

## Biometric Voting System Using Arduino Uno and LabVIEW

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### ABSTRACT :

In democratic country like India voting system plays a paramount role. Our main objective of this project is to enhance the present Indian voting system by implementing the Biometric system in the voting system; we are able to make the polling method more secured and economical than the present one. In present EVM based electronic and ballot paper voting system chance to rigging and malpractice in voting. This may result in a ruling of bad party. Therefore using Biometric voting system, polling is more secured than the present voting system. By this process we eradicate fake voters. Here all voter data info was stored to register during this system. Voter data info consists of fingerprint data and phone number. The Biometric recognition refers to the utilization of iris, fingerprint, face, palm and speech characteristics, known as biometric identifiers. However here we use the fingerprint for the authentication purpose. Every person are having unique fingerprint. Therefore there'll not be any kind of malpractice done while using this method. Here we are using GSM module for send messages to citizens who are casting vote that "your vote casted successfully, thanking you". For remaining we send alert message as "please cast your vote" and also send alert message to nearest police station when voter try to re attempt to cast vote. Here we are using Wi-Fi module to store polling data to firebase real time database. Polling data consist of respective parties polled votes and result of winning party. Here we use LabVIEW as programming platform by Arduino interfaced with LabVIEW.

**Keywords** - Biometric voting system, Firebase real time database, GSM module, LabVIEW.

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### I. INTRODUCTION

India is democratic country. The heart of democracy is voting system. Introducing biometric in voting system we can achieve rigging free and accurate voting. Present, they are two types of voting system. One is paper based voting system known as ballot paper voting system. Other is EVM (Electronic voting machine) based voting system. In ballot paper voting system, Voters had to go to polling booth and cast their vote by marking on seal in front of the symbol of a candidate for which they wanted to cast their votes on ballot paper. Results were announced by counting the votes. The maximum vote gainer was declared as winner. In more population countries like India, the ballot paper voting system is not much reliable, time consuming and very difficult to count the vote and there are also problems like marking stamp seal for more than one candidate hence there is a strong need to overcome these problems.

In order to overcome these problem Electronic Voting Machines (EVM's) were

introduced. Electronic Voting Machine (EVM's) mainly consists of two components one is Control Unit, it Stores and assembles votes. Other is ballot Unit, it consist of buttons of respective parties with their party symbols beside of button. Here voter is used to cast their vote to desired party. Using electronic voting machine system we are able to get accurate and fast declaration of result. But we have facing problem in authentication of voter. To overcome this we are proposing biometric fingerprint voting system. We also face problem counting votes of each control unit. To overcome this problem, we are using real time database to store all polling data. By using this we can save the time of counting. Polling percentage of urban areas is less compare to rural areas. To encourage and increase polling percentage of voting here we are using GSM module to send alert message to citizens.

### II. LITERATURE SURVEY

[1]. Adhar based Electronic Voting Machine using Arduino by R. Murali Prasad, Polaiiah Bojja, and Madhu Nakirekanti. This paper

describes an online voting system is managed in a simple way as all the users should login by Adharcard number and password and click on his/her desired candidates to cast their vote. Security features like a voter high security password is confirmed before the vote is accepted in the main database of ECI and the voter will ensure if his/her vote has gone to correct candidate/party.

[2]. Biometric-Secure e-Voting System for Election Process by M. Khasawneh, M. Malkawi, &O. Al-Jarrah. In this paper they propose a multifaceted online e-voting system is capable of handling electronic ballots with multiple scopes at the same time, e.g., presidential, municipal, parliamentary, amongst others. To verify the robustness and reliability of the proposed system, intensive computer simulations were used to changing voting environments, viz. voter density, voter inter-arrival times, introduced acts of malice, etc.

[3]. Fingerprint Based Voting System Using LabVIEW by K. Shyamsundar ,R. Sathish , S. Ruknudeen , R. Naga Surya , M. Shanmugavalli. In this paper they proposed fingerprint based voting system using LabVIEW, used myrio microcontroller with alerting system using gsm module and security features like face recognition.

[4]. IOT based Biometric Finger Print Electronic Voting System for Rigging Free Governance by Pushpalata, G.Revati. In this paper they proposed finger print based voting system using Arduino Uno, wifi module is used to send voting information graph to things cloud server, the message regarding polling booth location and serial number information send to mobile numbers before a day of voting by using GSM module and The non local citizens are cast their vote using MIT build application.

[5]. IOT Based Biometric Voting System by R. Surender Reddy, K. Ajay Kumar, MA. Faiyaz Ahmed, M.Shyam Sunder, Syed Nazeeruddin. In this paper they proposed fingerprint based voting system using Arduino mega micro controller, wifi module is used to send voting information and results to server, alerting system using buzzer to find unauthorized voter.

### III. COMPONENTS REQUIRED

#### 3.1 Hardware Components

##### 3.1.1 GSM Module:

In this project GSM module is used to send messages to every citizen to successful casting of vote, send alert messages to people who left to cast their vote and also send alert message to nearest police station.



Fig.1 GSM module

##### 3.1.2 Finger Print Module:

We are using R305 fingerprint module to enrol biometric data and verification of authorised voter to allow to vote.



Fig. 2 fingerprint module (R305)

##### 3.1.3 Arduino Uno:

Arduino Uno (ATMEGA328) microcontroller is used for processing the data. It is heart of project and used to control all external peripherals.



Fig. 3 Arduino UNO microcontroller

##### 3.1.4 Esp8266-01 wifi Module:

This module is used to sending polling votes to respective party automatically when citizens cast their votes and results to firebase Real time Database.



Fig.4 ESP8266-01 wifi module

##### 3.1.5 LCD Display:

It is used to display instructions of controller and results.



Fig. 5 LCD display

### 3.2 Software Requirements

#### 3.2.1 Arduino Ide:

The Arduino Integrated Development Environment (IDE) is a cross platform application (for Windows, macOS, Linux) that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards.



Fig.5 Arduino ide software

#### 3.2.2 LabVIEW:

Laboratory Virtual Instrument Engineering Workbench (LabVIEW) is a system design platform and development environment for a visual programming language from National Instruments. It offers a graphical programming method that helps you visualize every aspect of your application, including hardware configuration, measurement data, and debugging. We require installing NI VISA software and VI packet manager.



Fig.6 LabVIEW software

#### 3.2.3 Firebase:

it is a mobile and web application development platform and Firebase's first product was the Firebase Real-time Database, an API that synchronizes application data across iOS, Android, and Web devices, and stores it on Firebase's cloud.



Fig.7 Firebase server

## IV. BLOCK DIAGRAM

V.

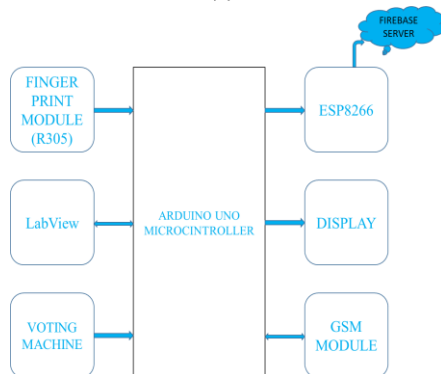


Fig.8 Block Diagram of project

## VI. PIN DIAGRAM

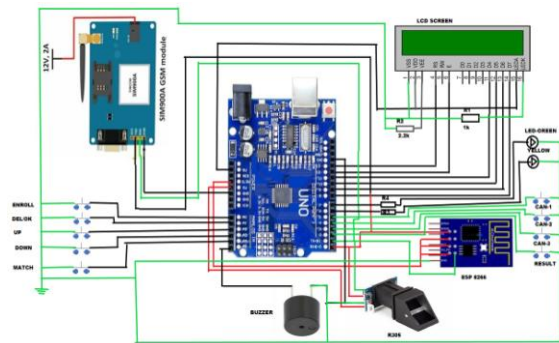


Fig.9 Pin Diagram of Project

## VII. FLOW CHART

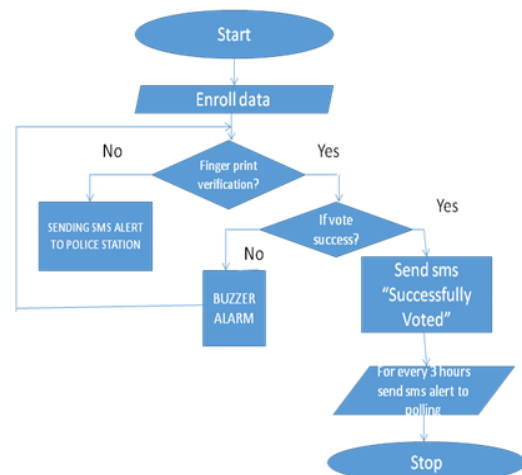


Fig.10 Flow Chart of Project

## VIII. IMPLEMENTATION AND WORKING

First, connect the circuit as shown in Fig.9 then write code in LabVIEW interface with Arduino (LIFA) example in VI libraries of national instrumentation. LIFA is Arduino Ide code for LabVIEW interface with Arduino controllers. Upload Arduino Ide code in the Arduino Uno microcontroller after that using push buttons Enroll, Ok/Del, up, and down, enroll data of voters using fingerprint module and mobile numbers information is added in code when enrolling data. Design LabVIEW code as Fig.12. In LabVIEW code we have five buttons, three are candidates representing party's buttons, one is match and other is result button. Select the digital pins and serial port related to Arduino Uno. Configure Arduino Uno using makerhub as tools-->makerhub-->LINUX firmware wizard in front panel. After that run code then Press match key to verify biometric user authentication using fingerprint module.

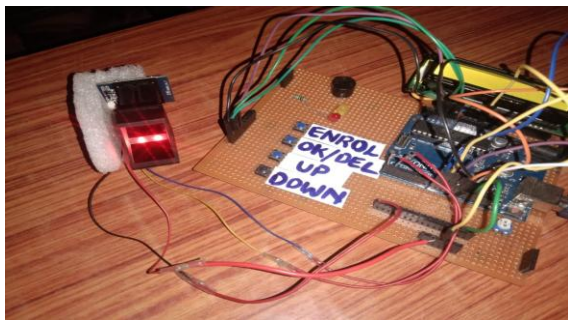


Fig.11 Hardware Implementation of Project

After verification valid voters are allowed to cast their vote to desired party by pressing on party button.

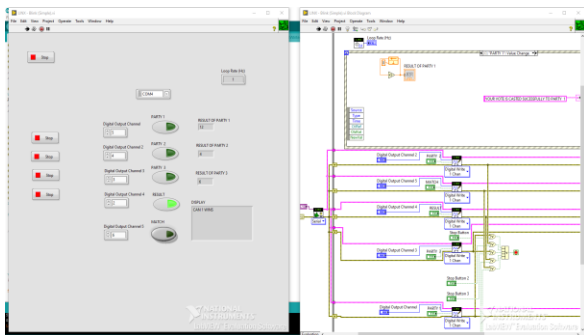


Fig.12 LabVIEW coding implementation

When voter casted vote immediately party vote is updated and stored in firebase real time database, the alert message to successful voters, alert message to nearest police station in case of fake voters and for every 3 hours we send alert message to voters to encourage and increase polling percentage of voting in urban areas.

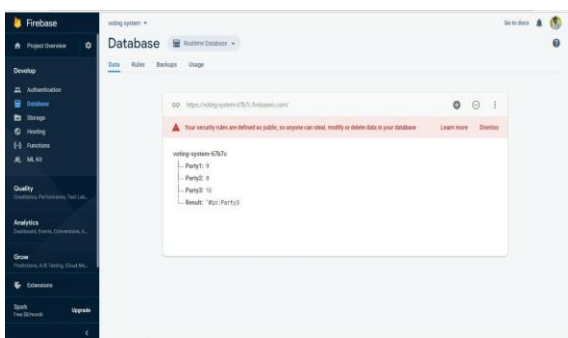


Fig.13 getting results in firebase real time database

### VIII. ADVANTAGES & APPLICATIONS

This project is applicable in general elections, it also applicable company and union election, and authenticating applications. It is more secure, reliable, economical and accurate. It is possible to get instantaneous results, reduce the

timing of polling, and avoid illegal practices and rigging.

### IX. CONCLUSION AND FUTURE WORK

Thus the appearance of this biometric finger print voting system would change hosting of honest elections in India. This may preclude the illegal practices like rigging. The voters will be sure that they alone will opt for their leaders, thus exercising their right in the democracy. A better technologies coming ahead like fingerprints are detecting using human pulses, so that no one can manipulate our fingerprints without our presence. For more security add like face recognition and Iris recognition, Adharcard (UIDAI) for biometric fingerprint verification and more secure server to store data in database to avoid stealing of data from hackers.

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