Helmeet

**Topic: Work Safety**

**Emphasize:**

**Define:** Workers do not obey. We will design a product which forces them to obey safety.

**Idea:** Design a helmet which sends a signal about temperature and heart rate of worker.

**Materials:** Plastic helmet, Arduino Uno, HC-06 Bluetooth Sensor, KY-039 Heart Rate Sensor, DHT11 Temperature and humility sensor.

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**Prototype:**

**#include <math.h>**

**#include <SoftwareSerial.h>**

**#include <dht.h>**

**#define DHT11\_PIN 7**

**#define samp\_siz 4**

**#define rise\_threshold 5**

**SoftwareSerial BTserial(10, 11); // RX | TX**

**SoftwareSerial mySerial(10, 11);**

**String isim = "Arduino UNO";**

**int sifre = 1234;**

**int sensorPin = 0;**

**String uart = "9600,0,0";**

**void setup() {**

**BTserial.begin(9600);**

**Serial.begin(9600);**

**Serial.println("HC-05 Modul Ayarlaniyor…");**

**Serial.println("Lutfen 5 sn icinde HC-05 modulun uzerindeki butona basili tutarak baglanti yapiniz.");**

**mySerial.begin(38400);**

**delay(5000);**

**mySerial.print("AT+NAME=");**

**mySerial.println(isim);**

**Serial.print("Isim ayarlandi: ");**

**Serial.println(isim);**

**delay(1000);**

**mySerial.print("AT+PSWD=");**

**mySerial.println(sifre);**

**Serial.print("Sifre ayarlandi: ");**

**Serial.println(sifre);**

**delay(1000);**

**mySerial.print("AT+UART=");**

**mySerial.println(uart);**

**Serial.print("Baud rate ayarlandi: ");**

**Serial.println(uart);**

**delay(2000);**

**Serial.println("Islem tamamlandi.");}**

**void loop ()**

**{**

**float reads[samp\_siz], sum;**

**long int now, ptr;**

**float last, reader, start;**

**float first, second, third, before, print\_value;**

**bool rising;**

**int rise\_count;**

**int n;**

**long int last\_beat;**

**for (int i = 0; i < samp\_siz; i++)**

**reads[i] = 0;**

**sum = 0;**

**ptr = 0;**

**while(1)**

**{**

**// calculate an average of the sensor**

**// during a 20 ms period (this will eliminate**

**// the 50 Hz noise caused by electric light**

**n = 0;**

**start = millis();**

**reader = 0.;**

**do**

**{**

**reader += analogRead (sensorPin);**

**n++;**

**now = millis();**

**}**

**while (now < start + 20);**

**reader /= n; // we got an average**

**// Add the newest measurement to an array**

**// and subtract the oldest measurement from the array**

**// to maintain a sum of last measurements**

**sum -= reads[ptr];**

**sum += reader;**

**reads[ptr] = reader;**

**last = sum / samp\_siz;**

**// now last holds the average of the values in the array**

**// check for a rising curve (= a heart beat)**

**if (last > before)**

**{**

**rise\_count++;**

**if (!rising && rise\_count > rise\_threshold)**

**{**

**// Ok, we have detected a rising curve, which implies a heartbeat.**

**// Record the time since last beat, keep track of the two previous**

**// times (first, second, third) to get a weighed average.**

**// The rising flag prevents us from detecting the same rise**

**// more than once.**

**rising = true;**

**first = millis() - last\_beat;**

**last\_beat = millis();**

**// Calculate the weighed average of heartbeat rate**

**// according to the three last beats**

**print\_value = 60000. / (0.4 \* first + 0.3 \* second + 0.3 \* third);**

**Serial.print(print\_value);**

**Serial.print('\n');**

**third = second;**

**second = first;**

**dht DHT;**

**int chk = DHT.read11(DHT11\_PIN);**

**Serial.print("Temperature = ");**

**Serial.println(DHT.temperature);**

**Serial.print("Humidity = ");**

**Serial.println(DHT.humidity);**

**delay(1000);**

**BTserial.print("1234");**

**BTserial.print(",");**

**BTserial.print(print\_value);**

**BTserial.print(",");**

**BTserial.print(DHT.temperature);**

**BTserial.print(",");**

**BTserial.print(DHT.humidity);**

**BTserial.print(";");**

**//message to the receiving device**

**delay(20);**

**}**

**}**

**else**

**{**

**// Ok, the curve is falling**

**rising = false;**

**rise\_count = 0;**

**}**

**before = last;**

**ptr++;**

**ptr %= samp\_siz;**

**}**

**}**

<https://create.arduino.cc/projecthub/Johan_Ha/from-ky-039-to-heart-rate-0abfca>

<https://www.instructables.com/id/How-to-Receive-Arduino-Sensor-Data-on-Your-Android/>

<http://www.circuitbasics.com/how-to-set-up-the-dht11-humidity-sensor-on-an-arduino/>