Abstract

Aid for the visually impaired

Team: OCULUS

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MOTIVATION

India is home to the largest population of visually impaired people. Out of the 37 million blind people in the world, India has 15 million – 26% of which (3 million approximately) are children. Our project, if implemented in the right way could make the life of this neglected population loads easier.
(Statistics taken from TOI)

WHAT IT DOES

1) Detects obstacle in the path(via ultrasonic sensors). The speaker gives directions(eg. Turn left/right, watch your step/head)
2) Detects whether it is day or night.(using LDR). The torch on it switches on in the dark.
3) We will attached a transmitter and receiver so that in case the person doesn't find it then he can press a button and it starts ringing.
4) There is a normal mode and traffic mode. The normal mode is for non-traffic situations. The traffic mode is to help the visually impaired person to cross the road or in outdoor environments essentially.

FOCUS

We will first focus on executing the normal mode operations (and then the traffic mode operations if time permits).

HOW WE PLAN TO DO IT

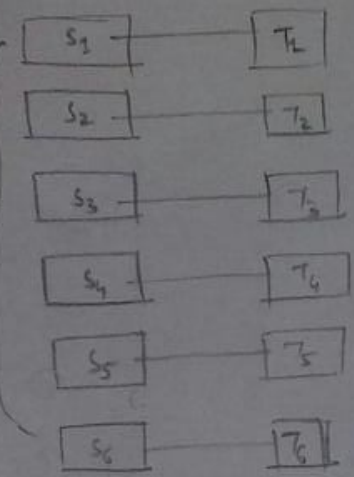
1) Obstacle detection will be done by ultrasonic sensors. There will be 5-6 sensors at different positions- each will be wired differently in the circuit, and will trigger the appropriate response.
2) There will be an LDR in the circuit. We will make a transisterised circuit such that depending on the light intensity, the mini-torch switches on if it is dark. There will also be another button which on being pressed, will start creeking if it is dark.
3) We will attached a HC05 chip and program it likewise so that it responds to the Bluetooth signals from the Android phone. We will use Google APIs so that the blind person will be able to find it.
4) We will include a speaker in the device in which our recorded commands are stored. The speaker will play the corresponding command based on where the obstacle is detected.
5) We are trying to include another utility in the device by which it will be able to detect whether there is water in the path so that the blind person will not slip. Basically we will attach the speaker which gives the corresponding response if the water is present in the path. The circuit works on the principle that the circuit is complete when it comes in contact with water as electricity is conducted.
6) We are also trying to include a normal mode and a traffic mode so that this aid might help the user in external environments(eg. It may make crossing the road easier for the user)
    - We aim to achieve all this either in the form of a handglove or a stick or a wrist band or a waistband- depending on which is most feasible.

BLOCK DIAGRAMS

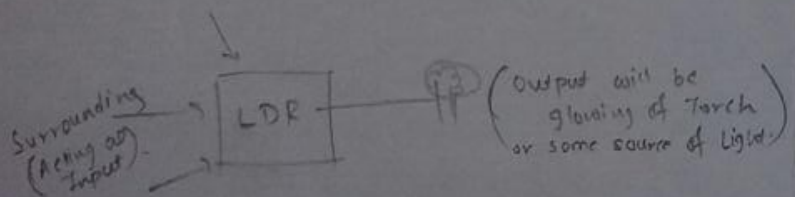
S_1 -> Sensor 1
S_2 -> Sensor 2
:
S_6 -> Sensor 6

T_1 -> Speaker 1
:
T_6 -> Speaker 6

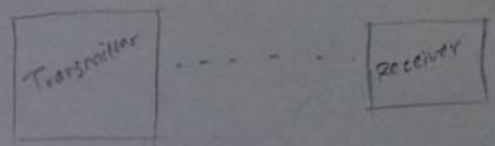
Obstacle
(Acting as Input)



LDR:



Aim: To find out misplaced stick.



The above thing is for finding out where the stick is using the HC-05 chip.

MATERIALS REQUIRED & ESTIMATED COST

1) Ultrasonic sensors(HC-SR04) – (7* Rs. 100)
2) LDR sensor module - (1*Rs. 245)
3) (Functions as a Torch) High power LED flashlight circuit(6 LED for 1.5V AA battery) – (I couldn't find its price on the net…. But if we don't get this we will use a simple small torch which wont cost more than Rs. 300)
4) AVR 40 pin ATMEGA microcontroller(1*Rs.220)
5) Batteries (1* Rs.600)
6) ICs and other essentials to make the circuit(approximately Rs. 500)
7) Buzzer(Alarm)(1* Rs. 250)
8) Speaker(1* Rs. 250)
9) Basic raw material required.(approximately Rs.500)
10) HC05 bluetooth(used in XLR8) (1*Rs.280)
11) Other paraphernalia like resistors, LEDs, etc. (approximately Rs. 100)

- Note: This is a rough estimate and is subject to any changes we make in the plan. We will try to minimise the cost to make it cost-efficient.

RESOURCES REQUIRED

1) Knowledge about how to programme and use HC05 chip
2) Knowledge about specifications of sensors which are of our use

3) Knowledge about speaker specifications.

LEARNING MOTIVES

1) Electronic Circuit designs
2) How to build various subsystems in one particular macrosystem
3) To get a fresh hand in technical stuff.
4) Team Work.

TIMELINE

We will start on 5th May 2016.

Week 1: Gathering all the components, learning the HC05 programming, and some electronics, making some refinements in the plan

Week 2: Making the circuit for water detection.

Week 3: Making the glove and making the ultrasonic sensors+speakers circuit

Week 4: Making the HC05 circuit and programming it

Week 5: Finishing touches and refinement to the last 4 weeks work and work on execution of normal mode and traffic mode.

Week 6: Execution of normal mode and traffic mode.

Week 7: Execution of Normal mode and Traffic mode.

Week 8: Finishing touches to the project.

REFERENCES

http://ocw.mit.edu/courses/edgerton-center/ec-s06-practical-electronics-fall-2004/labs/