Report of instrumentation project

Controlling LED using Mind Wave Mobile

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Abstract:

In this project we wanted to control a LED by change in attention level using Mind Wave Mobile which is an EEg sensor that can measure level of attention and meditation, brain waves such as GAMMA,DELTA and BETA and can also detect eye blink.

For doing so we have used a Matlab code to extract the data sent to our computer via Bluetooth by the Mind Wave Mobile, sent them to ESP8266 and control the LED.

Part 1: Sending data from Mind Wave

In this part we turn the head set on and wait for it to connect to our Laptop.

Once the device is connected to our computer and placed of some one's head; we check the Neurosky's application to check the signal's quality and when the quality of the signal is good, the device starts sending data to our computer.

Part 2: Receiving data from Mind Wave

In this part we use a Matlab code to extract data sent from Mind Wave.For doing so we use Neurosky's libraries provided for this.

This code checks the connection first and once the device is connected, receiving attention level starts.

Our code stores the attention level values in a variable in matlab.

Part 3: Sending data via serial port in matlab

Now that we have out data stored in a variable we need to transfer them to control the LED.

We have used the serial port to do so using the code below:

```
ar = serial('COM7','BaudRate',9600);      //defines serial port

fopen(ar);                                //opens serial port
```

```
fprintf(ar,'%d',data_att(j));          //sends data to serial port
pause(1);                              //waits for next data
fclose(ar);                            //closes serial port
```

Part 4: Receiving data from serial port in arduino IDE

In this part we use the arduino IDE program for reading data from the serial port.

We use the command: Serial.parseInt() to read integers from the serial port(since we know that the data transferred via serial port are binary of HEX).

We then store the data read from serial port in a variable and check the number.

Part 5: Controlling the LED

In our project the LED turns on when the level of attention drops lower than 50 and turns off when the level if attention is higher than 50.

Part 6: Showing data using Live Senor

We add some parts to our arduino code so that the data can be transferred from ESP8266 to a web server created by flask, Then we can view the changes in attention live on a html page.

Part 7: Showing data in Things Board

Things Board is a platform for showing the data graphically.

We install Things Board on linux on another lap top number 2.Since we want Things Board on to access the internet of our server we use bridge to connect linux to windows.Then we use ESP8266 for sending data from laptop 1 to laptop 2 via WiFi.

Data are received by the second laptop and are shown graphically on Things Board.

Conclusions:

Measuring attention can be useful for monitoring the coma patients level of awareness.

It can also be useful for enhancing brain features and finding the best time during the day to learn.

Most importantly monitoring attention is useful for autistic children since they are not able to express themselves properly.