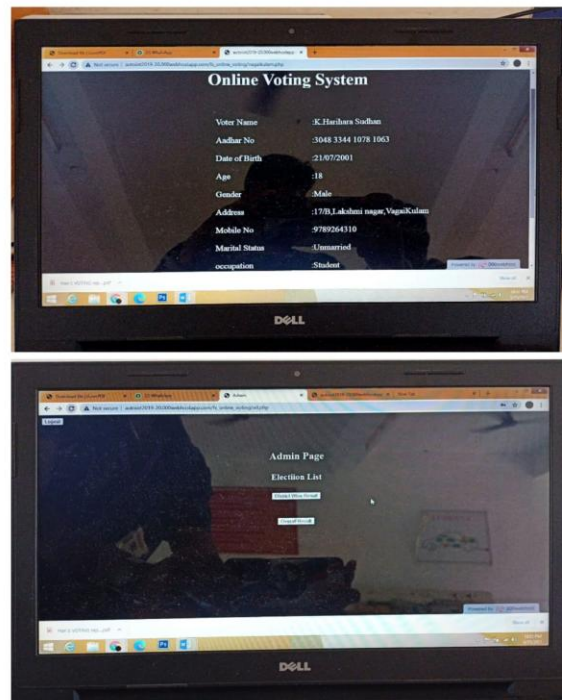


Fig.No. 5.2 IOT output and result

VI. CONCLUSION

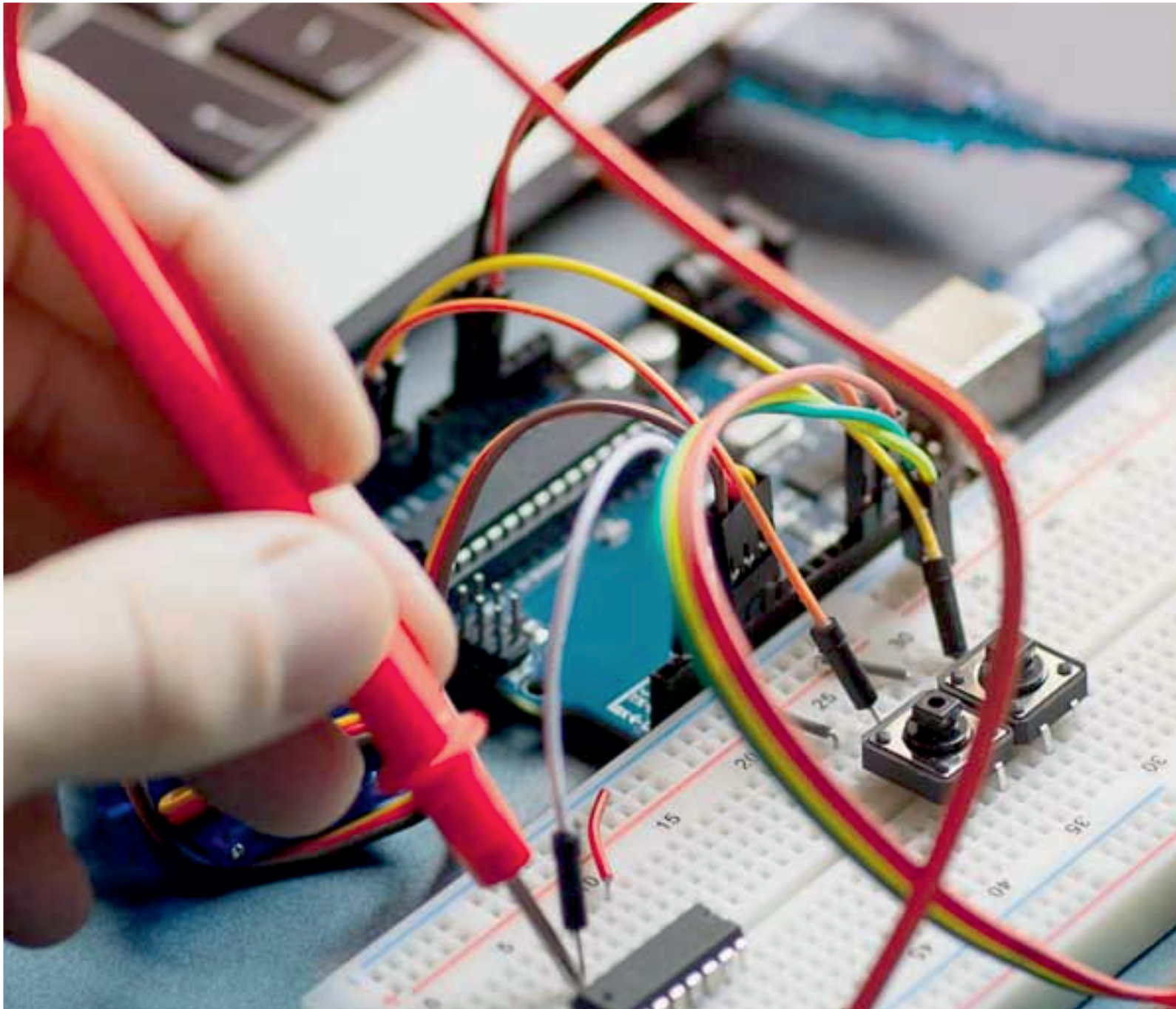
Our main proposal is to enable the user to cast his vote using online electoral system without getting to booth. User can cast his vote from his home or any way. And to scale back the proxy vote and in booth capturing situation this technique help us. thanks to easy and secure voting the share also increase drastically. the most advantage of this technique is that it doesn't require the graphical proximity. in order that soldier, policemen and other busy person are ready to participate within the election.

REFERENCES

1. Qiuhua Huang; Deepak Ramasubramanian; Vijay Vittal; Brian Keel; Jose Silva, Year: 2020, "Effect of accurate modelling of converter interfaced generation on a practical bulk power system", IET Generation, Transmission & Distribution, vol. 14, no. 15, pp. 3108 – 3116.
2. Priyank Shah; Ikhlaz Hussain; Bhim Singh, Year: 2018, "Real-time implementation of optimal operation of single-stage grid interfaced PV system under weak grid conditions", IET Generation, Transmission & Distribution, vol. 12, no. 7, pp. 1631 – 1643.
3. Arun Kumar Verma; Bhim Singh, Year: 2018, "Harmonics and Reactive Current Detection of a Grid-Interfaced PV Generation in a Distribution System", IEEE Transactions on Industry Applications, vol. 54, no. 5, pp. 4786 – 4794.
4. PavitraShukl; Bhim Singh, Year: 2019, "Grid Integration of Three-Phase Single-Stage PV System Using Adaptive Laguerre Filter Based Control Algorithm Under Nonideal Distribution System", IEEE Transactions on Industry Applications, vol. 55, no. 6, pp. 6193 – 6202.
5. Aakanksha Rajput; Neha Beniwal; Bhim Singh; Sukumar Mishra, Year: 2019, "Second-order sequence filter based control algorithm for single-phase grid interfaced solar PV system", IET Generation, Transmission & Distribution, vol. 13, no. 12, pp. 2382 – 2390.
6. Amresh Kumar Singh; Shailendra Kumar; Bhim Singh, Year: 2020, "Solar PV Energy Generation System Interfaced to Three Phase Grid With Improved Power Quality", IEEE Transactions on Industrial Electronics, vol. 67, no. 5, pp. 3798 – 3808.
7. PavitraShukl; Bhim Singh, Year: 2020, "Delta-Bar-Delta Neural-Network-Based Control Approach for Power Quality Improvement of Solar-PV-Interfaced Distribution System", IEEE Transactions on Industrial Informatics, vol. 16, no. 2, pp. 790 – 801.



8. Nirav Patel; Nitin Gupta; Ajay Kumar; B. ChittiBabu, Year: 2020, “Pseudo affine projection assisted multitasking approach for power quality improvement in grid-interactive photovoltaic (PV) system, IET Power Electronics, vol. 13, no. 13, pp. 2905 – 2916.
9. Priyank Shah; Bhim Singh, Year: 2020, “Low-voltage ride-through operation of grid interfaced solar PV system enabling harmonic compensation capabilities”, IET Renewable Power Generation, vol. 14, no. 12, pp. 2100 – 2113.
10. ShubhraShubhra; Bhim Singh, Year: 2020, “Three-Phase Grid-Interactive Solar PV-Battery Microgrid Control Based on Normalized Gradient Adaptive Regularization Factor Neural Filter”, IEEE Transactions on Industrial Informatics, vol. 16, no. 4, pp. 2301 – 2314.
11. V. Narendra Kumar; Narendra Babu P.;R. Kiranmayi; PierluigiSiano; Gayadhar Panda, Year: 2020, “Improved Power Quality in a Solar PV Plant Integrated Utility Grid by Employing a Novel Adaptive Current Regulator”, IEEE Systems Journal, vol. 14, no. 3, pp. 4308 – 4319.
12. ShailendraSingh;Shiv P. Singh, Year: 2018, “Energy saving estimation in distribution network with smart grid-enabled CVR and solar PV inverter”, IET Generation, Transmission & Distribution, vol. 12, no. 6, pp. 1346 – 1358.
13. TripurariNathGupta;ShadabMurshid;Bhim Singh, Year: 2019, “Power quality improvement of single phase weak grid interfaced hybrid solar PV and wind system using double fundamental signal extractor-based control”, IET Generation, Transmission & Distribution, vol. 13, no. 17, pp. 3988 – 3998.
14. VandanaJain;IkhlaqHussain;Bhim Singh, Year: 2019, “A HTF-Based Higher-Order Adaptive Control of Single-Stage Grid-Interfaced PV System”, IEEE Transactions on Industry Applications, vol. 55, no. 2, pp. 1873 – 1881.



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