Traffic light for visually impaired

Rodrigo Porto
Rio de Janeiro, RJ
Brazil
http://escolaeleva.com.br
rodrigo.porto@alunoeleva.com.br

Jean Menezes
Rio de Janeiro, RJ
Brazil
http://escolaeleva.com.br
jean.menezes@escolaeleva.com.br

ABSTRACT

The project consists in a traffic light that helps visually impaired to cross the street. It is basically a traffic light that verifies every time someone wants to cross the street or not and produces different sounds so as to tell this person whether the traffic light is red, yellow or green. The traffic lights were created as an iteration of another project, developed in collaboration with a group of classmates from Escola Eleva, in Rio de Janeiro. One of the project's main motivation was the necessity to figure out a way to make technology help people and affect their lives. Despite the fact that I hadn't known what Arduino was until the beginning of this year, I discovered what it was and I could create a project using Arduino motivated by trying to find a solution for a big problem that is: how to make visually impaired cross the street. Since I could create a new project using something that I had learnt in the beginning of the year, there must have been something magic during my work. There was. I concluded that every time you're motivated by a noble cause, you are able to accomplish everything and this is the lesson that I'd like to share.

Keywords

"Traffic light" ; "visually impaired" ; "crossing"; "street"
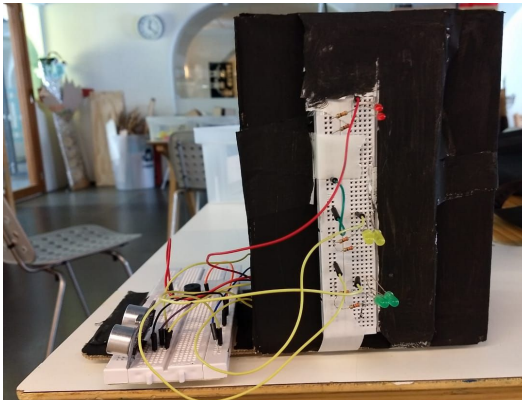
Front view
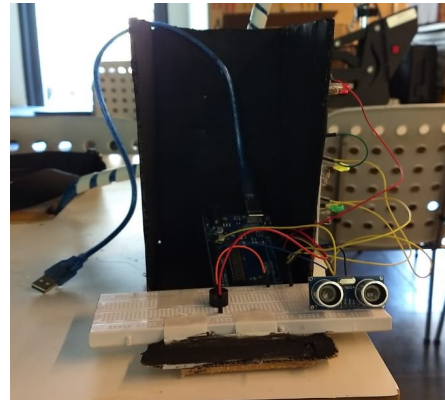
Side view

2.   PROJECT DESCRIPTION

The physical part of the project is a box which contains 2 protoboards. One of them is attached on one of the faces of the box and the other is on the opening of the box. The one attached to one of the faces will be the traffic light and contains LEDs to represent it. Imagine that they're pointing to the street. The other protoboard contains a buzzer and a distance sensor and they are pointing to the sidewalk. Finally, there is a Arduino which is responsible to receive energy and send it to the protoboards and it is located inside the box.

The project works this way: There is a traffic light with 3 LEDs: a green, a yellow and a red one. Attached to it, there's a distance sensor that detects either there's someone or not. Imagine a visually impaired person trying to cross the street and this person is on the reach of the distance sensor. Every time it's green for the cars, a buzzer will be activated in a frequency x in order to tell this person not to cross the street. Every time it's yellow, if the sensor detects someone it will activate a buzzer in the frequency y which will tell this person that the traffic light is on yellow for the cars. Finally, if it's red for the cars, the buzzer will not be activated. So, if the person knows that he/she is on the reach of the distance sensor and doesn't hear anything, then this person may cross the street. Here is the link to show the project: https://www.youtube.com/watch?v=iVGMKfXyGwg&feature=youtu.be

The second link is an example of how the idea of the first link would be applied: https://youtu.be/ri50NcIuwq4

One day, I was working on my project and after finishing what I was supposed to finish, I left it in Makerspace as usual. When I came back in the next day, the project wasn't the same: What remained was the Arduino, the protoboards, the distance sensor and some wires in the wrong place. I talked to my teacher and he said the kids from second and third grade hadn't probably read my name in the box and they had destroyed my traffic light. I got really upset with it, but I couldn't give up, because if I had done it, all my effort would not have been worth. So, I recreated and I've learnt an important lesson: If the live punches you, stand up stronger. Another important lesson is: Always highlight your name in projects.

2.1   Project Overview

My school encourages students to reflect on the different realities of the world in which we live. Thus, it annually promotes a science fair where groups of students come together to put into practice the ideas that arise. My group's original ideas[2] inspired me to further develop and build the current version of project during school's Makerspace classes. Then, I made researches to expand my knowledge about blind people's situation in Brazil, I developed the software, hardware, and built the prototype. The goal was to create a traffic light model that would provide self-confidence for the visually impaired and make them feel more participative in society. And, thinking of this idea, I realized that the same project would also contemplate people like my grandfather and his friends who, over time, lost part of the vision; colorblind people and distracted people with cell phones. The sound made by the traffic lights would aid in the safety and prevention of accidents, not only related to blind people.

2.2   Lessons Learned

I've learnt 2 different and important lessons throughout my project: The first one is that everything is possible as long as there's a noble motivation for it. The last one is that live only makes sense if you're audacious and, despite the situation, you should never give up of what you believe in.

I've also learned how to work with Arduino, how to create complex projects in it and I've experienced awesome experiences with other people which were blind and I understood how they feel. I think an important ability which I developed is the ability to find out a way to execute something without enough materials and time because this is exactly what happened to me. Finally, I've also searched statistics about visually impairment in the world and I discovered that about 39 million people in the world are blind which made even more enthusiastic while working on the project.

3.   BIOS

I'm Rodrigo Porto and I'm 14 years old. At the end of 2017, I applied for a school called : Escola Eleva, one of the best schools from Rio de Janeiro. I passed the exams and I was given a 100% scholarship based on my results and my financial condition. I started to study at this school in the beginning of the year and it completely opened my mind to see all the social problems faced by Brazil nowadays. The method of education sensitized me to grandpa's friend of mine situation and made me create this project. But it wasn't like this before.

My last years of middle school had been concluded in public schools because my parents were not able to pay for private schools. Unfortunately, the public education in Brazil is a disaster and there were times that teachers didn't even go to school because they hadn't been given their salaries from 2 months ago. So, I had to learn lots of things by myself which was hard but important too. In fact, since I didn't know what the teacher was supposed to be teaching, I've learnt even more than I was supposed to learn and this made my life a lot easier this year at Escola Eleva.

So, I think I became self-learner and this also helped on my project of the traffic light. Now, despite the fact that I hadn't had classes, I thanks my teachers because I became a person who likes to learn and create and I found out the knowledge is far beyond the classroom.

4.   ACKNOWLEDGEMENTS

5.   REFERENCES

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[2]   Porto, R. S. D.; Chalom, C.; Zambrotti, E. A.; Gorini, A. P. P.; Ramos, J. P. V. S. O Fim do Problema Mais básico Relacionado à Deficiência Visual, Escola Eleva Science Fair, 2018.