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FINGER PRINT BASED SECURED POLLING SYSTEM

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ABSTRACT

The basic idea of this project is to create an electronic voting machine that will help to eradicate defrauding of the manual voting systems and prior versions of electronic voting. The thesis looks into and proposes a system that includes multiple layers of verifications to ensure the reliability of the device. With the inclusion of biometric fingerprint sensor, each voter is entered into the system only after being recognized and checked with the given database of enlisted voters. Once the corresponding fingerprint is matched with the information provided, the voter will be allowed to proceed for choosing their preferred candidate from the panel of buttons. The final vote is then displayed onto a LCD for the satisfaction of voters. The proposed project displays transparency and also carries the feature of being autonomous during the course of operation.

Keywords: Electronic voting machine, Arduino, Finger print sensor, LCD.

1 INTRODUCTION

An embedded system is a gadget that is going to do a predefined exact assignment in the embedded machine and is even defined as a combination of each software program and hardware. A trendy-reason definition of embedded systems is that they're gadgets used to control, reveal, or help the operation of gadgets, machinery, or plant. "Embedded" reflects the truth that they're a quintessential part of the gadget. At the opposite severe, a preferred-cause computer can be used to control the operation of a massive complicated processing plant, and its presence can be obvious.

The very fine embedded systems are capable of performing most effectively an unmarried feature or set of capabilities to satisfy an unmarried predetermined reason. In greater complex structures a utility that allows the embedded machine to be used for a specific cause in a selected application determines the functioning of the embedded device.

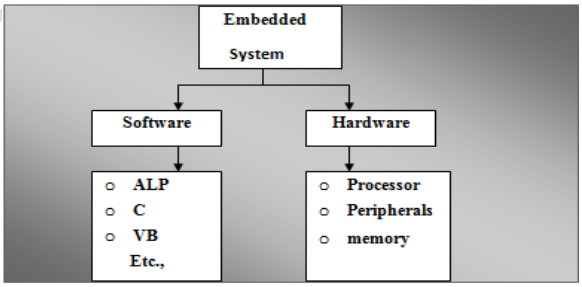


Figure:1 Block diagram of Embedded System

Software deals with the languages like ALP, C, and VB etc., and Hardware deals with Processors, Peripherals, and Memory.

Memory: It is used to store data or address.
Peripherals: These are the external devices connected
Processor: It is an IC which is used to perform some task

Applications of embedded systems

- Manufacturing and process control
- Construction industry
- Transport
- Buildings and premises

- Domestic service
- Communications
- Office systems and mobile equipment
- Banking, finance and commercial
- Medical diagnostics, monitoring and life support
- Testing, monitoring and diagnostic systems

1.2 Processors are classified into four types like:

- Micro Processor (µp)
- Micro controller (µc)
- Digital Signal Processor (DSP)
- Application Specific Integrated Circuits (ASIC)

Micro Processor (µp):

A silicon chip that incorporates a CPU. In the sector of personal computers, the terms microprocessor and CPU are used interchangeably. At the heart of all private computer systems and most workstations sits a microprocessor. Microprocessors also control the common sense of just about all virtual devices, from clock radios to gas-injection systems for cars.

1.3 Three basic characteristics differentiate microprocessors:

- **Instruction set**: The set of instructions that the microprocessor can execute.
- **Bandwidth :** The number of bits processed in a single instruction.
- **Clock speed :** Given in megahertz (MHz), the clock speed determines how many instructions per second the processor can execute.

In each instance, the extra value-effective the CPU, the better. A 32-bit CPU strolling at 50 MHz, as an instance, is greener than a 16-bit microprocessor jogging at 25 MHz. Microprocessors are categorized as RISC (decreased schooling set laptop) or CISC (not unusual coaching set pc) similarly to bandwidth and clock pace (complicated training set laptop).

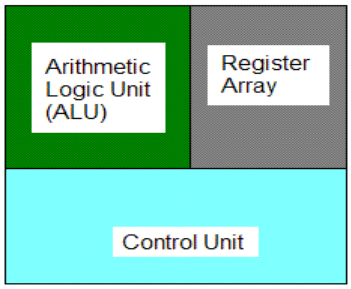


Figure 2 Three Basic Elements of a Microprocessor

1.4 Micro Controller (µc):

A microcontroller is a miniature pc with a CPU core, reminiscence, and programmable enter/output peripherals on an unmarried included circuit. A tiny quantity of RAM, as well as program memory in the form of NOR flash or OTP ROM, is often incorporated at the chip. Microcontrollers, as opposed to microprocessors used in private computers or different trendy-purpose programs, are evolved for embedded packages.

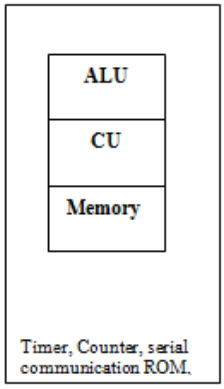


Figure:3 Block Diagram of Micro Controller (µc)

1.5 Reduced Instruction Set Computer (RISC)

A RISC (decreased practice set pc) is a microprocessor that is supposed to perform a decreased wide variety of various kinds of laptop instructions for you to run quicker (perform greater million commands in keeping with 2d, or hundreds of thousands of instructions consistent with 2nd). Because every kind of computer training necessitates greater transistors and circuitry, a longer list or set of

pc instructions makes the microprocessor extra complicated and slower to function.

- Aside from progressed overall performance, RISC and related layout upgrades have the following blessings:
- If one of the desires of a new microprocessor is to be less hard, it could be designed and examined extra quickly.
- Operating gadget and application programmers that hire the commands of the microprocessor will find it less complicated to write code with a reduced coaching set.
- The simplicity of RISC affords extra flexibility in how area on a microprocessor is used.
- Because better-level language compilers have usually tended to use the smaller set of instructions observed in a RISC system, they write extra efficient code than inside the past.

1.6 RISC characteristics

- **Simpleinstructionset:**

In a RISC machine, the instruction set contains simple, basic instructions, from which more complex instructions can be composed.

- **Samelengthinstructions.**

Each instruction is the same length, so that it may be fetched in a single operation.

- **1machine-cycleinstructions.**

Most instructions complete in one machine cycle, which allows the processor to handle several instructions at the same time. This pipelining is a key technique used to speed up RISC machines.

1.7 Complex Instruction Set Computer (CISC)

The acronym CISC stands for Complex Instruction Set Computer, and it's for a design concept for circuits that might be simple to programme and make the most advantageous use of reminiscence. A CISC instruction set can carry out a series of operations in the CPU with each training. This minimizes the range of commands wished to complete a program and lets the programmer memorize a restricted however flexible set of instructions.

1.8 The advantages of CISC

CISC machines exploited available generation to optimize laptop performance after they have been first advanced.

- Microprogramming is as simple to implement as meeting language and some distance much less steeply-priced than hardwiring a managed unit.
- Because it become so clean to micro-code new instructions, designers had been capable of built CISC machines upwardly well-matched: a brand new laptop should run the equal applications as older computers because it included a superset of the older computer systems' commands.
- Fewer instructions could be used to complete a challenge as every training was given extra successful. This allowed the comparatively gradual fundamental reminiscence to be used extra efficaciously.
- The compiler does no longer want to be as tough because micro application preparation units may be created to shape the syntax of excessive-stage languages.

1.9 The disadvantages of CISC

Designers quickly learned, however, that the CISC philosophy had its personal problems, consisting of Earlier generations of :

- A processor family that has been often contained as a subset in every new release —- so the instruction set and chip hardware became greater complex with every era of computers.
- Individual commands will be almost any length a good way to keep as many commands as possible in reminiscence with the least amount of wasted space. In this manner that diverse commands would require varying amounts of clock time to execute, slowing down the machine's average speed.
- Many specialized instructions are not utilized frequently sufficient to justify their life — in a normal program, best round 20% of the available commands are used.

- As an aspect impact of CISC instructions, the circumstance codes are often set. Not handiest does it take time to set the condition codes, however, programmers also need to take into account to check them.

1.9.1 Memory Architecture

There two different type's memory architectures there are:

- Harvard Architecture
- Von-Neumann Architecture

1.10 Harvard Architecture

Program instructions and facts are stored in specific reminiscence locations on computer systems. There are or greater internal information buses that give get right of entry to both commands and facts at an identical time. On the program memory bus, the CPU retrieves program commands.

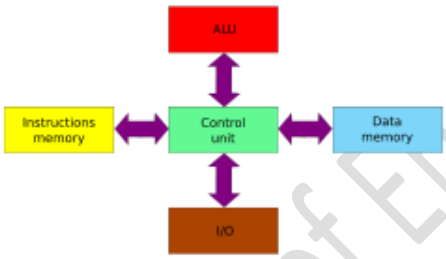


Figure:4 Harvard Architecture

1.11 Modern uses of the Harvard architecture:

Modified Harvard processors employing current CPU cache systems have dwindled the main advantage of the pure Harvard structure - simultaneous get right of entry to to a couple of reminiscence machines. Harvard architecture machines are generally utilized in packages where the benefits of disposing of caches, which include value and electricity reductions, balance the programming penalties of having separate code and facts cope with areas.

1.11.1 Von-Neumann Architecture

Both program instructions and information are stored in a computer's unmarried, not unusual memory area. Both commands and facts are retrieved through an unmarried inner records bus. They are not viable to do at the same time.

The von Neumann structure is a layout approach for a saved-application digital laptop that holds both instructions and statistics in an unmarried impartial garage shape ("memory"). It is known after John von Neumann, a mathematician, and early pc scientist. These computer systems feature a sequential architecture and use a frequent Turing device.

A virtual laptop with saved-application reminiscence stores each of its programmed commands and information in read-write, random-get right of entry to reminiscence (RAM). Program-controlled computers just like the Colossus and the ENIAC, which were programmed through setting switches and putting patch ends in course information and to perform calculations, had been changed through saved-application computer systems within the Nineteen Forties.

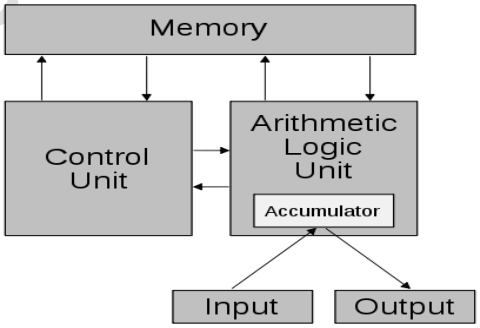


Figure:5 Schematic of the Von-Neumann Architecture.

1.11.2 Basic Difference between Harvard and Von-Neumann Architecture

- The predominant distinction among Harvard and Von Neumann architectures is that information and programs within the Von Neumann structure are saved in the same memory and controlled through the equal data dealing with the device.
- The Harvard architecture, however, stores statistics and programs in wonderful reminiscence gadgets which are dealt with via independent subsystems.

➢ The primary processor unit (CPU) in a computer with the Von-Neumann architecture without cache can both be analyzing and writing instructions or writing/analyzing information to/from reminiscence. Because the information and commands share the equal gadget bus, they cannot manifest at the same time.

➢ The Harvard structure lets the CPU examine training and get admission to record memory at the same time, without the usage of a cache. Because facts get right of entry to and guidance fetches do now not compete, a computer with a Harvard layout can in all likelihood be quicker for given circuit complexity.

CHAPTER-2

PROPOSED SCHEME

c is an electronic tool used to seize a digital image of the fingerprint sample [10]. The captured photograph is referred to as a staying test. This is a Fingerprint sensor module with a TTL UART interface for direct connections to microcontroller UART or to PC through MAX232 / USB-Serial adapter. The user can save the fingerprint facts within the module [11] and can configure it in 1:1 or 1: N mode for figuring out the person. The FP module can directly interface with 3v3 or 5v Microcontroller. A stage converter (like MAX232) is required for interfacing with the PC serial port. Basic Power: eight-12v AC/DC, Interface: RS232, Matching Mode: 1:1 and 1:N, Baud price: 9600 – 115200. Default: 57600,Storage Capacity: 256,Average Search Time: < 1sec,Image Acquire Time: <0.5sec. The voting device includes Arduino Uno, Fingerprint sensor, LCD show, SFG Demo V2 Software, switches. Arduino UNO acts as the controller unit.

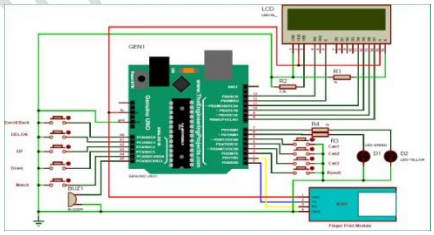
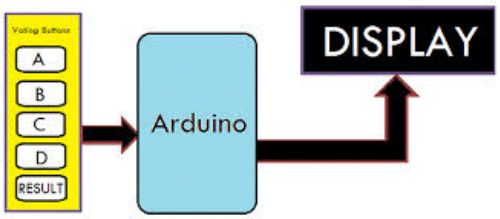


Figure:6 A fingerprint sensor



Arduino is an open-source electronics prototyping platform based totally on flexible, easy-to-use hardware and software programs. It's intended for artists, designers, hobbyists, and everybody interested in growing interactive objects or environments. Arduino can experience the surroundings with the aid of receiving enter from a spread of sensors and might have an effect on its surroundings by using controlling lighting, cars, and other actuators. The microcontroller at the board has programmed the usage of the Arduino programming language (based on Wiring) and the Arduino development surroundings (based on Processing). Arduino initiatives can be stand-alone or they are able to speak with the software on going for walks on a pc (e.G. Flash, Processing,MaxMSP).

Arduino microcontroller:uno

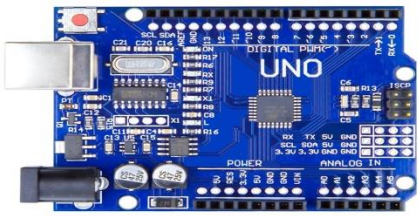


Figure 7 Arduino microcontroller:uno

2.1 Pin Description

Pin Category	Pin Name	Details
Power	Vin, 3.3V, 5V, GND	Vin: Input voltage to Arduino when using an external power source. 5V: Regulated power supply used to power microcontroller and other components on the board. 3.3V: 3.3V supply generated by on-board voltage regulator. Maximum current draw is 50mA.GND: ground pins.
Reset	Reset	Resets the microcontroller.
Analog Pins	A0 – A5	Used to provide analog input in the range of 0-5V
I/O Pins	Digital Pins 0 - 13	Can be used as input or output pins.
Serial	0(Rx), 1(Tx)	Used to receive and transmit TTL serial data.
PWM	3, 5, 6, 9, 11	Provides 8-bit PWM output.
SPI	10 (SS), 11 (MOSI), 12 (MISO) and 13 (SCK)	Used for SPI communication.
Inbuilt LED	13	To turn on the inbuilt LED.

2.2 Arduino Uno Technical Specifications

Microcontroller	ATmega328P – 8 bit AVR family microcontroller
Operating Voltage	5V
Recommended Input Voltage	7-12V
Input Voltage Limits	6-20V
Analog Input Pins	6 (A0 – A5)
Digital I/O Pins	14 (Out of which 6 provide PWM output)
DC Current on I/O Pins	40 mA
DC Current on 3.3V Pin	50 mA
Flash Memory	32 KB (0.5 KB is used for Bootloader)
SRAM	2 KB
EEPROM	1 KB
Frequency (Clock Speed)	16 MHz

2.3 How to use Arduino Board

The 14 virtual input/output pins may be used as entering or output pins by way of the usage of pinMode(), digitalRead(), and digitalWrite() features in Arduino programming.

- **Serial Pins 0 (Rx) and 1 (Tx):** Rx and Tx pins are used to receive and transmit TTL serial data. They are connected with the corresponding ATmega328P USB to TTL serial chip.
- **External Interrupt Pins 2 and 3:** These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value.
- **PWM Pins 3, 5, 6, 9 and 11:** These pins provide an 8-bit PWM output by using analogWrite() function.
- **SPI Pins 10 (SS), 11 (MOSI), 12 (MISO) and 13 (SCK):** These pins are used for SPI communication.
- **In-built LED Pin 13:** This pin is connected with an built-in LED, when pin 13 is HIGH – LED is on and when pin 13 is LOW, its off.

- Analog pin 4 (SDA) and pin 5 (SCA) also used for TWI communication using Wire library.

Arduino Uno has a couple of other pins as explained below:

- **AREF:** Used to provide reference voltage for analog inputs with analogReference() function.
- **Reset Pin:** Making this pin LOW, resets the microcontroller.

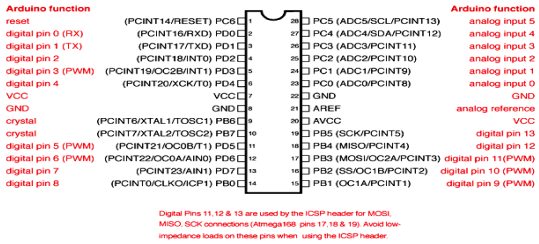


Figure 8 Arduino Board

Software

Arduino IDE (Integrated Development Environment) is required to program the Arduino Uno board.

2.4 Programming Arduino

Once Arduino IDE is set up at the laptop, connect the board with the laptop using a USB cable. Now open the Arduino IDE and select the best board through selecting Tools>Boards>Arduino/Genuino Uno, and pick the appropriate Port with the aid of choosing Tools>Port. Arduino Uno has programmed the usage of Arduino programming language primarily based on Wiring. To get it commenced with Arduino Uno board and blink the built-in LED, load the example code via selecting Files>Examples>Basics>Blink. Once the example code (also shown under) is loaded into your IDE, click at the 'add' button given at the pinnacle bar. Once the upload is completed, you should see Arduino's built-in LED blink. Below is the example code for blinking:

```
// the setup function runs once when you press reset or power the board
void setup() {
  // initialize digital pin LED_BUILTIN as an output.
  pinMode(LED_BUILTIN, OUTPUT);
}
// the loop function runs over and over again forever
void loop() {
  digitalWrite(LED_BUILTIN, HIGH);   // turn the LED on (HIGH is the voltage level)
  delay(1000);                       // wait for a second
  digitalWrite(LED_BUILTIN, LOW);    // turn the LED off by making the voltage LOW
  delay(1000);                       // wait for a second
}
```

Figure 9 Programming Arduino

Applications

- Prototyping of Electronics Products and Systems
- Multiple DIY Projects.
- Easy to use for newbie degree DIYers and makers.
- Projects requiring Multiple I/O interfaces and communications.

CHAPTER-3

HARDWARE COMPONENTS

3.1 POWER SUPPLY:

3.1.1 Block diagram:

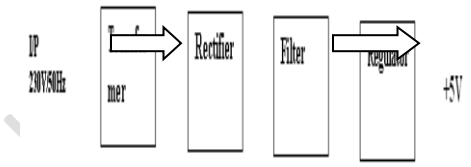


Figure:10 Power Supply

3.1.2 Circuit diagram:

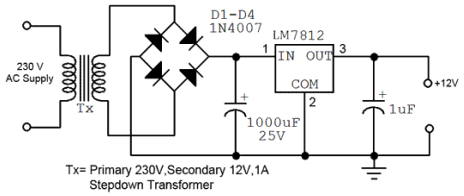


Figure 11 Circuit diagram

3.2 Description:

3.2.1 Transformer:

A transformer is a device that transfers electrical electricity from one circuit to another via inductively coupled conductors—the transformer's coils. Various cutting-edge in the first or primary winding creates a varying magnetic flux inside the transformer's core, and consequently a varying magnetic field thru the secondary winding. These various magnetic discipline induces a varying electromotive force (EMF) or "voltage" in the secondary winding. This effect is referred to as mutual induction.

Figure:12 Transformer Symbol

(or)

Transformer is a device that converts the one form energy to another form of energy like a transducer.

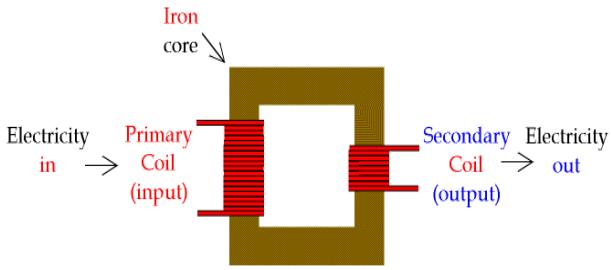


Figure:13 Transformer

3.2.2 Basic Principle :

A transformer makes use of Faraday's law and the ferromagnetic properties of an iron core to efficiently raise or lower AC voltages. It of course cannot increase power so that if the voltage is raised, the current is proportionally lowered and vice versa.

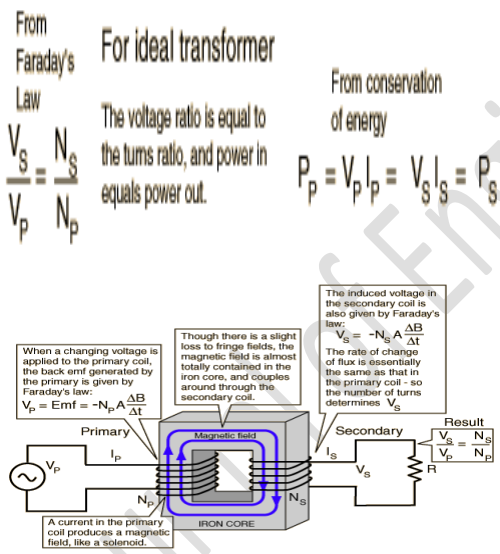


Figure:14 Basic Principle

3.2.3 Transformer Working:

A transformer consists of two coils (often called 'windings') linked by an iron core, as shown in figure below. There is no electrical connection between the coils, instead they are linked by a magnetic field created in the core.

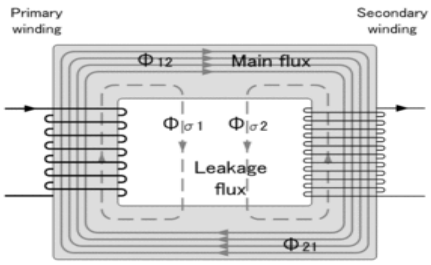


Figure:15 Basic Transformer

Transformers are used to transform strength from one voltage to every other with minimal lack of electricity. The simplest paintings with AC (alternating current) due to the fact they require a converting magnetic subject to be created of their center. Transformers can increase the voltage (step-up) in addition to reducing the voltage (step-down).

1. They provide overall electrical isolation between the enter and output, in order that they can be competently used to reduce the excessive voltage of the mains supply.

3.3 Classification of Transformer:

- Step-Up Transformer
- Step-Down Transformer

3.3.1 Step-Down Transformer:

Step-down transformers are used to decrease the voltage of an electrical device. They have a better primary voltage than a secondary voltage. The voltage provided to this form of transformer is "stepped down." To utilize a 110v device in a rustic with a 220v supply, for instance, a step-down transformer is required.

Electrical voltage is generally converted from one level or phase configuration to a lower level via step-down transformers. Electrical isolation, electricity distribution, and manage and instrumentation programs are all viable. To convert voltage and/or present-day degrees, step-down transformers normally use the precept of magnetic induction between coils.

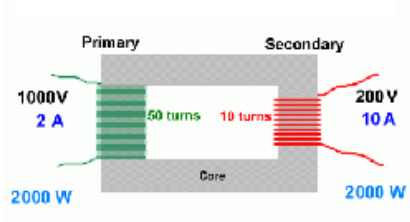


Figure:16 Step-Down Transformer

An example of this would be: 100 turns on the primary and 50 turns on the secondary, a ratio of 2 to 1.

The step-up is the most important component in voltage transduction.

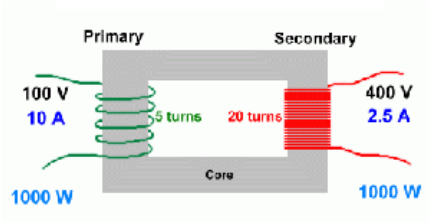


Figure: 17 Step-Up Transformer

Applications

Generally these **Step-Up Transformers** are used in industries applications only.

3.4 Turns Ratio and Voltage

The ratio of the number of turns on the primary and secondary coils determines the ratio of the voltages...

$$\frac{V_s}{V_p} = \frac{N_s}{N_p}$$

...where V_p is the primary (input) voltage, V_s is the secondary (output) voltage, N_p is the number of turns on the primary coil, and N_s is the number of turns on the secondary coil.

3.5 Diodes:

Diodes allow energy to float in the best route. The arrow of the circuit image suggests the course wherein the modern can float. Diodes are the electric version of a valve and early diodes have been really called valves.

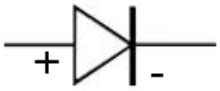


Figure:18 Diode Symbol

3.6 Rectifier

The purpose of a rectifier is to transform an AC waveform right into a DC waveform (OR) Rectifier converts AC cutting-edge or voltages into DC present-day or voltage. There are different rectification circuits, called 'half-wave and 'full-wave rectifiers. Both use components called diodes to convert AC into DC.

The Half-wave Rectifier

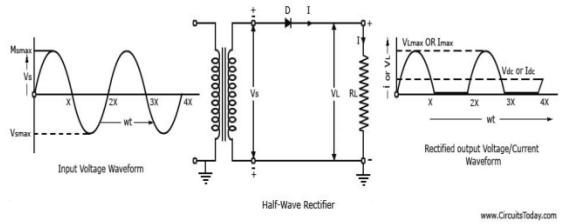


Figure:19 Half Wave Rectifier

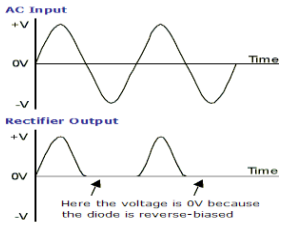


Figure:20 Half-Wave Rectification

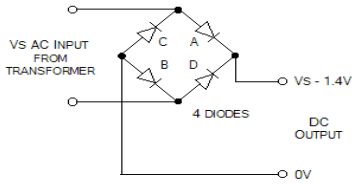


Figure:21Full-Wave Rectifier

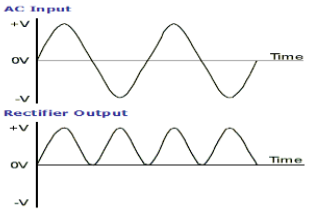


Figure:22 Full-Wave Rectification

3.7 Capacitor Filter

The **capacitor-input filter**, also called "Pi" filter due to its shape that looks like the Greek letter pi, is a type of electronic filter. Filter circuits are used to remove unwanted or undesired frequencies from a signal.

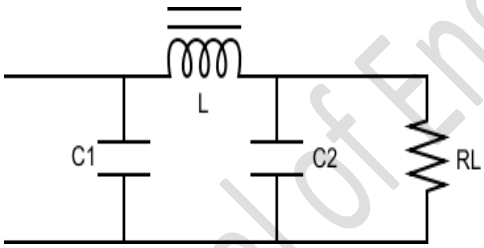


Figure:23 Capacitor Filter

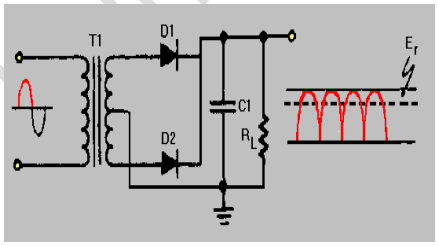


Figure:24 Centered Tapped Full-Wave Rectifier with a Capacitor Filter

3.8 Fingerprint Sensor:

Fingerprint identity is also known as dactyloscopy. Fingerprint identification is the process of evaluating examples of friction ridge pores and skin impression from human palms, palms,s or toes [1]. Today fingerprints are considered to be one of the oldest and popular among other biometric technologies [2]. The predominant hardware used in this machine contains the fingerprint sensor as proven in determine 3, also known as the biometric identification module. This sensor produces a digital print of the ridges inside the skin of the arms which could be uniquely defined for authentication.

Figure: 25 Scanning the finger

Supply voltage	3.6 - 6.0VDC
Operating current	120mA max
Peak current	150mA max
Fingerprint imaging time	<1.0 seconds
Signature file	256 bytes
Template file	512 bytes
Storage capacity	162 templates
Safety ratings	(1-5 low to high safety)
Interface	TTL Serial
Baud rate	9600, 19200, 28800, 38400, 57600 (default is 57600)
Working temperature rating	-20C to +50C
Full Dimensions	56 x 20 x 21.5cm

Figure:26 Technical Specifications

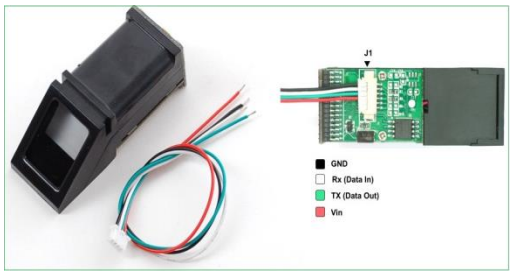


Figure:27 Fingerprint Sensor

Correct illustration of the fingerprint photo is crucial to an automatic fingerprint identification device.

Therefore, a fingerprint picture goes through numerous methods like enhancement, evaluation, binarizing, thinning, and ridge construction before the trivia is extracted.

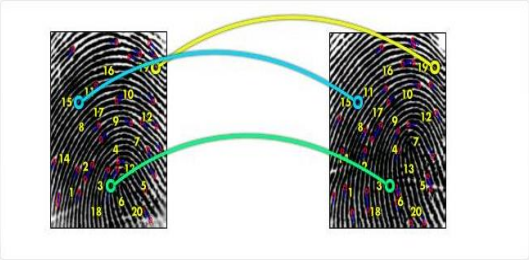


Figure:28 Matching algorithm

3.9 LCD (Liquid Cristal Display):

A liquid crystal show (LCD) is a thin, flat display device made from any wide variety of color or monochrome pixels arrayed in front of a mild supply or reflector. Each pixel consists of a column of liquid crystal molecules suspended among obvious electrodes, and two polarizing filters, the axes of the polarity of that are perpendicular to every difference. Without the liquid crystals among them, mild passing thru one might be blocked by way of the opposite. The liquid crystal twists the polarization of light coming into one filter to allow it to skip through the other.

The software has to engage with the outside global the use of input and output gadgets that talk at once with a man or woman. One of the maximum commonplace gadgets attached to a controller is an LCD display. Some of the most commonplace LCDs linked to the controllers are 16X1, 16x2, and 20x2 presentations. This method 16 characters according to the line by means of 1 line 16 characters in line with the aid of 2 strains and 20 characters according to the line by means of 2 traces, respectively.

16 x 2 Alphanumeric LCD Module Features:

- Intelligent, with built-in Hitachi HD44780 compatible LCD controller and RAM providing simple interfacing
- 61 x 15.8 mm viewing area
- 5 x 7 dot matrix format for 2.96 x 5.56 mm characters, plus cursor line
- Can display 224 different symbols
- Low power consumption (1 mA typical)
- Powerful command set and user-produced characters
- TTL and CMOS compatible
- Connector for standard 0.1-pitch pin headers

3.9.1 Data can be placed at any location on the LCD. For 16×1 LCD, the address locations are:

POSITION		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
ADDRESS	LINE1	00	01	02	03	04	05	06	07	40	41	42	43	44	45	46	47

Fig :29 Address locations for a 1x16 line LCD

Even restricted to person-based totally modules, there's nonetheless a wide sort of styles and sizes to be had. Line lengths of 8,16,20,24,32 and 40 characters are all standards, in single, and four-line variations.

3.9.2 .Electrical Block Diagrm

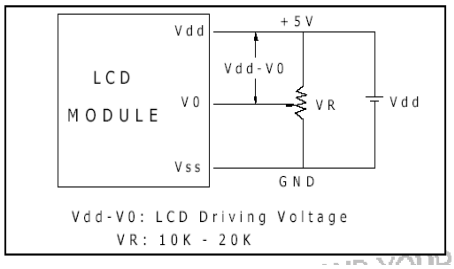


Fig: 30 power supply for LCD

3.10 Pin description:

Most LCDs with 1 controller have 14 Pins and LCDs with 2 controllers have sixteen Pins (two pins are more in each for lower back-mild LED connections). This is the primary interfacing example for the Parallel Port. We will begin with something easy. This instance would not use the Bi-directional characteristic discovered on more recent ports,

consequently, it needs to paintings with most, if not all Parallel Ports. It but would not show using the Status Port as an enter. So what are we interfacing? A 16 Character x 2 Line LCD Module to the Parallel Port. These LCD Modules are very commonplace in recent times and are quite easy to work with, as all the common sense required to run them is on board.

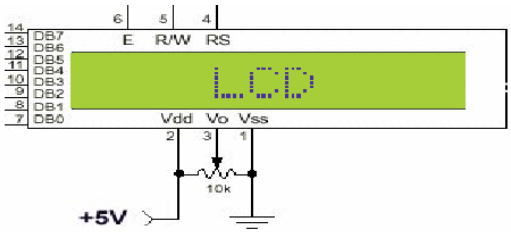


Fig 31 pin diagram of 1x16 lines LCD

PIN	SYMBOL	FUNCTION
1	Vss	Power Supply(GND)
2	Vdd	Power Supply(+5V)
3	Vo	Contrast Adjust
4	RS	Instruction/Data Register Select
5	R/W	Data Bus Line
6	E	Enable Signal
7-14	DB0-DB7	Data Bus Line
15	A	Power Supply for LED B/L(+)
16	K	Power Supply for LED B/L(-)

Fig 17: Pin specifications

3.11 CONTROL LINES:

EN: The line is called "Enable." This control line is used to inform the LCD to which you are sending data. To send records to the LCD, your program ought to ensure this line is low (zero) and then set the opposite control strains and/or place facts at the information bus.

RS: The line is the "Register Select" line. When RS is low (zero), the facts are to be dealt with as a command or unique preparation (along with the clear display, position cursor, and so on.). When RS is high (1), the facts being sent are textual content facts that should be displayed on the screen. For instance, to show the letter "T" on the screen you would set RS excessive.

RW: The line is the "Read/Write" control line. When RW is low (0), the data at the statistics bus is being written to the LCD. When RW is high (1), this system is successfully querying (or studying) the LCD. Only one training ("Get LCD fame") is a read command.

3.12 SWITCHES:

The switches should be the kind where On = 0, so that when they're turned to the zero function, all 4 outputs are shorted to the not unusual pin, and in position "F", all 4 outputs are open circuits. All the to be had characters that can be built into the module are proven in Table three. Studying the desk, you'll see that codes related to the characters are quoted in binary and hexadecimal, most large bits ("left-hand" 4 bits) throughout the top, and the least large bits ("proper-hand" 4 bits) down the left. Most of the characters agree to the ASCII popular, although the Japanese and Greek characters (and a few other matters) are apparent exceptions. Since these wise modules were designed within the "Land of the Rising Sun," it appears simplest honest that their Katakana phonetic symbols ought to additionally be incorporated.

Fig 19: character details in LCD

4 SOFTWARE IMPLEMENTATION

4.1 Install the board drivers

If you used the Installer, Windows - from XP up to 10 - will install drivers automatically as soon as you connect your board. If you downloaded and expanded the Zip package or, for some reason, the board wasn't

properly recognized, please follow the procedure below.

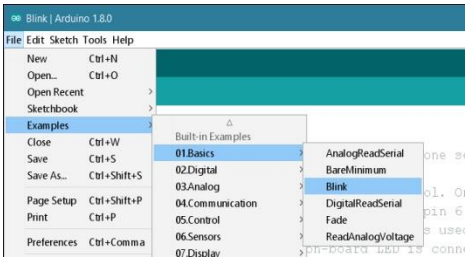


Figure20 : Select the board driver

4.2 Select your board type and port

You'll want to choose the entry within the Tools > Board menu that corresponds to your Arduino board. Select the serial tool Serial Port menu. This is possibly to be COM3 or higher (COM1 and COM2 are usually reserved for hardware serial ports). To discover, you may disconnect your board and re-open the menu; the entry that disappears should be the Arduino board. Reconnect the board and pick out that serial port.

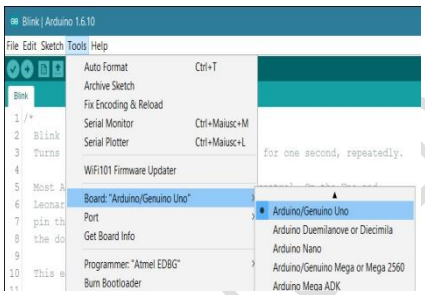


Figure 21: Select the type of board

4.3 Upload the program

Now, simply click the "Upload" button in the environment. Wait a few seconds - you should see the RX and TX leds on the board flashing. If the upload is successful, the message "Done uploading." will appear in the status bar.

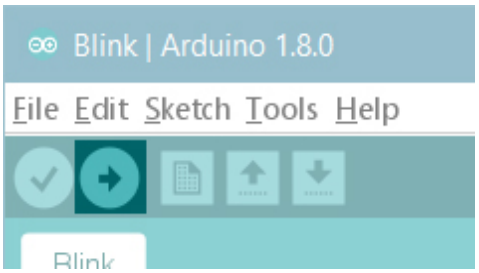


Figure 22 : Sketch the program

4.4 Writing Sketches

Programs written the use of Arduino Software (IDE) are called sketches. These sketches are written within the text editor and are stored with the report extension.Info. The editor has capabilities for cutting/pasting and for searching/changing textual content. The message area gives comments while saving and exporting and additionally shows mistakes. The console presentations text output through the Arduino Software (IDE), along with complete errors messages and other statistics. The backside right-hand corner of the window displays the configured board and serial port. The toolbar buttons allow you to confirm and add programs, create, open, and store sketches and open the serial screen.

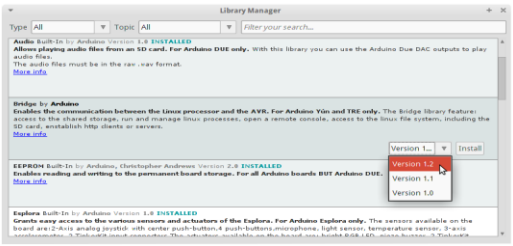


Figure 23: Library Manager

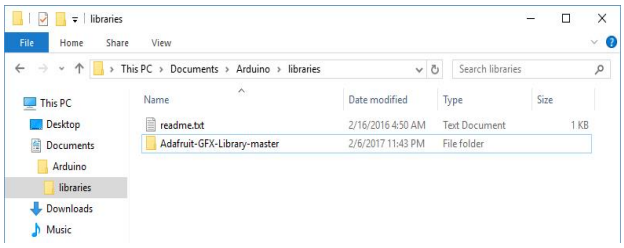


Figure 24 : Add library files

The manner libraries are chosen for the duration of compilation is designed to permit the replace of

libraries present within the distribution. This method that setting a library inside the “libraries” folder to your sketchbook overrides the other libraries variations. This is why we suggest that you only set up libraries to the sketchbook folder so they are not deleted at some stage in the Arduino IDE replace procedure.

4.5 Experimental Results

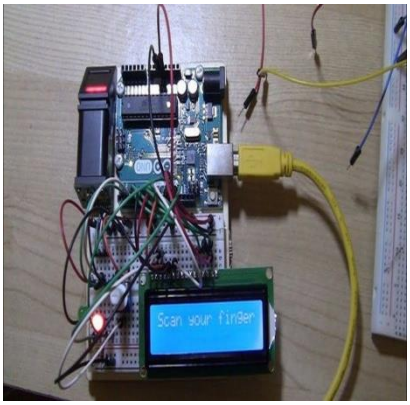


Figure 25 Experimental setup

CONCLUSION

Verification for accredited voters is accomplished by using a fingerprint scanner in our suggested balloting technique, which ensures that the voter is a registered voter and that only the approved electorate is allowed to enter the balloting place. This also ensures the voter's physical presence. Only one vote consistent with the user is authorized, therefore multiple votes from an unmarried voter are not possible. If a voter attempts to cast more than one ballot, he or she might be warned and a caution message might be displayed on the LCD screen. As a result, our machine eliminates the possibility of more than one vote casting, making it greater secure.

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