

**HELPING THE VISUALLY IMPAIRED USING ARTIFICIAL  
INTELLIGENCE OBJECT DETECTION WHILE REDUCING  
LIGHTING DISTORTIONS**

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# Background

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## Where

Outdoor mobility is  
essential to human life



## W.H.O

Approx. 2.2 billion  
people suffer from visual  
impairment



## Obstacles

Intersections, Objects,  
entrances

# Problem / How to Solve it

- White canes are not efficient.
  - it cannot detect objects above the waste.
  - difficult to detect hazards.
- Campus are limited to visual imparled individuals
  - difficult to find entrance of buildings.
  - in campus intersections.
  - over populated
  - Stairs and other undetectable objects.

- Create an object detective algorithm that can direct:
  - doors
  - people
  - cars
  - intersections
  - stairs
  - moving objects
  - hazards/other

# Technical details

- IDE for android app development, virtualbox
- Xcode for iOS app development
- Python3, Java, Swift
- Programming package libraries
- Raspberry pi, jetson nano
- Cameras
- Ultrasonic sensors
- Gyroscope
- Battery pack

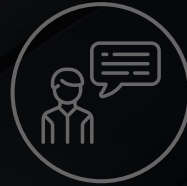
# Features

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## Computer Vision

Real time object detection  
& object tracking



## Notifications

Sound or haptic feedback



## Lighting Distortion

Ensure great accuracy in  
all lighting conditions



## Voice commands

Simple voice commands  
to assist in finding objects

# Cost vs. Performance

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## Goal

- Make it cheap
- Zero compromise with performance

## Analysis

- High performance hardware is expensive
- Expensive hardware is harder to obtain
- Cheap hardware can cause performance issues
- Poor performance can become useless or frustrating to use

# Scope/Delimitations

- Scope:
  - Test project via a random volunteer or ourselves
  - Tester will have the device mounted on the chest and data will be collected for improvement
- Delimitations:
  - Currently since it would be very difficult to get a visually impaired volunteer to help with our experiment, we are limited to only testing the device between the people in our group or with a random volunteer.