

Door Unlocking System Using Knocking Pattern

M. S. Maharishi¹, R. Manikandan², A. Manoj³, Dr. P. Bharaneedharan⁴

^{1,2,3,4}Electronics and Communication Engineering, Saveetha Engineering College, Chennai, Tamil Nadu, India

Abstract: Door Unlocking System Using Knocking Pattern is an intelligent Security System that can detect the knocking pattern set by the User (Host) and will unlock the door for the visitor when they use the exact pattern, but not when they use a different pattern. Intruders and thieves frequently assume that traditional security measures, such as biometric, pin-based, or IOT authentication-based systems, which may usually will keep them out. However, these measures can be hacked or compromised if the intruder or thief has access to your personal credentials. This design can be used as yet another but distinctive security system for our home in a way that burglars or intruders could never suspect this kind of security is being implemented, and an unauthorized person cannot predict this type of security system allows our designed to be more secure. Since it doesn't use personal credentials or any IOT based authentication and relies solely on our conscious effort thus avoiding any security compromises, which is a sole requirement for any Security system. The Secret Knock Pattern Door Lock can be utilized for business and industrial purposes in addition to household security.

Keywords: learning analytics, data analysis, Moodle, Excel, web scraping, optimization, e-learning, multiple-choice questions.

1. Introduction

The entryway lock. A development that traces all the way back to the Egyptian period, and a key part of the present society[1]. The Yale pin chamber entryway lock, which was created in 1848, is as yet the most well-known kind of entryway secure in present day homes, and hasn't seen a lot change in the beyond hundred years [2]. Today there is a developing business sector for elective entryway lock arrangements, with a wide scope of advanced choices which empower more advantageous approaches to locking/opening the entryway. Numerous frameworks require the client to supplant the entryway lock by and large, while some can be mounted on a current entryway lock to broaden its usefulness. With new computerized arrangements there are additionally new security dangers, similar to hack ability and hazard of computerized glitches [3]. On initial note we have started our project by a literature study on this field and collected necessary information about the similar door unlocking system. We found out that no systems developed using condenser mic sensor. So, we implemented this sensor in our system to upgrade from previous door unlocking system.[4]

This condenser mic sensor detects the noise or sound and turn them to a sine wave electric signal which raised as a complaint to the Arduino Uno. This complaint is been processed and verified, then send it to the unlocking chamber[5].

2. Literature Survey

To get into in the field of door unlocking we have referred previous reviews to make advancement in the current system.

To start up with, we taken a system called Bluetooth door unlocking in this system they used a bluetooth chip for unlocking each as its own specification to unlock. This criteria work only based Bluetooth enables. This is a low power consumption model where we can utilize power more. On contemporary, the function of this model as a chip which is loaded by a sequence of pin in it. When this chip get into the receiver, the chip starts to pass the sequence number via Bluetooth to the receiver. Then the receiver starts to calibrate with the uploaded sequence

number .This uploaded sequence as been dumbd through c coding on the basic board arduino . This arduino checks the sequence it receives with thesequence that was updated .On evaluatingit opens the door . This system is way more far and truly advanced.But coming to the part of security, this model completely fails. Everyone can easily generate , even the sequence is way more complex by knowing the loaded number in the arduino. So , only by the terms of advancement this isdeveloped [1].

On getting into next model ,we get a farmore better one that is Investing smart home security using IOT and Block chain model .This paper is not only for door unlocking but also forthe otherappliances too. On takinghomebased criteria , this system will controls thelights , fans , switches , doors and so on . This system as a separate workspacelike an app to work with. Every devices that is availablein an experimental area will be connected to a one working modelknow as block chain , this block chain modelwill control the whole program.

Then the system will generate a app which regulates or controls the whole appliances by taking commands from outside. User from outside will tend to install the connecting app forthe devices inside the house or the access area . Then a command is been passedusing the app , now a request is being sent to the cloud . This cloud profound the request into the built in sensor .Then sensor check the request and access or respond according to that. If this sensor meets the perfect number sequence or received code then it will openor switch on the requested device , if it doesn't match then it will sent an acknowledge oferror in the code so as to depict that the generated sequence is wrong . This system is completely advanced one , that it connect the whole body into a particularbounded area . On coming to security this system also fails and if there is a internet slowdown or breakage of network the complete system fails to perform its duty. So, we should wanta improvement in this area too[2].

Next system is completely updatedfrom the precious both .This systemhasmade to create a easy andimproved way of unlocking with the handful criteria with extensive innovation . This makes us to feel more feasible and easy to handle . This system works by meansofpressure that has been given by the unlocking hand to the door . This look simple but as to undergo various calibration to justify the pressure. They justify the pressure depending on the differentbones structure and innovative knocking force . They have examined that each people has giving different pressure handling to the door.

So they collectingthose informationstoring them into arduino . They dumping the code by means of c ++ program, where they would mention the unique pressure of the accessed persons . To get the pressure data we have kept a pressure sensor in the door , these sensor will calculate the value and send them to arduino . On to opening side they have allocated area where we can give the pressure to open it. This system can be widely used in the industrial sectors because many of the people need access and if they been liftinga weight or carrying goods they neednot to wait to get a key . They can give their input in the pressure handling area , so the pressure sensor will note the gesture and send them to arduino .

The arduino will start its calibration with the stored data ,if it gets the same gesture it will automatically open it . This system has a very good updationbutthere efficiency percentage are quitenot promising . That seems the system is not finding the correct gesture it eventually opens forthe people who doesn't have access. So this is a place we have to quite noticeable[3].

Disadvantages:

- Easy calibration of pin numbers
- Completely based on network servors
- Hand gestures can be identified
- Security can be updated

3. Proposed System

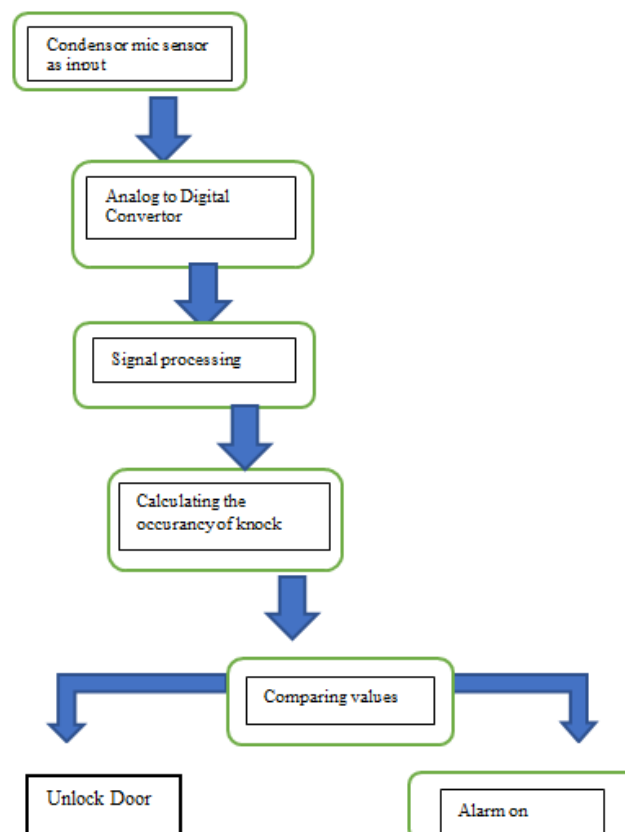
Our Door opening framework system utilizing thumping pattern is a clever Security Framework that can distinguish the thumping pattern set by the User (Host) and will open the entryway (Door) for the guest when

they utilize the same specific pattern, however it won't when they utilize an alternate knocking pattern. Intruders and Thieves as often as possible expect that conventional security measures, for example, biometric, pin-based, or IOT validation based Frameworks, which may will keep them out. However, these measures can be hacked or compromised assuming that the Criminals or Hacker has Admittance to your own personal credentials.

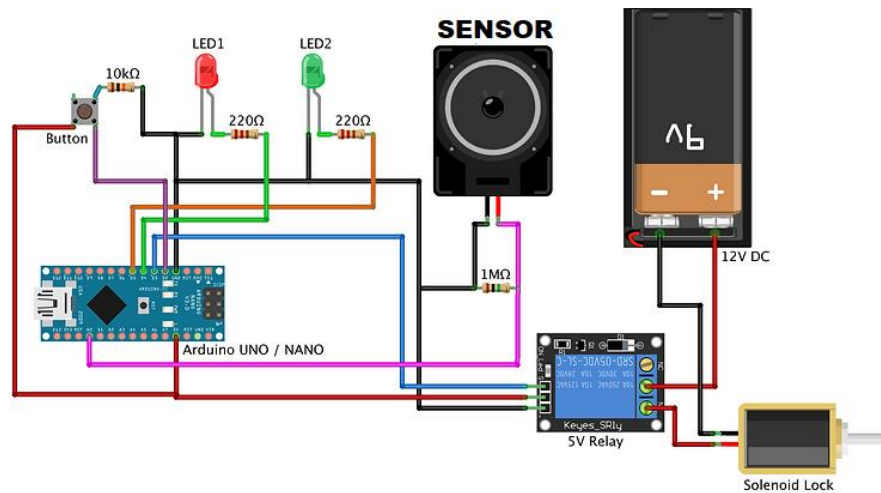
This plan can be utilized at this point another yet distinctive security framework for our home such that criminals or gatecrashers would never think this sort of safety is being carried out or implemented, and an unapproved individual can't anticipate this kind of safety framework permits our intended to be safer. Since it doesn't utilize individual certifications or any IOT based validation and depends exclusively on our cognizant exertion subsequently staying away from any security splits the difference, which is a sole necessity for any Security framework or systems.

Proposed Components:

1. Arduino NANO or Uno (any version)
2. Condenser Mic Sensor
3. 5V Relay Module
4. Solenoid Lock
5. 9V Battery
6. Resistors: 220 Ohms; 10K Ohms; 1M Ohms
7. Chassis or Wooden frame (Miniature for Door)
8. Jumper Wires
9. Button Switch
10. 5V LEDs: Red ; Green



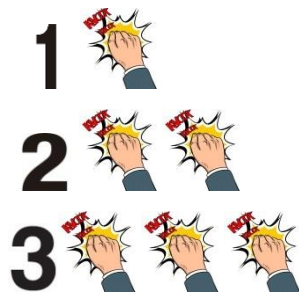
The entire schematic for this project is given beneath; as may be obvious, it Utilizes an Arduino mini than expected. Nonetheless, the indistinguishable circuit can likewise be assembled with an Arduino UNO.



A condenser mic sensor utilized in the project shows corresponding unique way of behaving, implying that a time varying electrical signal applied between the diaphragm and the backplane will make the diaphragm vibrate and produce an acoustic result having a comparable waveform, similarly as a time changing acoustic pressure creates an electrical result having a similar waveform. This system is used to receive the signal from the user who going to knock the door, that is a analog vibration signal. The vibrated signal is captured by the above mentioned condenser mic sensor. The received analog vibration signal is captured by the sensor and then turn it into a digital sine wave signal which can be able to read by the arduino. Then arduino UNO connected with this sensor is being able to receive the signal from the vibration sensor and can able to process the it. Here arduino going to check whether that already imported user pattern of the vibration signal and the received vibration signals are matched or not. arduino going to check whether the received signal and imported signals are same after the process finished. if the received signal is matching with the imported signal then ordino commands the locking motor which is also implemented inside the door and connected with the arduino. Then the Door Lock which is connected with the arduino inside the door can receive the signal from the arduino is receiving the verified signal then lock response to the arduino and open that door. Otherwise ,when signal doesn't matches no more operations is being done by arduino and door won't open.

Simple Working Dilemma

The whole system has been designed to deal with each andevery dilemma is on dependingthe knock we generate. This knocking is to be like , whether the pattern is 123 then we should store them with one knock and a gap, then other two continuous knock gap , and last threecontinuous knock



4. Conclusion

In conclusion, the paper is discussed about the document under the significance of Commercial and Household Door security system . By employing tools such as vibration detection, analog to digital conversion, motor lock& unlocking techniques, these papers have effectively gathered, examined and presented data to enhance

safety strategies, improve security experiences, and facilitate the new way locking system. The insights derived from these papers offer valuable perspectives on various facts of latching system, encompassing the optimization of old locking models, processing latest security models, and engaging users adapt to updated safety measures for the digital era. The application of our knock pattern unlocking system provides the safety from intruders and invulnerable to the ethical hackers. The updated pattern unlocking security practices ultimately leading to the efficient and personalised safety experienced.

References

- [1] Younes-Aziz Bachiri1, Hicham Mouncif, et al, "Artificial Intelligence System in Aid of Pedagogical Engineering for Knowledge Assessment on MOOC Platforms: Open EdX and Moodle," Vol. 18 No. 05, pp. 144–160, March 2023.
- [2] Hemanth S, Hemanth K, et al, "Moodle Data Analysis for Effective Online Teaching and Learning," Erode, India, pp. 557-563, February 2023.
- [3] Mengchi Liu and Dongmei Yu, "Towards intelligent E-learning systems, Educational and Information Technologies," pp. 7845–7876, July 2023.
- [4] Mohamed Abdelsalam, Amira M. Idrees, and Marwan Shokry, "A Proposed Model for Improving the Reliability of Online Exam Results Using Blockchain," ISSN 2169-3536, August 2023.
- [5] Sithara H. P. W. Gamage, Jennifer R. Ayres, et al, "Optimising Moodle quizzes for online assessments," IJ STEM Ed 6, August (2019).
- [6] Katerina Mangaroska and Michail Giannakos, "Learning Analytics for Learning Design: A Systematic Literature Review of Analytics-Driven Design to Enhance Learning," in IEEE Transactions on Learning Technologies, vol. 12, no. 4, pp. 516-534, 1 Oct.-Dec.2019.
- [7] RianneConijn, Chris Snijders, et al, "Predicting Student Performance from LMS Data: A Comparison of 17 Blended Courses Using Moodle LMS," in IEEE Transactions on Learning Technologies, vol. 10, no. 1, pp. 17-29, 1 Jan.-March 2017.
- [8] Mozaffer Rahim Hingorjo, FarhanJaleel, Fatima Jinnah, "Analysis of One-Best MCQs: the Difficulty Index, Discrimination Index and Distractor Efficiency," The Journal of the Pakistan Medical Association, pp. 142-7, February 2012.
- [9] Hongbo Zhu and Tadashi Shibata, "A Real-Time Motion-Feature-Extraction VLSI Employing Digital-Pixel-Sensor-Based Parallel Architecture", IEEE International Symposium on Circuits and Systems (ISCAS), Seoul, Korea (South), pp. 1612-1615, May 2012.
- [10] G. T. Crisp and E. J. Palmer, "Engaging academics with a simplified analysis of their multiple-choice question (MCQ) assessment results," Journal of University Teaching & Learning Practice, vol4, Issue 2, Article 4, 2007.