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

```
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,
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
  pinMode(led,OUTPUT);
                              // the LED is connected as output for 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
 }
  the sampling time, print the sampleBufferValue and test threshold for alarm
```

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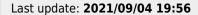
```
dB = 0.0666 *(sampleBufferValue) + 30.223; //linear regression to
calculate the decibel value based of the rough calibration of the sensor
response
  Serial.println(dB);
                                             // print decibel values on the
Serial Monitor
  Serial.print("dB");
                                             // print sound unit decibel
   if (sampleBufferValue > Threshold) {
                                            // test if the threshold is
surpassed
                                            //blink LED 2 ms ON and 1 ms OFF
   digitalWrite(led, HIGH);
   delay(2);
   digitalWrite(led, LOW);
   delay(1);
  }
 digitalWrite(led, LOW);
                                           // the LED is turned off to 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
  }
}
```

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