

# KARTEZYEN CORP

## axis | AID FOR THE BLIND

DS COORDINATOR: ASSOC. PROF. YEŞİM SERİNAGAOĞLU DOĞRUSÖZ

### WHO ARE WE?



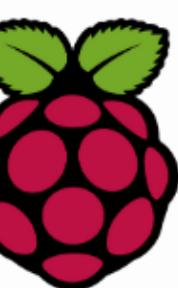
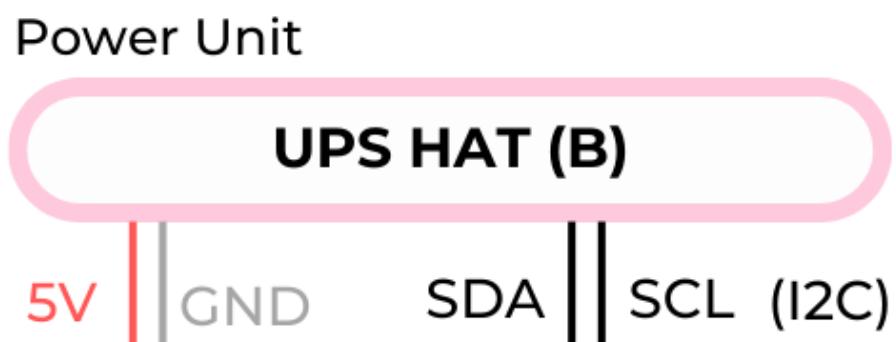
GÜNEŞ YILMAZ  
COO



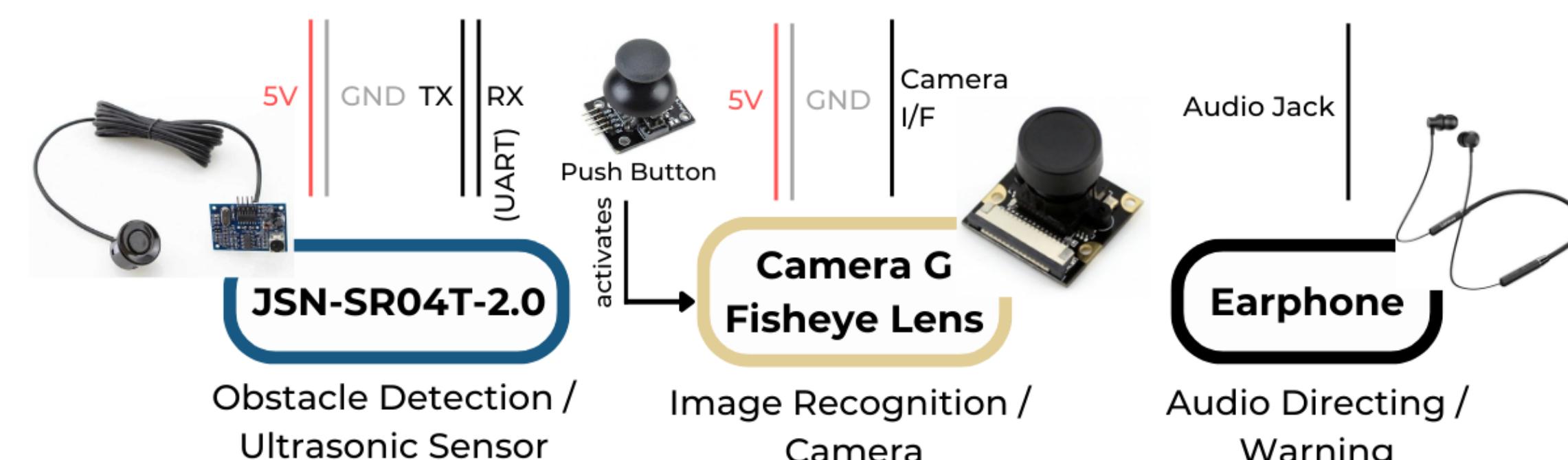
ÖZGE ÜNAL  
CEO



### SOLUTION APPROACH



Raspberry Pi 4 Model B



### PROJECT DESCRIPTION

The use of advanced technology has led to an increase in aids that assist individuals with disabilities. This particular project aims to design a wearable device that will continuously monitor the user's surroundings and provide guidance to navigate the streets safely.

### REQUIREMENTS

- Detect and recognize pedestrian crossings (mAP > 70%)
- Detection time for each class should be at most 5 seconds before audio warning
- Detect obstacles that are at least 25 cm high and from the distance of max. 1.5 m
- 5-10 battery life
- Voice command should be given in 1 second after detection

### TEST RESULTS

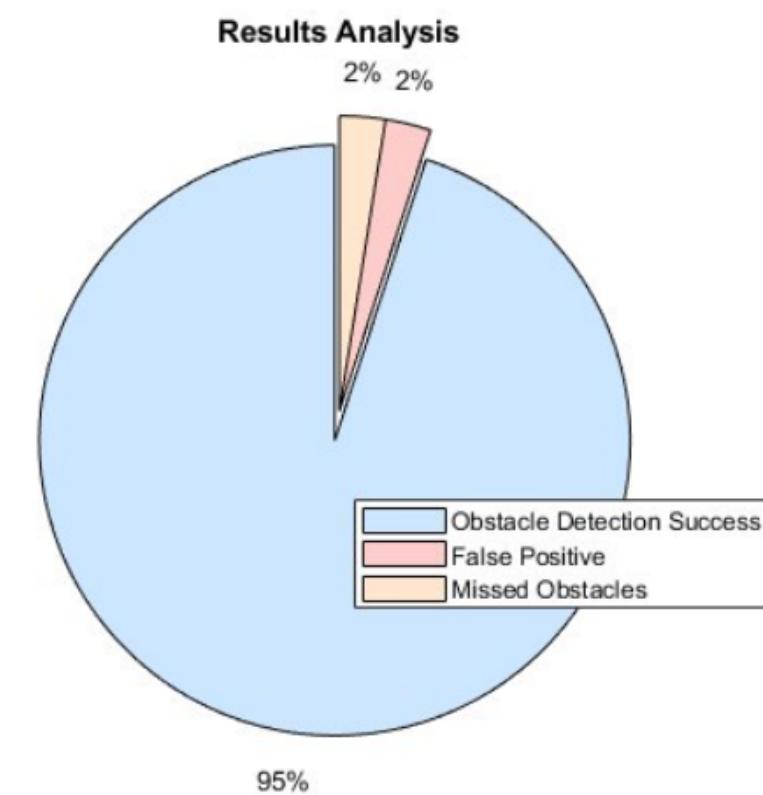
Image Detection Test Results: Transfer Learning method for YOLO V5:

	Recall	Actual mAP50	Expected mAP
All Classes	0.769	0.806	0.7



### Training Data

Part of Dataset	Number of Images	Augmentation Methods Used
Training	1.3k (88%)	<ul style="list-style-type: none"> <li>• Horizontal Flip</li> <li>• 90 degrees rotation</li> <li>• Grayscale</li> <li>• Bounding Box Blur</li> <li>• Brightness</li> </ul>
Validation	110 (7%)	Not Applicable
Test	73 (5%)	Not Applicable



### UNIQUE FEATURES

- Easy to use device with braille alphabet
- User positioning according to the location
- Directing according to position of the obstacle
- Remaining battery life warning
- Adjustable chest strap for best performance

### DELIVERABLES

- Wearable Device:
- 2 x 18650 Batteries
- Charging Adaptor
- Adjustable Chest Strap
- Acquaintance Software
- User Guide Manual
- 7/24 Hotline
- 2 Years Warranty Certificate

### COST ANALYSIS

Components	Cost (\$)
Raspberry Pi 4 Model B 8 GB	80
JSN-SR04T-2.0 Ultrasonic Sensor	5,28
Camera G Fisheye Lens	32,89
UPS HAT (B) Power Unit	28,37
2 x 3.7V 3400 mAh Batteries	16,44
3D Printed Case + Chest Strap	25
<b>TOTAL</b>	<b>187,98</b>