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## MULTISSENSORIAL WALK: CANNA PROJECT

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## INTRODUCTION

Accessibility is indispensable in the current context of the world, according to data from the 2010 demographic census of the Brazilian Institute of Geography and Statistics (IBGE), 18.6% of the Brazilian population has some type of visual impairment, and it is estimated that 528,624 people cannot see, 6,056,654 people are blind or have low vision (subnormal vision), which are considered individuals with a visual field of less than 20% and 29,000,000 have permanent difficulty seeing even with glasses or contact lenses. These numbers are worrying when realizing that the country lacks adequate planning for urban infrastructure, guaranteeing accessibility, safety and autonomy for the visually impaired and how people deal with this can often be an obstacle for them, and it is possible to point out that of these, 14 % have great difficulty in basic daily activities, such as working and studying, which violates the guarantee of the new constitution of 1988 (Article 6th sole paragraph) that defends the social right of man to work and access to education. In view of this, over time, laws were created to promote accessibility for these disabled people, such as, for example, Law 8.213/1991 (Article 89 sole paragraph) which says: "The qualification and professional and social rehabilitation must provide the beneficiary partially or totally incapacitated for work and to people with disabilities, the means for (re) education and professional and social (re) adaptation indicated to participate in the labor market and the context in which they live." (BRASÍLIA, 1991) and Article 93 sole paragraph, determines that the company with 100 or more employees is obliged to fill, from 2% to 5% of its positions, with rehabilitated beneficiaries or people with disabilities, since the law 11.126/2005, created 14 years later, ensures the visually impaired the right to be accompanied by guide dogs and then in

2012 Law 12,587 was created (Article 24 §5°) which guarantees accessibility for people with disabilities and mobility restrictions, aiming to organize means of transport, mobility networks in municipal territories and infrastructure for the disabled. This difference in years demonstrates society's lack of concern for the disabled.

We live in a society that is very dependent on communication and information technologies and this dependence has intensified even more during the period of the COVID-19 pandemic in order to adapt to the scenario of a worldwide outbreak and social isolation. Digital technologies were fundamental and it can be said that they stimulated the need for innovation. It is possible to observe that with each passing day new things appear in the market, mainly in automation projects, which use technology to perform tasks, most of the time, without human interference or presence, however, little is said about automation projects. automation for people with disabilities. It is noted that the visually impaired population has been experiencing difficulties in their daily lives, having more and more problems to live among us, such as, for example, difficulties to cross a street and walk through the urban center with various obstacles. Usually, for the locomotion of the visually impaired, guide dogs or canes are used. With the innovations in technology, new and more effective means of locomotion can be created to help them, with that, this project brings the multisensory cane called Canna to make life easier for the visually impaired.

With the innovation of sensory canes that help the movement of the visually impaired in their routines, making it easier and more autonomous, new problems have also emerged, as there are people who do not have enough strength or mobility to use these canes, despite their light weight. In view of this, the following questions were raised: how

will people with reduced mobility be able to move freely with a cane? How to transform the cane into something innovative and revolutionary? Is it possible to create a cane model that is cost-effective and affordable for everyone? Can we create custom models for people with other types of disabilities? How could we further upgrade the technology of this cane over the years?

## **HYPOTHESIS**

To mitigate the problem of people with little mobility or a disability, a cane could be created where it is not necessary to apply effort. This cane uses distance sensors that alert the user about objects that appear in front of him and so that it is possible to alert the user, a vibracall is used that alerts him by vibrating the cane. Technology is always in constant evolution, so it is possible to take advantage of it so that we can increasingly facilitate accessibility for these disabled people.

## **OBJECTIVES**

### **GENERAL OBJECTIVE**

Based on Assistive Technology (AT), this project aims to identify obstacles and adequately guide visually impaired users in their desired trajectories both indoors and outdoors, aiming to provide them with autonomy, independence, quality of life and social inclusion.

### **SPECIFIC OBJECTIVES**

To provide accessibility and mobility for visually impaired people.

To create an eventual business so that the commercialization of the multisensory cane is possible.

Participate in events to publicize the project in order to get sponsorships for a future business.

## **JUSTIFICATION**

The theme, Multisensorial Bengal, was chosen with the aim of developing an innovative project with the previous knowledge of the author of the idea about programming with Arduino, with emphasis on society's disregard for the group of visually impaired people, leaving aside the problems that they face on a daily basis.

This project was originally created as a curricular activity in the classroom, however with the participation of the authors in the Congress of Scientific Initiation of UNIFAI (CICFAI) and in the Schools of Innovators, promoted by the Inova team of ``Centro Paula Souza``, there is a possibility of becoming an enterprise.

## **MATERIALS AND METHODS**

To carry out the project, a bibliographical research was first carried out, reviewing existing publications with the same theme that is based on a notion of creating a product similar to ours. After the research and certification of originality, the choice and purchase of materials necessary for the construction of the cane were made, with meetings held for the construction.

In order to build this project, it was necessary to use a distance sensor and a reflectance sensor, batteries and a charger for it, an Arduino Uno to control the sensors, a box printed on the 3D printer to protect the circuit and a walking stick to the structure.

After assembling the cane, it will be tested with a group of visually impaired people to evaluate the prototype and detect possible flaws. With the opinion of the test participants, improvements will be made to meet the demand of the target audience. After making the changes, the Canna project will be presented at school and out-of-school events to publicize the product with the aim of getting potential investors and sponsors,

leveraging the project to commercialization.

## RESULTS AND DISCUSSION

In addition to having the intention of using this cane that uses sensors to detect obstacles, we have the idea of availability and sales, which allows greater accessibility and autonomy for the visually impaired and, with the implementation of vibracall, users who also have hearing impairments will be able to use it freely in your day to day.

This cane, created by the students, was not only made thinking about helping the visually impaired individuals to move around, but also about their physical condition, as it

was designed so that it does not require great efforts to be used, thus facilitating its use by the elderly and with other types of needs.

From the tests to be carried out, we hope to conclude that this project has achieved the original objective of helping the visually impaired in their daily lives, alerting them to obstacles, steps, among others. This was only possible thanks to the use of an Arduino that is the heart of this project and also to the sensors that are like eyes that alert possible obstacles and objects. The cane was made with light materials so that it could be used by the elderly and people with other types of disabilities.

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