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IoT Based Smart Digital Door Lock System

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ABSTRACT—The Internet of Things (IOT) is a network of objects or 'things' connected with sensors, electronics, software etc which helps us to collect and exchange the data.In this paper we have explained the construction of IOT based smart digital door lock system by using PIR sensor.This system helps us to avoid the trespassing and unauthorized access.It helps us to increase the privacy and control the crime rates by decreasing activities like stealing money, documents etc.This system is economical and low cost which is affordable to the people.[2][3]

KEYWORDS: Smart digital door lock, Internet Of Things, PIR Sensor, unauthorised access,security,low cost

I. INTRODUCTION

Construction of IOT based digital door lock system using ARDUINO Uno.The components required in the project are ARDUINO Uno , PIR sensor , Breadboard , Potentiometer , 1K resistor , 16*2 LCD display , Buzzer and wires. This System is used to reduce the unauthorized access and trespassing. It improves the security which reduces the crime rate.The sensor used in this system is PIR sensors which is most desirable sensor which scans the object at a particular distance to open the door lock and the person inside comes to understand someone is opening the door lock as the buzzer starts working and it is also quite affordable.

The architecture and detailed information about sensors and components used are explained below:
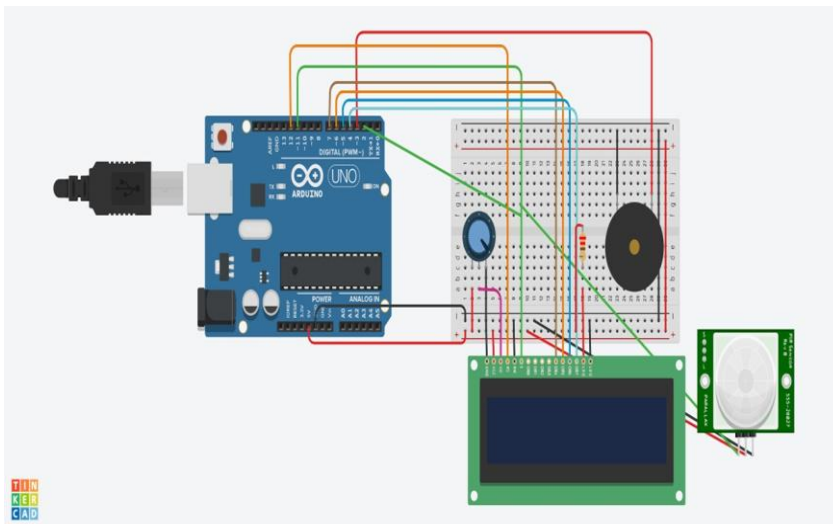
II. SYSTEM DESCRIPTION

Fig 1: Circuit Diagram

In circuit diagram , the components used are ARDUINOUNO ,potentiometer , buzzer ,LCD display ,resistor and PIR sensor.The sensor has 3 pins which are signal pin , GND pin and power pin .Signal pin is connected to the pin 2 of ARDUINO and power pin , GND pin is connected to 5V pin and GND pin of ARDUINO respectively.Buzzer +ve pin

is connected to the pin 3 of ARDUINO and -ve pin to the GND pin of ARDUINO.The pins of LCD display used in connection are GND , 5V , VE , RS , RW ,EN , d4 ,d5, d6, d7 , led +ve and led -ve.RS pin is connected to pin 12 of ARDUINO,EN pin is connected to pin 11 of arduino.d4,d5,d6,d7 pins are connected to pin 7,6,5,4 pins of ARDUINO respectively.potentiometer pins are connected to GND of a ARDUINO and LCD and pin VE of LCD.

III. COMPONENTS

ARDUINO UNO:

ARDUINO Uno is an open source microcontroller board with 14 digital I/O pins and 6 analog I/O pins. ARDUINO Uno is mainly used for communicating with computer , microcontroller board etc
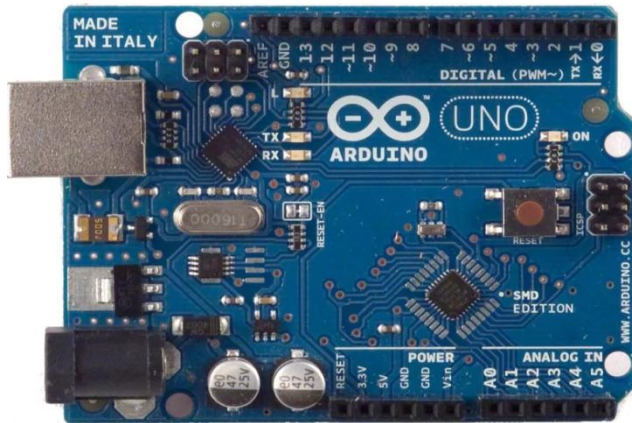

Fig 2 : ARDUINO UNO

PIR Sensor:

A detached infrared sensor (PIR sensor) is an electronic sensor that estimates infrared (IR) light emanating from objects in its field of view. They are frequently utilized in PIR-based movement locators. PIR sensors are usually utilized in security cautions and programmed lighting applications. PIR sensors identify general development, yet don't give data on who or what moved. For that reason, an imaging IR sensor is required. PIR sensors are ordinarily called just "PIR", or at times "PID", for "detached infrared indicator". The term detached alludes to the way that PIR gadgets don't emanate energy for discovery purposes. They work altogether by identifying infrared radiation (brilliant warmth) transmitted by or reflected from object
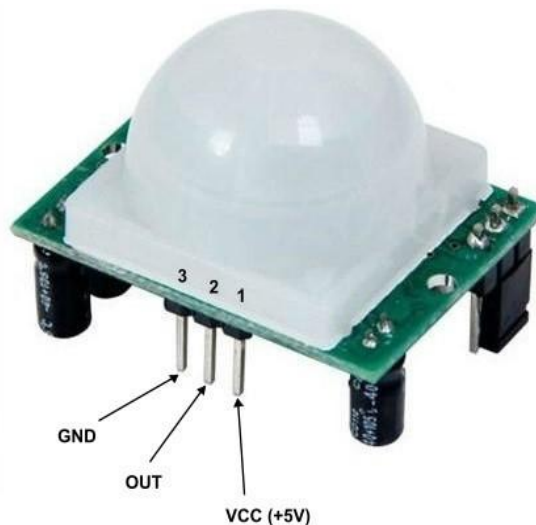

Fig 3 : PIR Sensor

Potentiometer:

A potentiometer is a three-terminal resistor with a sliding or turning contact that shapes a movable voltage divider.[1] If just two terminals are utilized, one end and the wiper, it goes about as a variable resistor or rheostat.The estimating instrument called a potentiometer is basically a voltage divider utilized for estimating electric potential (voltage); the segment is an execution of a similar standardconsequently its name. Potentiometers are ordinarily used to control electrical gadgets, for example, volume controls on sound hardware. Potentiometers worked by an instrument can be utilized as position transducers, for instance, in a joystick. Potentiometers are seldom used to straightforwardly control huge force (in excess of a watt), since the force scattered in the potentiometer would be practically identical to the force in the controlled burden
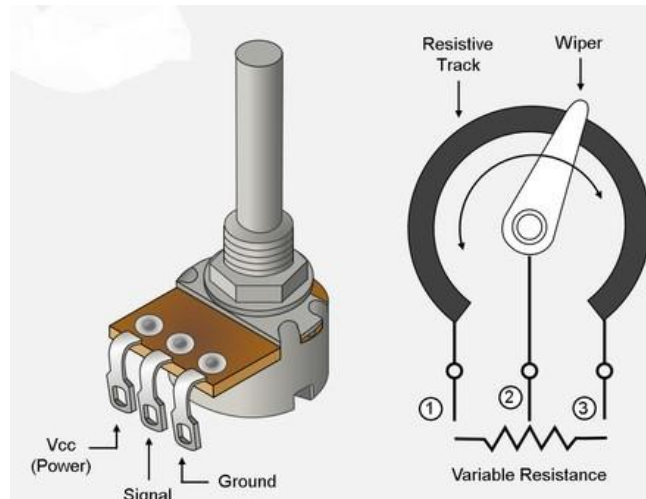

Fig 4 : Potentiometer

LCD Display

The term LCD represents fluid gem show. It is one sort of electronic presentation module utilized in a broad scope of utilizations like different circuits and gadgets like cell phones, adding machines, PCs, TV sets, and so forth these showcases are basically favoured for multi-section light-producing diodes and seven fragments. The fundamental advantages of utilizing this module are economical; essentially programmable, liveliness, and there are no constraints for showing custom characters, extraordinary and even activity, and so forth

The 16×2 LCD pin out is demonstrated as follows.

Pin1 (Ground/Source Pin): This is a GND pin of show, used to interface the GND terminal of the microcontroller unit or force source. Pin2 (VCC/Source Pin): This is the voltage gracefully pin of the presentation, used to associate the flexibly pin of the force source. Pin3 (V0/VEE/Control Pin): This pin manages the distinction of the presentation, used to associate an inconsistent POT that can gracefully 0 to 5V. Pin4 (Register Select/Control Pin): This pin flips among order or information register, used to interface a microcontroller unit pin and gets either 0 or 1(0 = information mode, and 1 = order mode). Pin5 (Read/Write/Control Pin): This pin flips the presentation among the read or composes activity, and it is associated with a microcontroller unit pin to get either 0 or 1 (0 = WriteOperation, and 1 = Read Operation). Pin 6 (Enable/Control Pin): This pin ought to be held high to execute Read/Write cycle, and it is associated with the microcontroller unit and continually held high. Pins 7-14 (Data Pins): These pins are utilized to send information to the presentation. These pins are associated in two-wire modes like 4-wire mode and 8-wire mode. In 4-wire mode, just four pins are associated with the microcontroller unit like 0 to 3, while in 8-wire mode, 8-pins are associated with microcontroller unit like 0 to 7. Pin15 (+ve pin of the LED): This pin is associated with +5V Pin 16 (-ve pin of the LED): This pin is associated with GND

Fig 5 : LCD display

Buzzer:

A buzzer or beeper is a sound flagging device, which might be mechanical, electromechanical, or piezoelectric (piezo for short). Ordinary employments of signals and beepers incorporate caution gadgets, clocks, and affirmation of client info, for example, a mouse snap or keystroke
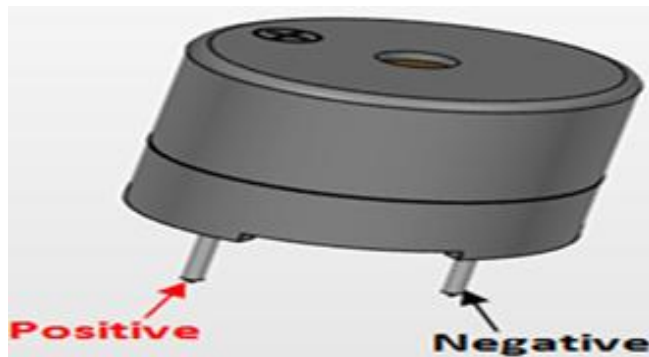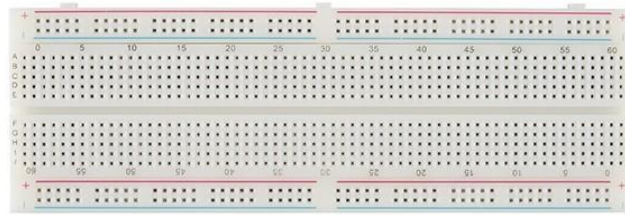

Fig 6 : Buzzer

Breadboard

A breadboard is a rectangular plastic board with a lot of little openings in it. These openings let you effectively embed electronic segments to model (which means to construct and test an early form of) an electronic circuit, similar to this one with a battery, switch, resistor, and a LED (light-discharging diode)

Fig 7 : Breadboard

Resistor:

A resistor decreases (or opposes) the progression of current. The estimation of the opposition is communicated as various ohms (the image Ω is utilized for "ohm"). ... Thus, a 1k Ω resistor has an estimation of 1,000 ohms and the number we will code is 1,000.

Fig 8 : Resistor

IV. WORKING

This system is fully operated using an ARDUINO compiler.All the connections are connected to the laptop.When we start the simulation he LCDdisplay "show your hand to open the door". When an object or person's hand comes in the range of the PIR sensor the buzzer connected to ARDUINO starts ringing when it is close to thesensor the volume of the buzzer increases and it helps to know that someone is trying to open the door , due to the buzzer alarm we get alert.

V.CONCLUSION AND FUTURE SCOPE

In future we can use this type of system and can also be implemented in banks , buildings , industries etc for security purposes and due to its touchless sensors it becomes more secured.We can also use ultrasonic sensor instead of PIR sensor in future according to our need.

We can conclude that we can use this type of system to avoid the trespassing and also can be used to protect houses , banks , industrial areas from intruders and stop such type of activities.

VI. ACKNOWLEDGEMENT

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