iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** V **Month of publication:** May 2022

DOI: https://doi.org/10.22214/ijraset.2022.43600

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue V May 2022- Available at www.ijraset.com

Biometrics Attendance System

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Abstract: Biometrics is the utilization of biological characteristics (face, iris, and fingerprint) or behavioral traits (signature, voice) for identity verification of an individual this paper discusses about Biometric System and its working. Various biometric technologies are also discussed and compared.

I. INTRODUCTION

A fingerprint sensor is an electronic device used to capture a digital image of the fingerprint pattern. The captured image is called a live scan. This live scan is digitally processed to create a biometric template (a collection of extracted features) which is stored and used for matching. Many technologies have been used including optical, capacitive, RF, thermal, piezoresistive, ultrasonic, piezoelectric, and MEMS. This project is about solving the problem regarding security of unauthorized people trespassing in our home, shops or offices. Security issues can be fixed using traditional locks but there is always possibility of someone opening the lock even without breaking it with the use of duplicate key. Using these kinds of locks also create problem if we lose keys and also we have to carry keys along with us always. Again, using patterns in the locks can increase security but again it can be opened if somehow the passwords or patterns are known. So, leaving every system in this project we will implement a system using biometrics. In case of biometrics, the pattern which will be used as key will be unique. Here, to implement the project we will use fingerprint as the key. This arduino project will make use of different devices for the implementation of the security lock where there will be different features to increase the security level. In simple words, we can say that we are implementing a door access system using arduino which make use of fingerprints to identify whom to allow and who not to allow inside our homes, offices, shops, etc. We are trying to implement it using a normal and simple door lock which is fitted in every home so as to minimize the cost of the device as a product. Security is a major concern in our day to day life, and digital locks have become an important part of these security systems. There are many types of security systems available to secure our place. Some examples are PIR based Security System, RFID based Security System, Digital Lock System, biomatrix systems, Electronics Code lock.

II. LITERATURE REVIEW

Arduino Based Smart Fingerprint Authentication System. In today's world Home, offices, shops, banks need excessive security measure for safety motive. To supply security for these area, smart lock system is initiated. There are numerous innovational smart door locks are created to lock and unlock the system. These type of locks has fingerprint, RFID card, pin, password or IOT by unlocking the system using mobile phone. User using these kinds of bolting system either utilize pin number or fingerprint or RFID card to unlock the system. These system does not have security pecking order to grow the security. To grow the security the user should unbolt the system by minimal two security order. In house lock system there have to be unlocking option for guest.

Sometime burglars may miss use the option and get into the home. So, we can supply two level of security for guest also. This procedure have to be finished with the use of owner for security motive.

In current situation, there are probability to hack and unlock the smart locks. The suggested system can beat the security issues faced in the current situation. The 3 level security in the system can aid the user for precise security. The chief reason for the provided system is to protect the user living area, employment place or to keep their precious things, important papers in a secured way. Hence this project can be understand by the audience and will be helpful for the future work. Numerous mechanization and modernization can be done in this project. This project can be again build by different microcontroller and various methods.

Nowadays office/corporate territory security is a vital problem faced by everyone when far from home or at the home. When it comes to the security systems, it is one of the key worries in this occupied-merciless world, where people cannot get ways to provide security to their important possessions manually. Instead, they finds a different solution that provides better, dependable and atomized security. This is a time, where everything is attached through network, where anyone can get hands on information from anyplace around the globe. Thus possibilities of one's information being hacked are a serious affair. Due to these chaces, it's very crucial to have some kind of personal recognition to enter one's own info.

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These days personal identification is becoming an principle affair all around. Among normal personal recognition techniques we mostly see password and identification cards methods. But it is easy to hack password now, and identification cards may get loose, thus making these methods quite unreliable. The blueprint and execution of fingerprint based lock system is customizable and adjustable. This door locking apparatus is comparatively cost-effective than the already made lock systems in the conventional market. Our fingerprint based lock system has high correctness rate and is also rapid to identify fingerprints which authorize

A. Arduino Uno

ARDUINO UNO

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits.[1] The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts.



Technical specifications:-

1) Microcontroller ATmega328 (SMD) – Interface CH340G
2) Operating Voltage: 5V
3) Input Voltage (recommended): 7-12V
4) Input Voltage (limits): 5-20
5) Digital I / O Pins 14 (of which 6 provide PWM output)
6) Analog Input Pins: 6
7) DC Current per I/O Pin: 40 mA DC Current for 3.3V Pin: 50 Ma
8) Flash Memory: 32 KB of which 0.5 KB used by bootloader
9) SRAM: 2 KB
10) EEPROM: 1 KB
11) Clock Speed: 16 MHz
12) Length: 45 mm
13) Width: 18 mm
14) Weight: 7 g



Arduino Uno SMD R3 Developer
Arduino Manufacturer Many
Type
Single-board microcontroller[1]
Retail availability https://store.arduino.cc/usa/ Operating system None
CPU
Microchip AVR (8-bit) Memory
SRAM
Storage
Flash, EEPROM

*B. 16*2 Digital Display*

An LCD is an electronic display module that uses liquid crystal to produce a visible image. The 16×2 LCD display is a very basic module commonly used in DIYs and circuits. The 16×2 translates a display 16 characters per line in 2 such lines. In this LCD each character is displayed in a 5×7-pixel matrix.



16*2 LCD Display

LCD 16×2 Pin Diagram

The 16×2 LCD pinout is shown below: Pin1 (Ground/Source Pin): This is a GND pin of display, used to connect the GND terminal of the microcontroller unit or power source.

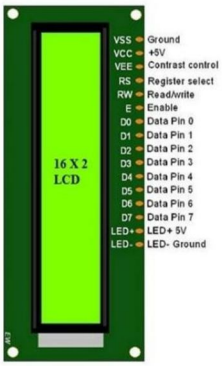
Pin2 (VCC/Source Pin): This is the voltage supply pin of the display, used to connect the supply pin of the power source.

 Pin3 (V0/VEE/Control Pin): This pin regulates the difference of the display, used to connect a changeable POT that can supply 0 to 5V. Pin4 (Register Select/Control Pin): This pin toggles among command or data register, used to connect a microcontroller unit pin and obtains either 0 or 1(0 = data mode, and 1 = command mode). Pin5 (Read/Write/Control Pin): This pin toggles the display among the read or writes operation, and it is connected to a microcontroller unit pin to get either 0 or 1 (0 = Write Operation, and 1 = Read Operation).

 Pin 6 (Enable/Control Pin): This pin should be held high to execute Read/Write process, and it is connected to the microcontroller unit & constantly held high.

 Pins 7-14 (Data Pins): These pins are used to send data to the display. These pins are connected in two-wire modes like 4-wire mode and 8-wire mode. In 4-wire mode, only four pins are connected to the microcontroller unit like 0 to 3, whereas in 8-wire mode, 8-pins are connected to microcontroller unit like 0 to 7.

 Pin15 (+ve pin of the LED): This pin is connected to +5V Pin 16 (-ve pin of the LED): This pin is connected to GND.



LCD-16×2-pin-diagram

C. Push Button

A push-button (also spelled pushbutton) or simply button is a simple switch mechanism to control some aspect of a machine or a process. Buttons are typically made out of hard material, usually plastic or metal. The surface is usually flat or shaped to accommodate the human finger or hand, so as to be easily depressed or pushed. Buttons are most often biased switches, although many un-biased buttons (due to their physical nature) still require a spring to return to their un-pushed state. Terms for the "pushing" of a button include pressing, depressing, mashing, slapping, hitting, and punching.



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D. Finger Print Sensor



R305 Finger Print sensor

Fingerprint Scanning technology is one of the most popular biometric modalities to verify the identity of individuals. The fingerprint matching compares the unique features such as the characteristics of ridges or minutia patterns that are found within the print pattern. This is an optical biometric fingerprint reader/sensor with an R305 module and TTL UART interface for direct connections to a UART microcontroller. The user can store the fingerprint data in the module and can configure it in 1:1 or 1: N mode for identifying the person. This module can directly interface with any 3.3V or 5V microcontrollers, but a suitable level converter/serial adapter is required for interfacing with the serial port of a PC. The fingerprint sensing process typically consists of capturing the fingerprint image, extracting the distinguishing features of the fingerprint, and then storing a digital template ofthe fingerprint or comparing the current image with the stored fingerprint templates

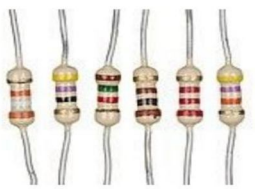
E. LED



LED

A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons.
The color of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor. White light is obtained by using multiple semiconductors or a layer of light-emitting phosphor on the semiconductor device. Appearing as practical electronic components in 1962, the earliest LEDs emitted low-intensity infrared (IR) light. Infrared LEDs are used in remote-control circuits, such as those used with a wide variety of consumer electronics. The first visible-light LEDs were of low intensity and limited to red. Modern LEDs are available in visible, ultraviolet (UV), and infrared wavelengths, with high light output.Early LEDs were often used as indicator lamps, replacing small incandescent bulbs, and in seven-segment displays. Recent developments have produced high-output white light LEDs suitable for room and outdoor area lighting. LEDs have led to new displays and sensors, while their high switching rates are useful in advanced communications technology.
LEDs have many advantages over incandescent light sources, including lower energy consumption, longer lifetime, improved physical robustness, smaller size, and faster switching. LEDs are used in applications as diverse as aviation lighting, fairy lights, automotive headlamps, advertising, general lighting, traffic signals, camera flashes, lighted wallpaper, horticultural grow lights, and medical devices.

F. Resistor



Resistors

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A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses. High-power resistors that can dissipate many watts of electrical power as heat, may be used as part of motor controls, in power distribution systems, or as test loads for generators.

Fixed resistors have resistances that only change slightly with temperature, time or operating voltage. Variable resistors can be used to adjust circuit elements (such as a volume control or a lamp dimmer), or as sensing devices for heat, light, humidity, force, or chemical activity. Resistors are common elements of electrical networks and electronic circuits and are ubiquitous in electronic equipment. Practical resistors as discrete components can be composed of various compounds and forms. Resistors are also implemented within integrated circuits.The electrical function of a resistor is specified by its resistance: common commercial resistors are manufactured over a range of more than nine orders of magnitude. The nominal value of the resistance falls within the manufacturing tolerance, indicated on the component.

G. DC Battery



A battery converts chemical energy into electrical energy by a chemical reaction. Usually the chemicals are kept inside the battery. It is used in a circuit to power other components. A battery produces direct current (DC) electricity (electricity that flows in one direction, and does not switch back and forth).

Using the electricity from an outlet in a building is cheaper and more efficient, but a battery can provide electricity in areas that do not have electric power distribution. It is also useful for things that move, such as electric vehicles and mobile phones.

H. Servo Motor

A servomotor is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for position feedback. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servomotors.



Servo motor

III. CONCLUSION

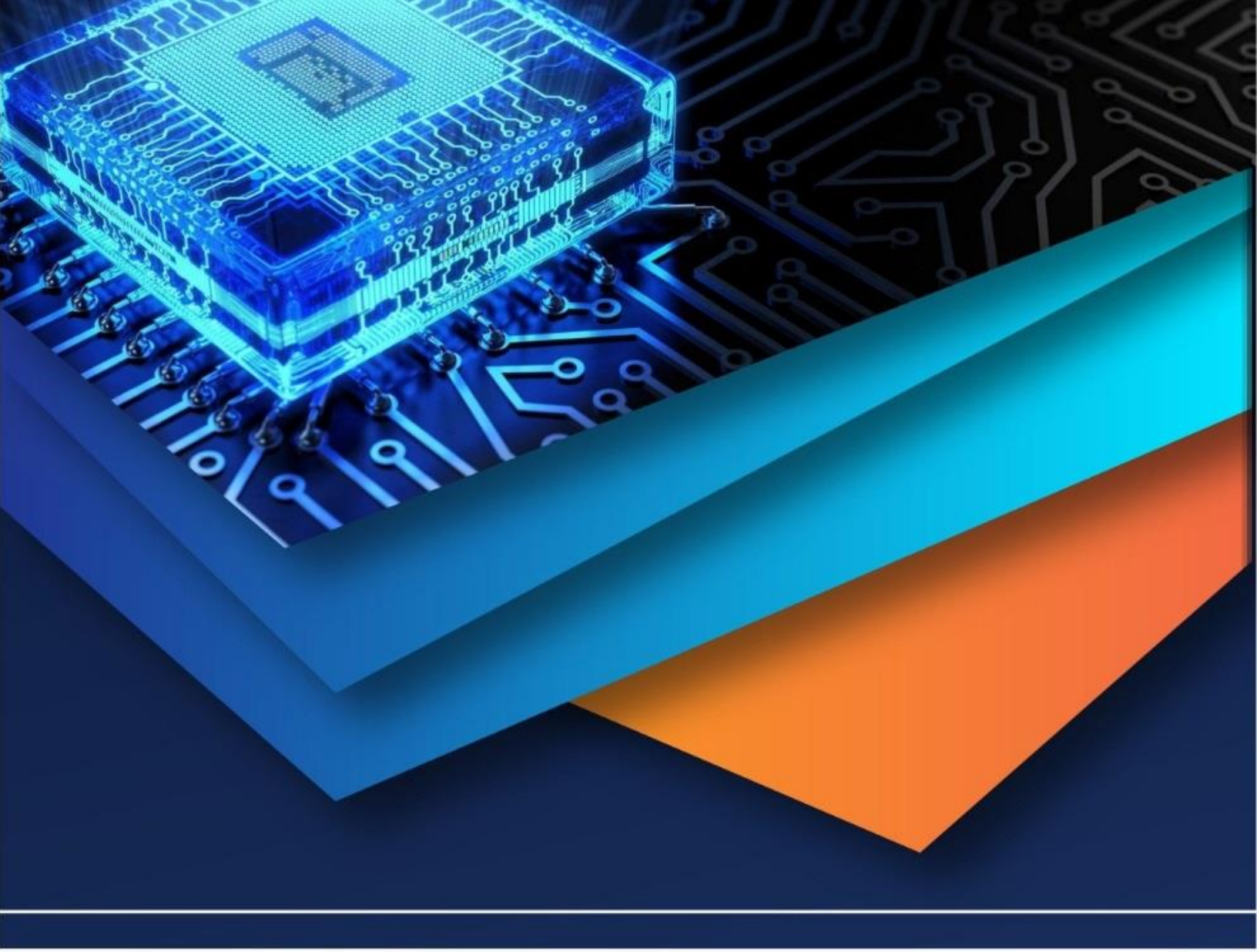
In this project, we have tried to solve the security matter in door by bringing the concept of biometrics along with the door lock. So, for that purpose we are using finger prints as unique key to implement a device so as to lock or unlock a door. We have discussed about the different components using arduino we would require to implement our project i.e we have given the hardware and software requirements in the project. We have gone through different research papers and then given a brief about the papers and after studying the papers we have come with an algorithm as to how our system will work. We have also given a project description diagram and also a cost structure so as to get to a price if it is sold as a product. We have shown a block diagram and a probable connected diagram of the components and also given the future possibilities in our project.

IV. ACKNOWLEDGMENT

We would like to acknowledge Mrs. Manisha Talware mam for their guidance, Moral Support, editorial reviews and useful suggestions during this research work.

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