A New Hope For Blind People Using Distance Sensors

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Introduction

There are millions of blind people in the world. Most of them do not live well in our societies because they can't perform their daily activities in the society. This project aims to provide a solution which would help the blind people in our current society. This is an electronic device which helps blind people to move or travel from one place to another without hitting any obstacle around them. The device produces an alarm if an object is detected in a range of 1 meter distance.

This device reduces the need of a blind person to have a stick in order to move, because millions of blind people around the world use blind-sticks to move from place to place but the drawback of the blind-sticks is that they can only scan a small area ahead of the blind person and also they can't detect objects which are at head level, thus making this device essential to be used by blind people. This device can be wearable like a wrist watch or it can be attached to the blind-stick for higher efficiency, hence it is comfortable. It is user-friendly because it doesn't consume a lot of power also it can be bought at an affordable price.
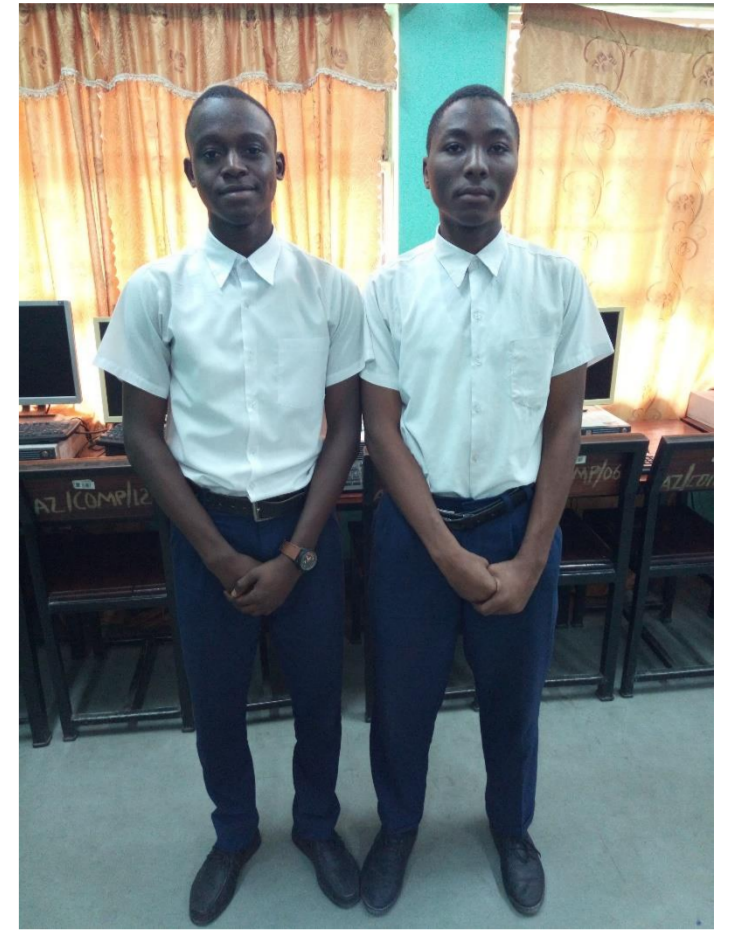
Method

The device consists of a plastic case, a micro-controller board(Arduino), a distance sensor, a speaker and the power source. The Arduino is the brain of the device, it controls all the functions in the device. The distance sensor uses ultrasonic sound waves, it produces sound echo's and find out if there is an object in the range of 1 meter. The speaker produces the alarm. The power source powers the whole device, it consist of a switch and batteries. The case protects the electronics inside from moisture, dust and sunrays. Some of the above components are connected with wires in order to complete the circuit. The following is the list of accessories we used and their pictures:

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	Arduino
	HC-SR04 Ultrasonic sensor
	Electronic speaker
	Wires

Procedure

The device is divided into two major compartments which are; The internal and the external. The internal includes the circuitry and the external structure consists of case or cover.
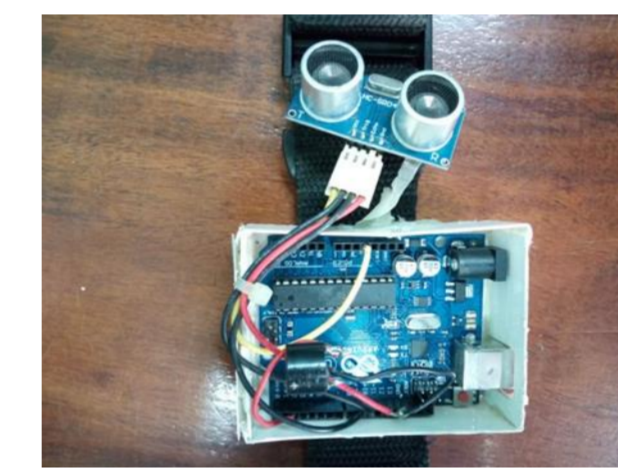
Results

When the switch on the device is turned on the distance sensor starts producing ultrasonic sound echo's which scan for objects on a range of 1 meter, when there is an object in that range the sound echo's produced bounce off the object and then returns to the distance sensor to be collected as readings, then the readings are sent to the Arduino UNO to be calculated in form of numerical values, after that the Arduino UNO triggers the speaker to produce an alarm thus showing that there is an object along the 1 meter distance.

Distance	Sensibility
0 – 25 cm	Continuous sound
0 – 50 cm	Continuous sound
0 – 75 cm	Continuous sound
0 – 100 cm	Continuous sound
0 – 102 cm	Occasional beep sounds
102 cm – above	Doesn't produce any sound
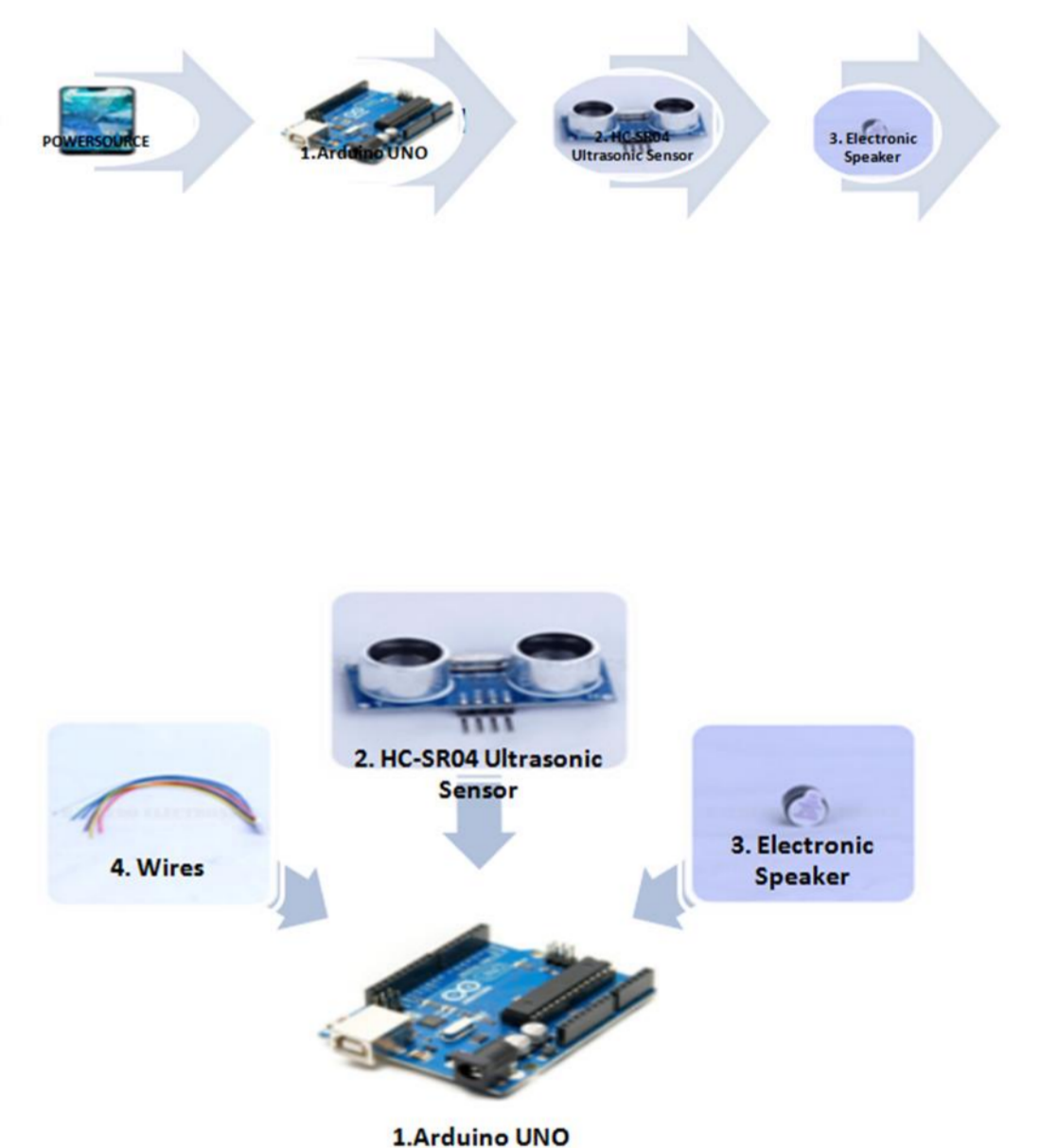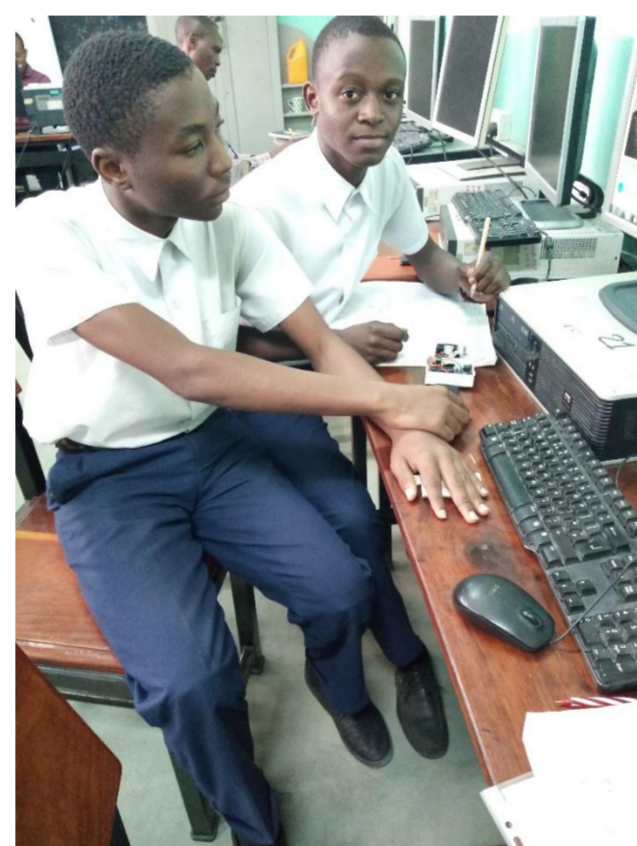
When an object is detected in the distance of 0 to 1 meter (100 cm), the electronic speaker is triggered and continuous sound. But, when an object is detected in the distance of 0 to 1.02 meter (102 cm) the device can either beep sounds. If it is 1.02 meter (102 cm) and above, it doesn't produce any sound.

Conclusions

From the results of the above research and experimentation it is right to conclude that the use of this device facilitates the everyday life of blind people. The device ensures comfortability and a smart life to the user.

The device's components and structure are indeed more helpful to a blind person than the use of blind-sticks. The device size can be decreased to a real smart watch size by using smaller micro-controller boards (Arduino).

Also we can upgrade the device by decreasing its size to a real smart watch size by using smaller micro-controller boards (Arduino) and to make it rechargeable in order to reduce the cost of power source maintenance.