



Self-Driving Vehicular Project



Arya
Shetty



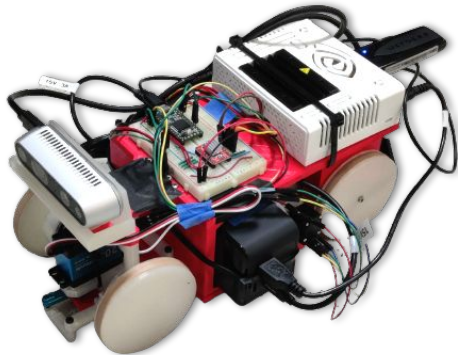
Tommy
Chu



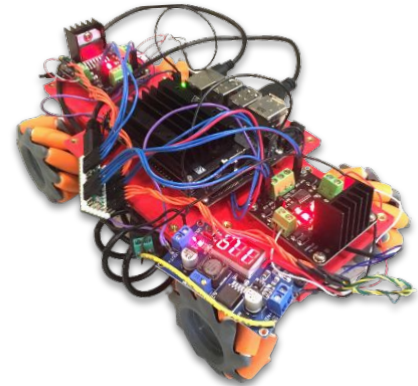
Aaron
Cruz



Brandon
Cheng



Advisors: Ivan Seskar and Jennifer Shane



Project Background

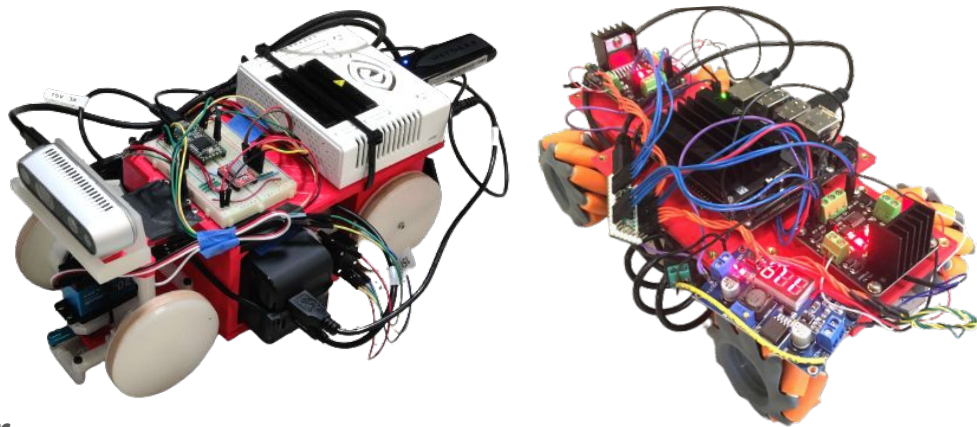
Smart City self-driving

RASCAL (Robotic Autonomous Scale Car for Adaptive Learning)

- Neural Network

SCAMP (Self-guided Computer Assisted Mecanum Pathfinder)

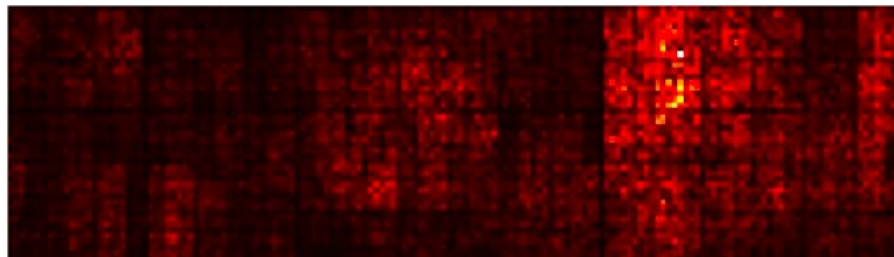
- NPC



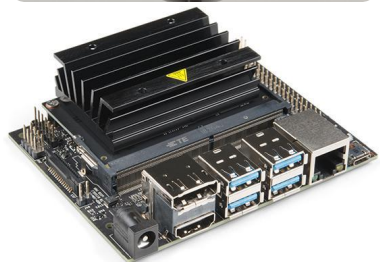
This Week's Progress

Saliency Maps

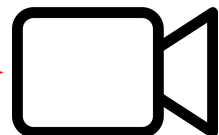
Video Training



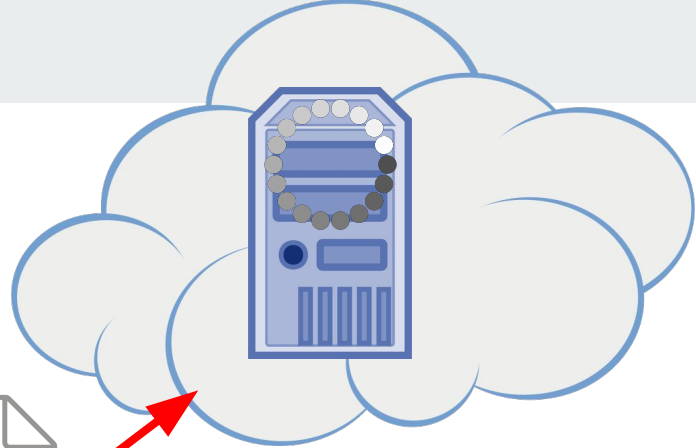
This Week's Progress



ROS



video, csv (info)



```
-rw-rw-r-- 1 rascal rascal 2464356 Jun 19 13:48 videoOutput.mp4  
rascal@rascal: /opt/uncar/dataProcessing/sessions/position_test$
```

2.46 GB → 0.22 GB

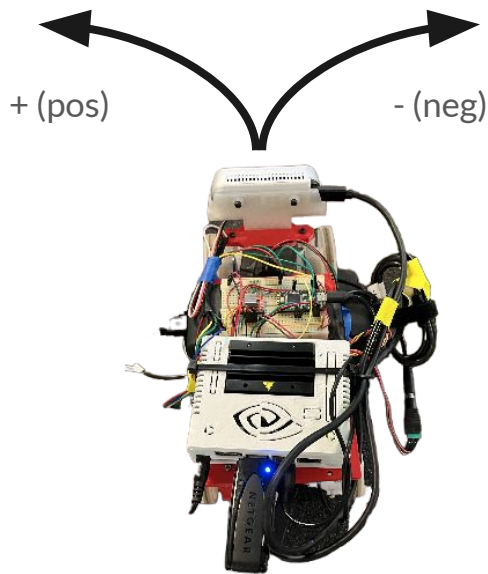
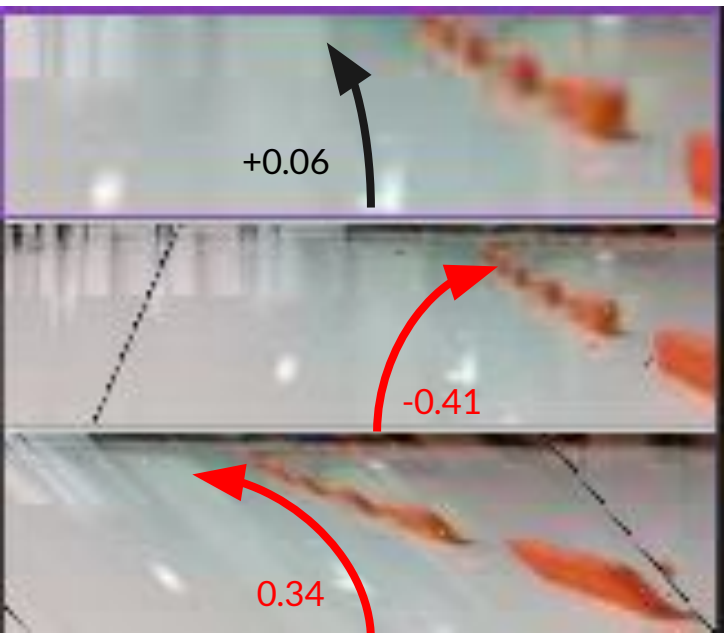
Image pipeline

```
-rw-rw-r-- 1 rascal rascal 48665 Jun 19 13:42 labels.csv  
-rw-rw-r-- 1 rascal rascal 218850 Jun 19 13:42 videoOutput.mp4  
rascal@rascal: /opt/uncar/dataProcessing/sessions/position_test$
```

This Week's Progress

Data augmentation

Rough steering calculation

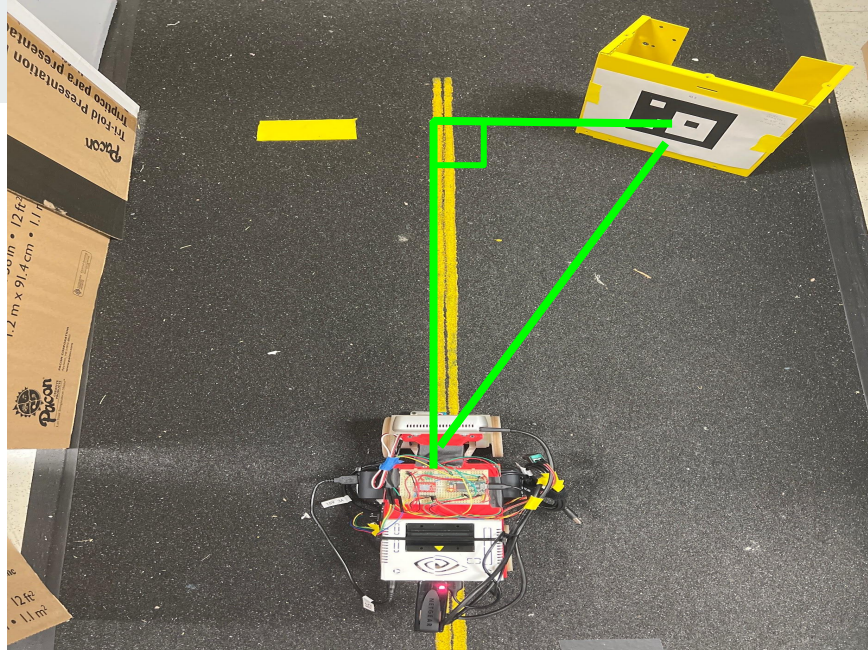
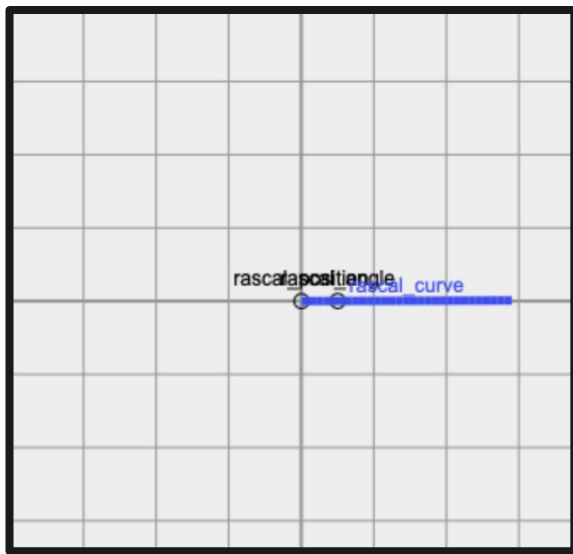


```
ost:~/rascaltraining/rascalModel/labels#  
4,991,100.0 0.066666662693023682,,  
ost:~/rascaltraining/rascalModel/labels#  
4,991a,100,-0.4052161004111983,,  
ost:~/rascaltraining/rascalModel/labels#  
4,991b,100,0.3431186326117869,,
```

This Week's Progress

Refined Aruco Detection. Now estimates camera position within :

XY plane of the city



`detectAruco.py` `poseEstimate.py`



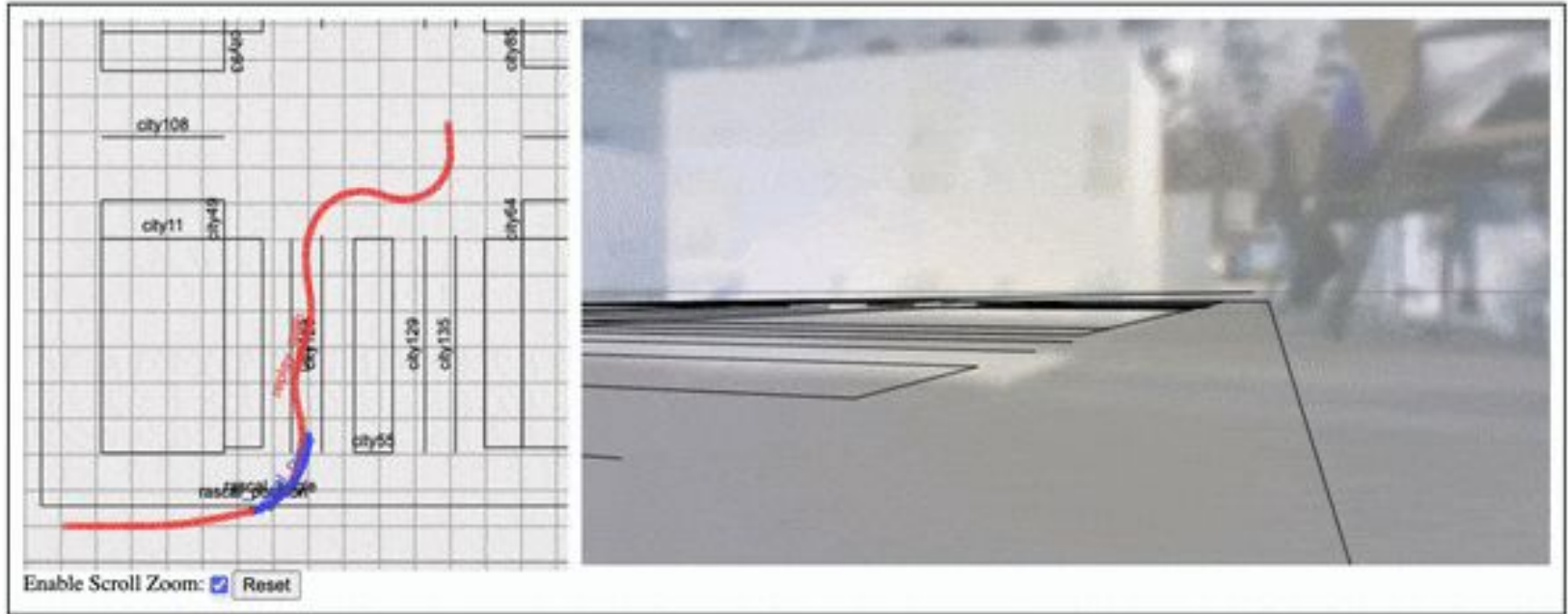
```
[INFO] ArUco marker ID: [3]
The aruco marker is:
0.038 feet right.
0.035 feet above.
2.904 feet forward.
Angle between car Z axis and aruco Z axis: 172.752
The car position in the XY plane is: (3.114, 1.671)
```

(not the actual output for above image)

This Week's Progress

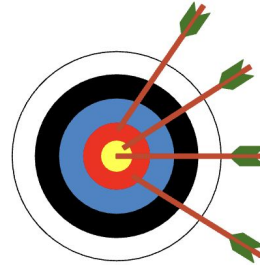
Data Visualization: Replayer

Displays steering curvature, overall path, and images

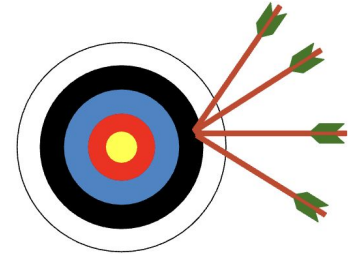


Next Week's Goals

- More accurate data
- Training more models
- More precise & accurate pose estimation with ARUCO



High Accuracy



High Precision

Thank you!

Any Questions?