For noise disturbance detection in the environment

This code monitors the sound intensity using an LM393 sensor connected to an Arduino UNO board. The used sensor has only a digital output. Therefore, the number of times the sensor detects a sound is summed up over a sampling time called "SAMPLE_TIME". Then the sum called "sampleBufferValue" is printed on a Serial Monitor and visualized with the Serial Plotter. Additionally, the code allows communication with a LED to provide a visual alarm if the "sampleBufferValue" surpasses a preset Threshold. Regarding the digital outputs, 0 means silence and 1 means noise.

Detailed explanation is given in the video tutorial

Sound Detection.ino

```
const int OUT PIN = 12;
                          // The OUTPUT of the sound sensor is
connected to the digital pin D12 of the Arduino
const int SAMPLE TIME = 10; // The sampling time in milliseconds,
can be set differently if required
const int Threshold = 90;  // Threshold on decibel value for LED
switching ON, the value has been optimized with respect to the used
sampling time (900 cumulative digital counts ≈ 90 dB from "Schall")
 unsigned long millisCurrent;
                                 // current time
unsigned long millisLast = 0;
                                //previous time
 unsigned long millisElapsed = 0; // difference between current time
and previous time (time interval)
int sampleBufferValue = 0;
                             // initiate the sum of digital
outputs over the sampling time
int led = 8;
                                // LED on pin 4 of Arduino
int dB = 0;
                                //initiate sound intensity dB value
void setup() {
  Serial.begin(9600);
                               //Arduino starts serial communication
with baud rate 9600
                               // the LED is connected as output for
  pinMode(led,OUTPUT);
alarm purpose
void loop() {
 millisCurrent = millis();
                                             //the current time is
assigned to the dedicated variable
  millisElapsed = millisCurrent - millisLast; //the elapsed time is
updated
  if(digitalRead(OUT_PIN) == HIGH){
                                           //HIGH means noise
  sampleBufferValue++;
                                            //increments the sum
```

```
variable by 1
 }
  surpasses the sampling time, print the sampleBufferValue and test
threshold for alarm
  dB = 0.0666 *(sampleBufferValue) + 30.223; //linear regression to
calculate the decibel value based of the rough calibration of the
sensor response
 Serial.println(dB);
                                          // print decibel values on
the Serial Monitor
 Serial.print("dB");
                                          // print sound unit
decibel
  if (sampleBufferValue > Threshold) {      // test if the threshold is
surpassed
   digitalWrite(led, HIGH);
                                         //blink LED 2 ms ON and 1
ms OFF
   delay(2);
   digitalWrite(led, LOW);
   delay(1);
 }
                                   // the LED is turned off to
 digitalWrite(led, LOW);
be ready for the next sample
 sampleBufferValue = 0;
                                        // re-initialization of the
sampleBufferValue variable for the new sampling time
 millisLast = millisCurrent:
                                        // update the previous time
to be the start for the next sample
```

https://student-wiki.eolab.de/ - HSRW EOLab Students Wiki

https://student-wiki.eolab.de/doku.php?id=amc2021:groupl:code:sound detection&rev=1630798704

Last update: 2023/01/05 14:38

