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Project Perceiving the World through Technology Milestone 4 - Deployment

Description of your solution/product:

Our product is a wearable neck band that includes a Passive Infrared sensor to detect motion and an ultrasonic sensor to detect distance in front of the user.

Motivation of the project:

-To add ease of movement/navigation for blind and visually impaired persons in both interior and exterior environments.

Target Audience:

-Any blind or visually impaired person. Colored vinyls are available especially for children or the fashion-conscious.

Added Value:

-A white cane cannot differentiate between an inanimate object and a person or animal. This device can help to reduce collisions with people in your path that are distracted or quiet through the use of a PIR sensor.

-The Ultrasonic sensor can detect obstacles at a greater distance than a white cane can, giving you earlier warning and helping to increase your walking speed and confidence in movement.

-This device detects and alerts the user to obstacles above one's shoulders that a white cane cannot detect.

Description of all the features that your product has, this should include the features of wearability, portability, fashionable, as well as the kind of interaction / feedback that provides to the user:

Synopsis:

All sensors and wiring will be implemented into a sleek stylish band that is to be worn around the neck. It will be lightweight and compact for easy portability. The product will be available in multiple colors to appeal to a range of people. The PIR sensor will activate a buzzer when there is motion within 6 meters of the sensor and within a 140 degree viewing range. The ultrasonic sensor will start to beep when an object is within two meters and beep more as the object gets

closer to you. The product will also include an on/off tactile button so the user is able to turn it off when in an area it is not wanted or needed.

Technical:

-Ultrasonic sensor that detects any nearby objects within 2 to 0.8 meters. The device clicks with increasing frequency as the object nears.
-A PIR (Pyroelectric InfraRed Sensor) that detects any objects in motion in front of you that emit heat, namely people and animals. The PIR sensor will activate a buzzer when there is motion within 6 meters of the sensor and within a 140 degree viewing range.

Non-Technical (Fashion/Comfort):

-The comfortable around-the-neck design was designed to be as non-invasive and secure as possible. Your hands remain completely free while the device is in use.
-For warm weather, the design is light and minimalist. However in colder weather, the device can easily be fitted around a jacket or underneath a scarf.
-The device comes standard in a professional solid black color. However, new patterns and colors can easily be added with our included vinyl skins, or you can get creative and decorate the device with your own paints or decorative tapes at home. ***Personalization is not included in our prototype and is hypothetical at this early stage.***
-The plastic cover can protect the device from rain! (Be careful to not completely submerge the device!) The PIR sensor and Ultrasonic sensor are functional in rainy or snowy conditions.

Visually-Impaired Specific (Special Design/Accessibility Functions):

-The device is toggled on and off using a large tactile button on the side of the device. By touch, it is clear whether or not the button has been completely toggled. Then, the user can wave their hand in front of the ultrasonic sensor to confirm.
-All of the outputs from the device are auditory. The cues are loud enough to be clear, but not too loud or high pitched to be disruptive.

Youtube unlisted video link: https://youtu.be/8eNo_SEE8z0
Project Document Repository Link:
https://github.com/danielmochalov27/Raspberry-Pi-FSE-100-Project