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THIRD EYE FOR BLIND PEOPLE

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ABSTRACT

This device includes a pair of glasses and an obstacle detection module fitted in it in the center, a processing unit, an output device i.e. a beeping component, and a power supply. The Obstacle detection module and the output device is connected to the processing unit. The power supply is used to supply power to the central processing unit. The obstacle detection module basically consists of a ultrasonic sensor, processing unit consist of a control module and the output unit consists of a buzzer. The control unit controls the ultrasonic sensors and get the information of the obstacle present in front of the man and processes the information and sends the output through the buzzer accordingly. These Ultrasonic Smart Glasses for Blind people is a portable device, easy to use, light weight, user friendly and cheap in price. These glasses could easily guide the blind people and help them avoid obstacles.

Keywords – Smart Glasses; Ultrasonic Sensors

INTRODUCTION

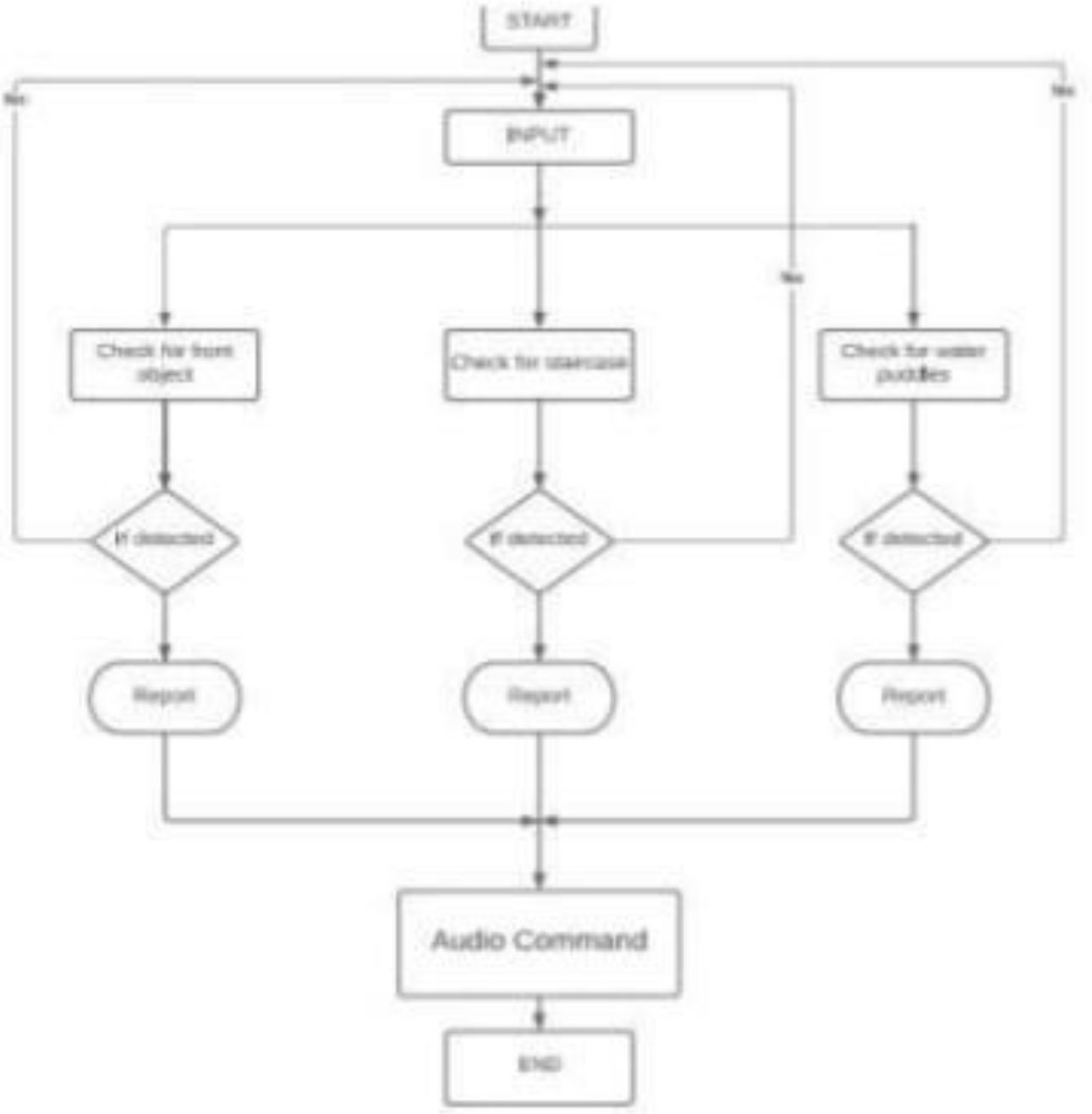
Third eye for blinds is an innovation which helps the blinds people to navigate with speed and confidence by detecting the nearby obstacles using the help of ultrasonic waves and notify them with buzzer sound or vibration.

Blind people have been using the convention white stick for a long time which in spite of being beneficial to them still has a considerable measure of weakness. This innovation will be wearable for the blinds.

PROPOSED MODEL

Blind people as a special group needs the care and attention of the society to live a better life independently. However, this group of people faces hazards nearly everyday while traveling. Traditional navigation device is the blind cane, which is put to use by tapping the ground or walking around the object to determine the direction. The structure is simple, single function, easy to use, but the people encounter many problems such as poor road conditions, uneven, hanging in front of obstacles. Ordinary cane cannot be proven accurate, thus imposing a safety hazard on the blind travellers. A smart ultrasonic glasses for blind people comprises of a pair of wearable glasses, ultrasonic sensors for detection of obstacles in the way of a blind person, a buzzer to emit the sound as per the direction of the obstacle from the person, a central processing unit comprising of Arduino NANO which takes the information from the sensor about the obstacle distance and processes the information according to the coding done and sends the output through the buzzer. Power supply is given to the central unit which distributes the power to different components. The sensor is mounted in between of the top bar and bridge present in optical glasses. All the components are connected to the central unit using single strand copper wires and the power is given to the central unit using a USB cable. The best sensors that can be used will be ultrasonic sensors because this sensor is not affected due to atmospheric dust, rain, snow etc. It has higher sensing distance compared to inductive/capacitive proximity sensor

Figure: Flow Chart of the Proposed System



COMPONENTS REQUIRED

- Arduino nano
- Ultrasonic sensor (2)
- SPST (Single Pole, Single Throw) switch

- Vibration motor (2)
- 3.7 V battery
- Black sunglass
- Piezo buzzer (2)

ARDUINO NANO : The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328P released in 2008. It offers the same connectivity and specs of the Arduino Uno board in a smaller form factor.

The Arduino Nano is equipped with 30 male I/O headers, in a DIP-30-like configuration, which can be programmed using the Arduino Software integrated development environment (IDE), which is common to all Arduino boards and running both online and offline. The board can be powered through a type-B mini-USB cable or from a 9 V battery.

Technical specifications :

- Operating voltage: 5 volts
- Digital I/O pins: 14 (6 optional PWM outputs)

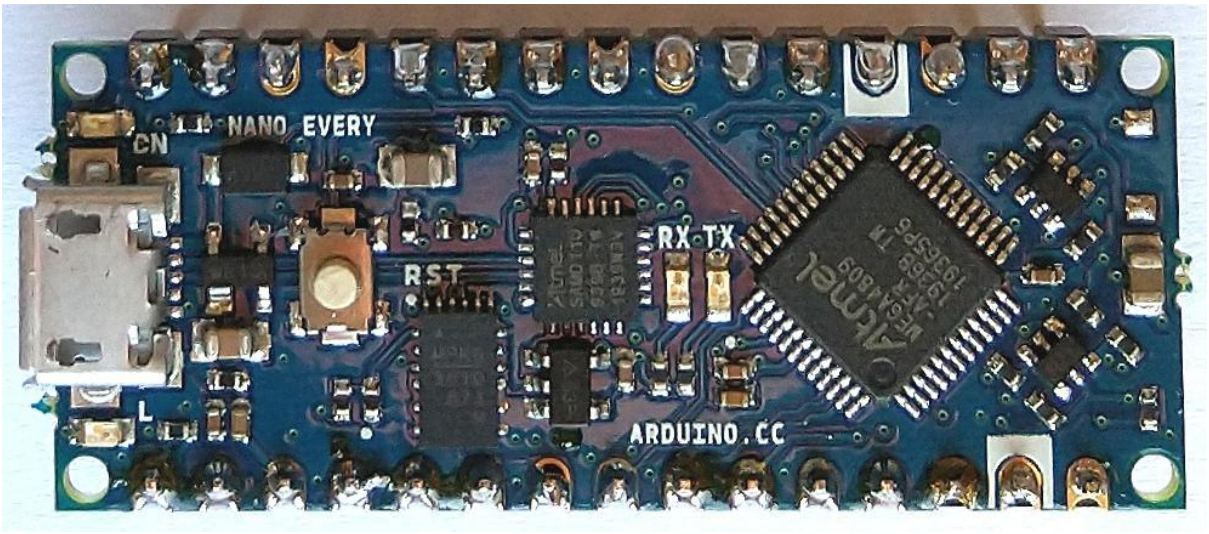


Figure: Arduino Nano

ULTRASONIC SENSOR : An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound (i.e. the

sound that humans can hear). Ultrasonic sensors have two main components: the transmitter (which emits the sound using piezoelectric crystals) and the receiver (which encounters the sound after it has travelled to and from the target).

Figure: Ultrasonic Sensor

SPST (SINGLE POLE, SINGLE THROW) SWITCH : The term "SPST" in an SPST switch stands for "Single Pole Single Throw" which includes a single input and a single output. Here, a single input is directly connected to a single output. The main function of this switch is to control the circuit by turning ON/OFF.

Once the switch in the circuit is closed, then the circuit will be turned ON whereas the switch is not closed or open, then the circuit will be turned off.

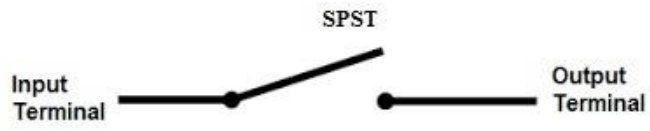


Figure: Switch Symbol

VIBRATION MOTOR : Vibration motors are a type of motor that provides vibration by operating electrical energy or pneumatic (air) energy. Vibration motors are used in all industrial machines where vibration energy is required, in food, feed, flour factories, in the construction industry in the forced water tunnels of subways, highways, hydroelectric power plants, etc.

Vibration motors, generates vibration energy by the rotation of the rotor of the energized motor.

Figure: Vibration Motor

LITHIUM POLYMER BATTERY (LiPo Battery) : A **lithium-ionpolymerbattery** (abbreviated as **LiPo**, **LIP**, **Li-poly**, **lithium-poly** and others), is a rechargeable battery of lithium-ion technology using a polymer electrolyte instead of a liquid electrolyte. High conductivity semisolid (gel) polymers form this electrolyte. These batteries provide higher specific energy than other lithium battery types and are used in applications where weight is a critical feature, such as mobile devices, radio-controlled aircraft and some electric vehicles.

Figure: 3.7 V – 1000 mAh Lithium Polymer (LiPo) Battery

PIEZO BUZZER : A piezo buzzer is a type of electronic device that's used to produce a tone, alarm or sound. It's lightweight with a simple construction, and it's typically a low-cost product. Yet at the same time, depending on the piezo ceramic buzzer specifications, it's also reliable and can be constructed in a wide range of sizes that work across varying frequencies to produce different sound outputs.

In the consumer electronics field, some of their most popular applications include sound generators in computers, telephones, toys and games — to name just a few.

Figure: Piezo Buzzer

OVERALL CONNECTION

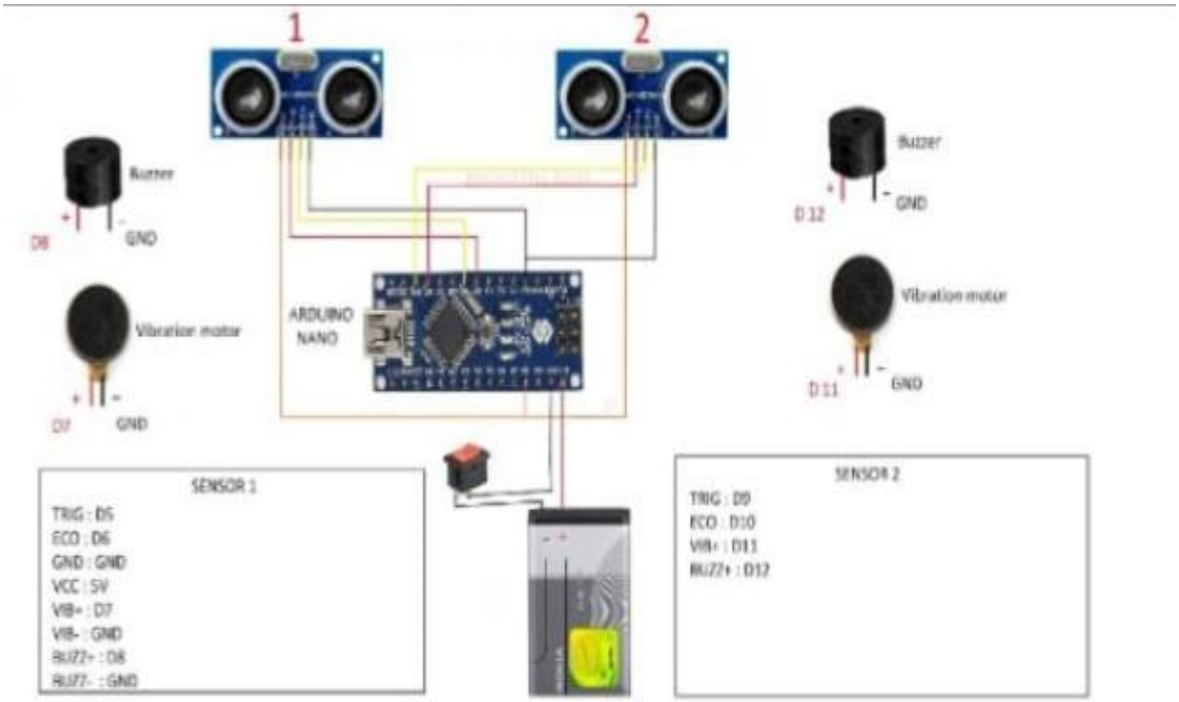


Figure: Circuit Diagram

We have connected the TRIG(trigger) of ultrasonic sensor 1 to D5 pin (digital pin 5) of Arduino Nano. Next we have connected the ECO to the D6 pin.

For ultrasonic sensor 2, we have connected the TRIG to D9 pin and ECO to D10 pin.

Next we have connected the positive terminal of the battery to the VIN of Arduino Nano. Then we have connected the negative terminal of 3.7 V battery to the positive terminal of SPST switch and we have connected the negative terminal of the switch to the GND of the ArduinoNano.

We have connected the VCCs of both the ultrasonic sensors to the 5v pin of the Arduino Nano.

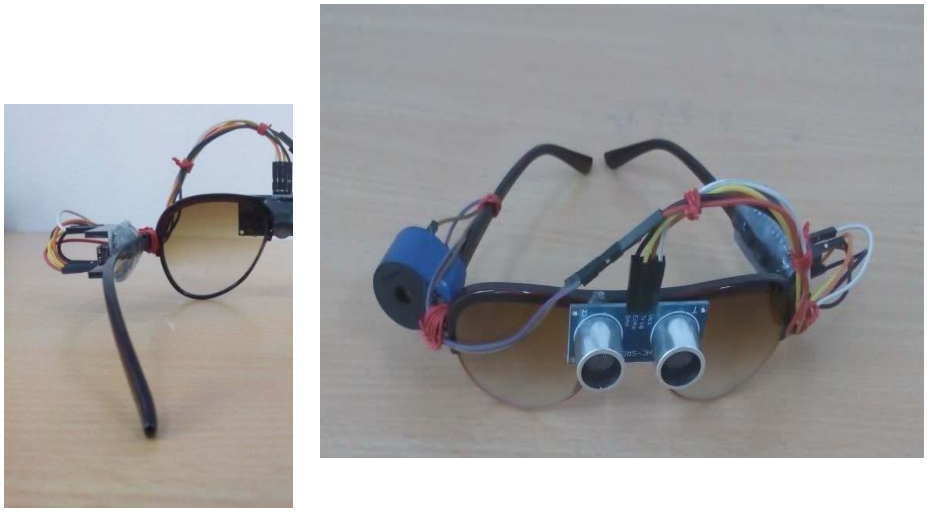
We have used two piezo buzzers here. We have connected the positive terminal of buzzer 1 to D8 pin and the positive terminal of buzzer 2 to D12 pin.

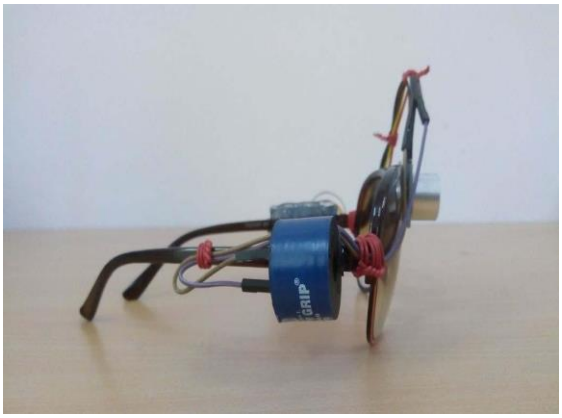
We have connected the GNDs of the buzzers to the GNDs of the ultrasonic sensors.

We have used two vibration motors here. We have connected the positive terminal of motor 1 to D7 pin and that of motor 2 to D11 pin. Then we have connected the GNDs of vibration motors to the GNDs of ultrasonic sensors. Then we have connected the GNDs of the ultrasonic sensors to the GND of Arduino Nano.

RESULT

As the blind person goes closer to the obstacle the distance sent by the sensors to the central unit will decrease. Hence the beeping of the buzzer will take shorter intervals thus the beeping will be faster. But as the person moves farther away from the obstacle the beeping will take long intervals and hence decrease.





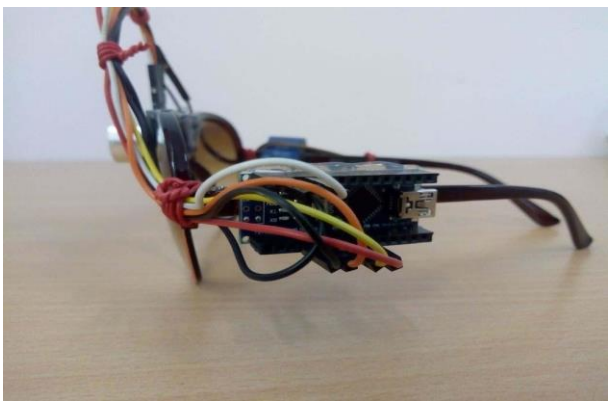


Figure: Smart Glass for Blind People

SUMMARY

At present, the blind people uses canes and guide dogs. But still some problems remain like training a guide dog demands at least 3-6 months. Moreover the ultrasonic glasses are very cheap and affordable by all. These smart glasses are very easy to use and very simple to understand thus proving beneficial to the blind society.

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