Sai SAI RAM INSTITUTE OF TECHNOLOGY
An ISO 9001 : 2008 Certified Institution
Sai Leo Nagar, West Tambaram, Chennai - 600 044

INNOVATION AND ENTREPRENEURSHIP DEVELOPMENT CENTRE (IEDC)
(Funded by Department of Science & Technology, Government of India, New Delhi)

IEDC project No. 04 – for the year 2015 -2016

CLAP SENSOR FOR DIFFERENTLY ABLED AND AGED PEOPLE


S. Mythili


R. Nagammai Nachu


S. Malathy


V. Kayalvizhi

IV YEAR ELECTRONICS AND COMMUNICATION ENGINEERING
SRI SAIRAM INSTITUTE OF TECHNOLOGY

Guide : **Dr.S.Rajarajan**
Professor/ECE
SRI SAIRAM INSTITUTE OF TECHNOLOGY

Funded by
NATIONAL SCIENCE & TECHNOLOGY ENTREPRENEURSHIP DEVELOPMENT BOARD (NSTEDB),
DEPARTMENT OF SCIENCE AND TECHNOLOGY,
GOVERNMENT OF INDIA, NEW DELHI.

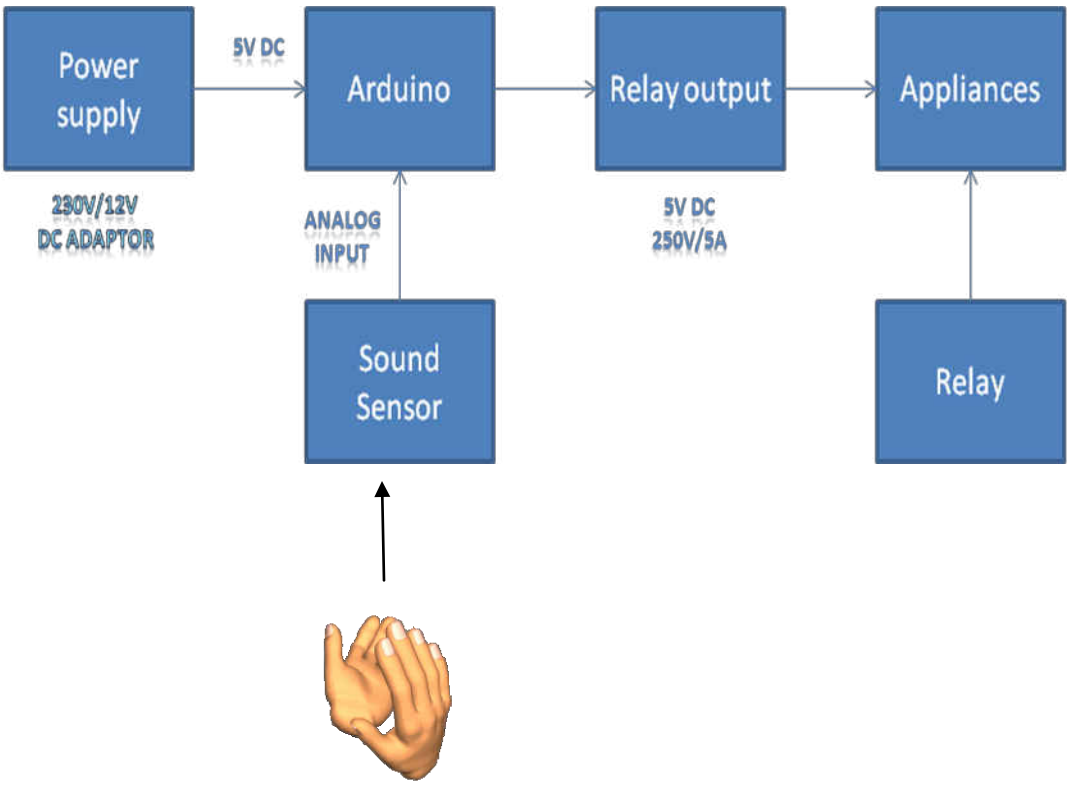
DEPARTMENT OF SCIENCE AND TECHNOLOGY

INTRODUCTION

Clap sensor is device which is used to control the household electrical devices like room light or fan in a room environment using whistle and clap. There are many alternative techniques to remotely control electrical devices in room environment such as using a TV remote control or speech recognition techniques etc. But this approach is the most cost effective. Though this product is aimed at physically challenged user, it has universal appeal as a comfortable way to control the room environment. The clap sensor is a microcontroller based circuits to detect clap against other sounds and it controls the intensity of the load using a microcontroller based on a specific code.

FUNCTIONAL DESCRIPTION

The block diagram of the clap switch is given below



SOFTWARE DESCRIPTION

PROGRAM

```
/*
  Arduino Clap Switch
  Artem Kalinchuk

  The THRESHOLD, SOUND_SAMPLE_LENGTH,
  CLAP_DURATION_WINDOW, and CLAPS_FOR_TRIGGER are
  all adjustable values and will probably need to be
  adjusted depending on your environment.
*/
const int SOUND_SENSOR = A0; //pin for the Grove Sound Sensor
const int LAMP_RELAY_1 = 2; //pin for the Grove Relay
const int LAMP_RELAY_2 = 3; //pin for the Grove Relay
const int LAMP_RELAY_3 = 4; //pin for the Grove Relay
const int LAMP_RELAY_4 = 5; //pin for the Grove Relay
const int THRESHOLD = 400; //the sound level that will be treated as a 'clap'
const int SOUND_SAMPLE_LENGTH = 200; //the amount of ms to wait before determining to
turn off/on
const int CLAP_DURATION_WINDOW = 500; //the amount of ms max to make the number of
claps specified (ms)
const int CLAPS_FOR_TRIGGER_1 = 1; //the number of claps for the relay to trigger
const int CLAPS_FOR_TRIGGER_2 = 2; //the number of claps for the relay to trigger
const int CLAPS_FOR_TRIGGER_3 = 3; //the number of claps for the relay to trigger
const int CLAPS_FOR_TRIGGER_4 = 4; //the number of claps for the relay to trigger

//kind of used the same way as 'delay' but does not pause code.
//I use this because I have multiple 'delays' running in my original code.
//this 'delay' will make sure the relay does not switch on and off to fast.
//The current time is set to 1000 ms min (in code below)
unsigned long lastLampRelayLoop = 0;
int soundSensorReading = 0;
int soundLength = 0;
int previousSoundLength = 0;
int soundSampleLength = SOUND_SAMPLE_LENGTH;
int clapDurationWindow = CLAP_DURATION_WINDOW;
int currentClaps = 0;
int relayState_1 = LOW;
int relayState_2 = LOW;
int relayState_3 = LOW;
int relayState_4 = LOW;
void setup() {
  pinMode(LAMP_RELAY_1, OUTPUT);
  pinMode(LAMP_RELAY_2, OUTPUT);
```

```
  pinMode(LAMP_RELAY_3, OUTPUT);
  pinMode(LAMP_RELAY_4, OUTPUT);
}
void loop()
{
soundSensorReading = analogRead(SOUND_SENSOR);
  if (soundSensorReading >= THRESHOLD) {
    soundLength++;
  } else
 {
if (soundLength > 0) {
      previousSoundLength = soundLength;
    }

    soundLength = 0;
  }
  if (soundSampleLength == SOUND_SAMPLE_LENGTH) {
    soundSampleLength = 0;
  if (previousSoundLength > 0) {
      clapDurationWindow = 0;
      currentClaps++;
previousSoundLength = 0;
    }
  }
 if (clapDurationWindow >= CLAP_DURATION_WINDOW) {
  if (currentClaps == CLAPS_FOR_TRIGGER_1) {
        relayState_1 = !relayState_1;
 digitalWrite(LAMP_RELAY_1, relayState_1);
      }
   else if (currentClaps == CLAPS_FOR_TRIGGER_2) {
        relayState_2 = !relayState_2;
if (millis()-lastLampRelayLoop >= 1000) {
 digitalWrite(LAMP_RELAY_2, relayState_2);
  lastLampRelayLoop = millis();
         }}
   else if (currentClaps == CLAPS_FOR_TRIGGER_3) {
        relayState_3 = !relayState_3;
digitalWrite(LAMP_RELAY_3, relayState_3);
      }
    else if (currentClaps == CLAPS_FOR_TRIGGER_4) {
        relayState_4 = !relayState_4;
digitalWrite(LAMP_RELAY_4, relayState_4);
      }
    currentClaps = 0;
```

```
  }
if (clapDurationWindow <= CLAP_DURATION_WINDOW) {
   clapDurationWindow++;
  }
 if (soundSampleLength < SOUND_SAMPLE_LENGTH) {
   soundSampleLength++;
  }
 delay(1);
}
```

WORKING OF THE CLAP SENSOR

The circuit of the clap sensor mainly consist of 2 important segment which is as follows:

- Sound sensor to ardiuno
- Ardiuno to relay

The block diagram consist four blocks which are:

- Power supply
- Sound sensor
- Relay
- Home appliances

POWER SUPPLY

A 230V/12V DC adapter is used to convert 230v AC power supply into 12v DC supply. Because ardiuno requires 12v constant power supply . This 12v supply is used to powerup the ardiuno. The ardiuno has internal voltage converter which converts the 12v volt power supply into 5v which is only used by the ardiuno for further operations.

SOUND SENSOR TO ARDIUNO

A clap sound is the input to this whole clap sensor setup. An analog sound sensor is connected as input to the ardiuno . When a clap sound is given the sound sensor will sense the clap sound . The sound sensor is also called as micro phone. It converts the clap sound into electrical energy. This electrical energy is given as analog input to the ardiuno.

ARDIUNO TO RELAY

Using an ardiuno IDE software the program for different clap pattens is embedded into the ardiuno. Thus the different home appliances can be operated according to clap patteren of user.

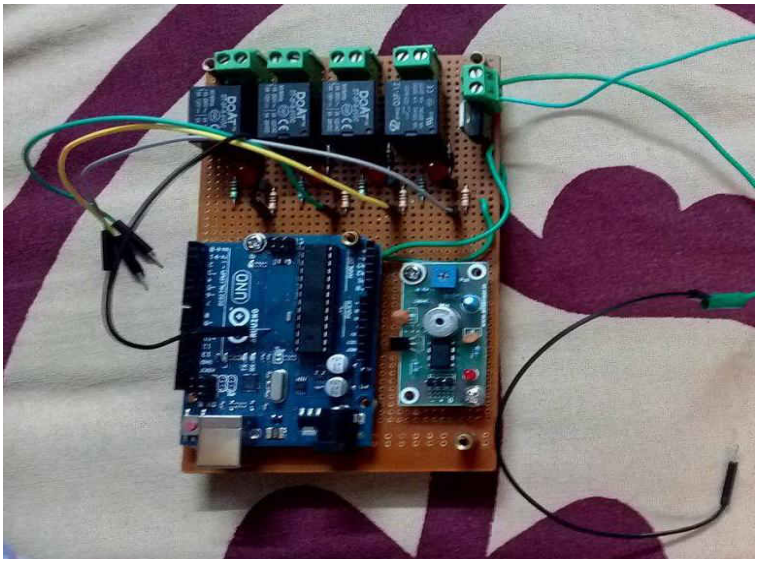
Four relay is connected to four output pins of the ardiuno . Usually a voltage spike will be produced when current enters into the relay and this may damage other part of the circuit. So, an suppersion or flyback diode is connected between the output pins of the ardiuno and the relay. For one clapsound the ardiuno will enable the first output pin to the first relay according to the program embedded into the ardiuno . Thus the appliance 1 which is connected to first relay will turn on . For the same clap patteren given again the appliance can be switched off .

ARDIUNO TO RELAY

Using an ardiuno IDE software the program for different clap pattens is embedded into the ardiuno. Thus the different home appliances can be operated according to clap patteren of user.

Four relay is connected to four output pins of the ardiuno . Usually a voltage spike will be produced when current enters into the relay and this may damage other part of the circuit. So, an suppersion or flyback diode is connected between the output pins of the ardiuno and the relay. For one clapsound the ardiuno will enable the first output pin to the first relay according to the program embedded into the ardiuno . Thus the appliance 1 which is connected to first relay will turn on . For the same clap patteren given again the appliance can be switched off .

INTERNAL COMPONENTS OF THE CLAP SENSOR



FINAL PRODUCT

CONCLUSION

- The major advantage of this proposed system is that it is more reliable, cost effective and more essential for differently abled and aged people.
- It will be very useful for people who are bedridden and depend others for each and everything.
- It can also be used to raised alarm in security system with a noise and also used at a place where silence is needed.
- It is a best example of how engineering and electronics have made lives easier.