**PEIZOELECTRIC SENSOR MODEL TO UNLOCK DIGITAL DOORS USING ARDUINO UNO**

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**Abstract:** This investigate is anticipated to extend comfort for clients from manual frameworks to auto-matic systems, entryway locks employing a predetermined thump code. Opening the computerized key that's created from the sensor when employing a tap will enter through the Peizoelectric sen-sor of the Arduino Uno microcontroller framework. The test comes about appear that the thump code given to this framework is related to the number of beats. The interim time esteem or the dis-tance between each beat is stored within the Cluster information sort which shapes a certain beat of beats utilized within the program. This thump interim esteem (thump code) will be put away to begin with within the microcontroller streak memory. The thump on the framework will begin working by perform-ing exact interims between the beats, in the event that the rhythm/rhythm of the beats matches what has been already put away, the entryway opening framework will be dynamic. In case the rhythm/rhythm of the beat is off-base at that point the entryway bolt will not open.

**Keywords:** Knock Piezoelectric Sensor, Arduino Uno.

**Abstrak:** Penelitian ini diharapkan dapat meningkatkan kemudahan bagi pengguna dari sistem manual ke sistem otomatis, pengunci pintu menggunakan kode ketukan yang telah di tentukan. Pembukaan kunci digital yang dihasilkan oleh sensor dilakukan dengan ketukan jari melalui sensor piezoelektrik sistem mikrokontroler Arduino Uno. Hasil pengujian menunjukkan bahwa kode ketukan yang diberikan pada sistem ini berhubungan dengan jumlah ketukan. Nilai interval waktu atau jarak antara setiap ketukan disimpan dalam tipe data array dan membentuk ritme ketukan tertentu yang digunakan dalam program. Nilai interval ketukan (kode ketukan) ini awalnya disimpan di memori flash mikrokontroler. Sistem ketukan beroperasi dengan mengukur interval ketukan secara akurat. Jika ritme ketukan sesuai dengan yang disimpan sebelumnya, sistem pembukaan pintu akan diaktifkan. Apa bila ritme/irama ketukan salah maka kunci pintu tidak akan terbuka.

**Kata kunci:** Sensor Piezoelektrik Kunci Ketuk, Arduino Uno.

**INTRODUCTION**

The development of modern technological science has now brought humans to a better civilization. There are many benefits and conveniences resulting from technological developments in the digital revolution 4.0 era, especially with the birth of computers, the quality and effectiveness of humans at work has increased. In fact, it is no longer possible for humans to be separated from these tools, because the computer field offers various conveniences to help humans complete their work, for example in mathematical calculations, databases, statistical data processing, presentations, playing games, and even computers. based automation system.

Among people in general, they still use a simple key system. The function of opening doors is still to use conventional (manual) keys such as locking levers, sliding locks or rotating hinges. The use of keys, which are widely used as a general security method, often results in the loss of keys when traveling.

One of the triggers for criminal acts is the very large differences in levels of welfare in society. There are many ways that can be done to avoid criminal acts of robbery at home or private rooms, such as hiring security personnel such as security guards to be on guard. Of course this will increase monthly costs, this is where the problem starts with a weak key security system.

The application of electronic technology is one of the solutions considered the most relevant to implement. The security system that the author will create is a security system equipped with an Arduino microcontroller and a Peizoelectric sensor. Article writing does not use sub-chapters. Arduino is an Open Source Physical Computing Platform, the word "platform" is the right choice of words, Arduino isn't fair a development tool, but could be a combination of equipment, pro-gramming language and a advanced Coordinates Advancement Environment (IDE). IDE may be a program that plays a huge part in composing programs, compiling them into twofold code and uploading them into microcontroller memory. There are numerous ventures and instruments created by academ-ics and experts utilizing Arduino, separated from that there are too numerous supporting modules (sensors, shows, drivers and so on) made by other parties to be con-nected to Arduino. Doorlocks like this are relatively expensive, by utilizing a microcontroller and vibration Peizoelectric sensors a security system can be explored using the secret beats and sounds or knock code method that can be applied to access the entrance to a house or private room. This door locking system will be efficient among the public because basically the materials or components used to make it are relatively expensive and in terms of use it is very easy and can modify the knocks that have been determined and stored in the system.

**METHOD**

In this arrange the analyst employments the model strategy, since this meth-od may be a strategy that's broadly used by computer program designers. The pith of this strategy is the method of creating a show into a last framework. 

Image 1. Stages of the Prototype Method

The taking after are the stages of making a model methodIn composing equations and conditions utilizing the equa-tion as within the equation.

1. Requirements Collection

Here the author collects data to make a digital knocker door lock with a peizoelectric sensor using an Arduino Uno microcontroller. This really helps owners of private houses and rooms in opening the doors of private houses and rooms more practically than is usually used by the general public.

2. Prototype Design Process

At this stage of the design process the author carried out design planning and design before carrying out the process of making the "Digital Knock Key" tool.

3. Build a Prototype

In this stage the author builds a prototype and creates a temporary design that focuses on making a digital door lock with a peizoelectric sensor and using an Arduino microcontroller.

4. Protoptype Evaluation

At this prototype evaluation stage, we will discuss the software design that will be used by users, whether the prototype that is built meets their desires and needs, then the next stage will be implemented.

**RESULT AND DISCUSSION**

Prototype Models

A prototype model is an initial version of a software system that is used to demonstrate concepts, design experiments and find more problems and possible solutions. Prototype systems allow users to find out how the system works.

Digital Knock Door Lock Device Model

The system illustrate of the Arduino Uno contraption on the Comput-erized Pound Entryway Jolt system can be done utilizing the fol-lowing steps:

1. Interface the electric current source to the electrical control control equipment cir-cuit.

2. After that the Digital Knock Door Lock will light up as will the Arduino supporting devices, the LED lights and the relay circuit.

Knock Sensor Testing

This test is carried out to find out whether the sensor is able to detect knocks that have been programmed in the storage carried out on the Pust Button. This sensor is placed on the back of the door, so that when you knock on the door to unlock the door, this sensor will detect whether the knocking process is correct. If the tap is correct, the solenoid will open, if the tap is wrong, the LED light will flash quickly. The solenoid will not open. The Peizoelectric sensor test results are shown in table 3.1 as follows:

|  |  |  |
| --- | --- | --- |
| **Testing** | **Beat Distance** | **Information** |
|
| 1 | 1 Second | Open |
| 2 | 2 Second | Open |
| 3 | 3 Second | Open |
| 4 | 4 Second | Not open |
| 5 | 5 Second | Not open |

Table 1. Knock Sensor Testing

Based on the sensor test, √ means the knock is correct, the Solenoid is open, and × means it is wrong, the LED light will flash quickly. The Solenoid is not open.

System Testing using the Black-Box Method.

To test the system, the author uses the black-box testing method. This testing is carried out to decide whether the pro-gram is appropriate for utilize or not and whether it meets the anticipated needs or not.

Black-box testing could be a arrange that centers on the utilitarian articulations of the program. This test case points to appear the work of the computer program and how it works. Is the input of beat and sound information running because it ought to? Hence, black-box testing permits computer program designers to ob-tain a set of input conditions that completely utilizes all useful necessities for a program.

Black-box testing tries to find botches in a couple of thingg, particularly: a. wrong or off base capacities. b. Interface botch. c. execution botch the taing after table traces the black-box

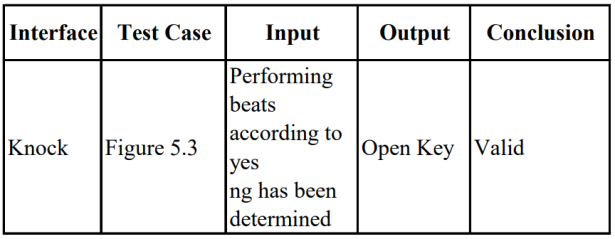


Table 2. Black-Box Testing

**CONCLUSION**

After testing and analyzing this thesis, it can be concluded as follows:

1. From the test results, if the door is knocked according to the knock code that has been determined then the door lock will open, if it does not match the LED light will turn on quickly. The door can open because of the recognition of each sensor, the sensor will detect the vibration results of the knock.

2. Detected results from the Peizoelectric Sensor, the sensor will respond properly if the command carried out is correct. The process of detecting each sensor is vibration and frequency, apart from that, the program has been uploaded to each tool that will work.

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