CLAP / SOUND CONTROLLED SWITCH FOR PHYSICALLY DISABLED PERSONS

BY:

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PROBLEM STATEMENT AND SOLUTION

PROBLEM STATEMENT:

Many physically disabled individuals face difficulty in operating manual switches for electrical appliances.

SOLUTION :

Design a sound-activated switch using Microphone to detect clap/sound.

PROJECT GOALS

1) No physical contact, cost-effective, easy to implement.

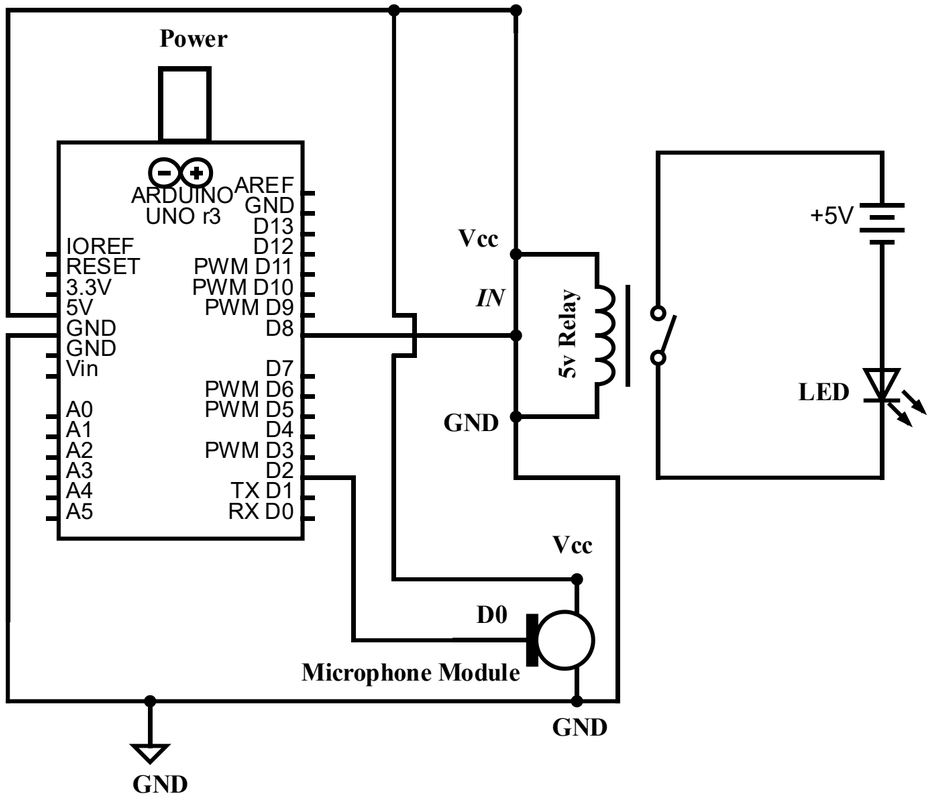
2) Relay driver to control appliances

3) Able achive idependecy in operating machinerys.

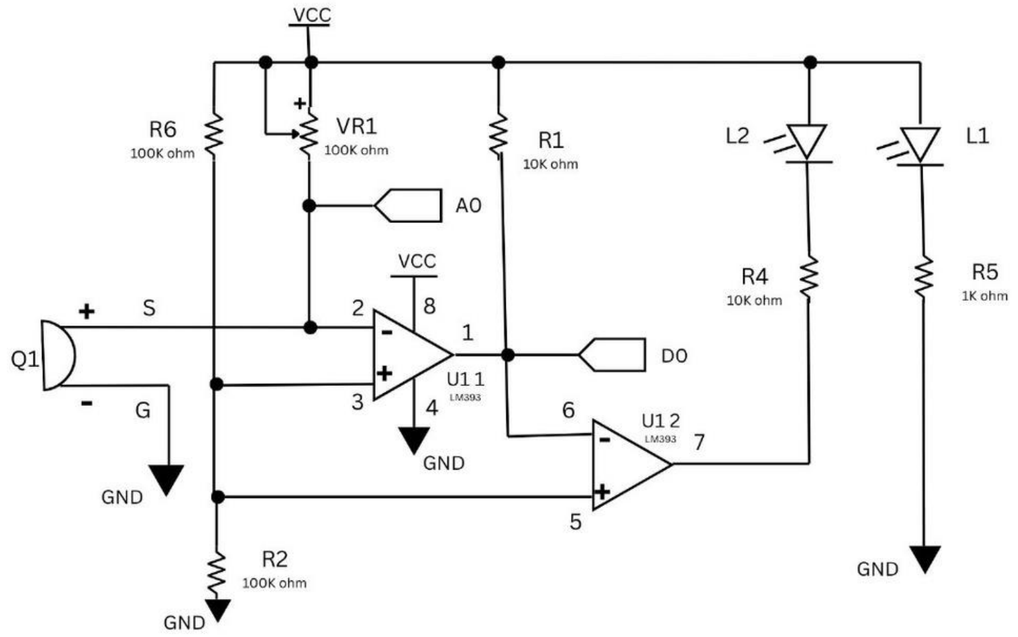
COMPONENTS

1) Microphone module
2) 5v relay
3) Arduino
4) Connecting Wires
5) Comparator(LM393)
6) potentiometer

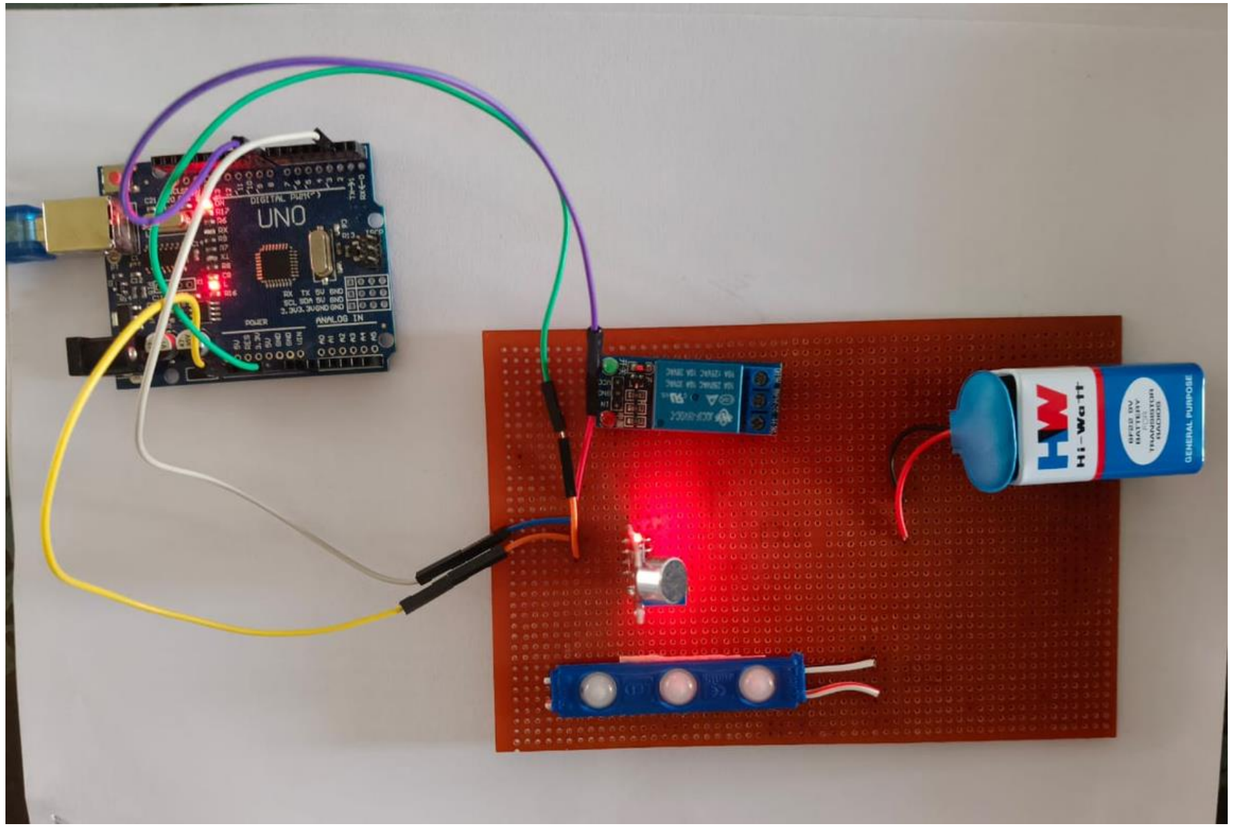
CIRCUIT DIAGRAM



MICROPHONE MODULE



PROTOTYPE IMAGE



CODING

main_modified.ino

```
int soundSensor = 2;
int relayPin = 8;
bool relayState = false;
bool lastSoundState = LOW;
unsigned long lastToggleTime = 0;
int debounceDelay = 300;
void setup() {
pinMode(soundSensor, INPUT);
pinMode(relayPin, OUTPUT);
digitalWrite(relayPin, LOW);
}
void loop() {
bool currentSoundState = digitalRead(soundSensor);
unsigned long currentTime = millis();
if (currentSoundState == HIGH && lastSoundState == LOW && currentTime - lastToggleTime > debounceDelay)
 {
  relayState = !relayState; // Toggle relay state
 digitalWrite(relayPin, relayState ? HIGH : LOW);
 lastToggleTime = currentTime;
 }
lastSoundState = currentSoundState;
}

```

WORKING PRINCIPLE

This project uses an LM393 sound sensor, Arduino, and a relay module to toggle an electrical device (like a lamp) based on sound input. The LM393 acts as a voltage comparator, comparing the amplified sound signal from the microphone to a reference voltage set by a potentiometer. When the sound signal exceeds the reference threshold, the LM393 outputs a digital HIGH signal to the Arduino. The Arduino reads this signal and toggles the relay state, turning the connected device ON or OFF. This setup enables simple sound-based automation using comparator logic.

ADVANTAGES:

- Automation – The light automatically turns ON or OFF in response to sound (like claps or voice), removing manual effort.
- Simple to Build – Easy wiring and coding make it ideal for beginners in embedded systems.
- Low Cost – Uses inexpensive components like Arduino Uno, mic sensor, and a relay module.

APPLICATIONS:

- It helps elderly or disabled people control lighting without physical touch.
- It can be used in smart homes for clap-based automation systems.
- Also useful in security systems where loud noise triggers lights or alarms

CONCLUSION

This proposed system is affordable,reliable and easy to use.

It helps physically disabled persons to control appliances without any help.

can be further upgraded with toggele function , noise filteration , wireless communication.

THANK YOU