



BANK SECURITY USING FINGERPRINT AUTHENTICATION AND FACE DETECTION USING ESP32 CONTROLLER

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Abstract— As today fingerprint based system provides high accuracy in terms of security. Also, there is a high demand for integration of fingerprint matching techniques for making secure authentication systems. This research paper introduces this door locker system which integrates fingerprint reader in it so as to provide a good level of security. The main goal of fingerprint door locker with image capture project is to provide security with no manual security flaws. It is easy to use and requires no special training or equipment. This system needs fingerprint authentication while operating the door locker as well as captures the images of person who is handling the locker and saves it in memory card which can be later viewed with card reader to the authorized person. The functionality of system is that it will scan the fingerprint and if it matches with registered fingerprint the locker opens and also captures the image of user.

Index Terms: Esp32 Controller, Motor Driver, Switches, Buzzer, Motor, Fingerprint

I. INTRODUCTION

In this world, people are more worried about safety and security for their expensive things like Jewelry, money and any important things. So, most of the people are preferring the bank lockers are the safest to store them. In this fast-growing world more technologies have been emerged for security purposes. Especially for storing valuable items in banks and in Museums. Face authentication and verification has become one of the most using and secured identification for identifying an individual by comparing the data base which is stored with the faces of every individual. In the identification mode the system recognizes an individual by searching entire template data base for match. And the system performs one to many comparisons to establish the individual identity or fails if the subject is not enrolled in the system data base. So, in our project we are using face recognition and keyword security system.

II. EXISTING SYSTEM

In existing system, we have used buzzer alerts in case of any unauthorized persons tries to open door. And we have used RFID for detecting authorized persons. For this RFID can be used by anyone so that no safety and security is

available. If RFID tag is stolen then the person needs to worry about as the tag can be used to open door.

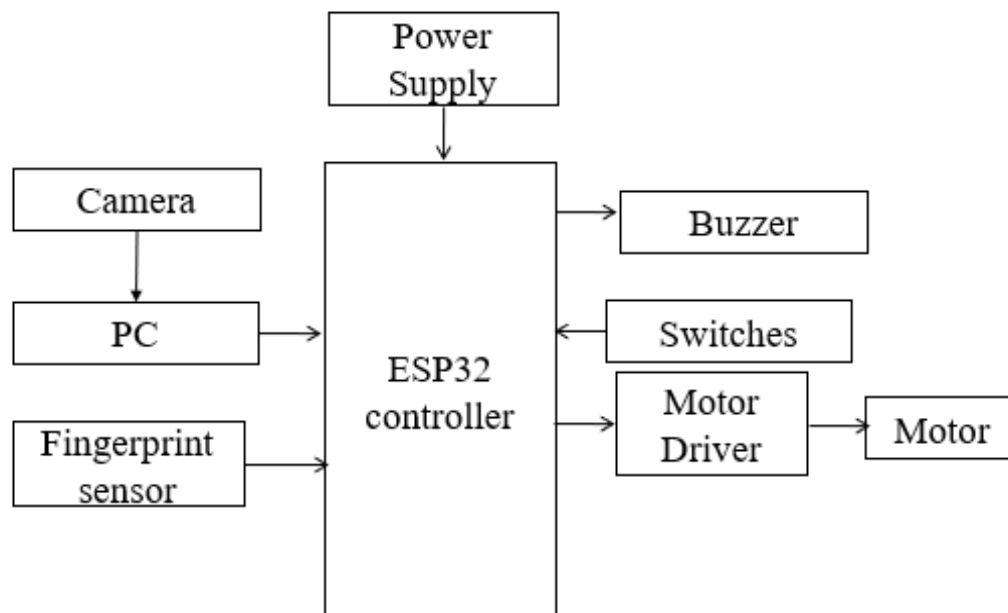
Drawbacks:

- No safety and security
- Card is Compulsory
- Stolen chances are high

III. PROPOSED SYSTEM

In this proposed system we are using finger print sensor to check the whether the person is Authorized person or not. if the person fingerprint doesn't match then USB camera will send the mail with image of the person to owners and GSM will send message. If finger print matches also image will be sent to mail through Python. The web camera is interface to the PC which has python software installed.

IV. BLOCK DIAGRAM



V. HARDWARE REQUIREMENTS

ESP32 Microcontroller:

ESP32 is a low-cost, low-power Microcontroller with an integrated Wi-Fi and Bluetooth. It is the successor to the ESP8266 which is also a low-cost Wi-Fi microchip albeit with limited vastly limited functionality. It is an integrated antenna and RF balun, power amplifier, low-noise amplifiers, filters, and power management module. The entire solution takes up the least amount of printed circuit board area. This board is used with 2.4 GHz dual-mode Wi-Fi and Bluetooth chips by TSMC 40nm low power technology, power and RF properties best, which is safe, reliable, and scale-able to a variety of applications. The block diagram below shows all that is in there! We will look at each of these blocks and see what they mean when using ESP32 in your project.

WEB CAMERA

A webcam is a video camera that feeds or streams an image or video in real time to or through a computer networks, such as the internet. Webcams are typically small cameras that sit on a desk, attach to a user's monitor, or are built into the hardware. Webcams can be used during a video chat session involving two or more people, with

conversations that include live audio and video.

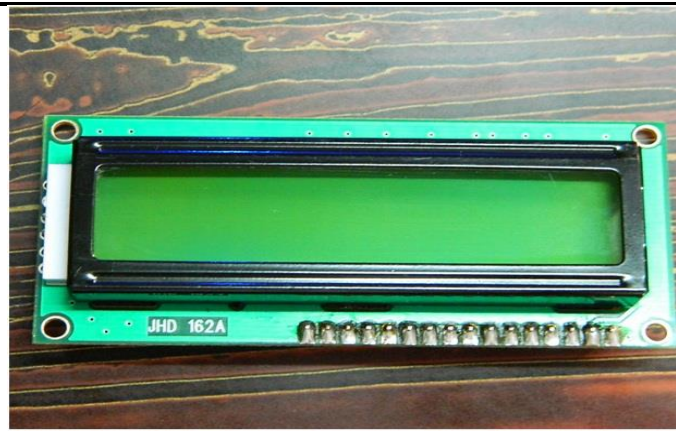
Webcam software enables users to record a video or stream the video on the Internet. As video streaming over the Internet requires much bandwidth, such streams usually use compress formats. The maximum resolution of a webcam is also lower than most handheld video cameras, as higher resolutions would be reduced during transmission. The lower resolution enables webcams to be relatively inexpensive compared to most video cameras, but the effect is adequate for video chat sessions



LCD:

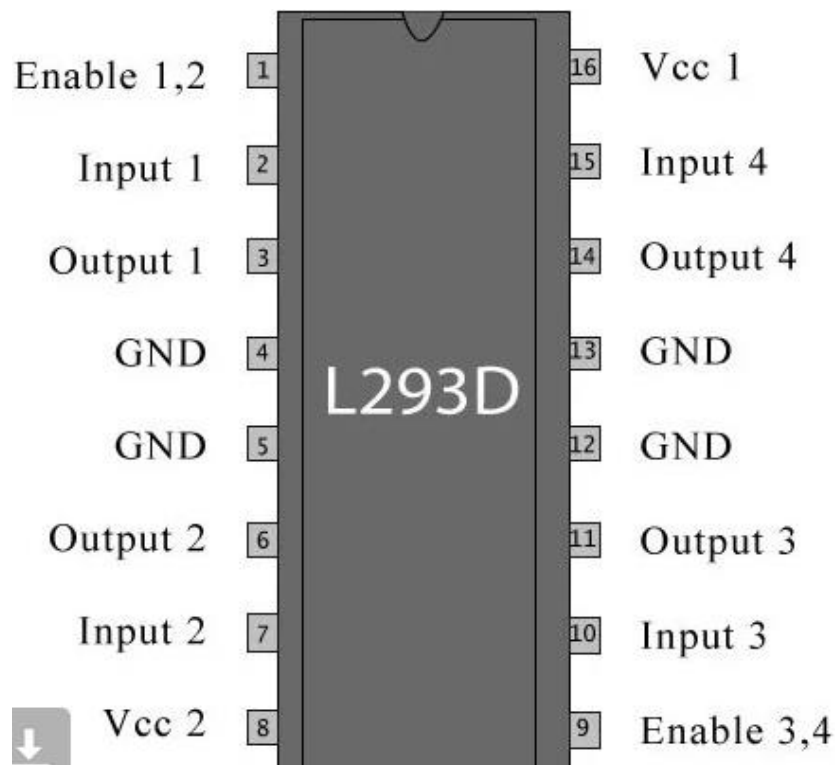
LCD (Liquid Crystal Display) is the innovation utilized in scratch pad shows and other littler PCs. Like innovation for light-producing diode (LED) and gas-plasma, LCDs permit presentations to be a lot more slender than innovation for cathode beam tube (CRT). LCDs expend considerably less power than LED shows and gas shows since they work as opposed to emanating it on the guideline of blocking light.

A LCD is either made with a uninvolved lattice or a showcase network for dynamic framework show. Likewise alluded to as a meager film transistor (TFT) show is the dynamic framework LCD. The uninvolved LCD lattice has a matrix of conductors at every crossing point of the network with pixels. Two conductors on the lattice send a current to control the light for any pixel. A functioning framework has a transistor situated at every pixel crossing point, requiring less current to control the luminance of a pixel.

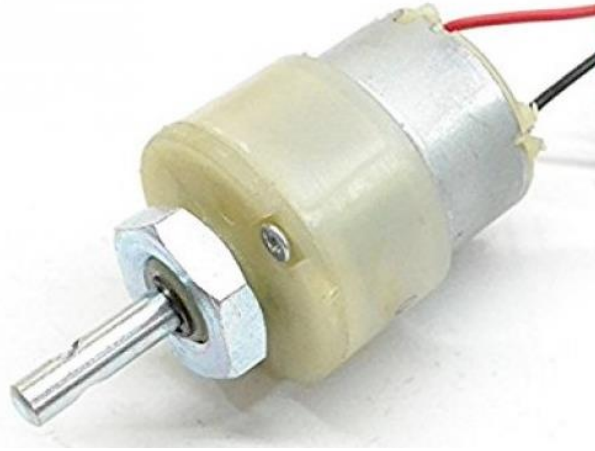


Motor Driver:

A motor driver is an integrated circuit chip which is usually used to control motors in autonomous robots. Motor driver act as an interface between Arduino and the motors. The most commonly used motor driver ICs are from the L293 series such as L293D, L293NE, etc. These ICs are designed to control 2 DC motors simultaneously. L293D consist of two H-bridge. H-bridge is the simplest circuit for controlling a low current rated motor. We will be referring the motor driver IC as L293D only. L293D has 16 pins.



The L293D is a 16 pin IC, with eight pins, on each side, dedicated to the controlling of a motor. There are 2 INPUT pins, 2 OUTPUT pins and 1 ENABLE pin for each motor. L293D consist of two H-bridge. H-bridge is the simplest circuit for controlling a low current rated motor.



Buzzer:

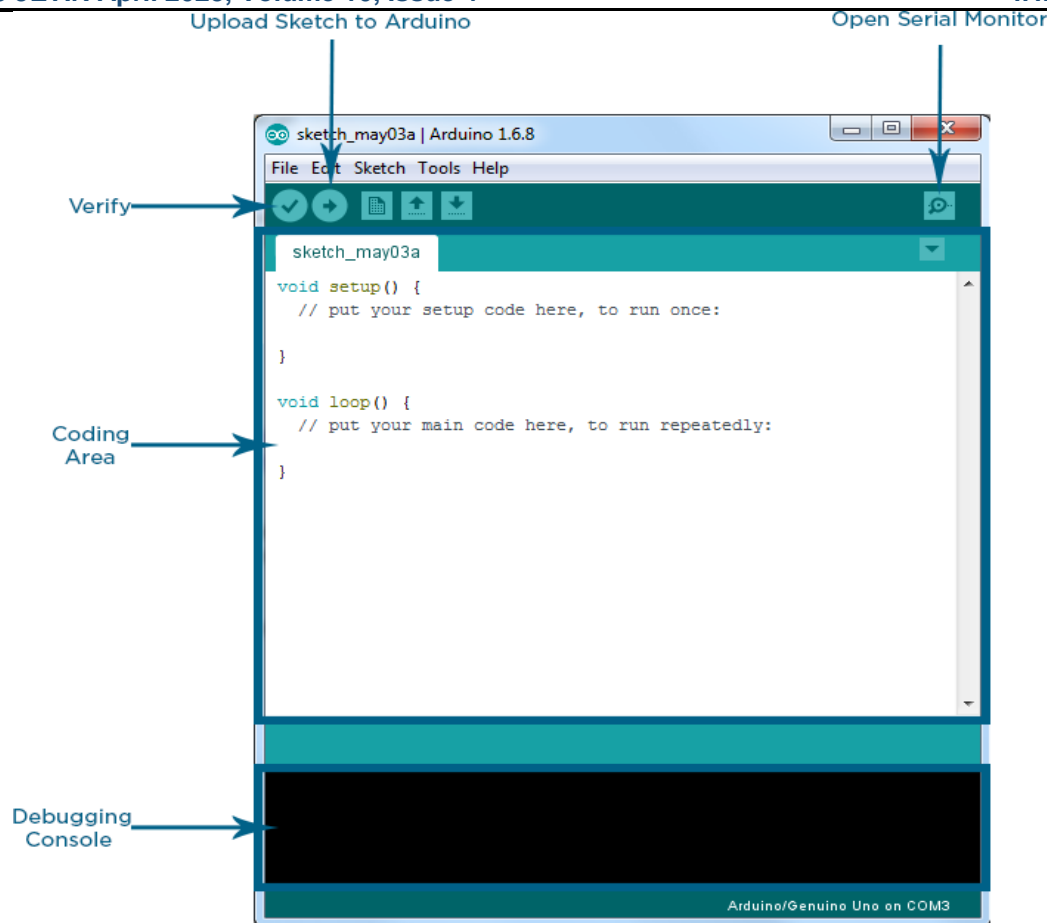
A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke. Buzzer is an integrated structure of electronic transducers, DC power supply, widely used in computers, printers, copiers, alarms, electronic toys, automotive electronic equipment, telephones, timers and other electronic products for sound devices. Active buzzer 5V Rated power can be directly connected to a continuous sound, this section dedicated sensor expansion module and the board in combination, can complete a simple circuit design, to "plug and play.



VI.SOFTWARE REQUIREMENTS

Arduino IDE

where IDE stands for Integrated Development Environment – An official software introduced by Arduino.cc, that is mainly used for writing, compiling and uploading the code in the Arduino Device. Almost all Arduino modules are compatible with this software that is an open source and is readily available to install and start compiling the code on the go.



PYTHON:

Python is a general purpose, dynamic, high level and interpreted programming language. It supports Object Oriented programming approach to develop applications. It is simple and easy to learn and provides lots of high-level data structures. It is easy to learn yet powerful and versatile scripting language which makes it attractive for Application Development. Its syntax and dynamic typing with its interpreted nature, makes it an ideal language for scripting and rapid application development. It supports multiple programming patterns, including object oriented, imperative and functional or procedural programming styles. It is not intended to work on special area such as web programming. That is why it is known as multipurpose because it can be used with web, enterprise, 3D CAD etc. We don't need to use data types to declare variable because it is dynamically typed so we can write `a=10` to assign an integer value in an integer variable. It makes the development and debugging fast because there is no compilation step included in python development and edit-test-debug cycle is very fast.

VII. ADVANTAGES

- Less power consumption
- Real time observation

VIII. APPLICATIONS

In all bank for Lockers, in all bank ATMs, in all Educational Institution, used in jeweler shops, in all shopping malls, in all IT Sectors, In house, Schools treasury, College's treasury and in industries, VIP vehicles, in hospital, offices.

IX. CONCLUSION/FUTURE SCOPE

A security system is proposed by using Voice Authentication and face Recognition. It is a low cost, low in power conception, compact in size and standalone system. The microcontroller compares the faces by it with its data base. If these faces are correct, the microcontroller provides necessary control signal to open the bank locker otherwise the door remains locked and faces are saved in database after capturing. The proposed system can be

used in other places such as offices and diamond jeweler shops.

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