Ambilight using Arduino Nano

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The aim of the project is to create a system that creates the Ambilight(ambient lightning) efect on the computer screen. That is, using a led stripe, showing the colour that appears on the computer screen at the back of this. Our software should read brightness and colour of the screen in order to create this effect.

Subject: Intermediate Project
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1. Description.

Ambilight is the short of “ambient lighting” a lightning system for televisions. We will use this concept to refer to our Project. Instead of a Television, we will use our computer to test it.
The Ambilight works this way: We process the signal/data from the screen using Prismatik[1] Software and use it to reproduce the same colors from the screen to a led stripe conected at the back of the computer. That data is sent to our Arduino Nano[2] microcontroller using the serial port of our computer. Then the arduino Nano sends data to the addresable[3] led stripe and shows the colour.

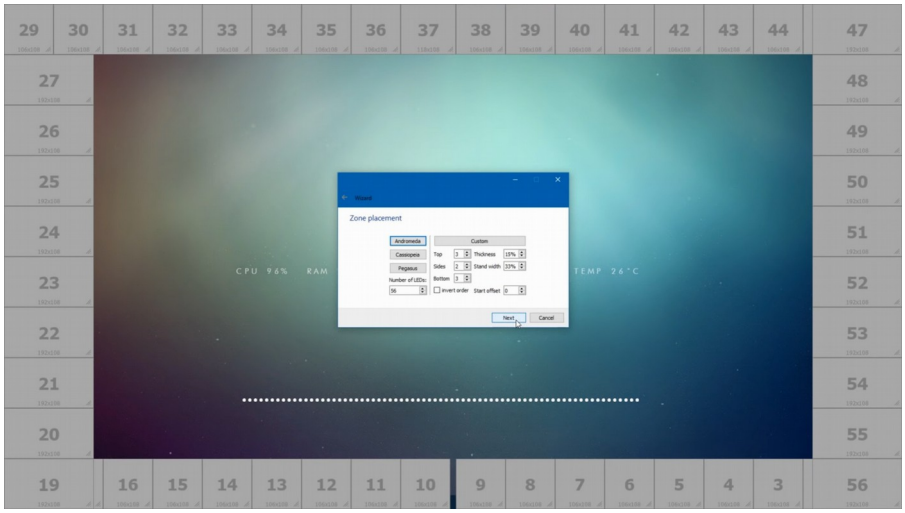
2. Stages of development.

2.1 Software.

The software tools used for this project are:

The main program Arduino IDE[4] to compile the main code and upload it to the microcontroller provided by Arduino. We will need an extra library for this project such as FastLED[5] wich is a library for programming addressable LED strips.
A problem with the Arduino IDE is that sometimes the uploader does not work as it should, we fixed this problem changing the bootloader (The IDE has the tool to do it in an easy way).

For the screen colour reading we are going to use Prismatik. A part from reading the screen colours, this program helps us to locate all the leds from the stripe and redistribute the colors.



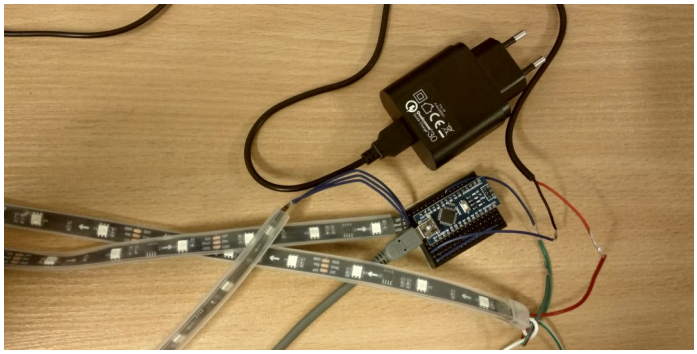
(Screenshot from Prismatik Software Tool)

Once we set up how we would like the colours to be shown, we configure the output from where the data will be sent to the serial port where our Arduino Nano device will be connected.

2.1 Hardware.

For the hardware we use a breadboard, the Arduino Nano microcontroller, an addressable led stripe, some cables, a phone charger(for the power supply on the led stripe) and a soledring station.

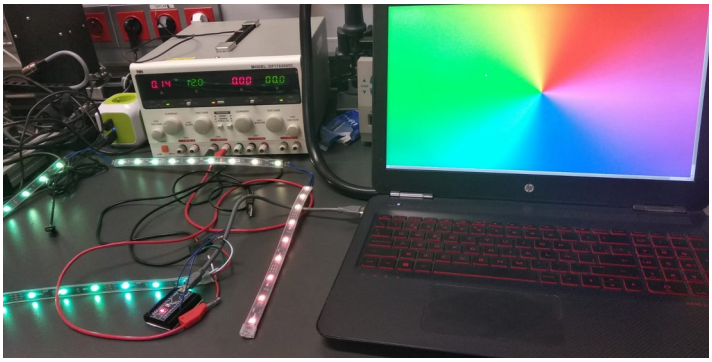
First of all we measured how much leds from the led stripe are we going to need to cover all the back of our computer and then cut and soldered them. We had a problem with the led stripe because they were supposed to be all with different address but they work in group of three. Nevertheless we can still see how it is working. With the data input of the led stripe connected to our Arduino Nano we can see how it is working.



(Picture of the prototype finished)

3.Conclusions.

After solving some small issues the system is working properly. It has a little delay due to the caption of the screen colours(not enough FPS). So far all the goals have been accomplished.
I had a little problem with the Arduino code because it was my first time programming code for that microcontroller. Thankfully is not difficult at all. I also had a problem with the led stripe, instead of buying a 5V input one I accidentally bought a 12V one, so I had to use a power supply from the laboratory to make it work properly.



(Picture 1 of the system fully working)

4.References.

[1] Prismatik. The main tool of the project https://lightpack.tv/

[2] Arduino Nano. Microcontroller used in the project. https://store.arduino.cc/arduino-nano

[3] Addressable. The type of our led stripe. All locations(leds) can be separately accessed by a the program.

[4] Arduino IDE. Program used to compile the code for https://www.arduino.cc/en/main/software

[5] FastLED. Library used. http://fastled.io/