



OTP Based Locking System using IOT

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ABSTRACT

OTP based mostly Advance lock up System is Associate in Nursing IOT resolution to create lockup system employed in vehicles abundant safer than typical lockup System with regular keys. The vehicle felony rate in Asian nation is 1,65,690 (In the year 2013). this technique is constructed by microcontroller mistreatment IOT technology. Any typical lock is updated with this technique. Consider lockup and unlocking of automotive, whereas unlocking user can press button to unlock the automotive. An only once countersign (OTP) are going to be sent to the registered mobile range of the vehicle owner. Then kind the countersign mistreatment keyboard in vehicle, if the countersign is correct the vehicle are going to be unfastened. The same system is wont to unlock home doors, bank lockers, public lockers, gates etc.

Key words: Arduino/Genuino Uno, GSM Module, Liquid Crystal Display, Keypad.

1. INTRODUCTION

An Advance digital lockup system is intended to make a microcontroller based mostly Digital Code Lock that serves the aim of security. want of safety may be achieved by creating locks which might be electrical or mechanical with one or some keys, except for lockup a giant space several locks area unit needed. As everybody is aware of quaint locks area unit significant weight and fragile additionally counting on the tools thus electronic locks area unit given additional price than those of mechanical locks. These lockup systems area unit wont to management the movement of door and area unit useful while not requiring a key to lock or unlock the door. These lockup systems area unit controlled by a keyboard. The microcontroller based mostly Digital Code Lock is associate degree access system that permits solely approved persons to access are stricted space. Security may be a prime concern in our day-today life. everybody needs to be the maximum amount secure as potential. associate degree access management for doors forms a significant link in an exceedingly security chain. The system contains of a electrical

switch keyboard connected to the Arduino microcontroller. The lock can open if and as long as the entered countersign matches the countersign sent to mobile. Thus, what we wish is digital technology to construct associate degree integrated and well custom-built safety system at a worth that is cheap.

2. METHODOLOGY

The authentication technique used here could be a four-digit numeric code generated in Arduino microcontroller and sent to the registered mobile range through GSM module and conjointly keep in Arduino microcontroller's RAM, that is then entered through the computer keyboard. The code entered this manner is then compared to the countersign keep in memory. The Arduino microcontroller endlessly monitors the computer keyboard for a match with the keep counter sign. As and once there's a match the output line is enabled which may then be wont to run motor. Associate in Nursing liquid crystal {display| LCD | digital show | alphanumeric display} display is additionally wont to display whether or not the entered countersign is correct or not. The whole system is consisting of three elements. Primary half is receiving unlock command exploitation switch. Secondary half is generating a random OTP and causation it to the registered mobile range. Last half is storing the OTP and comparison the OTP and comparison the OTP entered by the user, If the OTP is correct then the door opens, If OTP is wrong then the liquid crystal {display| LCD | digital display| alphanumeric display} display the OTP entered is wrong and therefore the authentication gets unsuccessful and therefore the door can't be opened. When you submit your final version, after your paper has been accepted, prepare it in two-column format, including figures and in the Table1.

Table 1: Design specification of system

No.	Component required	Quantity
1	Arduino UNO	1
2	I2C LCD Display	1
3	GSM Module	1

4	4x4 Keypad	1
5	Solenoid Lock	1
6	Power supply 5v	1
7	Connecting Wires	Any amount

3. PROPOSED SYSTEM



Figure 1: Key Tampering

Figure 1 depicts this drawback of key change of state, which can easily tired jiffy, thus creating the system susceptible to thief attacks. This projected paradigm shown in Figure 2 creates secured means of protection victimization digital platform wherever digital input device and otp is employed to unlock therefore there's no would like of mechanical keyholes which may be simply cracked.



Figure 2: Digital Lock

4. BLOCK DIAGRAM AND ITSCOMPONENTS

The model was designed victimization Arduino microcontroller, I2C liquid crystal display show, GSM module, 4X4 Keypad, magnet lock, Power provide 5V, connectingwires:Figure3 shows the diagram of the proposed system. It's one of the only combos of microcontroller and elements.

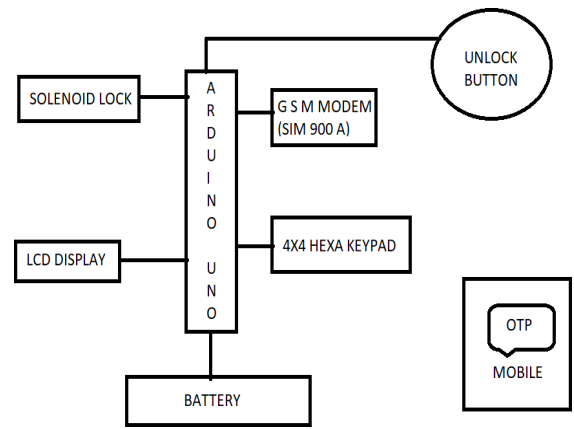


Figure 3: Block Diagram of Complete System

4.1 Arduino / GenuinoUno:

The Arduino Uno is an ASCII computer file microcontroller board supported the semiconductor unit ATmega328P microcontroller and developed by Arduino.cc. The board is supplied with sets of Digital and Analog input/ output (I/O) pins which can be interfaced to various growth boards (shields) and completely different circuits. The board has fourteen digital I/O pins (six capable of PWM output), vi Analog I/ O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a kind B USB cable. it'll be powered by the USB cable or by AN external 9-volt battery, though it accepts voltages between seven and twenty volts as shown in the . It's quite just like the Arduino Nano and old master. The hardware reference vogue is distributed beneath an artless Commons Attribution Share-Alike 2.5 license and is obtainable on the Arduino internet site. Layout and production files for many versions of the hardware are also on the market. Serial communication interface might be a feature throughout this board, at the side of USB that is ready to be used to load the programs from portable computer.



Figure 4: Arduino Uno

4.2 GSMModule:

The GSM module we tend to use is SIM 800/900 MODULE as shown in the Figure 5. During this electronic equipment, Bluetooth is interfaced by default. Basically, there square measure 3 forms of GSM module square measure there. They are

- DataLoggers
- DataPushers
- DataPullers

SIM900A electronic equipment will work with any GSM network operator SIM card similar to a portable with its own distinctive telephone number.

HYPERLINK"<https://en.wikipedia.org/wiki/GSM>"GSM
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 HYPERLINK"https://en.wikipedia.org/wiki/General_Packet_Radio_Service"

Modem is plug and play electronic equipment with RS232 serial communication supported. Thus Advantage of mistreatmentthiselectronicequipmentarethatitsRS232 port will be accustomed communicate and develop embedded applications.



Figure 5: SIM 900A GSM Modem

4.3 LCD (liquid crystal display):

16 x 2 digital display is interfaced with Arduino microcontroller as shown in the Figure 6. It wont to show

standing of sensors and battery voltage. It is combination of 2 states of matter, the solid and also the liquid. digital display uses a liquid to provide a noticeable image. Liquid displays area unit super-thin technology video display that area unit typically utilized in laptop personal computer screen, TVs, cell phones and moveable video games. LCD's technologies permit displays to be abundant diluent in comparison to electron beam tube (CRT) technology. Liquid show consists of many layers that embody 2 polarized panel filters and electrodes. Display technology is employed for displaying the image in notebook or another electronic device like mini computers. Lightweight is projected from a lens on a layer of liquid. this mix of collared lightweight with the grayscale image of the crystal (formed as electrical phenomenon flows through the crystal) forms the colored image. This image is then displayed on the screen Figure 6: {LCD | liquid crystal show|LCD|digital display|alphanumeric display}display4.4 Key Pad: 4x4 Matrix Membrane input device (#27899). This 16-button input device provides a helpful human interface element for microcontroller comes. Convenient adhesive backing provides an easy thanks to mount the input device in an exceedingly style of applications.

Figure 6: LCD display



4.4 KeyPad:

4x4 Matrix Membrane computer keyboard (#27899).This 16-button computer keyboard provides a helpful human interface part for microcontroller comes. Convenient adhesive backing provides an easy thanks to mount the computer keyboard in a very kind of applications.



4.5 SolenoidLock

Solenoids are an excellent thanks to induce linear motion for pushing, propulsion or dominant switches and levers as shown in the Figure 8. This smaller magnet is meant to figure directly with 5V that make sit an excellent match for embedded comes.

it's a throw of regarding four. 5mm and a pair of M2 mounting holes on the body. The wire lead is regarding 2" long and is terminated with a 2-pin JST hydrogen ion concentration instrumentation.

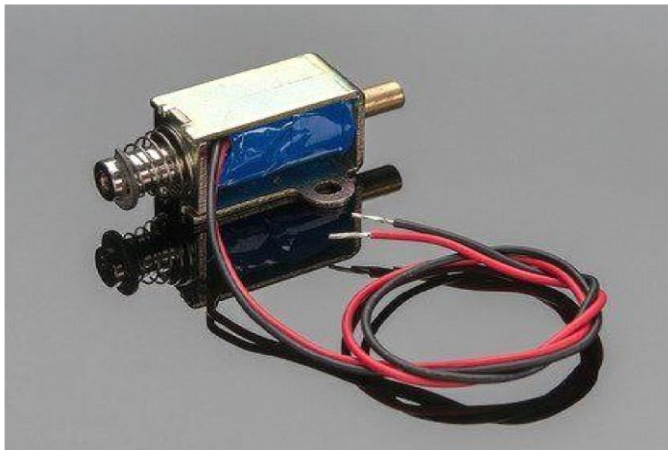


Figure 8: Solenoid Lock

4.6 ArduinoIDE

Arduino is Associate in Nursing ASCII text file physical science platform supported easy-to-use hardware and computer code. Integrated development environments are designed to maximize engineer productivity by providing tightly knit parts with similar user interfaces. day gift one program during which all development is completed. This program generally provides several options for authoring,

modifying, compiling, deploying and debugging computer code. This contrasts with computer code development victimization unrelated tools, such as vi, GCC.

One aim of the IDE is to scale back the configuration necessary to piece along multiple development utilities, instead it provides an equivalent set of capabilities collectively cohesive unit. Reducing setup time will increase developer productivity, particularly incases wherever learning to use the IDE is quicker than manually desegregation and learning all of the individual tools. Tighter integration of all development tasks has the potential to boost overall productivity on the far side simply serving to with setup tasks. For instance, code may be incessantly parsed whereas it's being altered, providing instant feedback once syntax errors are introduced permitting developers to right code abundant quicker Associate in Nursing easier with an IDE.

4.6.1 Interfacing LCD and GSM with Arduino

Arduino Uno consists of fourteen digital input/output pins, of that half-dozen may be used as PWM output, half-dozen analog inputs, 16MHz ceramic resonator, a USB affiliation, an influence jack, AN ICSP header and a button.

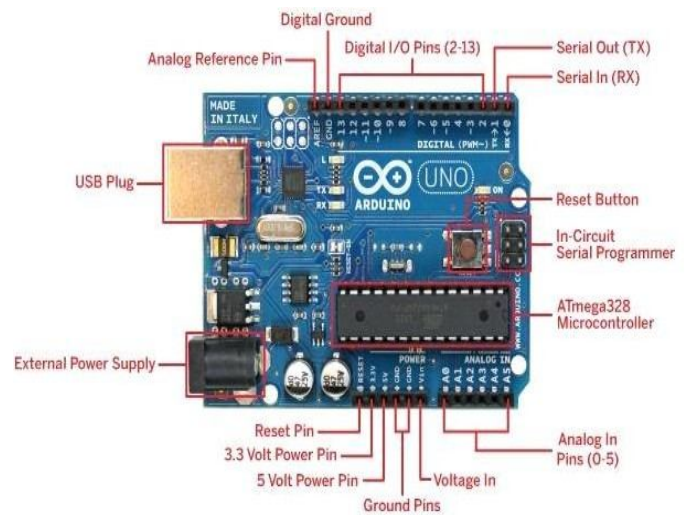


Figure 9: Interfacing LCD and GSM with Arduino

4.6.2 Interfacing LCD with Arduino

The LCDs have a port which means that the microcontroller must manipulate many interface pins right away to regulate the show. It consists of 16 pins referred in the Figure 10. The name and functions of every pin of the 16x2 digital display module is Pin1 (Vss): Ground pin of the digital display module. Pin2 (Vcc): Power to digital display module (+5V provide is given to the present pin) Pin3 (VEE): distinction adjustment pin. this can be done by connecting the ends of a 10K potentiometer to +5V and ground and so connecting the slider pin to the VEE pin. The voltage at the VEE pin defines the distinction. the conventional setting is between zero.4 and 0.9V.

Pin4 (RS): Register choose pin. The JHD162A has 2 registers specifically command register and information register. Logic HIGH at RS pin selects information register and logic LOW at RS pin selects command register. If RS pin is forced HIGH and also the input is given to the info lines (DB0 to DB7), this input are treated as information to show on digital display screen. If the RS pin is LOW and also the input is feed to the info lines, then this may be treated as a command (a command to be written to digital display controller – like positioning indicator or clear screen or scroll) Pin5 (R/W): Read/Write modes. This pin is employed for choosing between browse and write modes. Logic HIGH at this pin activates browse mode and logic LOW at this pin activates write mode. Pin6 (E): This pin is supposed for enabling digital display module. A HIGH to LOW signal at this pin can alter the module. Pin15 (LED+): Anode of the rear light-weight junction rectifier. once operated on 5V, a 560 ohm resistance is connected asynchronous to the present pin. In Arduino primarily based comes the rear light-weight junction rectifier is supercharged from the three.3V supply on the Arduino board. Pin7 (DB0) to Pin14 (DB7): These are information pins. The commands and information are fed to the digital display module these pins. Pin16 (LED-): Cathode of the rear light-weight junction rectifier.

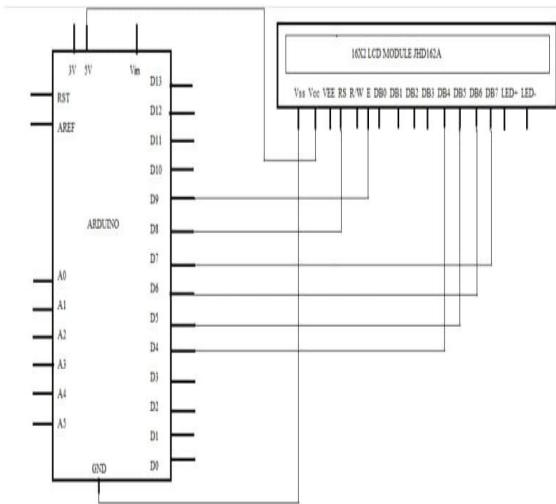


Figure 10: Interfacing LCD with Arduino

4.6.3 Interfacing SIM900A with Arduino

SIM900A gsm module communicates with arduino victimization serial communication SIM900A consists of four pin as shown in the Figure 11. The name and performance of sim900a module area unit Pin1(Vcc): Power to gsm module (+5V of fer is given to the present pin). Pin2(RX): The serially transmitted information from Arduino (TX) given to the present pin(RX). Pin3(TX): This pin transmits serial

information to arduino thus TX of sim900a connected to RX of arduino. Pin4(GND): Ground pin of the gsm module.

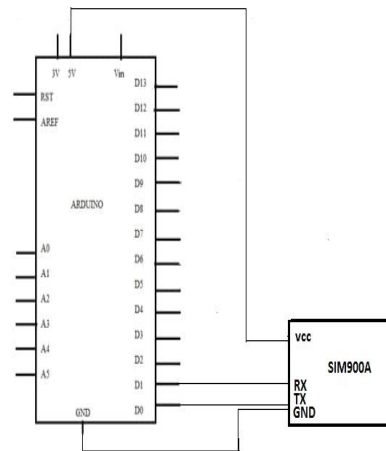


Figure 11: Interfacing SIM900A with Arduino

Expected Outcome

- Will be able to build varied platforms sturdy with OTP primarily based technology.
- Can improve the protection of a protection system with fail safe.
- Can even be used as a protection system for a automotive, bike and varied vehicles.
- Making security system keyless or the other chips than RFID.
- Comparing to different systems which might be cracked like RFID, Bio-metric, Pin lock, Mechanical Lock, The OTP primarily based protection system can't be cracked since the OTP is directly sent to user mobile and also the parole is haphazardly generated.

5. CONCLUSION

- Internet of Things is one in every of the hugest revolutions within the technological field.
- In this project, OTP primarily based protection system for vehicles is predicated on Sim card, GSM, input device etc that integrates security with automation.
- Since our projected system is constructed over not possible to unlock while not owner's authentication and it's low cost, versatile and simple to handle.
- We can even decision this as Anti-Theft Device.

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