NAAYAN

(Glasses for blind people)

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ABSTRACT

We have often seen that blind people face a lot of mobility issues when no help for them leads to accidents. Even though some technologies are built to solve this issue but their incompetence, high cost, and poor reliability amid no benefit in the eye. Acknowledging all this situation and upon several reset types of research have figured out a device namely "NAYAN" which especially designed optics for the blind person that will help them in analyzing the obstacle's speed, and distance but also warns them of threats in both lateral and transverse directions.

Keywords: - *Nayan Optics, Artificial Intelligence, Sensory device.*

1. Introduction

New technology and ideas are taking over the globe, making people's lives simple and pleasurable while requiring less effort from individuals and completing some of the most challenging chores in a simple, useful manner. All of these inventions and innovations exist in every field and make it easier for people to carry out their daily tasks. But when it comes to helping blind people in need, no technology on the market can assist them or restore their eye-related abilities. Blind people encounter numerous difficulties in performing their daily tasks. Be it walking alone on roads, parks, or any such community places they seek other people's help to company them.

Recently, some initiatives to help overcome blind people's limitations have been made. The needs of blind persons have been somewhat met by a unique form of eyewear that has been developed. One of them is a spectacle that notifies blind persons of the object's proximity to the obstacle using infrared and ultrasonic sensors. But this system is quite simple and fundamental. Only the horizontal distance of the approach is known from the data obtained by ultrasonic and infrared sensors. Furthermore, the current technology lacks advanced alarm systems, 360-degree coverage, and depth.

To address these issues, we have developed new, less-complex smart glasses that are more dependable and specifically designed for blind people, eliminating all the drawbacks of the aforementioned technologies. Our "NAYAN" optics, a cutting-edge eyewear technology, measures the proportions of obstacles using sophisticated infrared sensors in addition to depth. When operating, the help of embedded the "NAYAN" system warns the user if an obstruction is detected using clever ultrasonic and infrared sensors that spin at 180 degrees.

2. DISCUSSION

Our "NAYAN" invention, which we are proposing, is a feature-weighted spectacle that enables blind persons' non-bionic eyes and aids in achieving complete independence in performing daily duties. To fully inform you of how "NAYAN" functions, the following are discussed:

The native ultrasonic and infrared sensor is placed on either side in a specially designed spectacle to begin the entire procedure. Reach out to the front-held obstacle's oncoming range. Both of these sensor modules are powered by servo motors that enable the movement of the sensor module in a 180-degree field of view to support this. Additionally, we have attempted to set up a system such that "NAYAN" can detect the depth and filtration of the road's surface. To prompt a response when an impediment is detected, the process information sent by the microcontroller in our product produces a very weak electrical shock.

Components details:

2.1 Ultrasonic sensor:

Using ultrasonic waves, ultrasonic sensors are used to measure distance. Sensors that use ultrasound produce the waves and then catch the reflections. The ultrasonic sensor will then measure the distance to the object at this point. It has a range of 2-400 cm. Function: The Ultrasonic sensor is employed in "Smart Glasses" to gauge the separation between the camera and an item to distinguish the text from the text image. This range is necessary to obtain a clear image, so the distance should be between 40 cm and 150 cm.

Distance $L = 1/2 \times T \times C$ L: The separation.

T: Temporary interval between emission and receipt

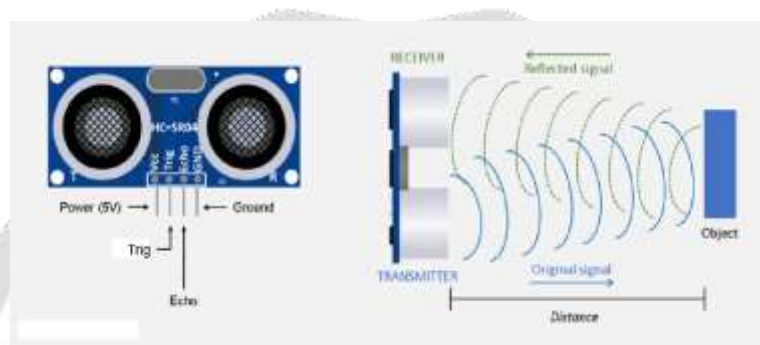C: Sonic velocity *The amount is increased by half since T is the time for the go-and-return distance**.**

Fig 1: Ultrasonic sensor

2.2 Servo Motor:

Servomotors enable accurate control of angular or linear position, velocity, and acceleration. They are also known as servomotors or servo motors. It includes a suitable motor.
connected to a sensor for feedback on position. It also needs a rather sophisticated controller, frequently a special module created just for use with servomotors.

Although the word "servomotor" is frequently used to describe a motor appropriate for use in a closed-loop control system, servomotors are not a particular sort of motor.

Applications for servomotors include robotics, CNC equipment, and automated manufacturing.

A vibration sensor is a tool that gauges the intensity and frequency of vibration in a certain machine, system, or piece of equipment. These metrics can be used to identify imbalances or other problems with the asset and foresee upcoming failures.
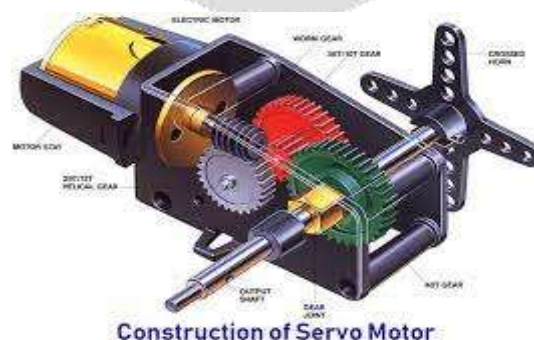

Construction of Servo Motor

Fig 2: Servomotor

2.3 Infrared sensor:

An electrical device that monitors and detects infrared radiation from its environment is known as an infrared (IR) sensor. William Herschel, an astronomer, made the unintentional discovery of infrared radiation in 1800. He observed that the temperature just beyond the red light was the highest while measuring the temperature of each color of the light (separated by a prism). Despite being on the same electromagnetic spectrum as visible light, IR has a longer wavelength than visible light, making it invisible to the human eye. Infrared radiation is produced by everything that emits heat (i.e., everything with a temperature higher than about five degrees Kelvin).

Infrared sensors come in active and passive varieties. Infrared radiation is both produced and detected by active infrared sensors. A light-emitting diode (LED) and a receiver are the two components of an active IR sensor. The receiver detects the infrared light from the LED that reflects off an object as it gets close to the sensor. Active IR sensors serve as proximity sensors and are frequently incorporated into robots' obstacle detection systems.

Fig 3: Infrared Sensor

PIR Device: PIR sensors do not produce infrared radiation themselves; they only detect it when it is there. The components of passive infrared sensors include:

• A pyroelectric sensor consisting of two strips of pyroelectric material.

• An infrared filter (which cancels out all other light wavelengths);

• A Fresnel lens concentrates light coming from many angles into one spot.

• A housing unit (which shields the sensor from outside factors like dampness).

The most typical application for PIR sensors is motion-based detection, such as in-home security systems. The difference in IR levels between the two pyroelectric elements is determined when a moving item that emits infrared radiation crosses the detector's detecting range. An embedded computer receives an electronic signal from the sensor and processes it.

2.4 Extra components:

- **Arduino Nano:** Arduino Nano is one type of microcontroller board, and it is designed by Arduino. cc. It can be built with a microcontroller like Atmega328. This microcontroller is also used in Arduino UNO. It is a small-size board and also flexible with a wide variety of applications. Other Arduino boards mainly include Arduino Mega, Arduino Pro Mini, Arduino UNO, Arduino YUN, Arduino Lilypad, Arduino Leonardo, and Arduino Due. And other development boards are AVR Development Board and PIC.

- **Blinker**: LED flashers are semiconductor integrated circuits that are used to switch on and off clusters of light-emitting diodes in a predetermined order or accordance with a predetermined pattern. They can be discovered in both custom-built projects and circuits that are utilized as indicators and controllers.

- **Jumper wire**: A jumper wire is just a wire with connector pins on both ends that can connect two places without soldering. Typically, jumper wires are used with breadboards and other prototyping tools to make it easy to change a circuit as needed.

- **Breadboard:** Temporary work boards for electronic circuits are called breadboards. Circuit connections are made using 24-gauge solid wire, which is not stranded and is compatible with the

majority of breadboards. There are occasionally kits available with different colors of set lengths that are designed specifically to fit breadboards. These are lovely comforts.

▪ **Vibrator sensor:** A vibration sensor is a device that measures the amount and frequency of vibration in a given system, machine, or piece of equipment. Those measurements can be used to detect imbalances or other issues in the asset and predict future breakdowns.

3. Block Diagram
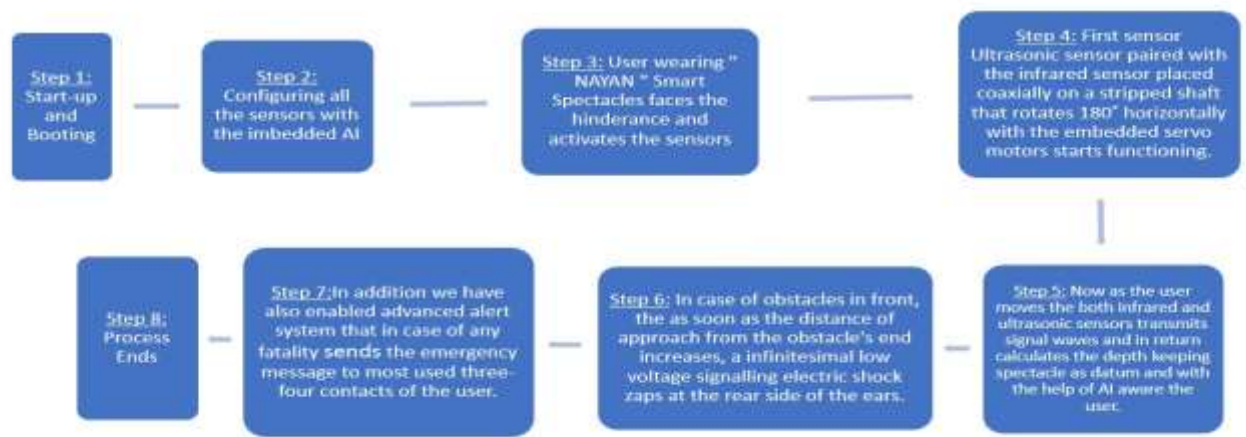
4. CONCLUSIONS
As we consider NAYAN's potential, we intend to create a functional prototype, recruit testers, and ensure that the technology performs as we had expected. Following a series of successful trials, we intend to submit our innovative idea for a patent, have it published, and have the government grant it. After that, we'll sell NAYAN on the Indian market and to anyone else who needs it around the world.

5. REFERENCES

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