

MAE 148 Team 4 -The Puppy

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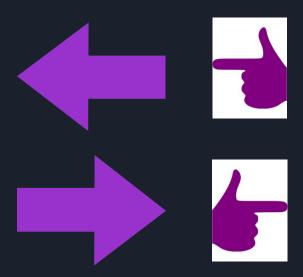
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Original proposal:

To get the robot to learn specific signs to direct it.

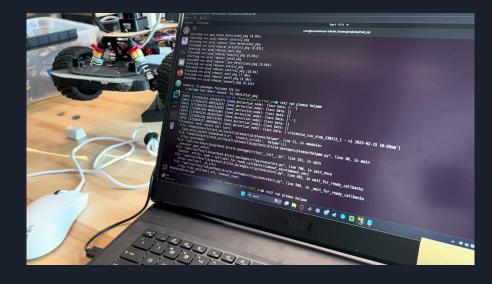






Demonstration

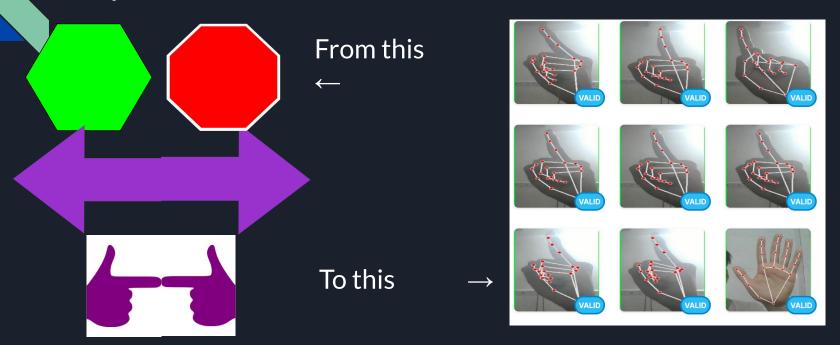








Experimentation and transition:



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Accomplishments:

- learned how to train a custom model on Roboflow
- learned how to source a public data set with a trained model on Roboflow
- learned how to install a package using ros2 that uses a model from Roboflow
- The robot is able to recognize specific hand signs as classes trained from Roboflow
- The robot WOULD be able to do an action we could associate with each unique class it identifies but our VESC doesn't work!!

What did not work as expected:

- VESC inconsistency/breaking
- debugging code that we wanted to implement
- wifi connection



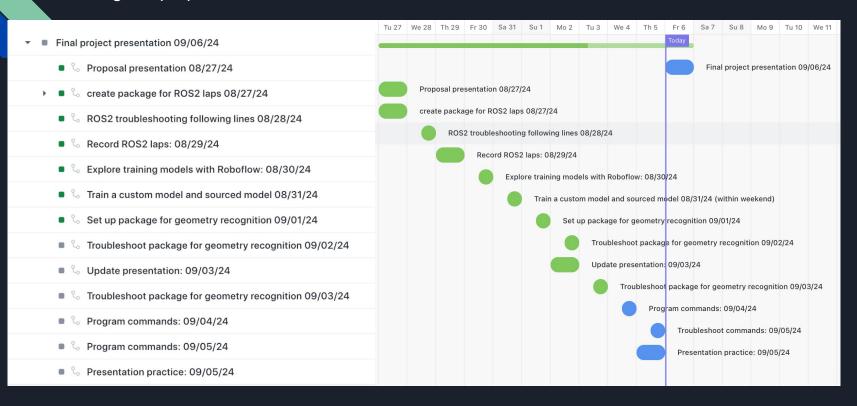
```
[lane detection node-3] inverted filter: 0
[lane detection node-3] kernal size: 7
[lane detection node-3] erosion itterations: 5
[lane detection node-3] dilation itterations: 5
[lane detection node-3] number of lines: 9
[lane detection node-3] error threshold: 0.35
[lane detection node-3] min width: 0
[lane detection node-3] max width: 500
[lane detection node-3] crop width decimal: 0.8
[lane detection node-3] rows to watch decimal: 0.71
[lane detection node-3] rows offset decimal: 0.36
[lane detection node-3] camera centerline: 0.52
[lane detection node-3] debug cv: 0
[lane_detection_node-3] [INFO] [1725661553.880308010] [lane_detection_node]:
[lane detection node-3] Initializing Camera...
[lane detection node-3] [INFO] [1725661553.883786332] [lane detection node]:
[lane detection node-3] Camera Initialized
[lane_detection_node-3] [INFO] [1725661553.921193766] [lane_detection_node]: Straight_curve: [tracking_error: -0.1710963455149502], [tracking_angle: 30.8720836639404
[vesc twist node-2] [INFO] [1725661553.931864201] [vesc twist node]: rpm: 375, steering angle: 0.41445183008909225
[vesc twist node-2] [INFO] [1725661553.935680230] [vesc twist node]: Could not connect to VESC. Shutting down vesc twist node...
[lane detection node-3] [INFO] [1725661553.955609177] [lane detection node]: Straight curve: [tracking error: -0.5265780730897011], [tracking angle: 33.8327713012695.
[lane detection node-3] [INFO] [1725661553.990363442] [lane detection node]: Nothing detected
[vesc twist node-2] [INFO] [1725661553.990930732] [vesc twist node]: vesc twist node shut down successfully.
vesc twist node-21 Connecting to VESC
 vesc twist node-2] Could not connect to VESC
[lane detection node-3] [INF0] [1725661554.025690674] [lane detection node]: Nothing detected
[lane detection node-3] [INFO] [1725661554.058714527] [lane detection node]: Nothing detected
[lane detection node-3] [INF0] [1725661554.092362806] [lane detection node]: Nothing detected
[lane detection node-3] [INFO] [1725661554.124488850] [lane detection node]: Only detected one line: [tracking error: 0.6096345514950167], [tracking angle: 90.0]
[lane detection node-3] [INFO] [1725661554.158668221] [lane detection node]: Only detected one line: [tracking error: 0.6112956810631229], [tracking angle: 90.0]
[INFO] [vesc twist node-2]: process has finished cleanly [pid 127]
[lane detection node-3] [INFO] [1725661554.193836599] [lane detection node]: Curvy road: [tracking error: -0.41362126245847175], [tracking angle: 90.0]
[lane detection node-3] [INFO] [1725661554.221396772] [lane detection node]: Nothing detected
[lane detection node-3] [INFO] [1725661554.244986385] [lane detection node]: Only detected one line: [tracking error: -0.8920265780730897], [tracking angle: 90.0]
[lane detection node-3] [INFO] [1725661554.269833441] [lane detection node]: Only detected one line: [tracking error: -0.8986710963455149], [tracking angle: 90.0]
```

```
Could not connect to VESC
[INFO] [1725661426.261605139] [vesc_twist_node]:
max_rpm: 7640
steering_polarity: 1
throttle_polarity: 1
max_right_steering: 0.8
straight_steering: 0.5
max_left_steering: 0.1
steering_offset: 0.25
^C[INFO] [1725661436.938402797] [vesc_twist_node]: Could not connect to VESC, Shutting down vesc_twist_node...
[INFO] [1725661436.947495789] [vesc_twist_node]: vesc_twist_node shut down successfully.

Docker_Container@ucsdrobocar-148-04:/home/projects/ros2_ws
```

Connecting to VESC

Meeting everyday:



Solution

- Testing another VESC
- countless hours finding a variety of solutions for debugging code
- seeking help



If we had another week...

 Get the robot to follow us constantly while simultaneously responding to hand signals when prompted



THANK YOU!!



