

Secret Knock Detecting Door Lock

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Abstract.

In this paper, we have try a different approach from digital door lock by implementing a secret knock sequence, which consist of knocks to open and close the door easily to reduce the manual work for the user. To lock and unlock the door lock by detecting the knocks by piezo sensor to unlock the door, a servo motor rotates when detects the knocks and open and closes the door lock. During the short span of time and also due to pandemic situations our project prototype which achieves a good result. Here, Arduino UNO a microcontroller which controls the framework of door lock and unlock by Knock recognition method to provide security by coding in Arduino IDE by programming in Embedded C language which functions as a Key to open the door lock.

Keywords: Arduino UNO, Servo motor, Piezo Electric Sensor, Knock detection.

1. Introduction

Secret Knock Detecting Door Lock is especially designed to open and close the door lock by knocks. Arduino UNO which plays a vital role to control the mechanism for open and close the Door Lock. When the input given to piezo electric sensor, the mechanism starts by sending the analog signals to Arduino UNO and servo motor which finally starts to work open and close while detecting the sensor used in Door. Piezo Electric Sensor which senses every knocks whenever the required time difference of Arrival reaches the point. Since it provide easier way to open the door by a knock in kitchen hall, emergency areas and also for old age peoples open and close the door by detecting the piezo sensor to reduce the human power that empowering the customer in their day to day lives for instance and for their need, The model is made up of servo motor, piezo electric Sensor, and Arduino UNO.

2. Literature Survey

“Automatic Password Based Door Lock System” was proposed by Shilpi Banerjee. This proposed system works on fixed password concept for the user while installation process. If customer forgets the password, there will be a certain privileges to change or reset the password. It has more security to lock/unlock the system.

“Password Based Security Lock Proposed Methodology system” was proposed by Arpita Mishra, Siddharth Sharma, SachinDubey, and S. K. Dubey. This proposed system works using keypad to enter a password to the system. If the user entered password correctly then door will open and close by servo motor to handle the door lock. Also this includes extra features like adding new users and changing old password etc.

“Door – Automation System Using Bluetooth” was proposed by LiaKamelia, AlfinNoorhassan S.R, MadaSanjaya and W.S., Edi Mulyana. This proposed system works on Android platform. In this implementation cost is less for common customer. The use of wireless Bluetooth connection in this system installation is more easy way.

3. System Architecture

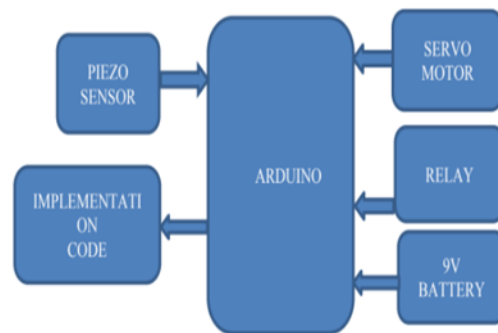


Fig.1. System Architecture

In this Architecture diagram, the Power supply is connected to all components and relay which is connected with Arduino UNO and piezo sensor which systematically connected with system to implement the code with the ArduinoIDE and detects the sensor when the system authorizes the knock the door opens and again detects door locks. If the input of knock is wrong then the servo motor will not run and the result will be idle in the serial monitor.

4. Hardware Description

4.1. Arduino UNO

A microcontroller is a little PC with a processor center, memory, and programmable info/ yield peripherals on a solitary coordinated circuit. The important part for us is that a microcontroller has a



Fig.2. Arduino UNO

processor (which all computers have) and memory, as well as some controllable input/output pins.

This kit includes a Microcontroller as well as all of the required extras to make building and debugging your projects a breeze. The ATmega328P is utilized in the Uno shown in fig.2 which is a microcontroller board. There are 14 progressed data/yield pins (six of which can be used as PWM yields), six straightforward information sources, a 16 MHz quartz valuable stone, a USB cable A2B interface, a force jack, an ICSP header, and a reset button on the board. This incorporates all you'll require to begin with the microcontroller, including a USB link to associate it to a gadget and an AC-to-DC connector or battery to control it.

4.2. Piezo Electric Sensor

Piezo electric sensors works on the principle of piezoelectric effect. The mechanical force which applied on piezoelectric material which has high sensitivity that uses to measure electric potential. This sensors mostly used in flex motions, touch, vibrations, and shock measurement which has high frequency, transient response to get output. The piezoelectric material which has high stability, available in various shapes and sizes. The output gain which is insensitive to temperature and humidity.



Fig.3. Piezo Electric Sensor

4.3. Servo Motor

A servo motor is a electric motor which controlled with the help of servo mechanism. It is a rotatory or linear actuator which coupled with sensor for position, velocity, and acceleration. In servos any code, hardware or libraries can be used to control the rotation of the motor. If there is

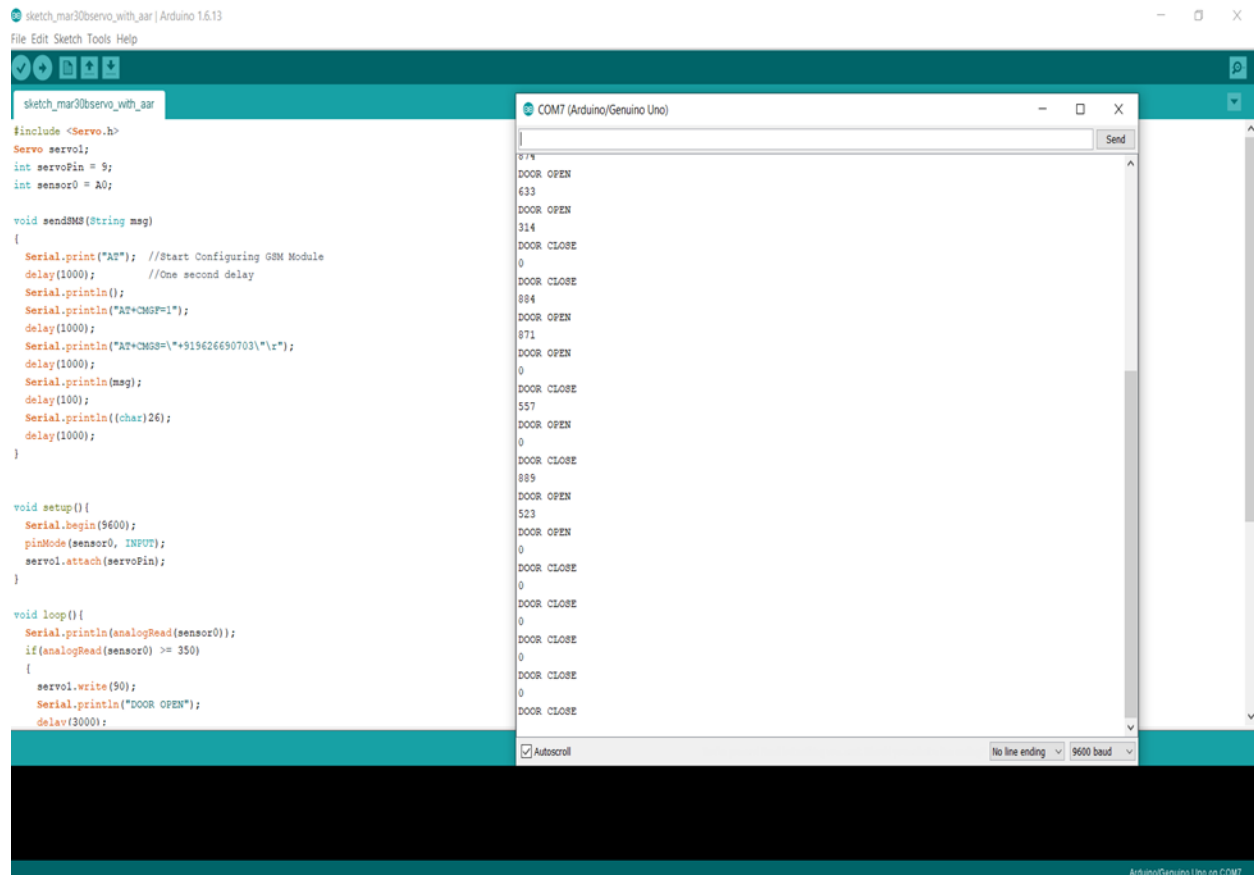
some difference from the expected output, then there will be a error signal and the motor stops and doesn't show any changes in the position.



Fig.4. Servo Motor

5. Proposed System

The Proposed system reduces the manual power by just knocking the door which will be easily detected by Piezo Electric Sensor and if it correctly detects then the servo motor starts to rotate and the door opens. If it doesn't detects then the servo motor will be idle and door is in closed state. Here, the door will detects the knocks by the customer and it can be visually seen in serial monitor and it's easily understandable.



6. Result

The hardware setup is done with the help of customer service to fix in the door. Then after connecting all the components to Arduino and information of knocks been stored in the system which can be easily accessible and setup by the user to open and close the door lock. And the result can be viewed in the serial monitor when the user does the actions.

7. Future Scope

In this project, tend to square measure thinking to create it safer. If tends to get scope than tend to embrace GSM and camera during this system. GSM can get SMS to user's phone if any reasonably unknown person square measure knocked. On the opposite hand, camera can facilitate for user to observe live, if any known/unknown person are knock in his/her door. If this hardware use properly and user will perceive its usability. It can use for different sites like residences, schools, faculty et al. It will use all the business, native and every one the building altogether over the planet to create it absolutely secure. It will improve for different things if it is helpful for user and that they got help from this system.

8. Conclusion

This application is very efficient and economic manner. The inputs of data which stored in the Arduino UNO and the system which reads by authorizing the number of knocks and opens the door lock. The project can easily satisfy the customer and also user friendly to open the door to every user. Here, to use servo library function to open and close the door. This project cost less and easily understandable to every user without knowledge.

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