Jurnal Sainstech Nusantara	Vol.1 No.1 (2024) 1-6
https://nusantarajournal.id/sainstech	ISSN: 3063-0657

Sound-Based Light Control System in The Ship's Room With Uno Arduino

Maverik Adnin Nanda Pratama[1*], Edi Kurniawan[1], Eddi[1]

[1]Electro Technical Officer, Surabaya Shipping Polytechnic, Indonesia Jl.Gunung Anyar Boulevard No.1, 60293-East Java, INDONESIA

Article Info

Article history:

Received 01 January 2024
Revised 10 February, 2024
Accepted 15 February 2024

Abstract

Technological advances have given us many advantages, electronic devices and new procedures. Technological advances can also have negative side impacts if not used appropriately and correctly. In particular, it covers risks arising from careless use of electricity and accidents in the workplace. The research method used is research and development; data is obtained by carrying out direct observations on the tools when assembled. With this sound-based system for turning on the lights, you will be able to control the turning on and off of the lights just by sound, which means you can find out whether the lights are on or off and will be given information via a 16x2 LCD which has been programmed on the Arduino UNO to detect frequencies. The sound sensor on the system receives sound.

Keywords: Sound Waves, Sound Code, Arduino UNO Microcontroller, KY-037 Sound Sensor

Corresponding Author:

Name: Maverik Adnin Nanda Pratama
Email: maverikaden@gmail.com

1. Introduction

Electricity is the transfer of electrons between atoms in a conductor of energy, which impacts everyday life because the technology was developed to help facilitate the completion of human tasks. Technology has become critical in almost every aspect of human life. Electricity can threaten human safety. Electricity can also cause significant problems; for example, When humans want to touch cables or electronic objects with wet hands, it is straightforward to get an electric shock because water can conduct electricity. The use of sound to operate electronic devices has become the subject of extensive research, including the creation of Android applications with research results to control lights with Android smartphones and inverter applications via Bluetooth communication in smart homes. Research on designing a voice command recognition application based on Android and Arduino UNO, with the findings presented in the form of controlling light with an Android smartphone and the Google voice command recognition system, which acts as a form of application for translating voice commands into text in the AMR_voice application on a smartphone, next is the text string data. The Arduino UNO microcontroller can process it to turn on and turn off the lights. Based on the Arduino UNO microcontroller, all written research inspires further research on voice-activated light control. This

DOI: https://doi.org/10.71225/jstn.v1i1.43

research aims to increase the effectiveness and efficiency of using electrical power by utilizing the Arduino UNO microcontroller to facilitate light control without a switch and enable more useful sound control of the lights.

2. Research Method

In this research, researchers used experimental research. Experiments are carried out as part of the research process, and experimental research seeks to evaluate research hypotheses, predict events or happenings in the experimental environment, and make generalizations about the relationships between variables. Researchers use experiments because they carry out experiments and produce a tool as a sound-based light control system, which will then be tested in a room. If it receives an incoming sound or a predetermined sound code in the form of clapping, the tool will detect a frequency value, which gives a command to the microcontroller to turn it on and off. The lamp. The KY037 sound sensor functions as a sound detector, a 16x2 LCD to display the frequency value of the sound sensor, and the Arduino UNO as a microcontroller to process all programmed commands.

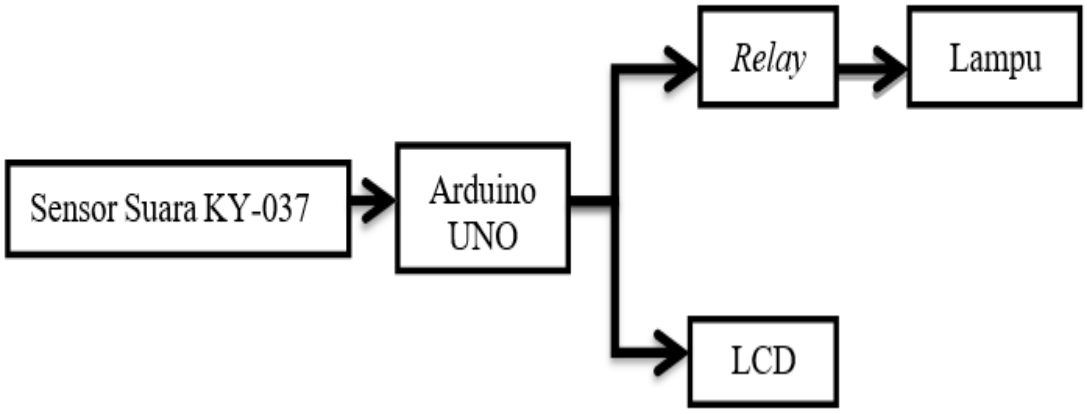

Figure 1. Diagram Block.

Component description in block diagram:

1. KY-037 sound sensor: This sensor detects sound when used. The KY-037 sensor is a module that can function as a form of measuring the level of sound when connected to a microcontroller. The measurement results from this sensor will later be converted into electrical quantities and read by a microcontroller such as Arduino.
2. Arduino UNO: As a system controller for the sound sensor, it will display the sound frequency on the LCD and command the relay as a form of electromagnet to operate the switch mechanically.
3. 16x2 LCD: Used as a form of display or visual output to display the value or frequency of the sound sensor to researchers.
4. AC: As a form of alternating voltage current, it is commonly used in everyday life with electronic objects.
5. Lights: As a form of media for the results to determine whether the tool is working.

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3. Results And Discussion

Static tests on the tool carry out component testing to ensure that each component functions as it should and with the correct function. In addition, testing aims to collect data to provide the effectiveness of the designed tools and show that the system implemented meets previously planned specifications.

3.1. Arduino UNO Test

Testing on the Arduino UNO microcontroller is carried out by providing voltage via 220V AC power or a USB cable to a laptop or other voltage source that suits the voltage requirements of the Arduino UNO.

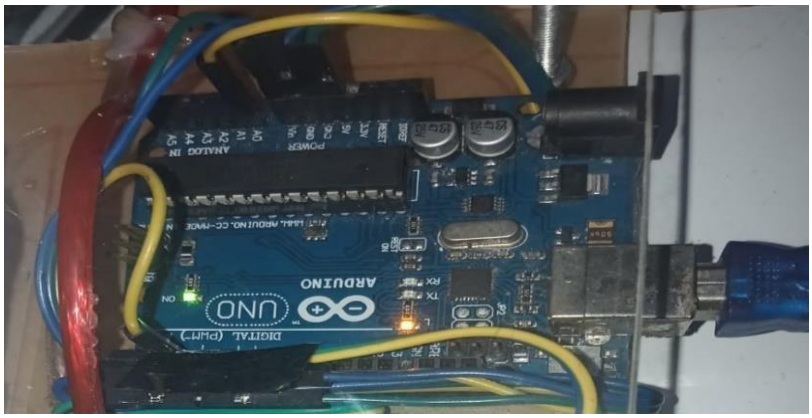

Figure 2. Arduino UNO Testing

Figure 2 shows how the Arduino UNO microcontroller can work well and is successfully connected to a computer/laptop with the Arduino UNO microcontroller module port, marked by a green LED indicator light that lights up when the Arduino gets voltage.

3.2. Sound Sensor KY-037 Testing

This sound sensor was tested by giving a sound code that the researcher had programmed, namely by clapping, as in the picture below, which is reading the sound frequency when it hears a clapping sound, which is indicated by the activation of 2 red indicator lights.

Figure 3. Sound Sensor KY-037 Testing

Figure 3 shows that the results of the sensor test can be read well, and the results of the sound sensor reading with digital output = 1 (sound detected), 0 (no sound available). These results show that

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the KY-037 sound sensor has worked and was successfully connected to the program. Then, this sensor works according to the reading of a sound frequency wave in the input from a clap of the user's hand, created in the Arduino UNO microcontroller program for Inductive Proximity Sensor Test Results.

Table 1. KY-037 Sound Sensor Test Results Against Tapping Sound

No.	Input	Spacing	Relay	Lamp Status
1.	The Sound Of Applause	50CM	ON	It`s On
2.	The Sound Of Applause	50CM	ON	It`s On
3.	The Sound Of Applause	50CM	ON	It`s On
4.	The Sound Of Applause	50CM	ON	It`s On
5.	The Sound Of Applause	50CM	ON	It`s On
6.	The Sound Of Applause	50CM	ON	It`s On
7.	The Sound Of Applause	100CM	ON	It`s On
8.	The Sound Of Applause	100CM	ON	It`s On
9.	The Sound Of Applause	100CM	ON	It`s On
10.	The Sound Of Applause	100CM	ON	It`s On
11.	The Sound Of Applause	100CM	ON	It`s On
12.	The Sound Of Applause	100CM	ON	It`s On
13.	The Sound Of Applause	150CM	ON	It`s On
14.	The Sound Of Applause	150CM	ON	It`s On
15.	The Sound Of Applause	150CM	ON	It`s On
16.	The Sound Of Applause	150CM	ON	It`s On
17.	The Sound Of Applause	150CM	ON	It`s On
18.	The Sound Of Applause	150CM	ON	It`s On
19.	The Sound Of Applause	200CM	ON	It`s On
20.	The Sound Of Applause	200CM	ON	It`s On
21.	The Sound Of Applause	200CM	ON	It`s On
22.	The Sound Of Applause	200CM	ON	It`s On
23.	The Sound Of Applause	200CM	ON	It`s On
24.	The Sound Of Applause	200CM	ON	It`s On
25.	The Sound Of Applause	300CM	ON	It`s On
26.	The Sound Of Applause	300CM	ON	It`s On
27.	The Sound Of Applause	300CM	ON	Not On
28.	The Sound Of Applause	300CM	ON	It`s On
29.	The Sound Of Applause	300CM	ON	Not On
30.	The Sound Of Applause	300CM	ON	It`s On

3.3. Relay Test

Relay testing will be carried out by connecting the relay to the Arduino UNO microcontroller and sound sensor and then programming it, which will become a switch to turn the lights on and off.

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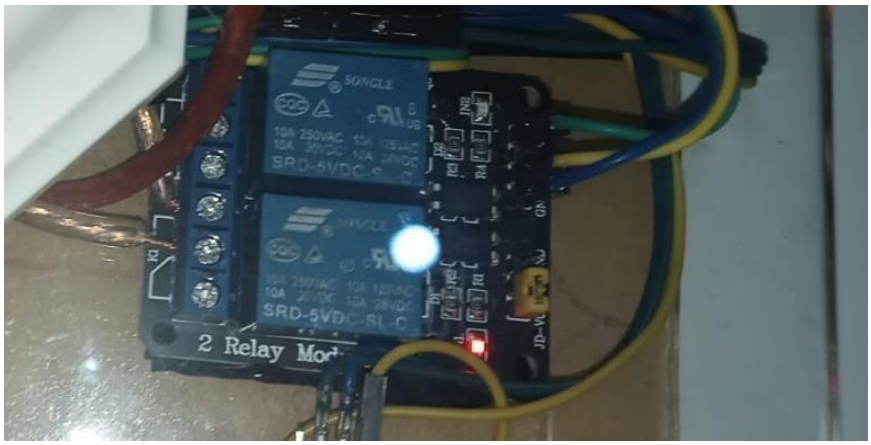

Figure 3. Relay Testing

Figure 4 shows that the relay is active in the program and has been compiled. A relay is a form of controlling the electrical power source of a lamp so that the light can turn on or turn Sensor Accuracy Level Test Results.

3.4. LCD Test

The test will be carried out by connecting the LCD to the Arduino UNO microcontroller and a sound sensor, then programmed to display the written name of the researcher and the frequency value when the sound sensor detects the sound of clapping.

Figure 4. LCD Testing

Figure 4 shows that the LCDs the author's data for 10 seconds, then the display will change to a frequency value that can read how many bits are produced from the sound wave frequency on the sound sensor.

4. Conclusion

Based on the design, assembly, and discussion of the Sound-Based Light Control System in Ship Rooms with Arduino UNO, it can be concluded that this design can work well; that is, only one clap is needed for the system to activate, two claps will turn off the lights that are already on. The KY-037 sound sensor detects sound input in the form of clapping. Next, the program uploaded to the Arduino collects over 400 million, which can be used as a 5-volt output to turn the light on and off. A number of factors influence how close the lights come on, including the level of surrounding noise and the sensitivity level of the sound sensor.

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Acknowledgments

Thank you for the guidance from the lecturers of the Politeknik Pelayaran Surabaya.

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