



# ROBOT TO ASSIST THE VISUALLY IMPAIRED

The proposed robot aims to serve as an aid to visually impaired people for outdoor and indoor navigation.

# POWER

- Raspberry Pi Camera Module (V2): 1.5W
- YDLIDAR X2: 4W
- NEO-6M GPS Module: 0.5W
- MPU-6050 IMU: 0.5W
- MAX9814 Electret Microphone Amplifier: 0.2W
- Waveshare WM8960 Audio HAT: 0.5W
- 2 Pololu Wheel Encoders: 0.4W (Assuming 0.2W each)
- 2 Racerstar BR2212 1000KV Brushless Motors: 10W (Assuming 5W each)
- Raspberry Pi 4 Model B: 5W

**Total Power Budget : 22.6W**

# NAVIGATION

- **SLAM:** ORB-SLAM2 will be used for indoor navigation. It is a feature-based SLAM algorithm that uses ORB (Oriented FAST and Rotated BRIEF) features for tracking and mapping. It's known for its efficiency and robustness.
- **Reactive Obstacle Avoidance:** These algorithms enable the robot to respond immediately to detected obstacles. They are based on simple reactive behaviors.
- **Path Planning:** Dijkstra's Algorithm: This is a classic algorithm for finding the shortest path in a weighted graph. It can be used for global path planning.
- **GPS:** GPS will be used for outdoor navigation.

# SENSORS

- Raspberry Pi Camera Module (V2): 8 megapixel Sony IMX219 image sensor
- YDLIDAR X2: Scanning angle: 360°, Scan frequency: 5-8 Hz, Max current: 500 mA
- NEO-6M GPS Module: Baud Rate: 9600, Input Supply Voltage Range: 3.3V-6V
- MPU-6050 IMU: Operating Current: 3.9mA, Typical Input Voltage: 3.3VDC-5VDC
- MAX9814 Electret Microphone Amplifier: Supply Voltage Range: 2.7V to 5.5V
- Waveshare WM8960 Audio HAT: Supply voltage: 5V DC
- Pololu Wheel Encoders: Operating voltage: 4.5 V to 5.5 V, 14 mA current consumption at 5.0V



# SOFTWARE/HARDWARE

- Raspberry Pi 4 Model B
- ROS
- OpenCV: Object Recognition and Computer Vision
- DC Motor: Racerstar BR2212 1000KV Brushless Motor
- Speech Recognition and Natural Language Processing (NLP)
- Firmware for Sensors