Smart Voice controlled door lock

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ABSTRACT

The safety in the house is very important. This project presents a prototype smart door lock which can be used to enhance security of a door. Here we are utilizing Bluetooth technology to scan Bluetooth Devices at the door knob for automatic door lock purposes. It searches for the user and senses approach and automatically unlocks the door, without having reach for the phone. The microcontroller will read the signal and verify the signal whether it is the right person or not to open the door. Also there is an android application which can be used to control various appliances inside the house as well as door lock.

Using a smart door lock system has many of its own advantages :

It's secure. simple and easy to access it’s pick-proof Entire lock and electronics housing is well constructed, We can use multiple smart locks.

Tools used –

1. Arduino board
2. A 9v Battery.
3. resistors (3.3k ohm, 1k ohm)
4. LCD display
5. 2' x 3' General purpose PCB
6. Jumper wires
7. HC-05 Bluetooth module
8. Tower pro Sg-90 9g Servo motor
9. Circular rod (metal or alloy for best result)
10. Metal wire
11. Double sided tape / Glue gun
12. Male and female header pins
13. Breadboard (For testing purpose)
14. Metal sheet (or just any box for main body)

INTRODUCTION

Security describes protection of life and property. The safety in the house is very important. Besides the traditional method door that used a key can be easily open by not authorized person or burglar if they have the right key. This will allows them to steal the entire valuable thing in the house. Nowadays the telecommunication technologies become wider and more new features exist to make human life better This project will use an bluetooth feature in mobile phone to automatically open the door so that bluetooth technology syncs your phone directly with the lock . It will automatic open if authorized person is detected. The door will open for a certain delay and the door automatically closes within this time.

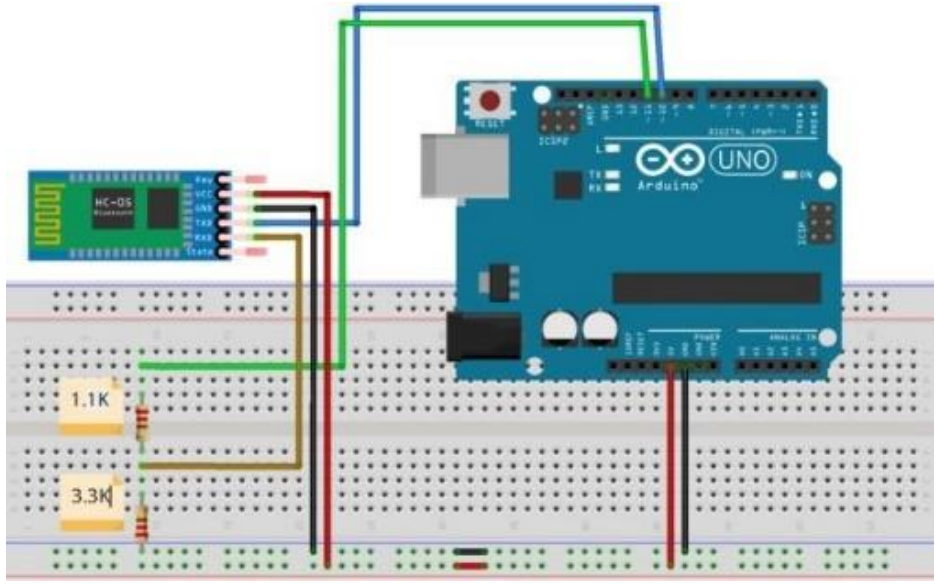
- A **voice command device** (VCD) is a device controlled by means of the human voice. By removing the need to use buttons, dials and switches, consumers can easily operate appliances with their hands full or while doing other tasks. Some of the first examples of VCDs can be found in home appliances with washing machines that allow consumers to operate washing controls through vocal commands and mobile phones with voice-activated dialing.
- Newer VCDs are speaker-independent, so they can respond to multiple voices, regardless of accent or dialectal influences. They are also capable of responding to several commands at once, separating vocal messages, and providing appropriate feedback, accurately imitating a natural conversation. They can understand around 50 different commands and retain up to 2 minutes of vocal messages.[VCDs can be found in computer operating systems, commercial software for computers, mobile phones, cars, call centers, and internet search engines such as google.

SYSTEM DESIGN

- BLOCK DIAGRAM –

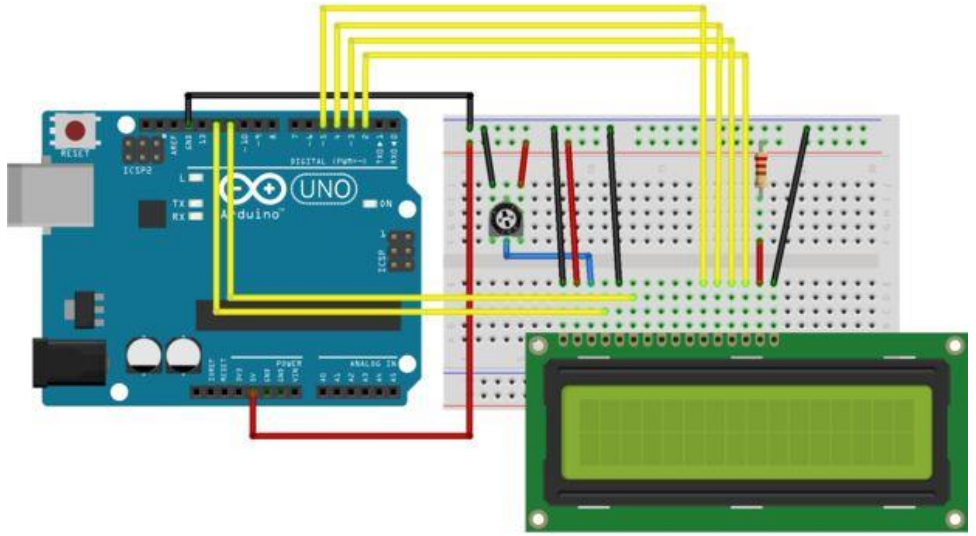
1. Connecting HC-05

- Connect HC-05 as show in fig.
- Vcc to 5v, GND to GND.
- Tx to arduino Rx (because when we send some info from our smart to Bluetooth module it will receive the data and transmitted to arduino so we can say that arduino is receiving the transmitted data).
- we cant connect Rx directly to arduino board because both Rx and Tx pins of HC-05 module works on 3.3V and arduino output can go up to 5V. So this may harm our module that is why we have used a voltage divider and yea.... Tx pin doesn't required a voltage divider because it is an output pin not a Input. if u aren't getting.



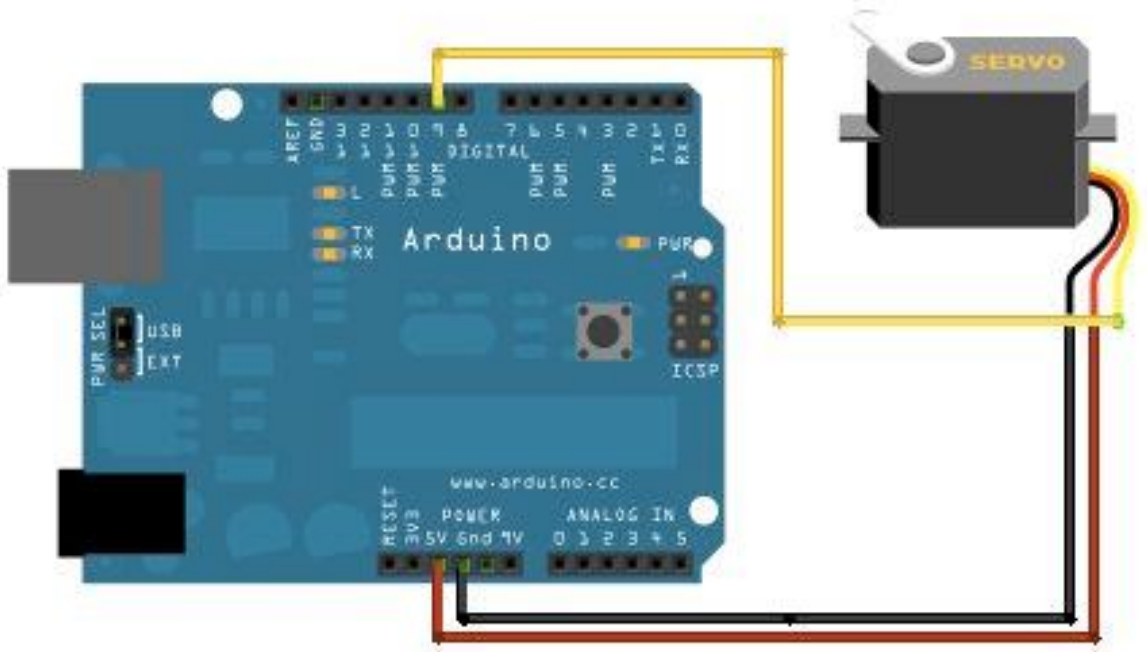
2. Connecting LCD Display –

- Here in this project we have used a 16x2 alphanumeric LCD display. Connect LCD display as shown in fig.
- pin D0-D7 aka data pins which is used as transmitting or receiving data from microcontroller here we didn't use D0-D3 because LCD module can work on 2 modes 4 bit mode and 8 bit mode. In 4 bit mode only D4-D7 pins are used (pros less wire required, cons printing speed is slow). And in 8 bit mode which uses all pins D0 to D7.
- Vss and Vdd are gnd pin and +5V respectively pin A and K are used for backlight
- V0 is used to adjust contrast on display
- E is for Enable.
- RW is read and write pin here we used LCD module in write mode that is why RW is grounded
- RS is Register select pin LCD display has 2 mode instruction mode and character mode.



3. Servo Motor –

- Tower pro Sg-90 has 3 pinout (Vcc, ground and signal).connection as shown the signal pin must be connect to PWM pin



Hardwares And Sensors

- Arduino UNO - **Arduino** is an open source computer hardware and software company, project, and user community that designs and manufactures single board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world.

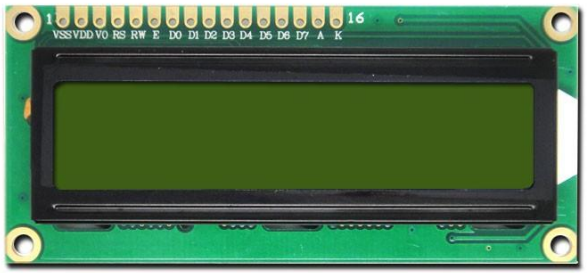
Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (*shields*) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers. The microcontrollers are typically programmed using a dialect of features from the programming languages C and C++. In addition to using traditional compiler toolchains, the Arduino project provides an integrated development environment(IDE) based on the Processing language project.

- HC-05 Bluetooth Module - **HC-05 module** is an easy to use **Bluetooth SPP (Serial Port Protocol) module**,designed for transparent wireless serial connection setup. The HC-05 Bluetooth Module can be used in a Master or Slave configuration, making it a great solution for wireless communication. This serial port bluetooth module is fully qualified **Bluetooth V2.0+EDR (Enhanced Data Rate)** 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses **CSR Bluecore 04**-External single chip bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature).
- The Bluetooth module HC-05 is a MASTER/SLAVE module. By default the factory setting is SLAVE. The Role of the module (Master or Slave) can be configured only by AT COMMANDS. The slave modules cannot initiate a connection to another Bluetooth device, but can accept connections. Master module can initiate a connection to other devices.

- SG90 digital servo motor -
  SG90 is the most popular 9g servo in the world, SG90 digital servo is the new version of SG90 analog servo.
  We are the original manufacturer of TowerPro SG90 servo.
  There are many counterfeit servo of TowerPro from China dealers selling on eBay, Amazon and Alibaba websites.
  If the suppliers removed “TowerPro” logo from the photos and the products description, they are selling counterfeits low quality servo.
  Please identify the supplier before you purchased the goods. Only our authorized dealers who provide reliable quality servos and after services.
- **Specifications:**
- Weight: 9g
  Dimension: 23×12.2x29mm
  Stall torque: 1.8kg/cm(4.8v)
  Gear type: POM gear set
  Operating speed: 0.1sec/60degree(4.8v)
  Operating voltage: 4.8v
  Temperature range: 0℃_ 55℃
  Dead band width: 1us
  Power Supply: Through External Adapter
  servo wire length: 25 cm
  Servo Plug: JR (Fits JR and Futaba)

- LCD Display –

- A **liquid-crystal display** (**LCD**) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in colour or monochrome. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and 7-segment displays, as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.



EXPERIMENTAL PROTOTYPE

CONCLUSION

- In this project, smart door lock system based on Bluetooth which integrates the home security with home automation.. Home security system for automatic doors provides advance security of today's standard for home owners. Since our proposed system is built over wireless sensor network, it is a cheap, flexible, and easily installable system without any overhead such as careful planning, cabling, and construction works

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First of all we would like to thank you for giving me this project work.

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