***UNIVERSAL ELECTROINC ‘I’ AND ‘WALKING GUIDE’***

**Objective:** The main purpose of the research is to design a new IoT based wearable walking support for physically impaired people (blind, deaf) and elderly people in order to navigate without any assistance from others. With the help of this device, a user can move independently and will be able to walk freely like a normal person and also to know their health condition through the device provided.

**Scope**

* To mobilize differently abled people on their own.
* To alert them for the oncoming obstruction while moving.
* To detect the rough patches.
* To monitor of their basic health conditions including pulse rate and blood pressure.
* To track the location and movement of the person.
* To upload all the data regarding the person on the cloud that can be accessible anywhere and anytime.

**HARDWARE DESCRIPTION**

1. **Proximity Sensor**

In order to provide the obstacle avoidance, proximity sensors are used. These sensors determines the distance to a reﬂective surface by emitting high-frequency sound waves and measuring the time it takes for the echo to be picked up by the detector. The sensor can determine the distance to an object. The proximity sensor actually consists of two parts: an emitter, which produces a sound wave; and a detector, which detects sound waves and sends an electrical signal back to the microcontroller. In order to determine the distance to an object, it is necessary to implement a timing loop in your microcontroller code to measure the length of time required for the sound wave generated by the emitter to traverse the distance to the object.

1. **Arduino Microcontroller**

Arduino is a single-board microcontroller, intended to make the application of interactive objects or environments more accessible. The hardware consists of an open-source hardware board. Current models feature a USB interface, analog input pins, as well as digital I/O pins which allows the user to attach various extension boards. It has crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.

It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an ac to dc adapter or battery to get started.

**Vibration motor**

Micro vibration motors are used in this project for guiding the person in case he is deaf and will not be able to listen the audio signal so by vibration motor he/she will be able to sense the vibration that in which direction the obstacle is encountering.

1. **Headphones**

The headphone is used in this project for guiding the visually impaired persons to navigate independently by amplifying the predefined voice signals.

1. **GPS**

Global positioning system uses longitude and latitude calculations for find out the position of object. Since it uses geospatial satellites signals, to calculate the positional difference from satellite; the accuracy is quite in the range of 100m to 300m.For the person who is walking on If by mistake he removes the kept memorized tag from his mind he cannot realize the locality and he got confused and if in case any emergency occurred we can easily track the position of a person.

1. **Wi-Fi shield**

Wi-Fi Shield is used to connect Arduino board with Wi-Fi. After connectivity with Wi-Fi, one can perform many tasks using this shield. We can built a complete server on it and can also use it as a client. Server designed on an Arduino Wi-Fi Shield are usually quite simple as it doesn’t have much processing power to support heavy server. It has numerous applications and is widely used.as this project is going to be implemented on “INTERNET OF THINGS”.

1. **Pulse Rate and blood measurement sensors**

The pulse rate sensor and bp sensors are used in this project to monitor the pulse rate as well as blood pressure of the person. The person places his/her index finger on the sensor and the resultant output is the number of beats per min of the pulse and his blood pressure measurement.

**Working**

Based on signals, decision is made in microcontroller to manage and give timely signals. The input string is from the proximity sensors which generate high frequency sound waves and evaluate the echo which is received back by the sensor. Sensors calculate the time interval between sending the signal and receiving the echo to determine the distance to an object. These can measure distances in centimeters and inches. The input string is received by the microcontroller. The microcontroller will carry out the issued commands and then communicate the status of a given appliance or device back to the earphones and in case he person is deaf so the vibration motor will alert the physically disabled person about the obstacle.

1. The device consists of proximity sensors. It includes a wearable equipment consists of head hat and waist belt to help the blind person to navigate alone safely and to avoid any obstacles that may be encountered, whether fixed or mobile, to prevent any possible accident. The obstacle can be overhead also or can either be rough patches.

2. Arduino microcontroller based control module receives instruction and command from a remote guidance system using sensor. The Arduino microcontroller processes it carry out the issued commands and then communicate the status of a given appliance or device back to the earphones. It provide the necessary interface between the sensor signals and audio system.

3. An Arduino can communicate relatively easily with one using its SPI interface. So as we want to issue and commands and communicate with the person. We will going to send audio signal to the person. We will going to load the audio into the Arduino. The best way to format the data for playback is to check into the format of WAV files, they can be saved into a format that can read directly using an Arduino. There is a small header at the beginning of the file, but then it is basically raw data. The data can be saved, which can be read into the Arduino, and written directly to the registers with no modification.

**VIBRATION MOTORS**

**INSTRUCTIONS THROUGH HEADPHONES**

**COMPUTE DISTANCE**

**IS OBJECT DETECTED**

**SENSE THE OBJECTS THROUGH ULTASONIC SENSOR**

**INTERNET OF THINGS**

The **Internet of Things** (**IoT**) is the network of physical objects or "things" embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data. The Internet of Things allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration between the physical world and computer-based systems, and resulting in improved efficiency, accuracy and economic benefit when IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems.

IoT devices can be used to enable remote health monitoring and emergency notification systems. These health monitoring devices can range from blood pressure and heart rate monitors to advanced devices capable of monitoring specialized implants, such as pacemakers or advanced hearing aids. Specialized sensors can also be equipped within living spaces to monitor the health and general well-being of senior citizens, while also ensuring that proper treatment is being administered and assisting people regain lost mobility via therapy as well.

As in our project we are going to use internet of things platform. We are going to connect our device to internet. So that we can send the person health status like blood pressure, heart rate etc. to his well-wisher in case any emergency occurred he can take further steps

The output of each sensor especially the healthcare sensors will be uploaded on the cloud. Also it will be transmitted to the emergency contact stated by that person time to time.