Study, Design And Implementation Of A Solar Smart Stick For Blind People

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INTRODUCTION

Over the years, the number of visually impaired people has increased more and more. for this reason, various works are carried out to help them move independently and in security. In this project, we study, design and implement an intelligent cane for people suffering from visual blindness by using several intelligent sensors to help the user.

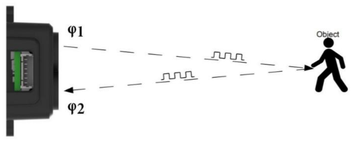
PROJECT OBJECTIVES

The objectives of this project are:

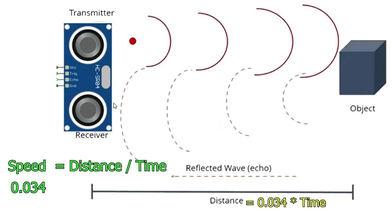
- Create a smart stick that is easy to use and meets the maximum needs of a visually impaired person when traveling.
- Detect objects at a distance of at least 100 cm and more.
- Use components that are suitable and usable in all circumstances.
- Different means of warning (Active buzzer, Passive buzzer, etc.) adaptable to user preferences.
- Suitable and sufficient life-Time, as well as an easily sustainable energy source.
- low cost.

DESIGN OF THE SYSTEM

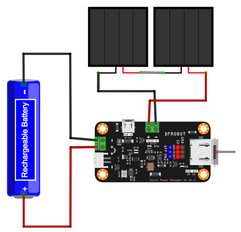
The electronic circuit is made up of several obstacle sensors connected to a processing card (**Arduino Uno**). One of the sensors is the **HC-SR04** ultrasonic sensor which measures distance by emitting a sound wave and calculating the time it takes for the wave to bounce back. It uses this time to determine the distance to an object. The other sensor is the **TF-Luna LiDAR** sensor uses laser light to measure distance by emitting pulses and detecting the time it takes for the light to return. It provides accurate, high-resolution distance measurements for objects within its range. The system is powered by a battery which is charged either by **solar energy** or by electrical networks via an adapter.



The Principle of TF-Luna LiDAR sensor.



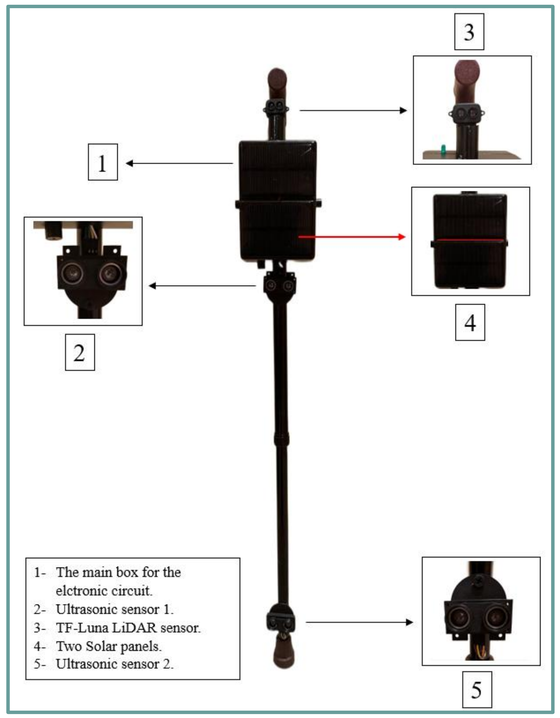
The Principle of HC-SR04 ultrasonic sensor.



Solar energy source for the system.

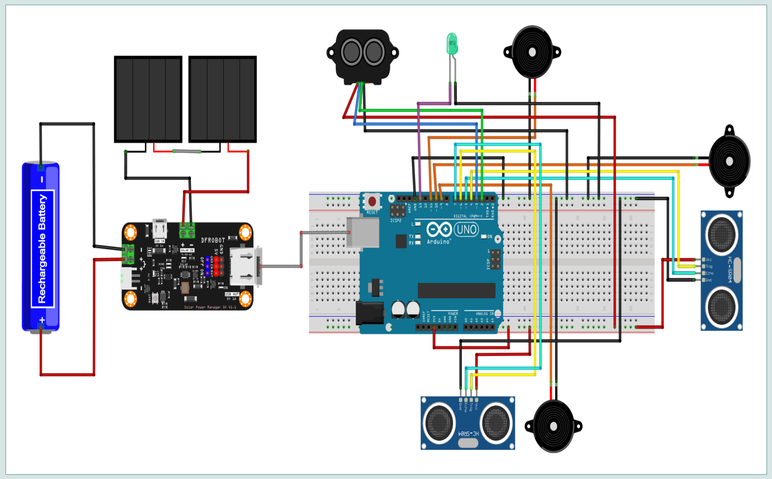
REAL IMPLEMENTATION DESIGN OF THE SOLAR SMART STICK

Front and side view of the design of the real solar smart stick.



Description of the real design of the solar smart stick.

CIRCUIT OF THE SOLAR SMART STICK



CONCLUSIONS

Solar Smart Stick is a valuable innovation that merges **renewable energy** with **assistive technology**, significantly improving the quality of life for visually impaired individuals. By addressing both mobility challenges and **environmental concerns**, it paves the way for a more inclusive and **sustainable future**. Continued research and development in this area will enhance its capabilities and broaden its accessibility, making it an essential tool for independence and empowerment..

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