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SMART LOCKER WITH WIRELESS CONTROL USING IOT TECHNOLOGY

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Abstract:

This thesis describes the development of an IOT application based upon Digitizing a smart door lock for making it connected to the internet and able to recognize employees that work in the office. This thesis concentrates primarily on the security aspects by listing the typical security challenges in IOT systems in general and summing these challenges up to develop a functional and secure product from scratch. A microcontroller is chosen for this project and a test environment is built to experiment and develop the security breaches. Architectural designs are chosen for the API being developed and even for the Android Application. A detailed description is made of the multi-master database represented by Azure active directory and its importance to achieving the security of an essential security breach. A new technique called Eddy-stone is introduced in the project to serve the transmission protocol with Bluetooth beacons. The final stage of this project is completing the development of the Android application and making sure that all the subsystems developed do communicate with each other, to deliver a functional and secure flow of the IOT system.

Keywords-

Power Unit, LCD, ESP-01,Buzzer ,Arduino UNO ,Motor

I. Introduction:

A Smart lock is an electromechanical lock which is designed to perform locking and unlocking operations on a door when it receives such instructions from an authorized device using a wireless protocol and a cryptography key to execute the authorization process. It also monitors access and sends alerts for the different events it monitors and some other critical events related to the status of the device. Smart locks can be considered part of a Smart lock

Most smart locks are installed on mechanical locks (simple types of locks, including deadbolts) and they physically upgrade the ordinary lock. Recently, smart locking controllers have also appeared at the market.

Smart locks, like traditional locks, need two main parts to work: the lock and the key. In the case of these electronic locks,

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the key is not a physical key but smartphone or a special key fob configured explicitly for this purpose which wirelessly performs the authentication needed to automatically unlock the door.

Smart locks allow users to grant access to a third party by means of virtual key. This key can be sent to the recipient smartphone over standard messaging protocols such as e-mail or SMS. Once this key is received the recipient will be able to unlock the smart lock during the time previously specified by the sender.

Smart locks are able to grant or deny access remotely via a mobile app. Certain smart locks include a built-in Wi-Fi connection that allows for monitoring features such as access notifications or cameras to show the person requesting access. Some smart locks work with smart door bells to allow the user to see who and when someone is at a door. Many smart locks now also feature Biometric features, like fingerprint sensors. Biometrics are becoming increasingly popular because they offer more security than passwords alone. This is because they use unique physical characteristics rather than stored information. Industrial smart locks (passive electronic lock) are a branch of the smart lock field. They are an iterative product of mechanical locks like smart locks. However, the application areas of industrial smart locks are not smart homes, but fields that have extremely high requirements for key management, such as communications, power utilities, water utilities, public safety, transportation, data centre, etc.

Industry smart locks mainly have three components: locks and keys, and management systems. Similarly, the key is no longer a physical key, but a special electronic key. When unlocking, the unlocking authority needs to be assigned before. Through the management system, the administrator needs to set the user, unlock date and time period for the key. Whenever the user unlocks or locks the lock, the unlock record will be saved in the key. The unlocking record can be tracked through the management software.

Industry smart lock cylinder (passive electronic cylinder lock)

At the same time, industry smart locks can also remotely assign permissions through mobile app.

Due to the inherent complexity of digital and wireless technologies, it can be difficult for the end user to confirm or refute the security claims of various product offerings on the market.

The devices may also gather personal information; representations by the vendors involved concerning the care and handling of this information is also difficult to verify by the end user.

LITERATURE REVIEW:

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Sr.no	Name of the paper	Year of the publish	Methodology used	Result	Limitation
1.	Authenticated secure bio metric based access to the bank safety lockers	2014	1)dual key safety lockers 2) bio-metrics	This system provides the dual key of an special characters and a biometric is only for staff id.	It can be easily hacked by any unauthorized user.
2.	Development of an Intelligent System for Bank Security	2014	1)Motion detection 2)messaging through GSM module	Unauthorized image detection signal send to microcontroller and warring message will be generated	Uses of microcontroller not gives that much of reliable system
3.	Web-Based Online Embedded Door Access Control and Home Security System Based on Face Recognition	2015	1)Face recognition 2) GSM 3)zig-bee	In this system monitoring and Controlling of equipment is based on web.	Face detection takes more complex algorithm
4.	Improving Home Automation Security; Integrating Device Fingerprinting into Smart Home	2016	1) Device fingerprint using JavaScript Login Credentials 3)OTP generated by sever	To improve the Home Security it verifies the user and also device	Malicious user tried to gain the access of locker more than one time
5.	An Efficient Multistage Security System for User Authentication	2016	1)RFID system 2)Password 3)Biometric consecutively	By using matrix keypad, GSM technology , RFID tag the security system is successfully implemented	The password can be hacked by the unauthorized user
6.	An Advanced Internet of Thing based Security Alert System For Smart Home	2017	1)PIR Sensor 2)email alert	Motion is detection by PIR sensor then that will sends to owners email which gives the warning of theft.	The Security alert warring is only given by the email

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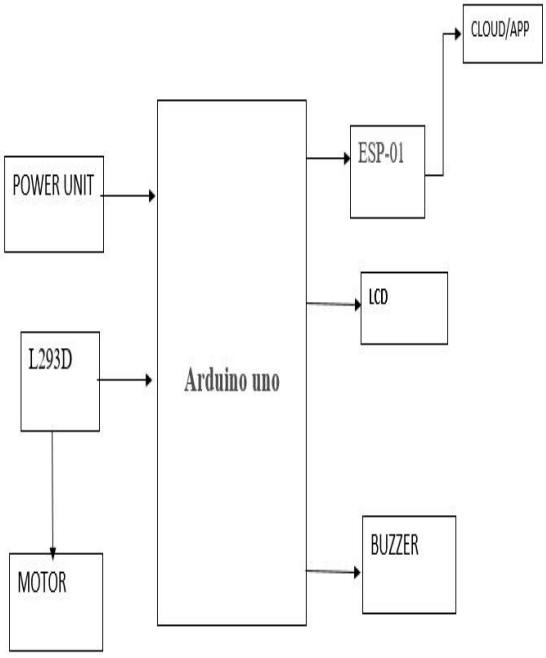
7.	IOT based smart locker system	2018	2)Fingerprint	Three phase conformation of procedure for smart locker, by providing User Name and Password, using fingerprints and OTP .	The password can be hacked by the unauthorized user

II. PROPOSED SYSTEM

i. Block diagram



Block Diagram of Smart locker with wireless control using IOT Technology

A. POWER SUPPLY UNIT

The power supply is mandatory to run the electronic component. We get 230V A.C from the supply, for the working of all electronic components we need a D.C supply. So we have to convert 230V A.C into D.C supply.

Block diagram power supply unit

230V A.C supply is given basically to a step down transformer.it converts 230V A.C into 12V ac supply. Here the 12v ac is given to bridge rectifier it converts 12v A.C into pulsating D.C the pulsating D.C is converted into pure D.C in the filter section. In the filter section we are using the capacitor, it will remove the ripples. for the constant maintenance of voltage we use 7805 voltage regulator.7805 voltage regulator will produce constant voltage of 5v.if we want 9v dc voltage we can use 7809 instead of 7805 at the end of power supply unit we are using led .we know that the fed will operates at 3.3v and we are getting 5v from 7805 voltage regulator, so we are using a resistor in between voltage regulator and led. The resistor is of 1k ohm. The resistor will oppose the flow of current and we will get 3.3V output from resistor and it is given as an input

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to led. Here we are using led only for the indication of power.

B. ARDUINO UNO:

Arduino is a microcontroller based on ATmega328, it consists of serial crystal oscillator, voltage regulator, capacitors, etc…..It is having 28 pins.in that 14 digital pins (D0-D13) in that 6 pins will provide PWM output , 6 Analog pins(A0-A5) is used to provide Analog input in the range of 0-5v, 3 grounds, reset pin is used to reset the controller, ARET, IO references are used for input/ output ,power barrel jack, serial pin is used these draw backs we are using Arduino in our proposed device. The advantages of Arduino are low cost, independent of external programmer, no external power supply need and lots of shields available.

- Arduino board was developed by graduating students in Italy, 2003.
- Arduino user's 8 bit AVR microcontroller development boards are released.
- It works on 5V.
- Digital pins are used as the input and output pins.
- RX and TX pins are used as transmitting and receiving pins.
- The reset pin is used to reset the Arduino Uno.
- Ground pin is connected to the ground to avoid power fluctuations.

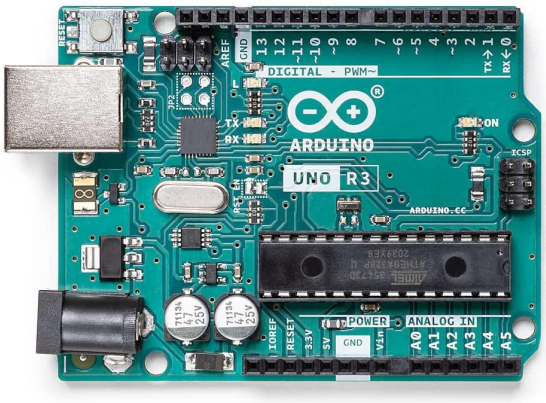

Fig: Arduino Board

- It has 32 Kb of flash memory.
- The size of RAM is to 2 Kb.
- It supports serial communication using RX and TX pins. It is used for interfacing of Wi-Fi, ZIGBEE and any module.
- Arduino is a open source platform (IDE) makes it easy to wright code & download to the board programmer need not worry about the HEX file, Arduino IDE is user friendly.
- It can be run on windows, mac OS and Linux.
- Many boards are available in Arduino boards such as Arduino Uno, Arduino Mega, Arduino Nano etc.,
- The library files are available in Arduino IDE which makes the work of a programmer easy.
- It is compatible with sensors available, such as humidity sensor, temperature sensor, gas sensor etc.,

C. Liquid crystal display unit (LCD):

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The main principle behind liquid crystal molecules is that when an electric current is applied to them, they tend to untwist. This causes a change in the light angle passing through them. This causes a change in the angle of the top polarizing filter with respect to it.

Fig : LCD

D. WI-FI Module

The ESP-01 ESP8266 Serial WIFI Wireless Transceiver Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much Wi-Fi-ability as a Wi-Fi Shield offers (and that's just out of the box)! The ESP8266 module is an extremely cost-effective board with a huge, and ever growing, community.

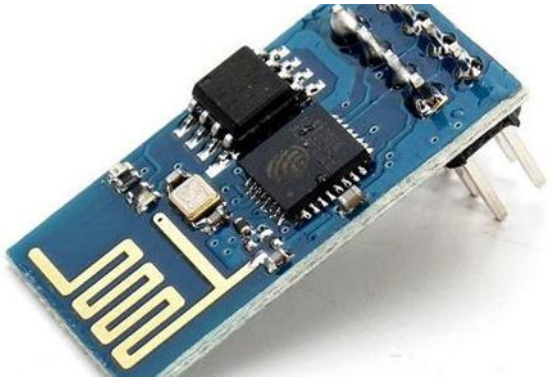

Fig: WI-FI Module

This module has a powerful enough on board processing and storage capability that allows it to be integrated with the sensors and other application specific devices through its GPIOs with minimal development up-front and minimal loading during runtime. Its high degree of on-chip integration allows for minimal external circuitry, including the front-end module, is designed to occupy minimal PCB area. The ESP8266 supports APSD for VoIP applications and Bluetooth co-existing interfaces, it contains a self-calibrated RF allowing it to work under all operating conditions and requires no external RF parts.

There is an almost limitless fountain of information available for the ESP8266, all of which has been provided by amazing community support. In the Documents section below you will find many resources to aid you in using the ESP8266, even instructions on how to transforming this module into an IOT (Internet of Things) solution!

E. BUZZER

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A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

F. MOTOR(L293D MOTOR):

The l293d motor driver IC is used to control the rotation direction and speed of two DC motors. The L293d is a dual-channel H-Bridge motor driver IC. This module uses two techniques for the control speed and rotation direction of the DC motors. These are PWM – For controlling the speed and H-Bridge – For controlling rotation direction. These modules can control two DC motor or one stepper motor at the same

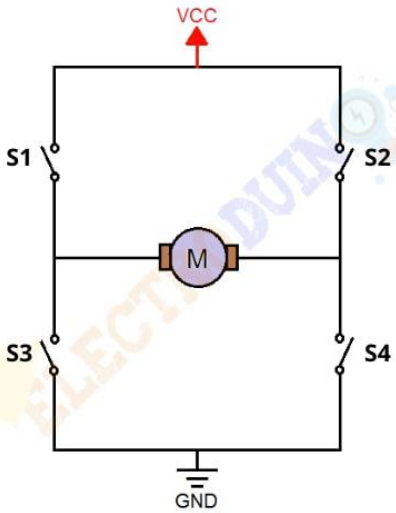
time.

This IC uses two techniques for the control speed and rotation direction of the DC motors. These are H-Bridge – For controlling rotation direction and PWM – For controlling the speed.

DC MOTOR

H-BRIDGE TECHNIQUES

L293D motor driver IC uses the H-Bridge technique to control the direction of rotation of a DC motor. In this technique, H-Bridge controlled DC motor rotating direction by changing the polarity of its input voltage.



L293D Motor Driver IC Working of H-Bridge Case 1

Case 2: When the switch S1 and S4 are closed, then the motor left terminal is

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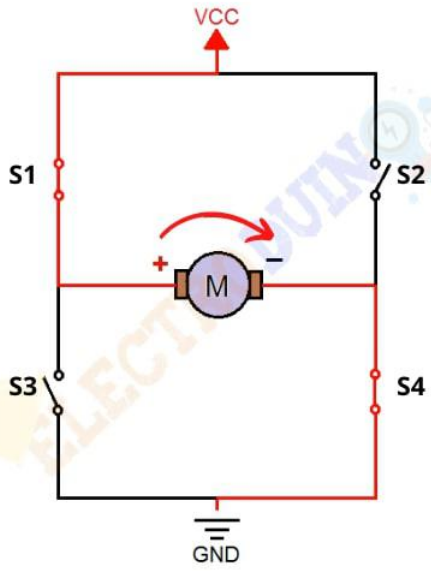
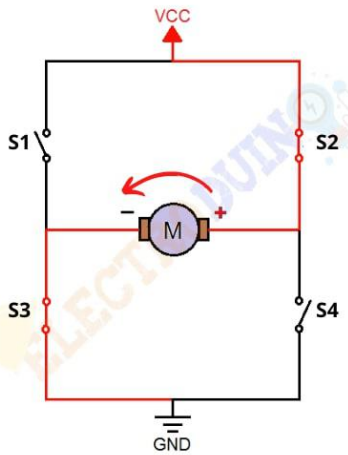
getting a positive (+) voltage and the motor right terminal is getting a negative(-) voltage. So, in this condition motor start rotating in a particular direction (clockwise).



L293D Motor Driver IC Working of H-Bridge Case 2

Case 3: When S2 and S3 switches are closed, then the right motor terminal is getting a positive (+) voltage and the left motor terminal is getting a negative (-) voltage. So, in this condition motor start rotating in a particular direction (anticlockwise).



L293DMotor Driver IC Working of H-Bridge Case 3

ii. OPERATION OF THE SYSTEM

Power Supply: Our project uses 5V,300mA Variable power Supply .It uses stepdown Transformer which has input of 230V,50Hz in primary side that converts into 12V output at secondary side. Then the bridge rectifier circuit which takes input in AC from and Convert it into equivalent DC. That output is passes to filter circuit which gives pure DC. After that regulator LM7805 is used. It helps to regulate the DC and gives the 5V supply at output.

The controller is used in our project is ATmega32 which operates in 5V supply which is generated by power supply. Keypad is connected to port B that is PB0-PB7. It is 16 key configuration which has 4 rows and 4 columns. Rows are made open and columns are connected to VCC i.es to registers of 10k each. The configuration can work when all columns are made high on permanent basis and rows are changes as per requirement. If any key is pressed the potential of row key changes and that particular character will be displayed at LCD. That data will be the user Id and Password, this will be verified by controller by comparing with stored data which is already in memory.

If that will be verified then controller activates the WI-FI module connected at

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port PB0. This will be acts as input to the controller. The data required for verification is stored in memory. At that stage the users password is matched with stored one at authentication process is carried out. After verification of password the will generated sends to

user"s passwrd via WI-FI module i.es SIM 800 which is controlled by AT commands and operates in 3.4~4.4V. As OTP is entered, the controller signals the motor driver L293D which is used to drive DC motor. As all verification process is successful then door will be accessed.

iii. APPLICATIONS:

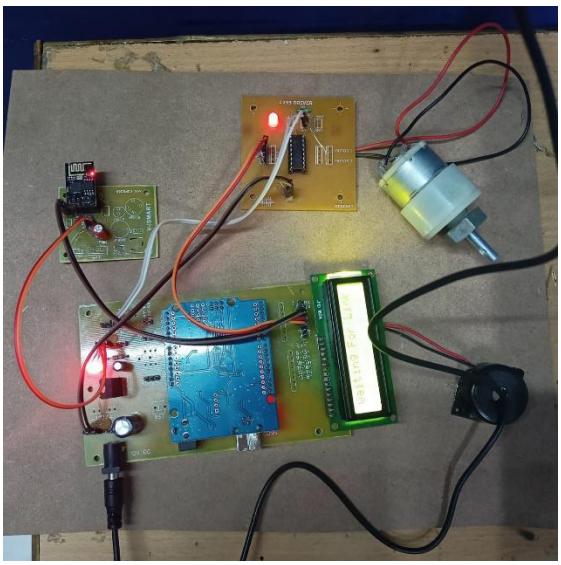
1.Bank security system.

2.Home security system.

3.It is use for protection and safety.

4.Industrial security system.

III. EXPERIMENTAL RESULT:



When we enter the password the door will be open .After few seconds the door will be closed automatically.

IV. CONCLUSION:

This paper solution is for highly secured reliable smart locker system. The use of smart lockers in retail environments, including grocery retail, offers significant advantages for both consumers and retailers. Customers appreciate smart lockers because the entire process is convenient and accessible from end-to-end; they can quite literally click and collect.

FUTURE SCOPE

With the advent of emerging digital technology, the global banking sector has gone through a rapid transformation with higher speed, advanced skillset, enhanced productivity, and improved customer experience. To meet the

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evolving needs of today's tech-savvy consumers and for a pleasurable and convenient banking experience, banks have ascended with more advanced products and services, Smart Lockers being one of them.As, automation is the current wave in global banking operations, envisioning to reduce repetitive tasks, increase employee productivity and retain focus on high-value operations. Matching pace with the evolving customer preferences has become important for banks to maintain a balance between traditional banking services and digitization. It is drastically

important for them to continually evolve and streamline their processes to enhance customer experiences and increasing customer retention and loyalties.

REFERENCES:

[1] Arun Cyril Jose, Reza Malekian, Member, *IEEE,* Ning Ye "Improving Home Automation Security; Integrating Device Fingerprinting into Smart Home"DOI 10.1109/ACCESS.2016.2606478,IEEE Access.

[2] Neeraj Khera, Amit Verma "Development of an Intelligent System for Bank Securiety"2014 5th International Conference-Confluence The Next Generation Information Technology Summit(Confluence).

[3] Ashutosh Gupta, Prerna Medhi, Sujata Pandey, Pradeep Kumar, Saket Kumar, H.P.Singh "An Efficient Multistage Security System for User Authentication" International Conference on Electrical, Electronics and Optimization Techniques (ICEEOT)-2016.

[4] S.Tanwar, P.Patel, K.Patel, S.Tyagi, N.Kumar, M.S.Obaidat "An Advanced Internet of Thing Based Security Alert System for Smart Home"fellow of IEEE and Fellow of SCS.

[5] Mrutyunjaya Sahani, Chiranjiv Nanda, Abhijeet Kumar Sahu and Biswajeet Pattnaik "Web-Based Online HEmbedded Door Access Control and Home Security System Based on Face Recognition" 2015 International Conference on Circuit, Power and Computing Technologies [ICCPCIT].

[6] Srivatsan Sridharan "Authenticated Secure Bio-metric Based Access to the Bank Safety Lockers"ICICES2014-S.A.Engineering college, Chennai, Tamil Nadu, India, ISBN No.978-1-4799-3834-6/14.

[7] K.Balasubramanian, A.Cellatoglu "Analysis of Remote Control Techniques Employed in Home Automation and Security System".

[8] Salil Prabhakar, Sharath Pankanti, Anil K. Jain "Biometric Recognition: Security and Privacy Concerns"

[9] S.V.Tejesvi, P.Sravani, M.L.Mythili, K.Jayanthi,

ISSN: 2057-5688

P.Nagesh Kumar, K.Balavani "Intellectual Bank Locker Security System "Int. Journal of Engineering Research and Application ISSN:2248-9622, vol.6, Issue 2(Part-2) February 2016,pp.31-34.

[10] Safa.H, Sakthi Priyanka.N, Vikkashini Gokul Priya.S, Vishnupriya.S, Boobalan.T "IOT based Theft Premption and Security System"DOI;10.15680/IJIRSET. 2016.0503229.