
SMART GATE LOCK SYSTEM

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ABSTRACT

In this paper, the advent of a door lock system is finished the usage of facial focus in conjunction with the ESP32 CAM for greater correct face detection. The ESP32 CAM is powered by way of battery that acts because it is the system's backbone, and it controls the gate locks and unlocks systems. This gate lock device works on facial recognition and car number plate. Here, the gate lock gadget is managed by using face recognition of a private. A gate is one of the protections features to take care of bodily safety of the house. If the gate of the domestic is frequently opened easily, a thief can without problems enter and steal the contents of the house. At first, a gate solely requires a bodily key to lock or free up the door however on the other hand, with the development of technology, a more modern door has been innovated, specifically the digital door which will lock or release door ways barring requiring any bodily key. We propose an software known as Face detection gate lock. which is predicated on Arduino the usage of Internet of Things (IoT) technological know-how to watch the fame of the door, manage the gate and enlarge security. By the use of ESP32 cam, the door will lock or free up automatically.

Index Term: Arduino, Face recognition, Door Access control, IOT module, ESP32 camera,

I. INTRODUCTION

Now-a-days with the severe use of clever gadgets are used to automate many of the processes. Home automation is one of the aggressively developed technological know-how use by using excessive cease society. It's a ways hard to think about blindly on standard and easy safety elements of the device. in traditional gadget

many of the doorways are having mechanical lock which have been limited on the range of keys. So, to overcome the aforementioned troubles and regular locking machine one has to alter them and make them clever and automated. It works properly however when we desire extra secured surroundings and accountability of who locked and unlocked when is the primary phase used to be lacking in usual system.

This paper proposes Smart Door Unlock System primarily based on Face Detection to enrich the security. Machine getting to know primarily based strategy with Haar Cascade technique is proposed in the paper. In this gadget digicam sensor will be used to

capture the face and picture matching algorithm will be used to discover the authenticated faces. Only the individual whose face is matched can be capable to free up the door. So, hassle of dealing with keys will be resolved. This device will now no longer fantastically enhance the protection on the other hand moreover make the

device keyless. Many promising digital primarily based automatic options got here in market whose particular evaluation is given in literature survey, a few are thumb based, Iris primarily based and Face Based. Many human beings tried to enhance the automation on door primarily based on clever cands, thumb based, iris based totally however very few of them are outstanding for face primarily based answer.

This gadget is so promising however has its personal execs and cons. Certain challenges are additionally confronted when we use face detection such as lightening, various brightness. The fundamental benefit of this device is obtaining the door the usage of face detection method and whole face is recognized. Face consciousness method includes attribute extraction from facial photograph with assist of clever door mannequin an excessive innocence is anticipated in safety enterprise and to make everyday objects synergistic.

II. LITERATURE REVIEW

In current years, the recognition of earth gadgets has increased due to the fact of effectivity and have an impact on due to the fact of the mixing and fee of clever phones. Text up and implement applicable IOT records with the aid of introducing IOT concepts and foundations at some point of a aware kingdom Now everybody can join anywhere, anytime, and build relationships that have a look at dynamic networks. During this section, they clear up the depend if there is a drag with the machine linked to the gadget and as a result the concept of data; use the answer so as that the only solution are frequently found.

- digital verbal exchange should additionally be a little discipline of computing it is used to music structures in large data, like statistics, computing device learning, and database systems. This includes examining statistics and particular phrases and translating them into essential statistics or knowledge.
- Administrators can get admission to and manage all units that are no longer linked to every user, however solely one person can connect gadgets to the user. With the assist of the online of Things (IOT) system, cell gadgets and computers can remotely manipulate all the work and things to do on earth gadgets over the online.

III. EXISTING SYSTEM

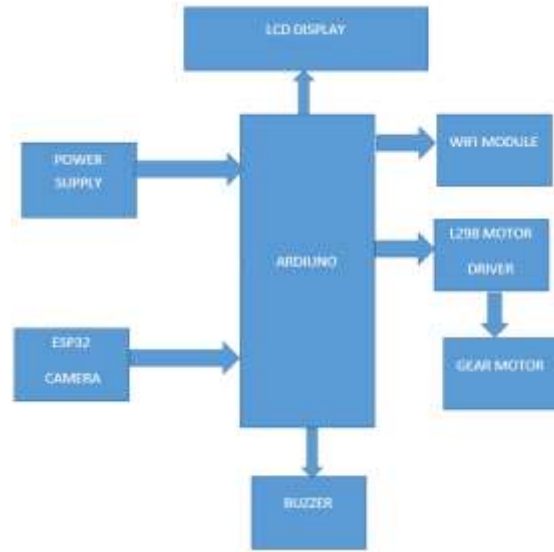
The technique of accumulating snap shots and storing this pic into the database takes too a lot time and massive storage. If approved individual tries to liberate the door, face modifications in licensed character due to each acquisition surroundings and physiological traits decrease matching accuracy, when anyone tries to open the door with comparable facial points the database get stressed and opens the door. The database wants giant storage area to keep all images. It opens the door besides getting any permission from the user. It is a essential downside for the consumer

IV. PROPOSED SYSTEM

In this section, the description of the proposed machine is provided. The new device is designed with the assist of facial attention module which is supported with and exterior digicam module that is connected to Arduino. Arduino presents many points for customers that can be used in exceptional clever applications.

The ESP32 cam is educated to understand faces and differentiate between approved and unauthorized faces by means of making use to education information set. Once, the ESP32 efficiently acknowledges the face in the front of the digital camera as licensed or unauthorized, relay is caused to open the door or to maintain it locked.

V. BLOCK DIAGRAM



1. ESP CAM32

The ESP32-CAM can also be a small size, low power consumption digicam module supported ESP32. It has an OV2640 digital camera and affords onboard TF card slot. The ESP32-CAM are frequently extensively utilized in smart IOT applications like wi-fi video monitoring, Wi-Fi image upload, QR identification, and so on.

The ESP32 CAM Wi-Fi Module Bluetooth with OV2640 Camera Module 2MP For Face Recognition aspects a very aggressive small-size digital camera module which may operate independently as a minimal gadget with a footprint of solely forty x 27 mm; a deep sleep contemporary of up to 6mA and is broadly utilized in a range of IOT applications. it's suitable for domestic clever devices, industrial wireless control, wi-fi monitoring, and different IOT applications.

This module adopts a DIP bundle and have to be directly inserted into the backplane to be aware of fast manufacturing of products, imparting clients with high-reliability connection mode, which is handy for utility in various IOT hardware terminals.



2. MOTOR DRIVE

This L298 Based Motor Driver Module is a excessive strength motor driver best for riding DC Motors and Stepper Motors. It makes use of the famous L298 motor driver IC and has the onboard 5V regulator which it can provide to an external circuit. It can manipulate up to four DC motors, or two DC motors with directional and pace control

This motor driver is best for robotics and mechatronics tasks and ideal for controlling motors from microcontrollers, switches, relays, etc. Perfect for using DC and Stepper motors for micro mouse, line following robots, robotic arms, etc.

An H-Bridge is a circuit that can power a cutting-edge in both polarity and be managed through Pulse Width Modulation (PWM).

Pulse Width Modulation is a potential of controlling the length of an digital pulse. In motors strive to think about the brush as a water wheel and electrons as the flowing droplets of water. The voltage would be the water flowing over the wheel at a steady rate, the extra water flowing the greater the voltage. Motors are rated at positive voltages and can be broken if the voltage is utilized to closely or if it is dropped rapidly to gradual the motor down. Thus PWM. Take the water wheel analogy and assume of the water hitting it in pulses however at a consistent flow. The longer the pulses the quicker the wheel will turn, the shorter the pulses, the slower the water wheel will turn. Motors will be closing lots longer and be greater dependable if managed via PWM. The DHT11 is a basic, ultra-low-cost digital temperature and humidity sensor. It makes use of a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital sign on the facts pin (no analog enters pins needed). It's pretty easy to use, however requires cautious timing to seize data. The solely actual drawback of this sensor is you can solely get new facts from it as soon as each and every two seconds.



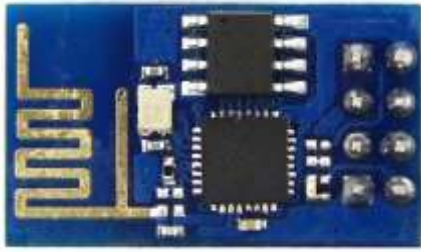
3. BUZZER

An Active Buzzer Alarm Module for Arduino is an audio signaling device, which may additionally be mechanical, electromechanical, or piezoelectric. Just like what you are viewing now, it is 3.3V-5V DC Electronic Part Active Buzzer Module. Using pinnacle first-class material, it is long lasting in use.



4. ESP8266 WIFI MODULE

The receiving internet records via ESP8266 modem when interfaced with microcontroller or PC is tons much less tough as differentiated and Ethernet module when you consider that ESP is a SoC and Integrated TCP/IP way of life stack. AT firmware is supplied convenient to use bearing set with which it will in accepted be orchestrated or labored at a variety of Baud Rate (Supported 9600, 115200 or 57600). Plain Text may additionally be dispatched via the modem via interfacing solely three warning signs of the successive interface of modem with microcontroller (TxD, RxD and GND). In this arrangement RTS and CTS symptoms of successive port interface of ESP Modem are associated with one another. The transmit banner of successive port of microcontroller is associated with of the consecutive interface get sign (Rx) of ESP Modem whilst get banner of microcontroller successive port is associated with transmit hail (Tx) of successive interface of ESP Modem.



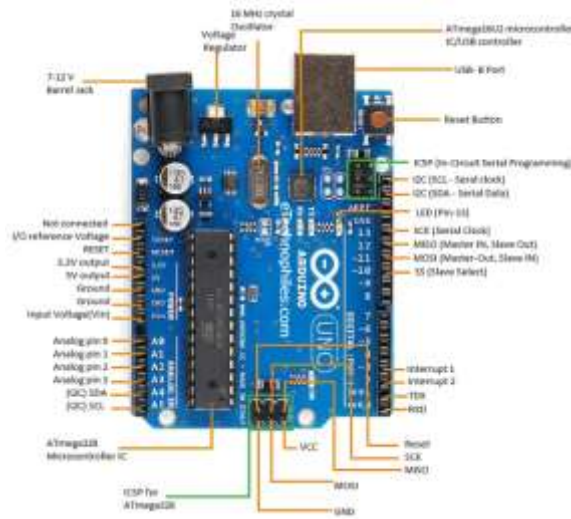
5. MICROCONTROLLER ARDUINO:

Arduino Uno is primarily based on AVR microcontroller referred to as Atmega328. This controller comes with 2KB SRAM, 32KB of flash memory, 1KB of EEPROM. Arduino Board comes with 14 digital pins and 6 analog pins. ON-chip ADC is used to pattern these pins. A sixteen MHz frequency crystal oscillator is geared up on the board. Following parent indicates the pinout of the Arduino Uno Board.



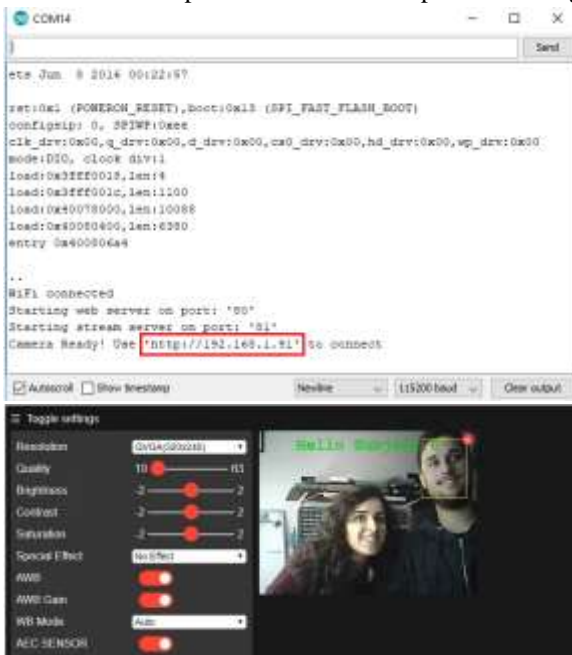
Pin description

There are various I/O digital and analog pins positioned on the board which operates at 5V. These pins come with fashionable running scores ranging between 20mA to 40mA. Internal pull-up resistors are used in the board that limits the modern-day exceeding from the given running conditions. However, too lots enlarge in present day makes these resistors vain and damages the device. LED. Arduino Uno comes with built-in LED which is related thru pin thirteen Providing HIGH price to the pin will flip it ON and LOW will flip it OFF Vin. It is the enter voltage supplied to the Arduino Board. It is unique than 5 V provided via a USB port. This pin is used to grant voltage. If a voltage is supplied via electricity jack, it can be accessed thru this pin. 5V. This board comes with the capability to grant voltage regulation. 5V pin is used to furnish output regulated voltage. The board is powered up the usage of three approaches i.e. USB, Vin pin of the board or DC energy jack. USB helps voltage round 5V whilst Vin and Power Jack guide a voltage stages between 7V to 20V. It is endorsed to operate the board on 5V. It is vital to notice that, if a voltage is furnished thru 5V or 3.3V pins, they end result in bypassing the voltage law that can injury the board if voltage surpasses from its limit. GND. These are floor pins. More than one floor pins are supplied on the board which can be used as per requirement reset. This pin is integrated on the board which resets the application walking on the board. Instead of bodily reset on the board, IDE comes with a characteristic of resetting the board via programming. IOREF. This pin is very beneficial for supplying voltage reference to the board. A protect is used to examine the voltage throughout this pin which then pick the applicable strength source. PWM. PWM is furnished via 3,5,6,9,10, 11pins. These pins are configured to provided 8-bit output PWM. SPI. It is acknowledged as Serial Peripheral Interface. Four pins 10(SS), 11(MOSI), 12(MISO), 13(SCK) grant SPI verbal exchange with the assist of SPI library. AREF. It is referred to as Analog Reference. This pin is used for imparting a reference voltage to the analog inputs. TWI. It is known as Two-wire Interface. TWI verbal exchange is accessed via Wire Library. A4 and A5 pins are used for this purpose. Serial Communication. Serial conversation is carried out via two pins known as Pin zero (Rx) and Pin 1 (Tx). Rx pin is used to acquire information whilst Tx pin is used to transmit data. External Interrupts. Pin two and three are used for imparting exterior interrupts. An interrupt is known as by means of offering LOW or altering value.



VI. RESULT

The hardware implementation of the esp32 cam Using Arduino is shown below



VII. CONCLUSION

The proposed facial cognizance invulnerable door running device is built, in which an Haar classifier is used for face detection, nearby binary sample histogram algorithm for facial recognition, digital camera to seize the photographs and raspberry pi for processing these operations alongside with sending the indicators to relay for door locking and unlocking.

When the photograph is no longer captured below acceptable ambient lighting fixtures then the proposed device is vulnerable. As future enhancement of the module, the machine can be skilled and examined on a large dataset to affirm the accuracy. The software of the proposed machine can be carried out for industrial and residential purposes.

FUTERE ENHANCEMENT

Android apps also are easy to use. Android applications have fire tools that activate and deactivate the system. you can also add camera modules to the system to extend security. If anyone tries to enter the house, the camera is activated; the person finds then opens the door.

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