# Leading the Blind

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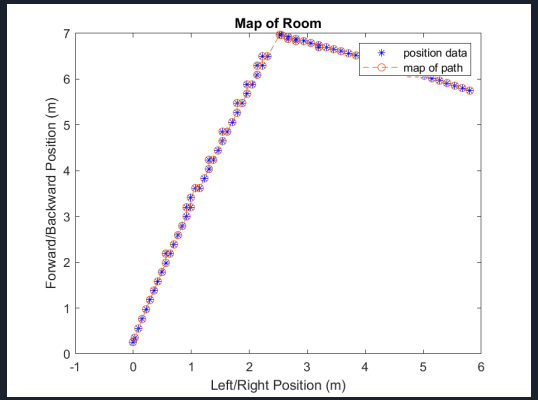
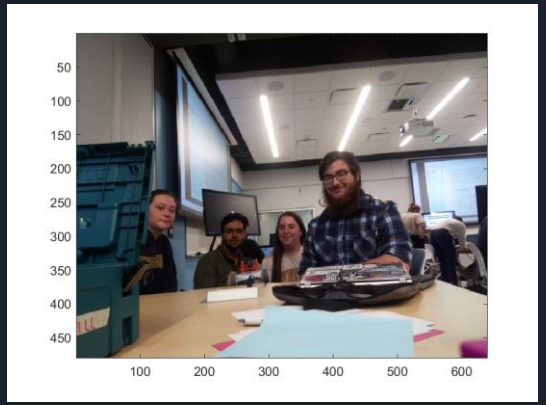
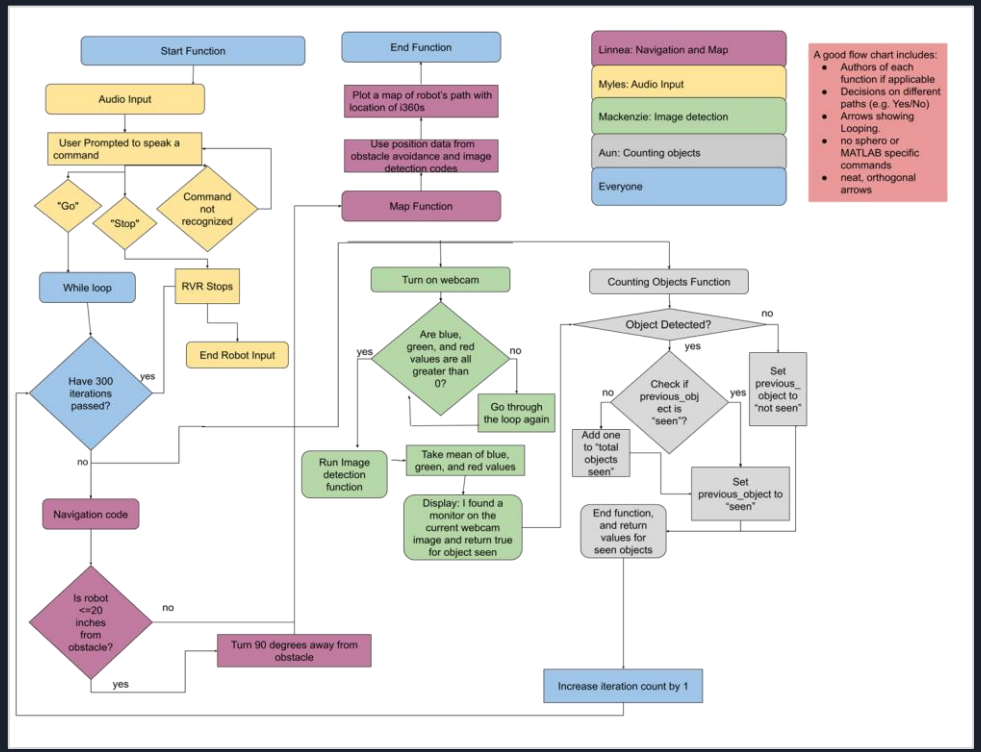
# EF 230 RVR Project Summary

- Mackenzie: Image Recognition & Color Sensor
  - Used the onboard Raspberry Pi webcam to run camera feed, then used the mean of the color values to detect the wanted object
- Linnea: Distance Sensor & Plotting
  - Use distance sensor to tell the robot when to turn and use orientation sensor to tell the robot what angle to turn, then plot the robot's path and position of i360s
- Myles: Voice Commands
  - Have a function that uses a pre-learned deep learning model that understand vocal commands to start the Robot.
- Aun: Counting Objects
  - Have a function that takes in the total objects seen (initially zero) as well as if the object has been seen in the current iteration and past iteration. The function checks if there has been a change in objects seen (i.e. an object has been seen this iteration that had not last time) and add it to total objects then return said value



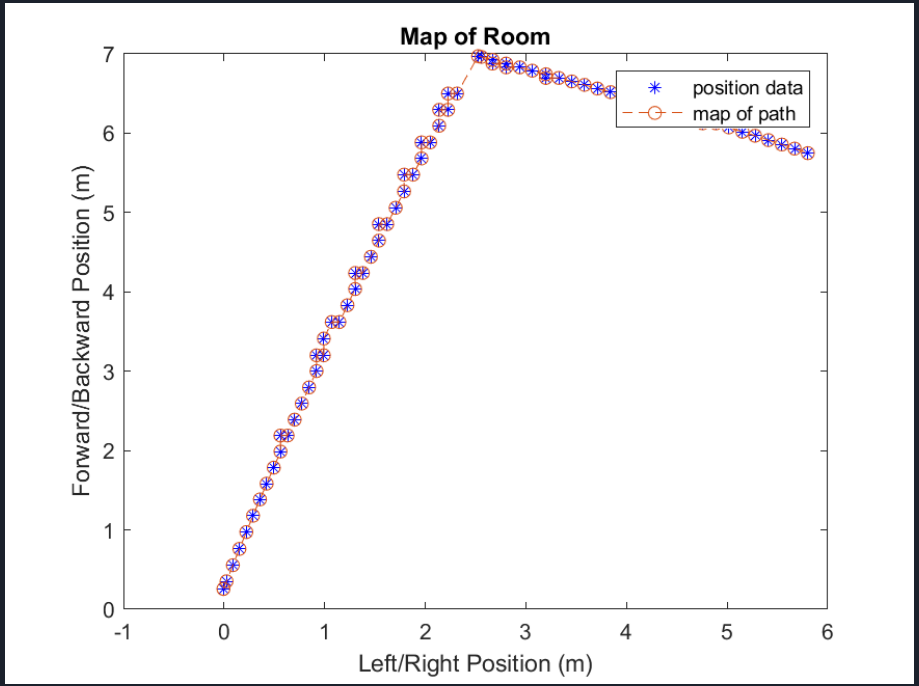

# Flow Chart


Start Function
Audio Input
User Prompted to speak a command
"Go"
"Stop"
Command not recognized
While loop
RVR Stops
End Robot Input
Have 300 iterations passed?
yes
no
Navigation code
Is robot <=20 inches from obstacle?
no
yes
Turn 90 degrees away from obstacle
End Function
Plot a map of robot's path with location of i360s
Use position data from obstacle avoidance and image detection codes
Map Function
Turn on webcam
Are blue, green, and red values are all greater than 0?
yes
no
Go through the loop again
Run Image detection function
Take mean of blue, green, and red values
Display: I found a monitor on the current webcam image and return true for object seen
Counting Objects Function
Object Detected?
no
yes
Check if previous_obj ect is "seen"?
no
yes
Add one to "total objects seen"
Set previous_ object to "not seen"
Set previous_object to "seen"
End function, and return values for seen objects
Increase iteration count by 1
Linnea: Navigation and Map
Myles: Audio Input
Mackenzie: Image detection
Aun: Counting objects
Everyone
A good flow chart includes:
Authors of each function if applicable
Decisions on different paths (e.g. Yes/No)
Arrows showing Looping.
no sphero or MATLAB specific commands
neat, orthogonal arrows

# Future Tasks

- Add in code that could identify all other objects in the room using distance sensors and color sensors
- Be able to plot a map of all obstacles in the room (different colors for different objects) at every occurrence of the object
- Have MATLAB return pre-recorded audio when an object is detected, telling the user what object is detected and possibly how far away

# Navigation and Map Plotting



# Image Detection

```
anet = alexnet; % Assigns alexnet deep learning to anet
while true % Infinite while loop
   drawnow;
img=Rover.getImage;
   img = imresize(img,[227,227]);
   imshow(img);
   drawnow;
blue_mean=mean(mean(img(:,:,3)))
green_mean=mean(mean(img(:,:,2)))
red_mean=mean(mean(img(:,:,1)))
if 80<=blue_mean && blue_mean<=92 && 80<=green_mean && green_mean<=90 &&
90<=red_mean && red_mean<=105
   title('I found a monitor')
    pause(5)
end
end
```

# Audio Input