JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Biometric voting system

Gopal Waghmare, Tejas Dabhade, Sarvesh Pande, Prof. Vineeta Philip

UNDER THE GUIDANCE OF

Prof. Vineeta Philip

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION

ABSTRACT

One of the most difficult and contentious aspects of the electoral process is still registration. Voter registration is even more complicated in nations without a reliable population count or identification documents. As a result of the low quality of the current registers, manipulation opportunities exist and electoral management bodies are under pressure to establish registration systems that are more trustworthy. In such a circumstance, it is many times expected that biometric innovation can give the necessary arrangements. The drive towards biometrics has been worked with by its generally objective nature. The fact that investing in high-tech solutions enables stakeholders to demonstrate their commitment to resolving registration issues is just one reason why there is widespread agreement regarding the necessity of its application in many instances. However, expectations regarding biometric solutions may also be exaggerated, and the emergence of novel biometric technologies may result in the emergence of brand-new difficulties. The point of this Guide is to work on comprehension of biometric advancements among key discretionary partners, including electing the board bodies, states and dynamic bodies, and common society, including electors. Biometrics can indeed solve some issues with voter registration, but technology alone will never be able to prevent fraud and manipulation. Sustainability and costs are also a concern. We trust that this Guide will go about as a valuable asset for constituent specialists considering presenting biometric advancements in decisions, and as an inspiration for development, where required, for the people who have previously finished.

1.INTRODUCTION

Project that aimed to evaluate voters' finger prints in order to ensure safe voting without impersonation. Raspberry Pi's keypad and fingerprint sensor are used to interface with a Python program.The voter's information is stored in a database on the Raspberry Pi, so when the voter enters their fingerprint, it processes. The voter can then vote by pressing the keypad, and the LCD will show the appropriate output. When compared to the conventional paper-based voting system, the biometric electronic voting machine is extremely accurate and simple to operate. Additionally, it makes the procedure more reliable and secure by lowering the likelihood of errors.

2. LITERATURE REVIEW

1.**Paper Name**: Gotten E-casting a ballot Framework Utilizing Two-factor Biometric Authentication(2020)

Creator: Sudeepthi Komatineni ,Gowtham Lingala

Abstract: For a long time, it has been difficult to construct a secure voting system that provides the same level of privacy as a traditional voting system and transparent voter authentication. For the purpose of developing a secure voting system, the research work makes a proposal for a secure and robust electronic voting system that is built on popular biometric authentication methods and facial recognition algorithms based on machine learning. Specifically, it centers around the likely working of face discovery and acknowledgment and bio-metric verification in particular bio-metric sweep, and the execution method, which works on the security and diminishes the copy vote and fake to make the framework as more proficient and easy to use in nature.

2.Paper's Name: Secured Biometric Remote Electronic Voting System (2020) **Author** :Samarth Agarwal,Afreen Haider

Abstract: India is the largest democracy in the world, and electing one's own representatives is fundamental to any democracy. But in today's world, booth capturing, rigging, fake voting, and tampering with electronic voting machines (EVMs) are just some of the issues that threaten a free and fair election. As responsible engineers, it is our responsibility to mitigate this threat. In the normally utilized EVMs, the democratic cycle happens electronically and this takes out the utilization of polling form paper to give votes in decisions a role as it is extremely tedious and blunders could creep in purposefully or unexpectedly. Today, voter authenticity is a major concern, and it should be ensured that the same voter cannot vote twice. This issue can be managed by presenting biometric based casting a ballot framework, where the genuineness of an elector is laid out in view of fingerprints.a result, the rule will be one genuine vote per person. A biometric voting machine based on fingerprints has been prototyped in this work. A feature that will link the Aadhaar database of the Government of India and the Unique Identification Authority of India (UIDAI) is proposed. New Delhi, India; can be integrated. This will work with every one of the citizens to get enrolled on the entryway naturally, which can be ordered based on districts and supporters in view of their exceptional distinguishing proof for example their

fingerprints. This will make it possible to use the device developed in this research at the national level by using it in nationwide elections. This will prompt a huge commitment to improve the Indian political race framework

3.Paper Name: Biometrically Secured Electronic Voting Machine (2015)

Author: Anish R., Anandaraj S., and Devakumar P.V.

Abstract: Voting is an important tool for collecting and refining people's thoughts in democratic societies. Customarily, casting a ballot is directed in concentrated or dispersed places called surveying corners. Under the supervision of authorized parties, voters go to polling booths to cast their ballots. After the election is over, the votes are counted by hand. With the fast developing improvement of PC innovation and cryptographic techniques. The electronic democratic frameworks can be utilized that supplant the occurrence and in particular blunder inclined human Part. Our undertaking proposes and executes a basic and got technique for surveying vote by utilizing biometric. Numerous advancements in the field of voting were made possible by technological shifts. The impromptu creations target expanding the adaptability security, dependability, versatility of the model and give less time utilization to declare the outcome. These days, the democratic method was held by physically working machines and, surprisingly, through SMS moreover. Be that as it may, this electronic democratic machine is a one of a kind and new idea which saves a ton of time and dodges the bogus democratic by a misleading individual. The user of this system must poll the authenticated vote using his fingerprint**.**

4.Paper Name: Biometric Identification Survey-Based Smart Electronic Voting System (2018)

Author:J.Deepika, S. Kalaiselvi, S. Mahalakshmi, S. Agnes Shifani, and S. Kalaiselvi

Abstract: During elections, the voting system plays a significant role in democratic nations like India. In the past, the election commission in India utilized electronic voting machines, which required more staff, took more time, and were less reliable. Numerous sophisticated strategies utilizing a variety of approaches are being proposed to avoid misunderstandings during elections. Biometric identification, on the other hand, provides trustworthy results and superior results. In this paper, we present the various works based on the voting system that uses biometric identification as a major concept. Some of these works use different algorithms, and others use different techniques based on multimodal biometric identification. In this paper, we proposed about the idea of getting the finger impression of a citizen which is placed as contribution to the framework. Then, it was compared to the database's data. Access to vote is granted if the particular pattern matches any person on the record. The result is instantaneous, and IOT counts the votes.

5. Paper Name: SECURE E-VOTING SYSTEM IN YCGCb COLOR SPACE WITH BIOMETRIC AND WAVELET BASED WATERMARKIN TECHNIQUE **Author:** Baisa L. Gunjal1 , Suresh N. Mali2

Abstract: Secure Casting a ballot Framework' is heart of any majority rules system. Worldwide, a variety of nationwide voting systems are in use, but each has its own drawbacks. The far off web casting a ballot frameworks actually experience numerous issues. These are reasons, why manual democratic is still practically speaking in many creating and created countries in this web time too. Hence, complete, firmly got and easy to understand 'E-Casting a ballot Framework' is need of time. Biometric and wavelet-based image watermarking are used to present a multilayer secured internet-based voting system in this paper. By embedding the voter's fingerprint as a watermark, a highly secure watermarking technique for the voter's color photograph in the YCgCb color space is processed. The watermark inserting is done safely through number of levels. Peak Signal

to Noise Ratio (PSNR) values of up to 54.26 and Normalized Correlation (NC) values of one indicate that the fingerprint was accurately recovered using this method. The entire system is kept "user-friendly."

6. Paper's Name: E-Voting System Using a Mobile Application on a Smart Phone (2020) Author: G.Kalaiyarasi,K. Balaji

Conceptual: The new application, which will make the voting process extremely simple and efficient, has grown as a result of advancements in web technologies. The E-casting a ballot helps in giving advantageous, catch and include the votes in a political race. The description of how to use an Android platform for e-voting is provided in this project. The user can cast their vote without having to go to the polling place thanks to the proposed e-voting system. The application gives confirmation estimates to stay away from misrepresentation electors utilizing the OTP. When the democratic interaction is done the outcomes will be accessible inside a small part of seconds. All the made choice count is encoded utilizing AES256 calculation and put away in the data set to keep away from any flare-ups and disclosure of results by third individual other than the director.

7. Name of Paper: Security of a Visual Cryptography and SHA-Based Remote Voting System (2016)

Author: Mrs. Kate Nilam, Mrs. J.V.Katti's

Summary: The goal of the Online Voting System (OVS) Using Visual Cryptography (VC) is to make it possible to vote on important and private decisions made within a company. The election is held in complete secrecy by employing appropriate security measures to ensure that the voter can only vote for any participating candidate if he logs into the system using the correct username, password, and shares. It has the flexibility to allow casting votes from any remote location. A web-based voting system that allows voters to vote regardless of location is our proposed method. Security of any data is concerning issue and it extremely delicate for internet casting a ballot framework. The proposed system does not make use of any biometric software; voter authentication is carried out without the use of a biometric function. The AES encryption algorithm is used to encrypt votes in this system to ensure their security. The AES encryption algorithm is quicker and results in faster encryption. As a result, time is saved and the system's performance is enhanced. In addition to meeting the security requirements of an online voting system, the proposed scheme is economical.

8. Paper Name: An Identity-Based Blind Signature-Based End-to-End Secure Internet Voting System (2019)

Author: Mahender Kumar , Satish Chand, and C. P. Katti

Abstract: Through end-to-end (E2E) verification, both voters and the general public can verify that the system has correctly counted all of the recorded ballots. There are numerous difficulties with the E2E-based Internet voting systems; the most crucial aspect is its safety. A few E2E casting a ballot frameworks have been talked about somewhat recently as far as dissecting the e-casting a ballot framework and formalizing its security prerequisites. This article presents an E2E evident web casting a ballot framework that gives versatility to an elector and permits him to make his choice furtively in open PC with the advantage of early democratic. By utilizing the distinctive identification and biometric characteristics of each voter, the proposed system aims to provide universal support for the election process. We propose another character based blind mark plot that guarantees the citizen's obscurity. We take on the Boneh-Lynn-Shacham short mark plot that guarantees the vote protection with the least polling form size. The framework gives a computerized observer to an elector that empowers him to check whether his vote is recorded as he implied and people in general to check on the off

chance that every one of the recorded polling forms are counted accurately. The security of the proposed framework is accomplished under the wellknown elliptic bend discrete logarithm and hole Diffie-Hellman presumptions

9. The name of the paper: Biometric-based electronic voting system (2020)

Author: CH. G. Rama Lakshmi Sri Rekha's

Summary: India is a popularity based country, which is exceptionally populated and included with various religions, dialects and culture. Every person in a democratic nation has the right to vote for their leader. In the current framework leading political decision all around the nation is an exceptionally tremendous and convoluted task which needs high consumption and labor supply. The elections can be held fairly and with less effort thanks to the proposed method. With their personal information, the new voting method aids in voter identification. It takes biometric thumb impression of the all citizens and store in the data set. During the election, the voter's thumb impression is compared to the information in the database, and if it is found to be accurate, the voter will be granted the right to vote. This prevents polling rigging. The proposed method is very accurate and helps fix the issues with the current polling system.

10. Name of Paper: Aadhar-Based Secured Smart Voting System (2017)

Author: Madhuri B , Adarsha M G , Pradhyumna K R , Prajwal B M

Author: Because India is a democratic nation, the people have the ability to choose their leaders. We use an election procedure that is prone to fraud and has numerous drawbacks for selection. India is losing the genuine significance of A majority rule government as the level of casting a ballot is diminishing radically step by step. By developing a mobile application, a simple and secure procedure must be made available to solve this issue. Nowadays, mobile devices have replaced everything and simplified and secured every process. This paper's primary objective is to propose an easy-to-use and secure voting system for India. It is more secure than an online voting system because it is an app. This framework involves finger impression for extraordinary distinguishing proof and Aadhar subtleties are gotten in light of unique finger impression information. This paper gives importance to the senior residents, debilitated, patients, warriors and transients. Individuals can partake in casting a ballot any place they are found.

3. AIM AND OBJECTIVES

3.1Aim

The aim of our project is to create and implement a biometric-based voting system that is safe, effective, and increases the accuracy, honesty, and openness of the voting process. Our framework will use biometric innovation to confirm the character of electors, in this manner lessening the gamble of extortion and guaranteeing a fair and dependable political decision framework.

3.2 Objectives:

The individual ought to choose any of the party by giving the number dispensed to that specific party as contribution through the keypad. After the choice is chosen the elector is incited for an affirmation. On the off chance that the elector enters an invalid number, the screen returns and heis incited to make the choice once

more. The party's vote total is then increased by one in accordance with the option chosen. Finally, it is possible to determine the parties' positions in relation to the total number of votes cast.

3.3 Methodology

Arduino UNO –

Arduino is an open-source gadgets stage in light of simple to-utilize equipment and programming. A light on a sensor, a finger on a button, or a Twitter message are all examples of inputs that Arduino boards can read and turn into outputs like turning on an LED, activating a motor, or publishing something online..

Specifications:

Microcontroller: ATmega328P

Operating Voltage: 5V

Length: 68.6 mm

Width: 58.4 mm

Weight: 25 g

Buzzer:

A passive buzzer is the Sensor-Buzzer. Similar to a magnetic speaker, it requires electricity at various frequencies in order to produce the appropriate sound. As the frequency rises, the pitch increases louder..

Specifications:

Rated Voltage :5 V

Operating Voltage:4~8 V

Max Rated Current:≤32 mA

Min. Sound Output at 10cm:85 dB

Resonant Frequency:2300 ±300 Hz

Operating Temperature:-20°C to 45°C

LCD:

In LCD 16×2, the term LCD stands for Liquid Crystal Display that uses a plane panel display technology, used in screens of computer monitors & TVs, smartphones, tablets, mobile devices, etc.

Specifications:

- The operating voltage of this display ranges from 4.7V to 5.3V
- The display bezel is 72 x 25mm
- The operating current is 1mA without a backlight
- PCB size of the module is 80L x 36W x 10H mm
- HD47780 controller
- LED color for backlight is green or blue
- Number of columns – 16
- Number of rows – 2

- Number of LCD pins – 16
- Characters – 32
- It works in 4-bit and 8-bit modes
- Pixel box of each character is 5×8 pixel
- Font size of character is 0.125Width x 0.200height

Finger Print Sensor:

The usage of fingerprint scanners allows for the identification and authentication of a person's fingerprints. Scanners and fingerprint readers are trustworthy security authentication tools..

Specifications:

- The fingerprint sensor is an optical type
- The interface is USB1.1/ TTL logical level (UART)
- The speed of scanning is 0.5 sec
- The speed of verification is 0.3 sec
- The capacity storage is 1000
- The security level is 5
- The baud rate of RS232 is 4800BPS ~115200BPS variable
- Current is typical 50 mA, and peak 80mA
- The corresponding technique is 1: N
- Fixed indicators-15KV bright green backlight
- The life of the sensor is 100 million times
- The dimension is 44.1 X 20 X 23.5mm
- The size of the character file is 256 bytes
- The template size is 512 bytes

3.4 Specifications of the System

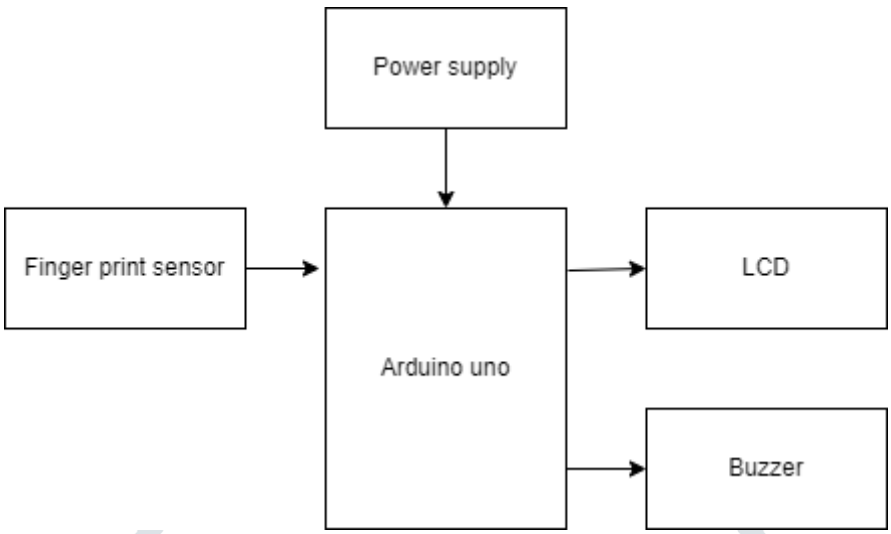
RAM : 8 GB As we are using Machine Learning Algorithm and Various High Level Libraries Laptop RAM minimum required is 8 GB. Hard Disk : 40 GB Data Set of CT Scan images is to be used hence minimum 40 GB Hard Disk memory is required. Processor : Intel i5 Processor IDE : arduino uno Best Integrated Development Environment as it gives possible suggestions at the time of typing code snippets that makes typing feasible and fast. Coding Language : Python Version 3.5 Highly specified Programming Language for Machine Learning because of availability of High Performance Libraries. Operating System : Windows 10 Latest Operating System that supports all type of installation and development Environment

4. PROBLEM STATEMENT

4.1 Problem Statement

The reliability and honesty of the electoral process are jeopardized by a number of obstacles in traditional voting systems. These difficulties incorporate personality extortion, numerous democratic, pantomime, and troubles in elector ID. Also, customary democratic techniques frequently depend on manual cycles that are tedious and inclined to human blunders.

5. BLOCK DIAGRAM OF THE SYSTEM AND ITS EXPLANATION



6.COMPONENT EXPLANATION

Arduino UNO

Description:-

The Arduino LLC in Italy developed and produced the open-source microcontroller board known as Arduino UNO, which is based on the ATmega328P. It has a power jack, a USB connection, a 16 MHz quartz crystal, 14 digital input/output pins, and 6 analog inputs. A variety of sensors, including temperature, light, and humidity sensors, are included on the board and can be added as project requirements dictate. Arduino UNO is widely used for various DIY electronics projects, robotics, and Internet of Things applications due to its easy-to-use user interface.

According to the datasheet, the Arduino Uno is a microcontroller board based on the ATmega328P. It has six analog inputs, 14 digital input/output pins, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header, and a reset button. Six of these pins can be used as PWM outputs**.**

Diagram:-

Features:-

Microcontroller: The board depends on the ATmega328P microcontroller, which is a low-power and superior execution gadget.

Pins for Digital I/O: There are 14 digital input/output pins on the board that can be used to connect to a variety of sensors and actuators..
Simple Information sources: The board has six analog inputs that can be used to measure analog signals like pressure, light, and temperature.
Clock Speed: The load up has a 16 MHz quartz precious stone, which gives a clock speed of 16 million cycles each second.
Connection via USB: The board can be easily programmed and connected to a computer thanks to its USB connection.
Power Jack: A power jack on the board enables it to be powered by an external power source like an AC adapter or battery.
Flexibility: The board is open-source, and that implies that clients can alter the equipment and programming to suit their requirements.
Commonly used: Due to its simplicity and ease of use, the Arduino UNO is widely used in robotics, home automation, and Internet of Things (IoT) applications.

Pinout :-
Advanced I/O Pins (14): The numbers 0 to 13 indicate these pins, which can be used as either inputs or outputs. They connect to a variety of sensors and actuators.
(6) Analog Inputs: Analog signals like temperature, light, and pressure can be measured on these pins, which have the numbers A0 to A5.
(2) Power Pins: The board receives power from these pins. A regulated 5V power supply is provided by the 5V pin, and a regulated 3.3V power supply is provided by the 3.3V pin.

(3) Ground Pins: These pins are utilized to give a shared conviction reference to every one of the associated gadgets.
Diverse Pins (No. 1): The microcontroller is reset via the Reset pin.
The official Arduino documentation or a variety of online resources contain the Arduino UNO board's pinout diagram. It is vital to comprehend the pinout while interfacing different sensors and actuators to the board, as inaccurate associations can harm the board and associated gadgets.

Working:-
The ATmega328P microcontroller is used to control a variety of sensors and actuators on the Arduino UNO board. The microcontroller runs on a program, or sketch, that is composed utilizing the Arduino Coordinated Improvement Climate (IDE) and transferred to the board through USB.
When the sketch is transferred, the microcontroller executes the program and cooperates with the associated sensors and actuators in light of the rationale determined in the sketch. A sketch could, for instance, be written to read the temperature from a temperature sensor and activate an LED when the temperature reaches a predetermined threshold.
The board's analog inputs can be used to measure analog signals from sensors like temperature or light and turn them into digital signals that the microcontroller can process. The digital I/O pins can be used to connect to various actuators, such as LEDs and motors, or sensors, such as buttons and switches.
In a nutshell, the Arduino UNO board works by controlling and communicating with a variety of sensors and actuators through the ATmega328P microcontroller, which is programmed in the Arduino IDE..

Specifications:-
Microcontroller: ATmega328P
Operating Voltage: 5V
Input Voltage (recommended): 7-12V
Input Voltage (limit): 6-20V
Digital I/O Pins: 14 (of which 6 provide PWM output)
Analog Input Pins: 6
DC Current per I/O Pin: 40 mA
DC Current for 3.3V Pin: 50 mA
Flash Memory: 32 KB (of which 0.5 KB used by bootloader)

SRAM: 2 KB
EEPROM: 1 KB
Clock Speed: 16 MHz
Length: 68.6 mm
Width: 53.4 mm
Weight: 25 g
Connectivity: USB, power jack, ICSP header
These specifications provide a basic overview of the hardwareof components and capabilities of the Arduino UNO board The board is compatible with a wide range of sensors and actuators ,making it a versatile platform for various DIY electronics projects..

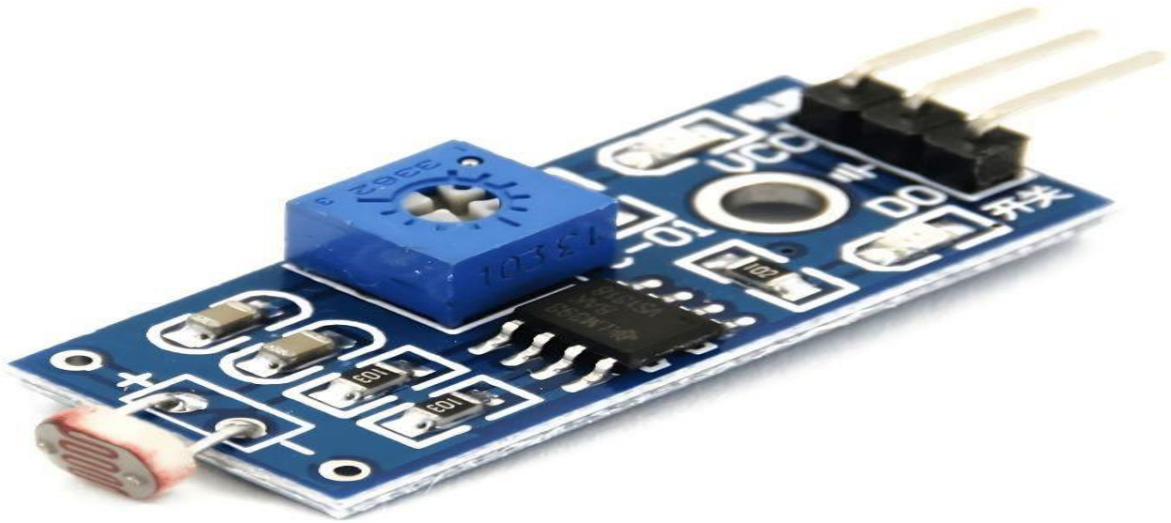
Applications:-
Robotics: The board can be utilized to control and program robots for different errands, for example, obstruction aversion and line following.
Automating Your Home: The board can be utilized to robotize different errands in a home, like controlling lights and machines.
IoT: Internet of Things The board can be utilized to construct Internet of Things projects, such as connecting sensors and actuators to the Internet for remote control and monitoring.
Monitoring the environment: Temperature, humidity, and air quality are just a few of the environmental parameters that can be tracked by the board.
Educational: In education, the board is frequently used to teach students about control systems, programming, and electronics.
Music and Art: Light shows and musical instruments are two examples of interactive art and music projects that can be made with the board.
Control of Industry: Manufacturing and assembly are two examples of industrial processes that can be controlled and automated with the help of the board.
These are only a couple of instances of the numerous uses of the Arduino UNO board. It is a popular choice for DIY electronics projects as well as a wide range of commercial and industrial uses due to its versatility and ease of use..

Type of sensor:-
Temperature Sensors: Temperature can be measured with thermocouple, RTD, and thermomirror sensors.
Sensors for Light: Photograph resistors and photodiodes can be utilized to quantify light levels.
Sensors for Motion: Accelerometers, gyrators, and magnetometers can be utilized to quantify movement and direction.
Sensors for Closeness: The distance between two objects can be measured with infrared and ultrasound sensors.
Ecological Sensors: Environmental parameters can be measured with humidity and air quality sensors.

Pressure Sensors: Atmospheric pressure can be measured with barometric pressure sensors.
Senses for Sound: Amplifiers can be utilized to gauge sound levels.
Sensors for Touch: To detect touch, capacitive touch sensors can be utilized.
These are only a couple of instances of the many sorts of sensors that can be utilized with the Arduino UNO board. The project's requirements and desired measurements will determine which kind of sensor is used.

LDR module Sensor with module:-
Description:-
Light level detecting: The LDR module is used to measure the level of light in a room or outside. This lets the user keep track of changes in light intensity and adjust the lighting accordingly.
Computerized lighting control: The LDR module can be utilized to control lighting frameworks, like turning lights on when the light level reductions and off when the light level increments.
Photography: In photography, the LDR module is used to measure a scene's light level and adjust the camera settings accordingly.
Robotics: The LDR module is utilized in mechanical technology to give a way to a robot to detect its current circumstance and answer changes in light power.
The LDR module sensor can be used in a variety of ways, some of which depend on the model and manufacturer of the sensor.

Diagram:-



Features:-

Light awareness: The LDR sensor can accurately measure light levels because it is very sensitive to changes in light intensity.

Simple layout: Because the LDR module typically consists of a straightforward voltage divider circuit, it is simple to incorporate it into a broad range of applications.

a low cost: When compared to other kinds of light sensors, LDR modules are typically less expensive.

Versatility: The LDR module can be utilized in a large number of utilizations, from light level detecting to mechanical technology and then some.

Robustness: LDR sensors are profoundly solid and can endure a large number of natural circumstances.

Wide working voltage range: LDR modules regularly work on a great many voltages, making them viable with a large number of frameworks and applications.

These are a portion of the normal highlights of a LDR module sensor, and the particular elements might differ relying upon the producer and model.

Buzzer :-

Description:-

A type of piezoelectric alarm sensor known as the Passive Buzzer Module KY-006 is frequently utilized in projects involving DIY electronics and robotics. It is a small, self-contained module that responds to input voltage by emitting an audible tone.

The KY-006 has a piezoelectric ceramic plate inside which vibrates when a voltage is applied, producing a sound. It is inactive, implying that it doesn't have its own inside oscillator and should be driven by an outside signal.

There are two pins on the module—one for connecting to a positive voltage (VCC) and the other to ground. At the point when a square wave signal is applied to the information, the piezoelectric ceramic circle vibrates at the recurrence of the square wave, creating a sound.

The KY-006 is a little and straightforward module that can be handily coordinated into different undertakings and gadgets. It can be used as a simple alarm, a signal generator, or a part of more complex audio systems. There are two kinds of piezoelectric buzzers, active buzzers and passive buzzers, that are commonly used in electronics projects. Dynamic ringers are called dynamic since they just need a DC voltage to deliver sound. To make a sound, passive buzzers require an AC voltage. The introduction of the buzzer 1 in structural principle (A). What the buzzer does: The integrated structure of a buzzer is made up of electronic transducers and a DC power supply. Buzzers are used in a lot of things, like computers, printers, copiers, alarms, electronic toys, automotive electronic equipment, telephones, timers, and so on. electronic goods for audio equipment.

2. Type of buzzer: primarily divided into two types of electromagnetic buzzers and piezoelectric buzzers.
3. Symbols for a buzzer circuit pattern: the buzzer in the circuit that starts with "H" or "HA" (the previous standard was "FM," "LB," "JD," and so on) indicates.
The structural principle buzzer is the second schematic buzzer. Piezo Bell: multivibrator, piezo buzzer, impedance matching, resonance box, casing, and other components make up the majority of the piezoelectric buzzer. Some piezo ringer case is likewise outfitted with light-emanating diodes.
Transistors or integrated circuits form a multivibrator. Multi-harmonic oscillator start-up, the output 1.5-2.5 kHz audio signal, and an impedance-matched push piezo buzzer sound occur when the device is turned on (working voltage 1.5V-15V DC).
Piezo buzzer made of lead magnesium niobate or lead zirconate titanate piezoelectric ceramic. The polarization and aging treatment on both surfaces of the ceramic sheet-plated silver electrode are adhered together with brass or stainless steel sheet.
2. Magnetic alarm: electromagnetic bell by the oscillator, the electromagnetic loop, magnet, stomach and lodging and different parts.

Diagram:-

Features :-

Easy to utilize: The KY-006 has just two pins for power and ground, making it extremely simple to interface and use.
Small size: The KY-006 is suitable for use in portable and compact devices due to its small size.
Low use of electricity: The KY-006 is a great option for battery-powered devices because it uses very little power.
Tone adjustability: By adjusting the input signal's frequency and duty cycle, the KY-006 can change the volume and frequency of its sound.
Wide range of voltages: The KY-006 can work over a wide voltage range, ordinarily somewhere in the range of 3 and 5 volts, making it viable with various microcontrollers and control gadgets.
Simple to control: The KY-006 can be constrained by a microcontroller or other control gadget utilizing computerized signals, making it simple to coordinate into different undertakings and frameworks.
The KY-006 is a great option for simple alarm systems, signal generators, and other audio-related applications due to these features.

Pinout :-

VCC: Connects to a positive voltage source, typically between 3 and 5 volts.
GND: Connects to ground.
The KY-006 can be connected to a microcontroller or other control device using these two pins. To generate a sound, a square wave signal is applied to the VCC pin, causing the piezoelectric ceramic disc inside the KY-006 to vibrate at the frequency of the square wave, producing a sound.

Working:-

A piezoelectric alarm sensor, the KY-006 passive buzzer module emits a sound when a voltage is applied to it. Utilizing a piezoelectric material that vibrates at a specific frequency when voltage is applied, it converts electrical energy into mechanical energy. The module delivers a perceptible sound or tone, which can be

utilized for alerts, signs, or warnings. The KY-006 module must be connected to a control circuit or microcontroller that can supply the required voltage and regulate the sound's frequency before it can be used.

Specifications:-
Operating Voltage: DC 5V
Operating Current: 15mA
Operating Frequency: 2.048 kHz
Sound Pressure Level (SPL): 65±5 dB
Connector: 3-pin interface
Dimensions: 22mm x 15mm x 10mm
Weight: 2g
These specifications are approximate and may vary slightly between different manufacturers and models. It is always a good idea to refer to the datasheet provided by the manufacturer for exact specifications and to ensure compatibility with your project requirements.

Applications:-

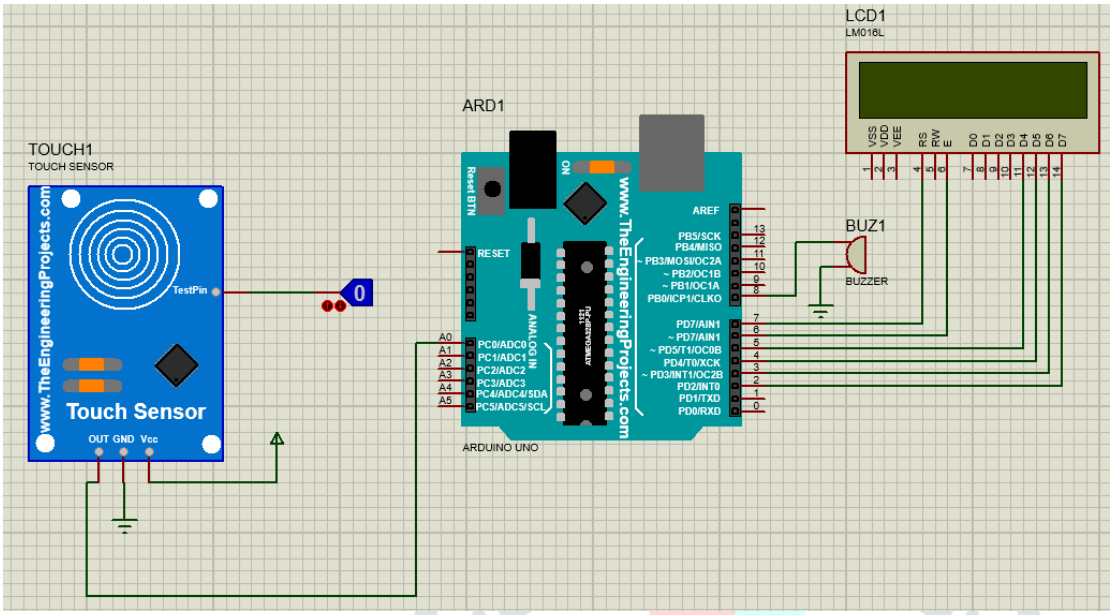
Alarms: It very well may be utilized as a basic caution sound generator, set off by a microcontroller or a control circuit.
Signaling: It tends to be utilized to give sound criticism in light of client activities, for example, button presses or different occasions.
Notifications: It very well may be utilized to give sound warnings, for example, approaching message or call cautions in an undertaking.
Instrument: It very well may be utilized in an instrument to create basic tones or blares.
Projects for the classroom: It very well may be utilized in instructive tasks to exhibit the standards of piezoelectricity and sound age.

Type of sensor:-

A type of piezoelectric alarm sensor is the KY-006 Passive Buzzer Module. A piezoelectric sensor is a gadget that changes over electrical energy into mechanical energy as well as the other way around. When a voltage is applied to the KY-006, it uses a piezoelectric material to produce a sound or tone. Because it doesn't have an internal oscillator and needs an external signal to make noise, the buzzer is called

"passive." "Active" buzzers, on the other hand, have an internal oscillator and can produce their own sound.

7. SOFTWARE DESIGN



8.1. ADVANTAGES

Expanded Effectiveness: By automating processes like vote counting, result tabulation, and data management, the Arduino-based system can make voting easier. This speeds up the process and reduces the need for manual labor, resulting in quicker election results.

Accuracy: The framework can fundamentally diminish human mistakes and likely cases of extortion or altering. The Arduino-based system can accurately record and count votes by utilizing electronic devices and sensors, reducing the likelihood of miscounts or discrepancies.

Cost-Effective: The microcontroller platform Arduino is reasonably priced, and the components needed for a smart voting system are relatively inexpensive. Compared to traditional paper-based voting methods, which require the printing and distribution of physical ballots, such a system may be more cost-effective. Accessibility and inclusiveness: Voting machines based on Arduino can be made to meet the needs of people with disabilities. Audio prompts, large font displays, or Braille interfaces, for instance, can be included in the system to make voting accessible to everyone, regardless of their physical abilities.

Scalability: Scalability is made possible by the adaptable platform known as Arduino. The framework can be effortlessly extended or changed to oblige a fluctuating number of casting a ballot machines or surveying stations, making it reasonable for appointment of various scales, from nearby to public levels.

Data Safety: Systems based on Arduino can incorporate security measures to safeguard the confidentiality and integrity of the voting data. To ensure the safety of the voting process, encryption methods can be used to protect sensitive information during transmission and storage.

Friendly User Interface: Arduino-based casting a ballot machines can be planned with natural connection points, making them simple to use for the two electors and survey laborers. During the voting process, clear instructions, touchscreens, and simple navigation can improve the user experience and reduce the likelihood of errors..

8.2 DISADVANTAGES

Specialized Difficulties: Technical expertise is needed to set up and maintain a voting system based on Arduino. Programming, hardware configuration, and troubleshooting might be difficult. Sufficient preparation and support should be given to guarantee smooth activity and convenient goal of specialized issues.

Power Reliance: To function properly, systems based on Arduino require a dependable power supply. Keeping power on throughout the voting process can be difficult in areas with unreliable or limited electricity infrastructure. Vulnerability to **Malfunctions:** Like any electronic framework, Arduino-based casting a ballot frameworks can be inclined to breakdowns or specialized misfires. The accuracy and dependability of the voting process could be compromised by hardware failures, software bugs, or compatibility issues. To reduce these risks, routine procedures for quality control and maintenance are necessary.

Security hazard: Although security measures can be incorporated into Arduino-based systems, there is always the possibility of cyberattacks and unauthorized access. Guaranteeing powerful network safety conventions, encryption methods, and secure information stockpiling is essential to safeguard the honesty and privacy of the democratic information. To address emerging security flaws, updates and monitoring are necessary on a regular basis.

Accessibility Restrictions for Some People: Even though systems based on Arduino can be made to accommodate people with disabilities, it might still be hard to give all voters equal access. A few people, particularly those with serious handicaps or explicit hindrances, may confront difficulties in connecting with the framework.

Privacy issues: Concerns about voters' privacy and anonymity are raised by electronic voting systems. It is essential to ensure that personal information and voting preferences remain confidential. In order to guard against data breaches and unauthorized access, adequate safeguards must be in place.

8.3. APPLICATION

Voting by the Company: Systems built on Arduino can be used in board meetings and in corporate settings to vote on important decisions. A safe and effective method for conducting votes within organizations is ensured by this.

Educational establishments: For student council elections, class representative elections, and opinion polls, Arduino-based voting systems can be used in educational institutions. Students are introduced to cutting-edge voting methods and encouraged to get involved.

Reviews and Surveys: Arduino-based frameworks can be utilized for leading reviews, popular assessments of public sentiment, or statistical surveying. The framework can catch and examine reactions continuously, giving significant experiences to independent direction.

Organizations with members: Arduino-based voting systems can be used by clubs, associations, and other membership-based organizations to conduct member voting, select leaders, or make important decisions that require member input.

Voting on the Board: Arduino-based casting a ballot frameworks can be used for board races in non-benefit associations, local area affiliations, or property holder affiliations. It makes voting easier, guarantees accuracy, and makes the process of electing board members transparent.

Initiatives and Referendums: During initiatives and referendums, systems based on Arduino can be used to let people vote on specific policies or issues. This gives a proficient and secure technique for gathering and arranging votes.

Voting by proxy: Arduino-based frameworks can be utilized for intermediary casting a ballot, where citizens can designate their democratic freedoms to someone else. In circumstances where voters are unable to physically participate in the voting process, this may be advantageous.

In general, Arduino-based smart voting systems can be used in any circumstance that calls for secure, accurate, and efficient voting procedures. It improves accessibility, ease of use, and transparency by offering a fresh take on conventional voting methods**.**

9. BILL OF MATERIAL

1	**A**rduino UNO	1100
2	Fingerpriint Sensor	1700
3	Cable	70

10. RESULTS

Accordingly the appearance of this biometric thumb impression casting a ballot framework would empower facilitating of fair decisions in India. Rigging and other illegal practices will be prevented by this. The thumb impressions of all voters in a constituency will be in the unsearched folder, so citizens can be sure that they alone can choose their leaders and exercise their democratic right. The image of the particular voter is moved to the searched folder as soon as a vote is cast. The searched folder is set up so that an image can't be in this folder more than once. Therefore, when a voter casts multiple votes, an exception is created, an alarm is raised, and the identity of the intruder engaging in this illegal activity can be revealed to the police.

11. REFERENCES (IEEE Format)

1 Kaur, R., Himanshi, E. (2015). Face recognition using Principal Component Analysis. 2015 IEEE International Advance Computing Conference (IACC). doi:10.1109/iadcc.2015.715.

2 Zhao, X., Wei, C. (2017). A real-time face recognition system based on the improved LBPH algorithm. 2017 IEEE 2nd International Conference on Signal and Image Processing (ICSIP). doi:10.1109/siprocess.2017.8124508

Mil'shtein, S., Pillai, A., Shendye, A., Liessner, C., Baier, M. (2008). Fingerprint Recognition Algorithms for Partial and Full Fingerprints. 2008 IEEE Conference on Technologies for Homeland Security. doi:10.1109/ths.2008.4534494

4 Finger Print Algorithm (https://www.supremasolution.com/Tech2.php)

5 Mallipamula Megha Sai Sree et al, International Journal of Computer Science and Mobile Computing, Vol.3 Issue.8, August - 2014, pg. 476- 481" Finger Print Enhancement Using Minutiae Based Algorithm"

6 Manisha Redhu and Dr.Balkishan/ International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622 www.ijera.com Vol. 3, Issue 4, JulAug 2013,pp .2488-2497 2488 — P a g e Fingerprint Recognition Using Minutiae Extractar

7 Bindhu, V. ”Biomedical Image Analysis using Semantic Segmentation.” Journal of Innovative Image Processing (JIIP) 1, no. 02 (2019): 91-101.

8 Hariyanto, Sudiro, S. A., Lukman, S. (2015). Minutiae Matching Algorithm Using Artificial Neural Network for Fingerprint Recognition. 2015 3rd International Conference on Artificial Intelligence, Modelling and Simulation (AIMS). doi:10.1109/aims.2015.16

9 RAVI. J*, K. B. RAJA**, VENUGOPAL. K. R “Fingerprint Recognition Using Minutia Score Matching” Ravi.J. et al /International Journal of Engineering Science and Technology Vol.1(2), 2009, 35-42

10 N. U. Ain, F. Shaukat, A.S. Nagra and G. Raja, “An Efficient Algorithm For Fingerprint Recognition Using Minutiae” Vol. 70 No. 2 June, 2018)

12.APPENDIX

A1	Bill of material.
A2	Important Datasheets, Application notes
A3	Project participation certificates.