Obstacle Detector for Blind People with low cost

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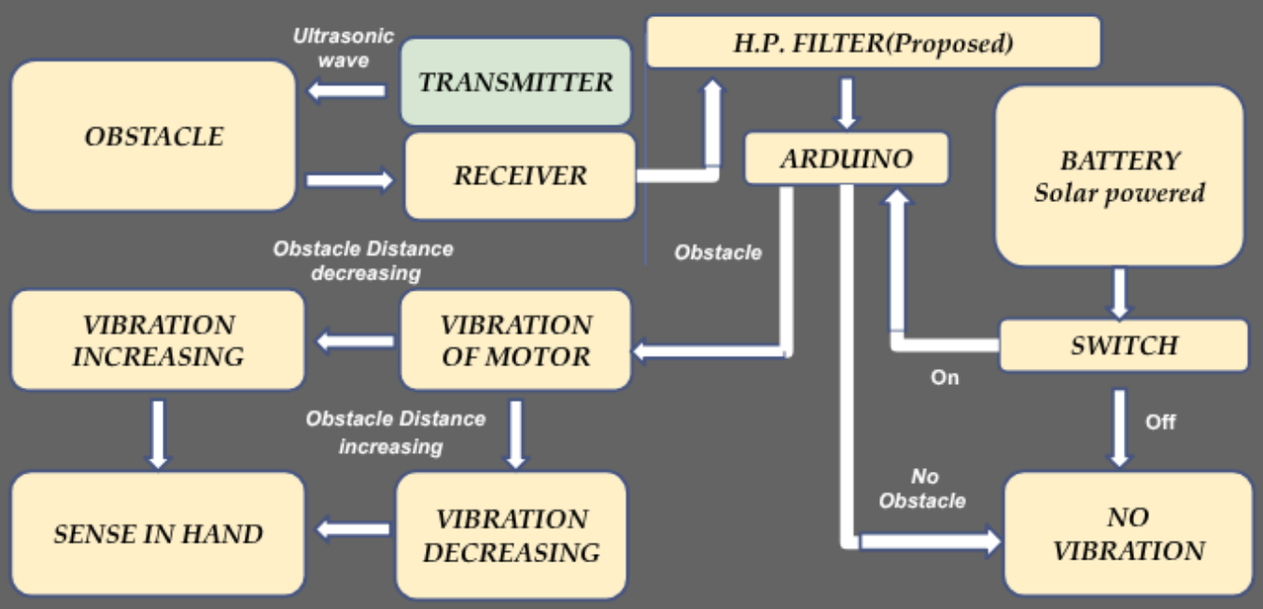
Abstract

*The name of this device is "**Obstacle Detector for Blind people**" . It is mainly designed for those who are unable to see and face many problems in moving everywhere safely within a limited distance. This device is made using some components which are easily available and not so expensive. The components of this device are **arduino uno, sonar sensor, battery, vibrating motor and switch.***

Project Flow Chart



Motivation

- *We wanted to make something easily available and cheap using renewable power source for visually impaired beggars.*
- *Same principle can be applied to help parents for keeping track of newborn babies movement inside a house.*

Primary constraints

- *Lack of funding for humanitarian projects.*
- *Lack of availability of **high-tech sensors** in our country.*
- *Conservative outlook of blind beggars towards using tech devices.*

Objective

- *Make blind people self –dependent .*
- *Self power generation system (solar cell) as power source for the device (Proposed).*
- *Make it easily available with low cost for every blind beggars of our country as well as blind people of moderate family background who use sticks to detect objects around them.*
- *Make it pretty flexible for the blind to use it without any training.*

Working Principle

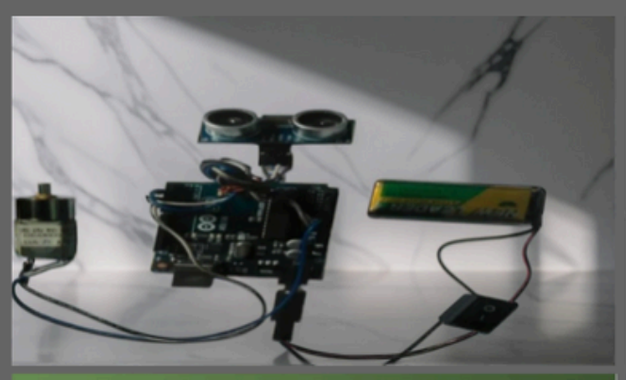
Sensor: *The sensor used here is sonar sensor. It sends out ultrasonic pulses in a course of time. It has two openings. one transmits ultrasonic waves and the other receives them. Naturally, **it can track the obstacles located at 61 inch (156.57 cm) and has a angular limitation of 15 degrees.***

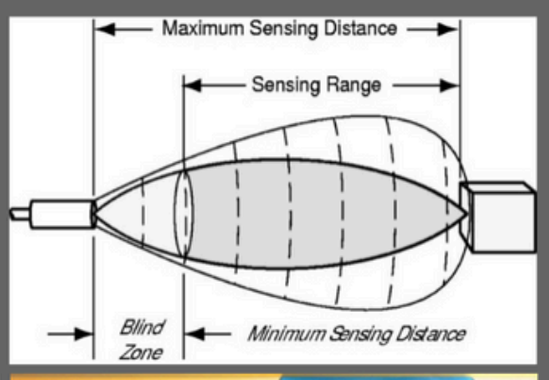
Relation between vibration and obstacles: *It is **programmed** in a way that motor vibration is inversely proportional to distance. When a user with the device in hand gradually approaches towards an obstacle , the motor vibration gradually increases and vice-versa. When the detector is being worn on his hand and if he is approaching towards any obstacle, the motor vibration gradually increases. As a result, he will feel the increasing vibration pattern in his hand and realizes that there is an obstacle in front of him. Then, he can avoid that and move towards a safe direction.*

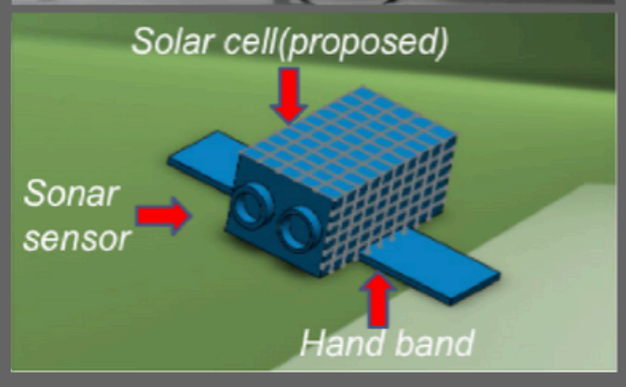
Scalability

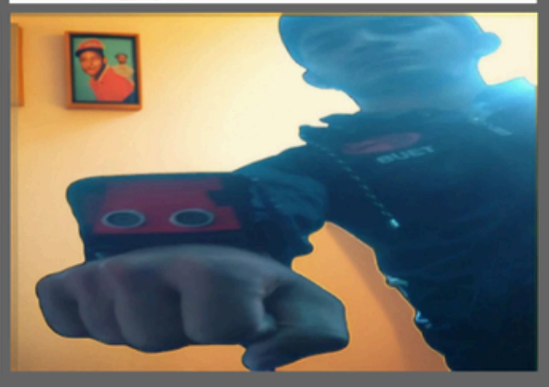
- *The user can use any starting value within the range of sonar sensor in order to detect the distance at which the motor will first start to vibrate or just start to detect the obstacle.*
- *Arduino Nano, arduino micro or self made PCB designed circuit board can also be used.*
- *The device can be worn in two direction i.e. **longitudinal & transverse** with respect to hand according to the comfort of the user.*

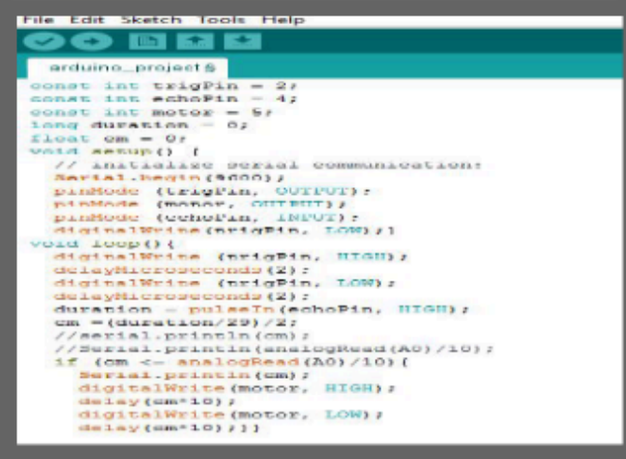
Hardware & Software











Our Contribution

- *Proposed an **algorithm** that can be easily understood and we have applied it in reality **which eventually worked**.*
- *Making it too much easy to produce at home.*
- *Making it lighter to be carried anywhere anytime.*

Implementation

We have successfully implemented this device on blind people (specially blind beggars) and all of them had positive replies with some suggestions as well. But most common was like if the device is freely get-able or not, if it can track objects appearing individually in left or right direction or both at the same time and what if the object is coming towards him.

Future Works

- *For making the device small in size and carrying easily, we have to do **PCB design.***
- ***Doppler effect** law for ultrasonic sound wave can be programmed in order to measure accurate distance from a **moving object**.*
- ***Two sensors angling in two direction** can be used to cover large area or to detect individually if the obstacle is in the left or in the right direction of the user .*
- *Tracking the sound waves coming from any angular direction. **Using a high pass filter** will remove noise which affects sonar sensors data receiving process. Also rotating on any plain or **degree of freedom** of the device can be increased to a larger extent.*
- ***Rechargeable battery or mini-solar panels** can be used for self power generation.*

References

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