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Fingerprint Based Voting Machine using ARM7

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Abstract: This project provide the concept of getting the fingerprint impression of a voter. The person has to give the fingerprint impression twice. One is for enrolling the details of the person before voting and next is required during the voting time. At the time of voting the person has to give the fingerprint impression then it is compared with enrolled data and check whether that person has voted or not. If the person has not voted than the person is allowed to vote and if the person has already voted than the buzzer is initiated to alert the security guards and take action on that person. All these warning instruction and the instruction required to cast a vote is displayed on the LCD. Finally the result will be announced after completion of voting through IOT. Means the result will be sent as a link through Global System for mobile (GSM) to the registered authorised person mobile number. To see the result the person has to login to the Thing Speak web server account. And we are displaying the results in terms of the graph. Hence we have a designed finger print based voting machine where there is no need for the user to carry his ID which contains his required details.
Keywords: ARM7, Global System for mobile (GSM), Fingerprint Module, Liquid Crystal Display (LCD), Internet of Things(IoT)

I. INTRODUCTION

A machine which is used during elections for the purpose of collecting and counting the votes casted by the common people is called as electronic voting machine. Such type of biometric based voting machine actually replaces the traditional way of collecting votes through boxes consisting of voting papers called as paper ballot. Then 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, and make the voting procedure simple and secure many algorithms have been introduced and one of the major idea of developing the system is to use the person's identity like fingerprint. The major unique identity of the each and every person is his/her fingerprint, Iris etc. So we are using the fingerprint in our project because it is the cheapest way of recognition. Only the developers use this biometric, the government also has taken necessary steps to collect the biometric data and stored into a database.

II. EXISTING TECHNOLOGY AND ISSUES

The EVMs were devised and collaboration with Bharat Electronics Limited (BEL), Bangalore and Electronic Corporation of India Limited (ECIL),Hyderabad. The EVMs are now manufactured by the above two undertakings. An EVM consists of two units, i) Control Unit, ii)Balloting Unit.

The two units are joined by a five-meter cable. The Control Unit is with the Presiding Officer or a Polling Officer and the Balloting Unit is placed inside the voting compartment. It ensures that vote casting cannot be altered by unauthorized person. The voter authentication in online e-voting process can be done by formal registration through administrators and by entering OTP Certificate. In Offline e-voting process authentication can be done using fingerprint sensing and RFID(smart cards) which enables the electronic ballot reset for allowing voters to cast their votes. Also the voted data and voters details can be sent to the nearby Database Administration unit in a timely manner using GSM System with cryptography technique. The criteria are Registration through Administrator, Voter identification and verification process is done through GSM with one time password. The final process concludes the analysis of polling data in real time and immediate resulting system of e-voting system.

The problem with EVM which is currently in use:

1. Illegal Voting (Rigging)-The very commonly known problem, Rigging which is faced in every electoral procedure. One candidate casts the votes of all the members or few amounts of members in the electoral list illegally. This results in the loss of votes for the other candidates participating and also increases the number votes to the candidate who performs this action. This can be done externally at the time of voting.

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III. DESIGN METHODOLOGY

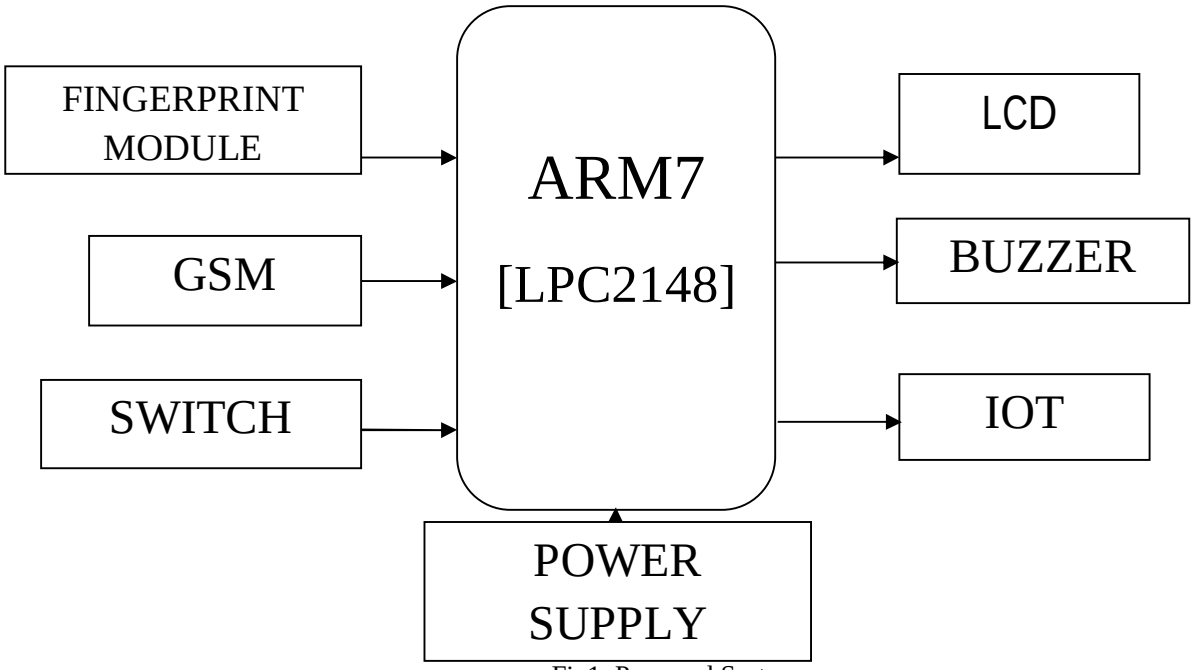


Fig1: Proposed System

A. ARM7

The LPC2148 microcontroller is based on a 32-bit ARM7TDMI-S CPU with real-time emulation and embedded trace support, that combine microcontroller with embedded high speed flash memory ranging from 32 kB to 512 kB. For critical code size applications, the alternative 16-bit Thumb mode reduces code by more than 30 % with minimal performance penalty. Due to their tiny size and low power consumption, LPC2141/42/44/46/48 are ideal for applications where miniaturization is a key requirement, such as access control and point-of-sale. LPC2148 is one of the core of ARM7. Which controls input and output devices of our project. LPC2148 has large instruction set with low power consumption and greater performance. When Voter gives his/her fingerprint it is compared with the enrolled data. To check whether that person has voted or not. This Data will be displayed in the LCD screen through LPC 2148.

B. Fingerprint Module

In this proposed paper, Finger print Optical scanner is used for authentication purpose. There is a scope to misuse of votes if we won't adopt biometric voting system. There are the chances where somebody can cast someone's vote illegally. To avoid this, we are using biometric voting system. Finger print optical scanner is an input module for LPC2148. The user need to put his proper thumb upon fingerprint scanner. If that particular fingerprint matches with the database of LPC2148 then only switches will be enabled by LPC2148 to cast vote. Biometric process for authentication, identification and verification functions that let your fingerprints act like digital passwords that cannot be lost, forgotten or stolen. The fingerprint sensor will take the digital image of the fingerprint and generate an ID based on that ID the details of the person is linked.

C. LCD

A liquid crystal display (LCD) is a flat panel display, electronic visual display, or video display that uses the light modulating properties of liquid crystals (LCs). LCs do not emit light directly. They are used in a wide range of applications, including computer monitors, television, instrument panels, aircraft cockpit displays, signage, etc. They are common in consumer devices such as video players, gaming devices, clocks, watches, calculators, and telephones. LCDs have replaced cathode ray tube (CRT) displays in most applications. In our project the LCD is used to the display the instructions which is required to guide the user to enrol the fingerprint and cast a vote.

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D. Switches

In this project, instead of EVM (Electronic Voting Machine), switches are used to cast vote by voters. Here five switches have been provided named as P1, P2, enrol, identify and result button. Two switch belongs to their respective political party except result, Enrol, identify button. Moreover in author's project for enrolling voters, Enrol Button is provided. While casting vote, user need to press a button named as identification Button. If the person is Already enrolled one, then only vote casting takes place. When voter press a button named as P1, vote is polled for respective political party. Like this, entire voting process completes.

E. GSM

GSM module is used to establish communication between a computer and a GSM-GPRS system. Global System for Mobile communication (GSM) is an architecture used for mobile communication in most of the countries GSM module consists of a GSM modem assembled together with power supply circuit and communication interfaces for computer. In our project we are using GSM for sending the result link to the registered mobile number of the authorised person. A GSM can perform the following operations:

1) Receive, send or delete SMS messages in a SIM.
2) Read, add, search phonebook entries of the SIM.
3) Make, Receive, or reject a voice call.

F. Buzzer

Buzzer is two terminal device which has two terminals longer is positive and shorter is negative. Buzzer is an audio output device. Hence we are using buzzer to alert when any person comes to give repeated voting and even when the person comes cast a vote without enrolling.

G. IoT

So to view the result the ThingSpeak web server is used. For this the person has to create the personal account on this thingspeak web server. To see the result the authorised person has to login into the ThingSpeak web server account. Thingspeak is a web based open API IoT source information platform that comprehensive in storing the sensor data of varied 'IoT applications' and conspire the sensed data output in graphical form at the web level. Thingspeak communicate with the help of internet connection which acts as a 'data packet 'carrier between the connected 'things' and the Thingspeak cloud retrieve, save/store, analyze, observe and work on the sensed data from the connected sensor to the host microcontroller such as 'Arduino, ARM7[LPC2148], TI CC3200 module, Raspberry-pi etc.

IV. EXPERIMENTAL SETUP AND RESULT

Following are the steps of showing how to enrol before voting and a cast using the fingerprint:

1) *Step1:* Send the mobile number of the authorised person in terms of message from his mobile to the SIM number used in the GSM kit. Then after sending the mobile number message is received as the GSM modem is initialised and the registered number is displayed on the LCD.



Fig2: Ask to register mobile number of authorised person

2) *Step2:* After initialisation of the GSM next is to enrol the fingerprint. First place the finger on fingerprint module it takes the fingerprint impression and then an ID is generated so with that ID details of that respective person is linked. Follow the following steps to enrol the fingerprint.



Fig3: Displays enrolling after placing finger

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Fig4: Enter the details of the person

3) *Step3:* After enrolling the next step is the voting. To cast a vote person has to give again the fingerprint then it is compared with the enrolled data to identify whether that person has already casted a vote or not. If the person has not voted the person is allowed to vote or else the buzzer will turn on to indicate that the person has come to give false vote.



Fig5: Identifying the enrolled details



Fig6: Displays the details of person



Fig7: select party



Fig8: Displays the selected party

If the person has already voted and attempts to give repeated vote then the buzzer is turned on with the display as already voted.



Fig9: Display already voted for repeated voting

After completing the voting procedure press the result switch. So the link will be sent to the registered mobile number.



Fig10: Result link is sent to the authorised person

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To see the result the authorised person has to log in to the ThingSpeak web server account.

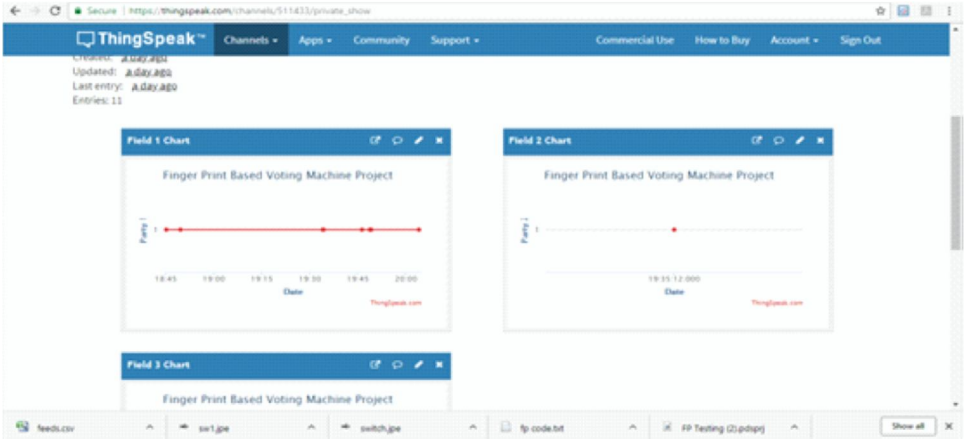


Fig11: Graphical representation of result

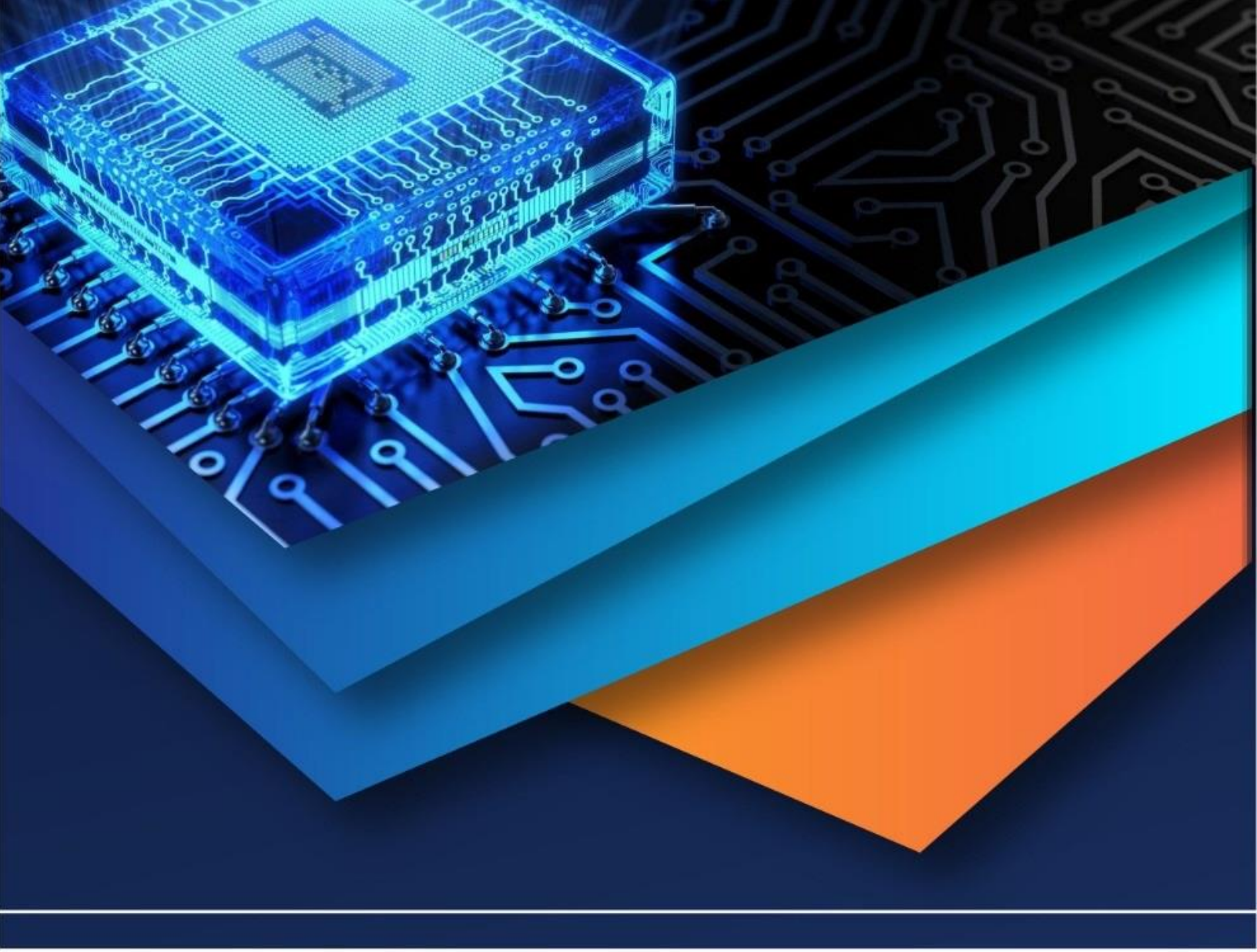
V. CONCLUSION

Our proposed architecture provide safe and secure voting system with accurate and fast voting results. Hence it will definitely overcome the drawbacks of the traditional methods. As each and every person has unique fingerprint impression so it makes our project more secure because the fingerprint impression of a person cannot be hacked or misplaced. It will be always with a person hence no need to carry the ID proof during the time of voting. Hence it also reduces the chances of repeated voting. Thus the advent of this biometric voting system would enable hosting of fair elections in India. The citizens can be sure that they can choose their leaders, thus exercising their right in the democracy.

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