Social distancing vest 2021

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A biosecurity vest designed to raise awareness about social distancing, which has a light and auditory signal

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Introduction

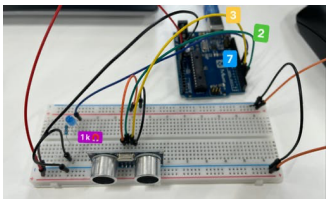
Currently, we are living in the midst of a pandemic in which different protocols and steps to follow have been handled. We also know that COVID-19 spreads through close contact with people who have the virus. People with the virus can get infected even if they have no symptoms. When a person with the virus breathes, speaks, coughs or sneezes, he releases small droplets containing the virus, COVID-19 can be contracted if we inhale these droplets or if we get to touch surfaces covered with these droplets. Therefore, the risk of contracting the virus is higher indoors and in crowded places. That is why, with the risk that we can choose to get infected in small spaces, we created a prototype of social distancing... You may be wondering how it works? well, this prototype is intended to make you understand the person who owns the product and the person who wants to get closer or even is close to this person. Additionally, so that this person knows that he is at risk of being in contact with the other, the prototype launches an alarm signal with LED lights to indicate if they are too close and making them understand that they have to keep their distance to more than 1 meter in outdoor areas and more than 1.5 meters in reduced areas.

Process of Creation

This project was carried out in the Digital Manufacturing class of the year 2021. In which, we were proposed to carry out a project on social distancing. That is why after many ideas in mind, it was decided with the group to make a kind of vest as a garment to contain the sensors. Ideas like caps were taken into account, but we concluded that for a better management of the distance and the height of the user the chest would be ideal, that's when the idea of a vest was born and its preliminary design was as follows:

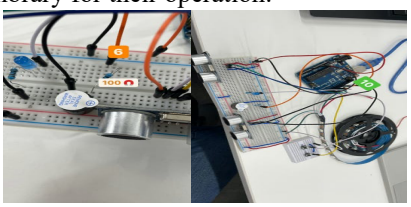
(Fig.1: Vest Idea design)

So we start with our circuit approach, what are we going to do to create a social alarm... well, what we did was build a circuit, using two variable ultrasonic sensors, that can measure the distance between one person and another. This mode will work in two modes: one indoors, where the WHO recommends maintaining a distance of 1.5 meters between each person, and another outdoors, which will work only 1.0 meters. In addition, for the sake of matching the alarm clock, it was decided to set two alarms; light and sound signals, which will be described in detail later. The first project is:



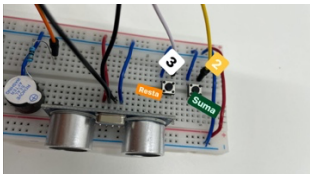
(Fig.2: the numbers represent the digital pin used)

Which consisted only of a sensor, connected to their respective digital pins and an LED that would serve as a guide for operation. We continued to advance with our circuits until we finally established the two sensors and downloaded the respective library for their operation:



(Fig.3 and 4: Buzzer and neopixels)

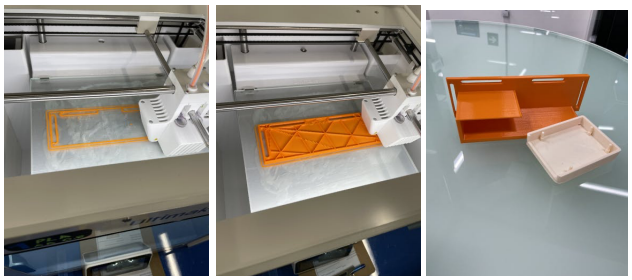
Finally, to conclude with the electrical circuit, it was decided to use two buttons to switch between operating modes; the top button would set a counter to 1 to put the sensor in indoor mode, while the bottom button would be responsible for setting the counter to -1 and therefore in outdoor mode... It should be clarified that between 1 and -1 is the 0 number that we use to turn off our vest. The buttons were as follows:



(Fig.5: The numbers represent the digital pin used)

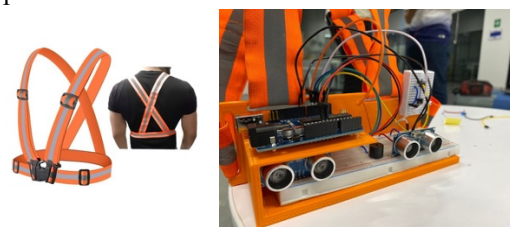
Design Process

Very well, this is how our circuit for the vest would end, however, it was still necessary to establish how our circuit would stay in the vest; that's when it was decided to design a solid structure that would serve as a support for the sensor and that would go just on the chest of our vest, the design of our solid we carried out digitally to then be printed on an Ultimaker, it was developed as follows:



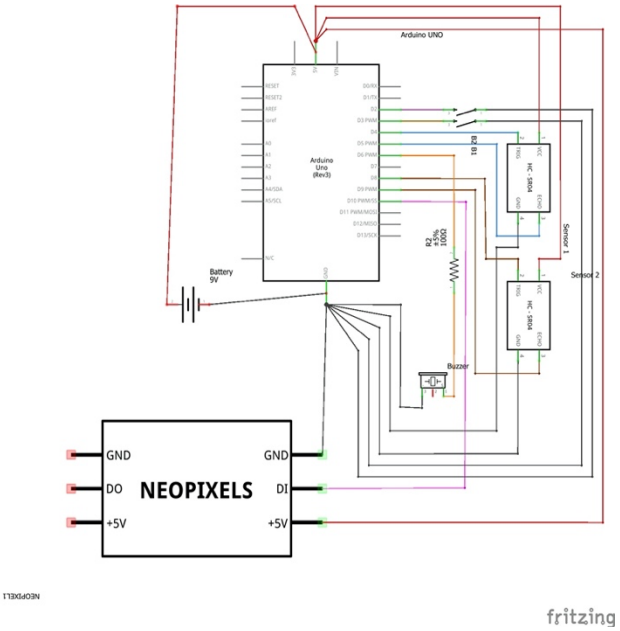
(Fig.6,7 and 8: Printing parts in Ultimaker 3d)

To conclude with the physical design, the design of the vest was completed and it was taken with a tailor to place the orange plate on the chest:



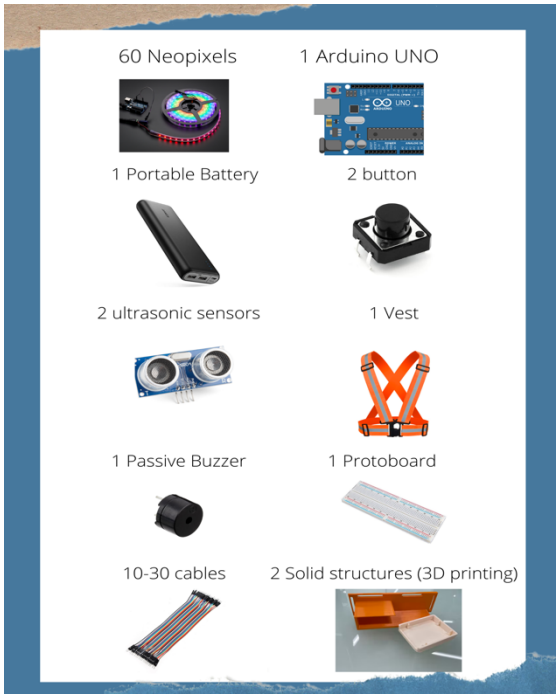
(Fig. 9 and 10: Final vest design and final assembly)

Schematic diagram



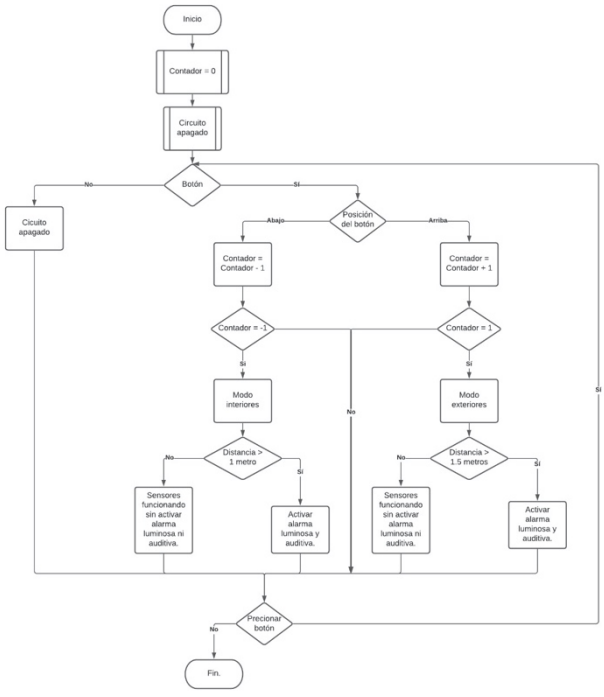
(Fig.11: Full electric vest circuit)

List of materials



(Fig.12: Materials)

Flowchart code



(Fig.13: FlowChart)

SCAN ME TO GET THE CODE

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