Automated Biometric-EVM Implemented Using Lab-View

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ABSTRACT

Election commission still uses manual system during election for vote casting in this modern age of digitalization. In parliamentary elections it is consider introducing Electronic voting machines (EVM) though Evm is not entirely automated and has many limitations. Integrated database system containing all voters' information and a convenient user interface of an automated biometric voting system had designed, in this work. Automatically casted votes will be counted simultaneously of the voting process and result will be displayed. Using Lab VIEW enables the data base storage and file management process to easy to build and applicable in all other fields compare to other methods. Lab VIEW is mainly for data acquisition, data base storage, extraction of the data from data base and displaying it and also for report generation to store election voting information in files for future purpose. Main advantage of this project is not using internet connection for database extraction and storing purpose. This paper presents 2nd stage of verification by proving Aadhar information of the voter extracted by the use of fingerprints and that going to display on screen. The Aadhar information can be monitored. In future IOT can be implemented to send election report etc. Therefore, voting management of the election commission will be improved by ceasing fraudulent activities, corruptions, ensuring security, transparency, fairness, accuracy, trustworthy and keeping backup trails of voting system can be seen in this paper.

Keyword: Lab-view database, Lab-view file generation, LPC 2184 ARM controller, RS 308, LCD, Keil compiler, SFG demo & Serial communication.

I. INTRODUCTION

EVM is used during elections for the purpose of collecting and counting the votes casted by the common people. This machine actually replaces the traditional way of collecting votes through boxes consisting of voting papers. This method is called as paper ballot. Slowly, this system has changed or altered into a new technical and mechanical system which uses electronic voting machines in order to avoid misconceptions. Even though this voting machine is fast and accurate, this system needs more manpower and also it is not much more reliable. To increase the reliability of the voting, many algorithms have been introduced. One of the major idea of developing the system is to use the person's identity. The major unique identity of the each and every person is his fingerprint, Iris etc. So one of the cheapest way of recognition is fingerprint recognition. Not only the developers use this biometric, the government also has taken necessary steps to collect the biometric data and stored into a database. The government also issued Aadhar card to identify the person's unique identity. Using the Aadhar card, we can easily make the voters to cast the vote without difficulty. Due to the advancements in upcoming technologies, we can also able to collect and count the votes in a faster manner and the counting process starts simultaneously as soon as the voting process ends.

II. RELATED WORKS

Election of Karnataka in 2018, we are proof of how voter ID card can be misused. Some of the region election had been cancelled because of the bogus IDs and voter ID duplication. The situation faced is 2500 voter IDs are seized in one place. Later election authority board cancelled the election. To avoid those scenarios best method has to be finding out. So day to day technology changing, introducing best technology for solving problem is ongoing process.

Evaluation of voting equipment
In recent years, voting equipment which were widely

adopted may be divided into five types
A. Paper based voting
B. Lever voting machine
C. Direct recording electronic voting machine
D. Punched card
E. Optical voting machine

These are methods used before; using these methods can able to misuses. To avoid cheating and give 100% efficiency and transparency we are going for improved version of identification. That may be Biometric identification. Now elections system uses the Voter ID for the identification. Instead of that Aadhar can be used, by that fingerprints can be extracted.

Mahboobkarmic proposed framework for Biometric Electronic voting system. The system developed to improve the voting management of Bangladesh by fraudulent activities, corruptions, ensuring security, transparency, fairness, accuracy and keeping backup trails of voting process. But using keypad for selecting candidate is disadvantage. Matching fingerprints may take more time than expectation.

Rudrappa explains a Finger print based voting system in 2015. Automatic counting can be enabled and here the Biometric-EVM is implemented. Here counting can be done automatically and only uses finger prints identification. They are not checking other information's of a voter. Collecting fingerprints leads the main problem here.

K. NishanthRao, explains, Human data Acquisition through Biometric Using Lab-view. We can refer this paper for learning Lab-view data Acquisition.

Till now they have proposed the framework for biometric electronic voting system and researches on this topic is ongoing process. Because as we know, in the digital environment verifying a person using ID cards is not possible. It increases the chances of misusing the ID cards and ID cards can be bogus. So Biometric verification has to be done to avoid cheating .so they are many Biometric verification possible for a person that includes face, retina, voice and finer pints. Here fingerprints identification is going to use because of accuracy, less complexity and less cost. Including easy maintenance can be possible. Biometric-EVM implementation with Lab-VIEW adds advantages. The enrolling of the fingerprints can implement through lab-VIEW but implementing it, is

very difficult.

Process of implementing Bio-metric EVM using Lab VIEW can be implemented but it uses the image-based fingerprint verification system. Accuracy of the fingerprint going to reduce and comparing the finger images is the difficult job. They are 2 different Biometric system available, one is based on minutiae and another is pattern based (image based). Local discontinuity in the ridge flow pattern is minutiae based, used when template size is important. Micro and macro feature of a fingerprint is used in image based machine algorithm and used in fast response is required.

III. OUR PROPOSED SYSTEM
A. Proposed system model
The proposed system is a Biometric-EVM system which has 4 main sections -1) Registration of voter 2) voting control and 3) Election report from Lab-VIEW 4) Aadhar ID card display on Lab-VIEW page. 5) Result display on Lab-VIEW page. All voters have to register the fingerprints into sensor for Biometric database. But we can use Aadhar data base to enroll the fingerprints. Aadhar cards data base implemented by government. So election committee can easily access and get fingerprints of all the citizens. These fingerprints can be used as Data base.

Before extracting fingerprints from Aadhar database we need to verify the each and every person age should be greater than 18 and those extracted fingerprints can be enrolled into the sensor. Digital ballot paper (Biometric-EVM) contains the list of candidates and respective logos. Only one vote can cast by registered voters once fingerprint matched. Below we are going to explain step by step.

Project uses the SFG algorithm to enroll the fingers after the enrollment step followed by is identification and verification. These two steps uses fingerprint sensor algorithm to verify the fingerprint of the same person and to identify the fingerprint in the fingerprint data base. Once the fingerprint of the voter matches the data base, controller allows the voter to access the EVM.

EVM and sensor connected through ARM controller .controlling part main in this project. As we said once the fingerprint matches controller allow casting vote. This is the 1st type of verification in election. Using Biometric verification Enables 100% accuracy in

finding a voter because of unique pattern of fingerprint to each individuals. ARM controller Commands simultaneously display on LCD. Commands have to be followed by voter to cast vote.

B. Architecture of the biometric voting system using lab-view

As shown in the below conceptual architecture of the EVM highlights all the components which are used. Controller, fingerprint sensor, LCD display and bunch of LEDs are the components in the project. Mainly EVM divided as two units; they are controlling unit and data acquisition (data base management) unit. These two units work using different software environment to do their job. This makes the Biometric-EVM complex. Here Lab View and Kiel compiler are the software implementation. Here Lab-view for data acquisition and data storing. Data storing contain the information of the name of the candidate who has been voted will be stored in data base and name of the candidate can be encrypted format for the security purpose. Lab-VIEW page display the candidate full information, name of the party voted and the votes are automatically counted while doing election. The busser indication has been given for indication to the next voter to get ready for voting. Biometric-EVM is automated; it is not controlled by human, so buzzer sound tells the voters that voting done and next person is allowed to vote.
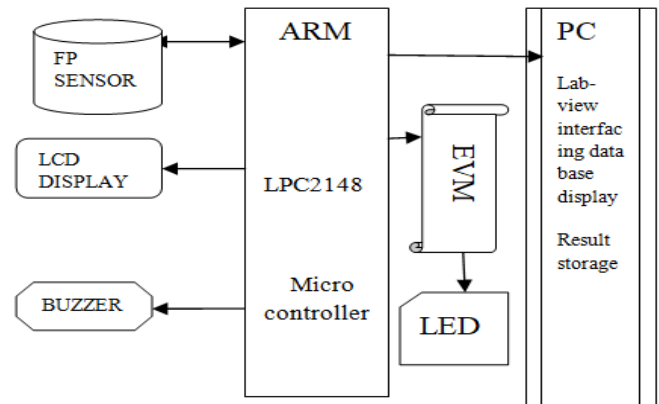

Fig 1: Conceptual Architecture of the system

C. Working principle of biometric-EVM

Working module of Biometric-EVM is explained in the following processes. The processes are explained using flow chart for better understanding of the software logic of the project.

a. Registration Process:

As shown in Figure 1, at the beginning of the registration process system will store detailed information of voters. If the fingerprints are valid, the system will generate templates for respective fingerprints which will be stored in the database alongside the voters other information. To check the authentication of a voter during registration process following cases will be considered:
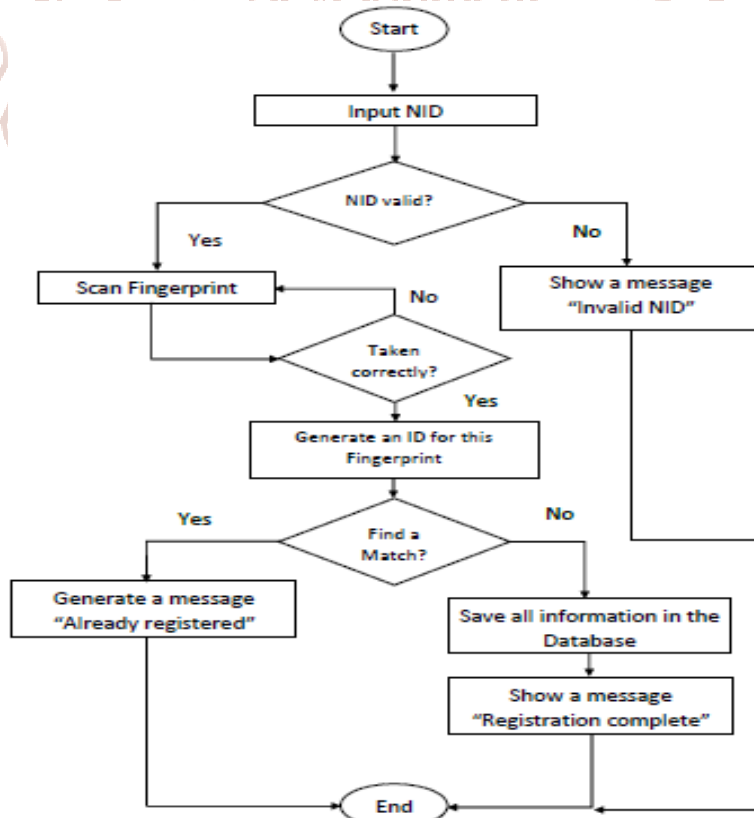

Fig 2: The Work Flow Diagram of Registration Process

b. Voting Process:

As shown in Figure 2, the system will ask for the voter's fingerprint until properly scanned. Then it will try to find a match with templates existing in the database. During voting process following cases will be considered if the match is not found then system will display a message saying 'Voter Not Registered and send message to the control. If the match is found then system will check if vote has been already given or not against that fingerprint.

a) If vote is already given against that fingerprint then system will display a message 'Your vote is already given' and notify authority with message.

b) If vote is not given against that fingerprint then system will ask to vote displaying a message 'Choose your candidate'. The voter will be able to see the candidate list on the display. Then the system will initialize time with 0 second and will wait for a certain time for the voter to give his vote.

c) If the button is pressed then system will add the vote against the candidate, display a message that 'Vote is granted' and an SMS will be sent to the voter to avoid any kind of miscommunication.

d) If the button is not pressed then system will wait for 30 second for the button to be pressed. If time exceeds 30 second, the process will terminate. The voting process will be held in each polling station by comparing a fingerprint with the voters of that specific station for faster operation. At the end of the election, the result of each polling station will be calculated automatically and will be integrated to the central database for overall result.
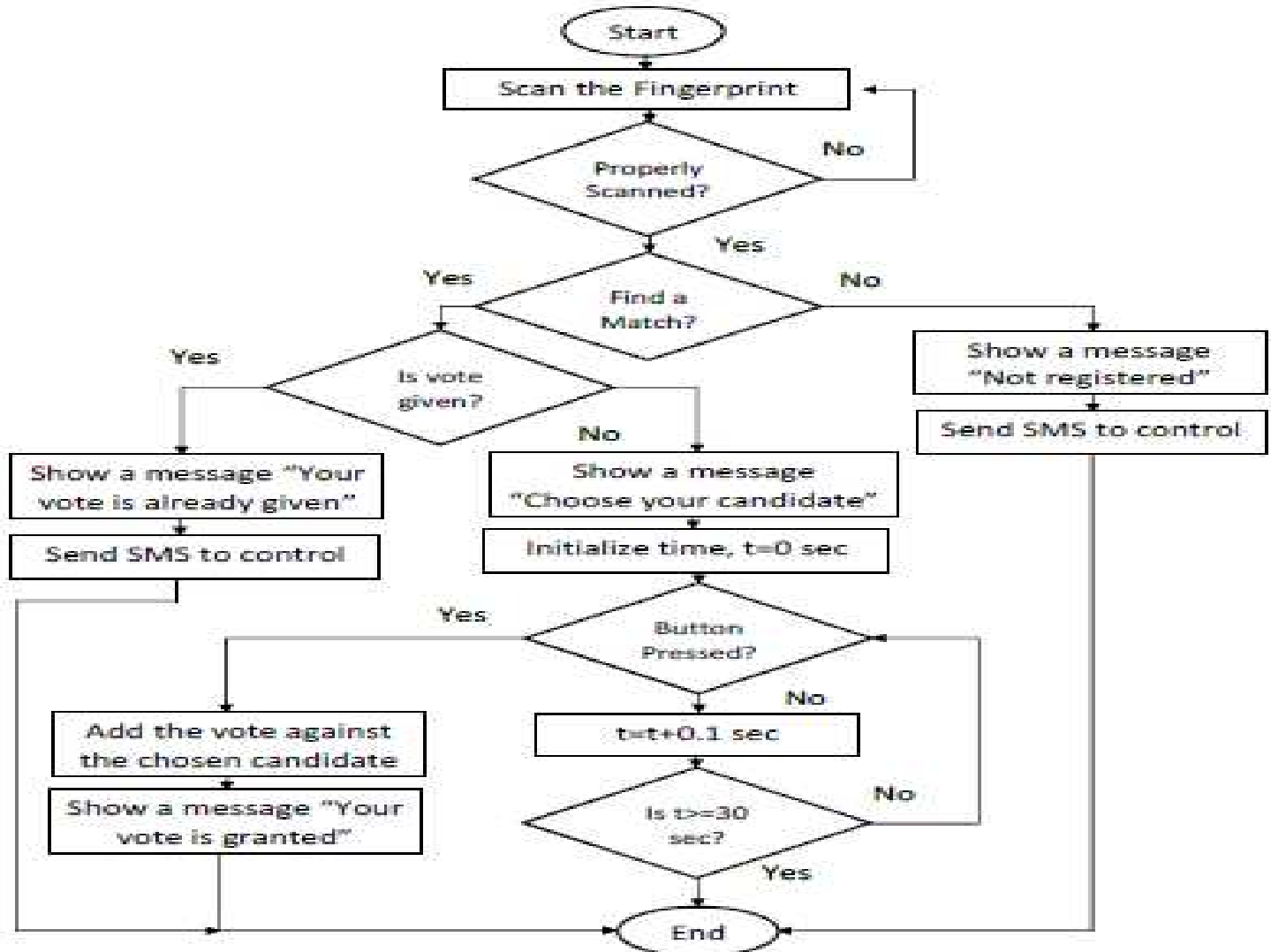

Fig 3: The Work Flow Diagram of Voting Process

IV. SYSTEM IMPLEMENTATION

Prototype is implemented by using different hardware which has been interfaced together as shown in figure Bellow:
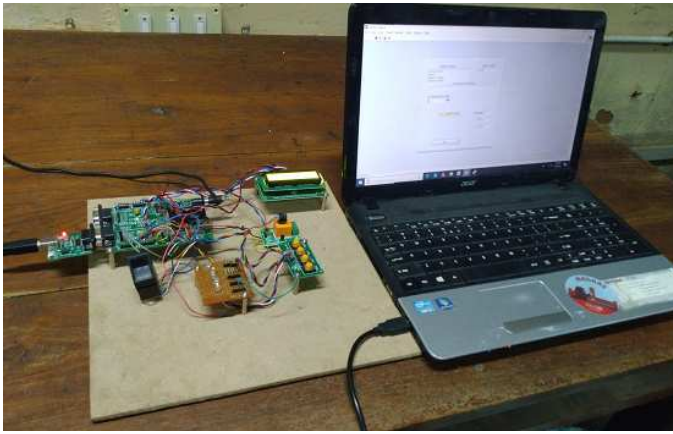
Fig 4: Hardware implementation

We have designed fingerprint based voting machine where there is no need for carrying his/her ID which contains his required details. At the polling booth the person needs only to place his finer on the device, thus allowing the acquisition of an on-spot fingerprint from the voter which serves as identification. From the tag the fingerprint reader reads the detail. The controlling unit receives the data for verification. The fetching of the data from reader and compares this data with already existing data stored during the registration of the voter done by controller. If the data matches with pre-restored information of the registered fingerprint, the person is allowed to cast his vote. If not, a warning message is displayed on LCD and the person is barred from polling his vote. The vote casting mechanism is carried out manually using the push buttons. LCD is used to display the related messages, warnings. Verification of the voter follows 2 steps respectively. To ensure secure voting, avoid bogus votes. Step one is fingerprint matching identification and another is to monitoring the Aadhar ID information (data base of voter) which is going to displays on PC, when the fingerprint matches the voter data base.

Hardware
1. ARM 7 LPC 2148 board with USB flasher
2. Fingerprint module RS 308
3. 16×2 LCD Display
4. LED's
5. Buzzer
6. Jumper wire
7. EVM module
8. Adapter 12v 2amp
9. Serial post to TTL converter

In hard ware implementation process, it is important to know about fingerprint module. The module used here is RS 308. Fingerprint identification is based

primarily on the minutiae, or the location and direction of the ridge endings and bifurcation (splits) along ride path. The sensor type used here is optical scanner. Fingerprint sensor capture images by employing high frequency optical devices that use prisms to detect the change in light reflectance related to the fingerprint. The fingerprint database can be created by using SFG algorithm, the address of the template can be found out and that can be viewed in the flash magic. This can show the how the sensor module and SFG algorithm interacts to store data base of fingerprints.

Software
1. Keil TOOLS by arm
2. Lab-view
3. Fingerprint SFG algorithm

Lab-VIEW: Laboratory Virtual Instrument Engineering Workbench commonly known as Lab-VIEW is a design platform/environment as a visual programming language from National Instruments. It is a graphical design platform wherein users can create a flow diagram to perform any type of mathematical, control system, measurement and data acquisition operation and to store the information of the process. The main advantage is implementing IOT applications using Lab-view. It is compatible with real time hard ware implementation. Lab VIEW has many in-built modules which have blocks for design, analysis and visualization of data. Consideration of the Lab-VIEW in the project is to report generation, data acquisition and data base management in easy and secure way. It helps save man power, time and cost.

Interfacing of hardware and software
Referring to the system architecture, a model the system is developed by 4 different interfacing methods for different purpose. They are
A. Interfacing sensor with fingerprint sensor algorithm: Registration process of voter is main step. It's possible to store the data base of voter fingerprints, which are eligible for casting vote can store.
B. Sensor interfacing with arm controller: Matching of the fingerprints can be found out. Once the matches the controller allow the voter to cast vote. If controller comes to know the unregistered voter it immediately declare that person is not eligible for voting.

C. Interfacing arm controller with LCD: Step by step interaction between voter and EVM can be done by this step. It provides user friendly environment. Commands are the procedure for the voter to cast vote

D. Interfacing b/w computer (pc) and controller through Lab-VIEW: Lab-VIEW helps to access the data, store the data and display the data. We can maintain the file that contains the process report of the election. This can be used for avoiding limitation of previous EVMs. IOT applications can be introduced in Lab-view.

Communication establishment of each and every device should be responsible for working. Above are steps to follow to get proposed to system to implement. Instead server we are using lab-view tool kit to design database which is used to store the information of voter , list of the candidates for specific election and other necessary information. Access to the data can be done by Lab-view very easily compered to all other integrated soft ware's. Only Lab-view can handle the data acquisition, data access and data storage. So using Lab-view is the main advantage in this project.
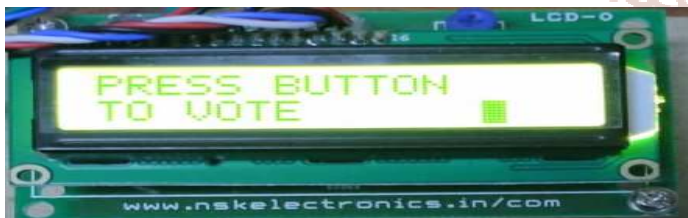
V. RESULT AND DISCUSSION
The results were obtained by simulating the system. The following results have been obtained in LCD display and are shown in below figures.
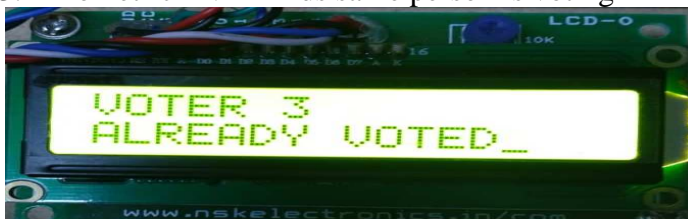
1. Biometric-EVM asks for placing the finger

2. Biometric-EVM allow voter to vote
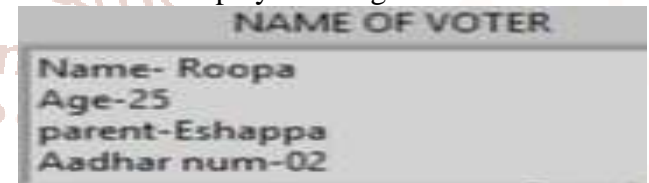

3. Biometric-EVM finds same person is voting

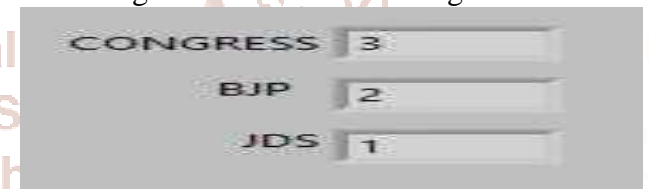4. Biometric-Evm, when the unregistered person come to cast vote

5. Lab VIEW display showing party name which is selected by voter

6. Lab VIEW display showing voter information

7. Counting of votes once the voting done

These are the main steps of the Bio-metric EVM. They can be check and some important results had been tested for various constraints and loopholes but the result was quite satisfying. Cheating is not possible so easy recognition of unauthorized voter. All information regarding the voting process (voter, voting, party) is stored in the database of Lab-View. We have obtained good accuracy.

VI. APPLICATION OF SYSTEM
➢ Biometric attendance system can be implemented
➢ Assembly lections
➢ Airport security system, where employee data acquisition required

VII. CONCLUSION
Basis of the democratic country is to help in free and fair way of conducting elections, which can be possible by the use of "Biometric-EVM using Lab-view for data acquisition and soring". Multiple and bogus voting can be avoided. This project overcomes with many disadvantages of previous EVMs. By this Biometric-EVM provides transparent, fair, secure and accurate election process.

REFERENCE

1. Anandaraj , S, Anish R, Devakumar P. V, "Secured Electronic Voting Machine using Biometric", IEEE Sponsored 2nd International Conference on Innovations in Information, Embedded and Communication systems (ICIIECS)2015.

2. M d. Mahbob Karin, Nabila Shahnaz Khan, "A Proposed Faramwork For Biometric Electronic Voting System", IEEE International Conference on Telecommunications and photonics(ICTP)2017

3. Rudrappa B. gujanatti, shivaram N. tolanur, "A Fingerprint Based Voting System", International Journal of Enineering Research &technology(IJERT)2015

4. Devendra Vijay Naik,"Smart Wireless Authenticating Voting Machine ", IEEE ICCSP 2015 conference.

5. J. Feng, "Combining minutiae descriptor for fingerprint matching", *J. Pattern Recognition Soc.*, 2008, *41*, 342-352.

6. P. Reid, "Biometric for Network Security", 1st Indian Reprint, Pearson Education, New Delhi, 2004.

7. E. Spinella, "Biometrics Scanning Technologies: Finger, Facial and Retinal Scanning", SANS Technology Institute, San Francisco, 2002.

8. Devendra Vijay Naik,"Smart Wireless Authenticating Voting Machine ", this full-text paper was peer-reviewed and accepted to be presented at the IEEE ICCSP 2015 conference.

9. B. Madan Mohan Reddy, D. Srihari RFID "Based Biometric Voting Machine Linked To Aadhaar For Safe And Secure Voting", International Journal of Science, Engineering and Technology Research (IJSETR) Volume 4, Issue 4, April 2015.