VINS: Visually Impaired Navigation System
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INTRODUCTION
MISSION STATEMENT:
It is often difficult for visually impaired people to navigate and avoid colliding with objects located within their proximity. Virtually Impaired Navigation System (VINS) aims to simplify that hassle of navigating from point A to point B while aiming to help avoid collision with obstacles.

CURRENT SOLUTION:
Currently, the visually impaired usually rely on their sixth sense or mobility aids such as canes or guide dogs. There are also smart watches and applications which can now help blind individuals navigate and avoid colliding with objects located within their proximity.

OUR GOAL:
Our project focuses on creating a navigation aid which detects the proximity of objects around the user with the use of ultrasonic sensors as well as the direction the user is facing to help navigate accurately. Our approach to this problem is different because it includes object recognition as well as navigation and voice commands.

FUTURE GOALS:
Our product lays the perfect base foundation which allows for improvements in many different directions.

In addition to what our product already does:
• Implement an object recognition software: Gives the ability to detect and voice what object is in the path.
• Working to implement Arduino Sight: Gives the ability to detect ground obstacles such as curbs.
• Working with Lookout by Google: Gives the ability to read text in signs on the road and identify currencies.
• Working with Seeing AI: Gives the ability to recognize people the app has seen before, and guessing strangers’ age and emotion.
• Implementing Motion sensors: Gives the ability to detect moving objects.

Our current design is an affordable option however, we plan to dynamically make further improvements to enhance user comfort and product quality.

METHODOLOGY
SOFTWARE:
• The Software components will be mainly composed of a microcontroller communicating with an android application via Bluetooth. We used the Google Maps API and TextToSpeech API to dictate directions to our user.
• We chose to use an Arduino Nano as our microcontroller not only because it's very flexible and inexpensive but the small structure allows for our product to be portable.

Software Used:
• Software Development Environments and Tools: Android Studio, Arduino Sketch
• Network Technologies: Bluetooth

HARDWARE:
The hardware is composed of an Arduino Nano that will be connected with:
• Four ultrasonic sensors to detect where an object in the path is and provide the distance from user to object.
• A magnetometer(compass) which provides the direction and angle of where the object is located.
• A Bluetooth module that will send data from the Arduino to the app

Hardware Used:
• Arduino Nano
• Bluetooth Module: HC-06
• Ultrasonic Sensors: Maxbotix
• Magnetometer(Compass)

REFERENCES:
https://developers.google.com/maps/documentation/android-sdk/start
https://www.maxbotix.com/Arduino-Ultrasonic-Sensors-085/#colling-1