Autonomous System Infrastructure
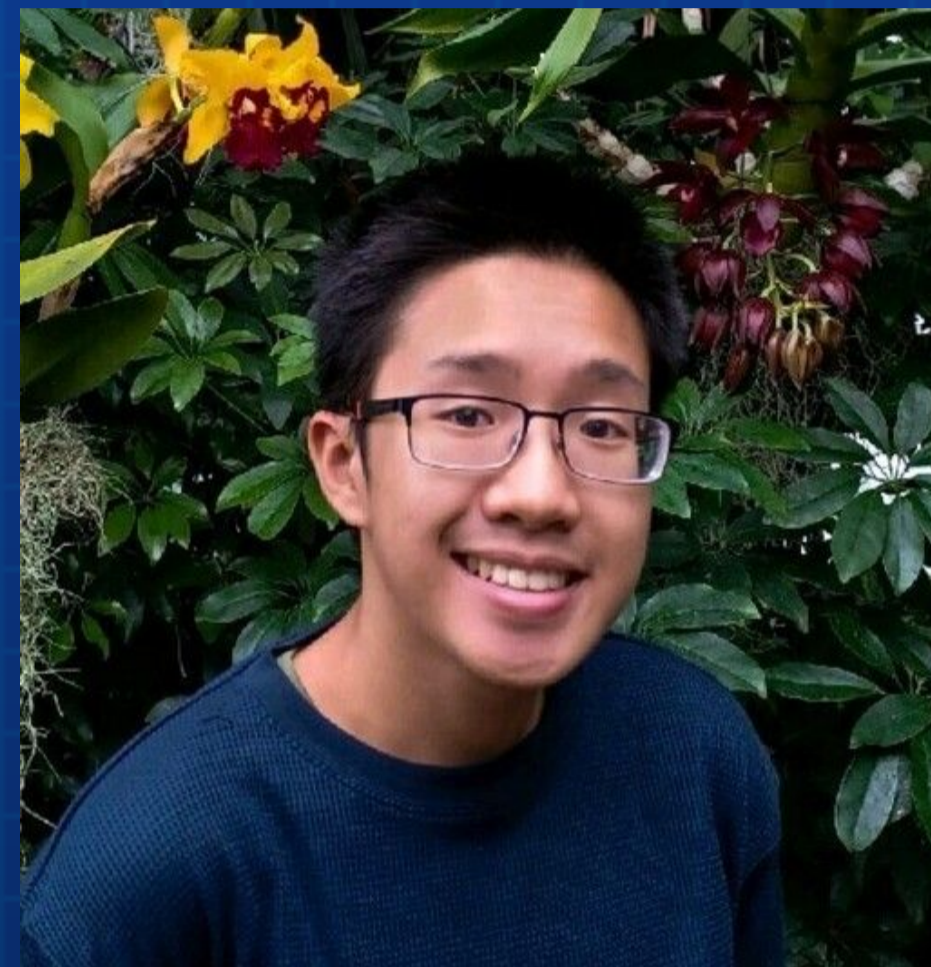
Anitej Thamma, Steven Tan, Meghana Achyutananda, Arunima Suri, Pranav Manikonda, Suhani Sengupta

Who are we?

Anitej Thamma(UG)

Steven Tan(UG)

Meghana
Achyutananda (UG)

Arunima Suri(HS)

Pranav Manikonda(HS)

Suhani Sengupta(HS)

Project Overview

Goal:

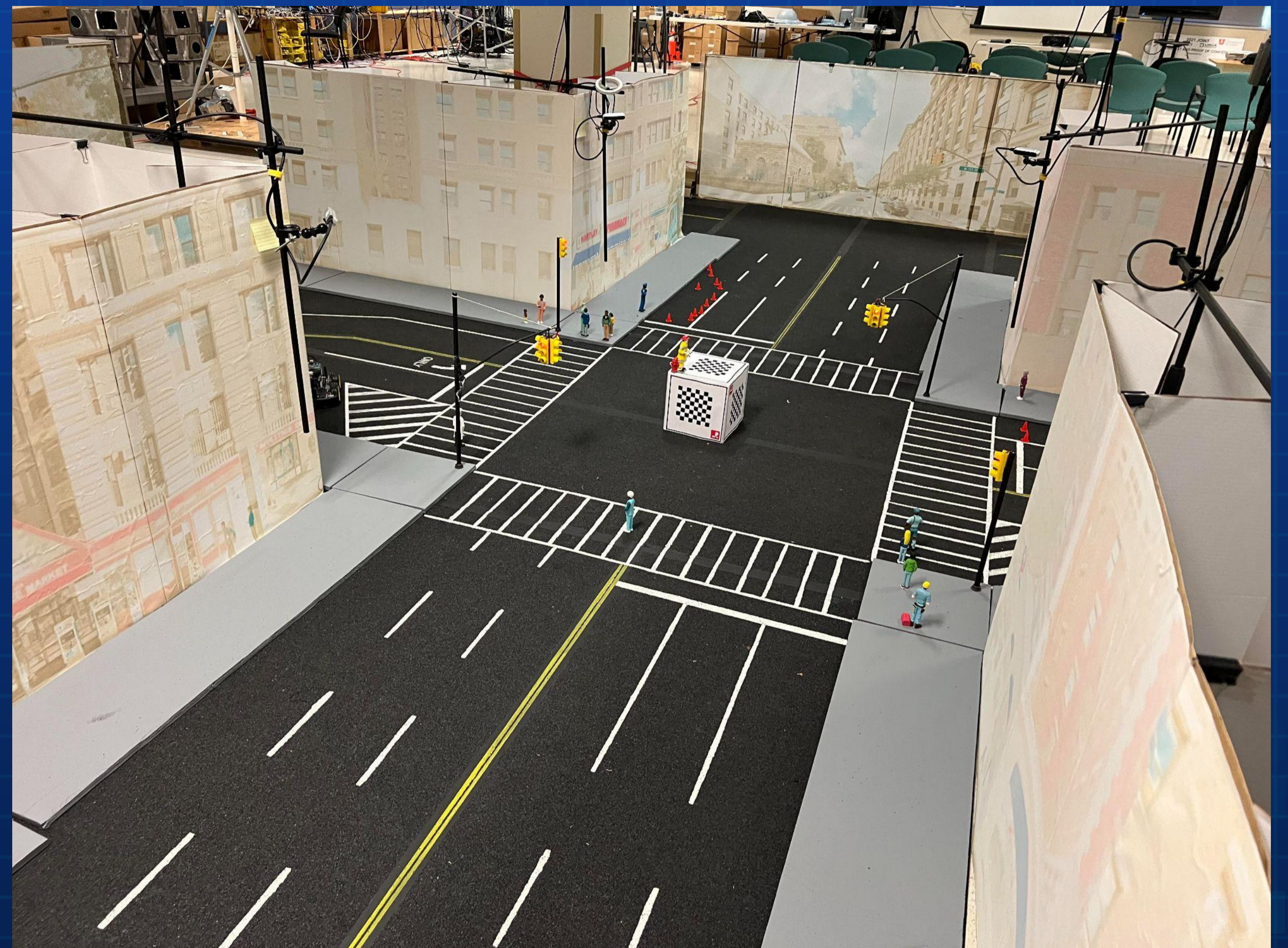To develop a server-client infrastructure to allow for remote control of autonomous robots in a smart city environment

RealSense Camera

Pioneer 3DX Robot

Orbit Smart City Environment

Modeled after 120th and Amsterdam Avenue in NYC

Data Acquisition with ROS

- ROS: Robot Operating System
- Data: Image data from Realsense Camera on Robot
   Steering (Twist) data from remote control joystick

1. Learned the basics of ROS
2. Connected the robot to remote controller
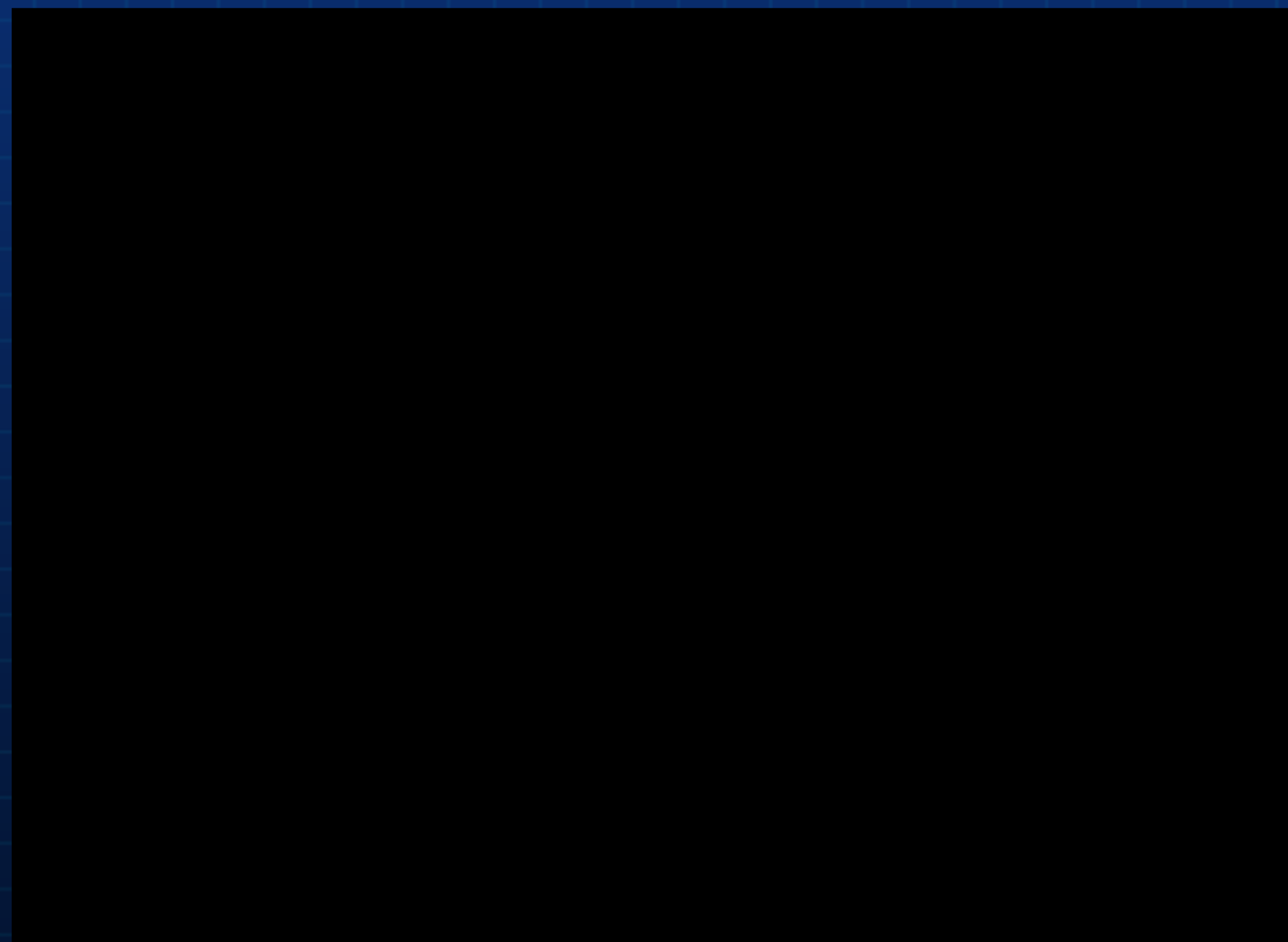3. Recorded ROSbag files (data files) that stored steering and image data
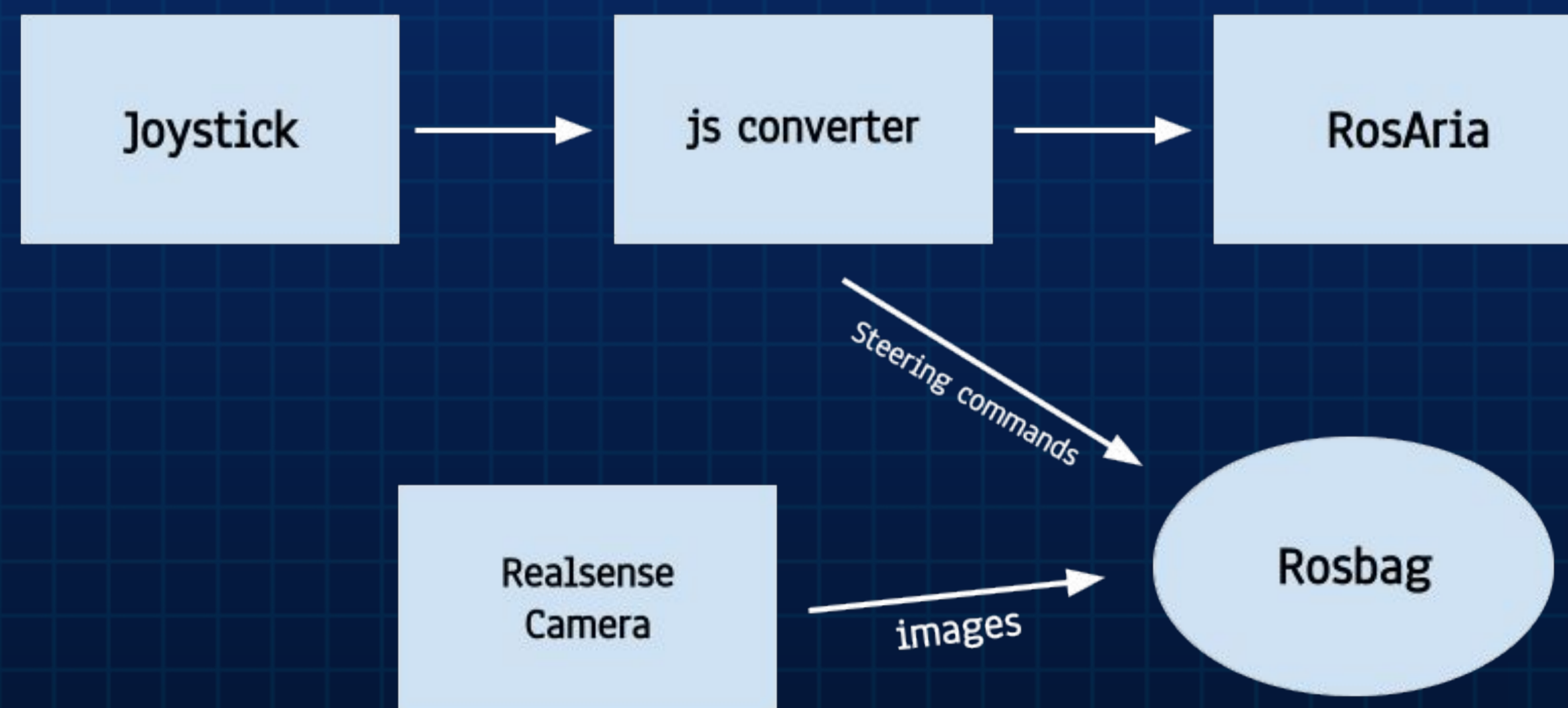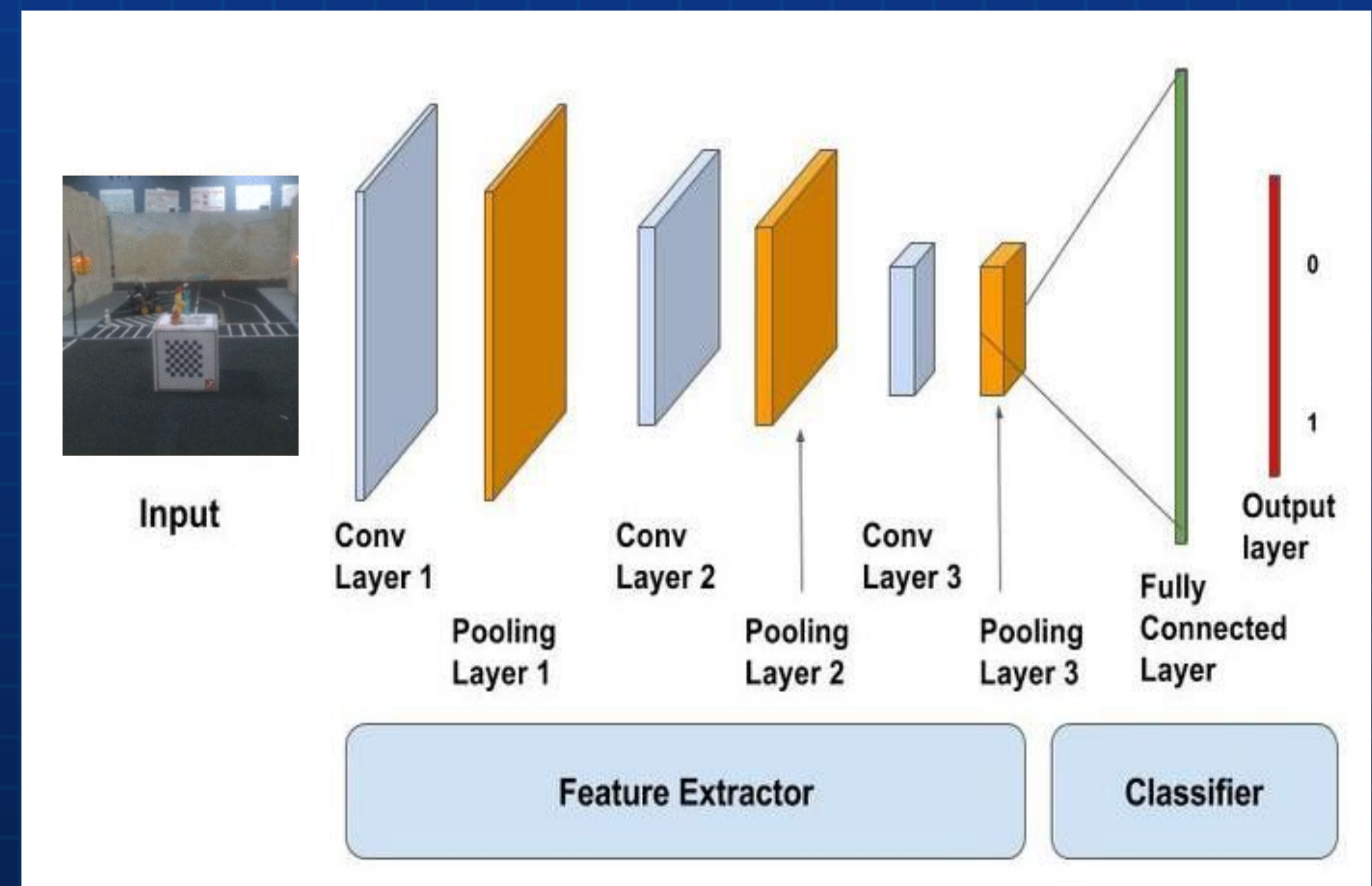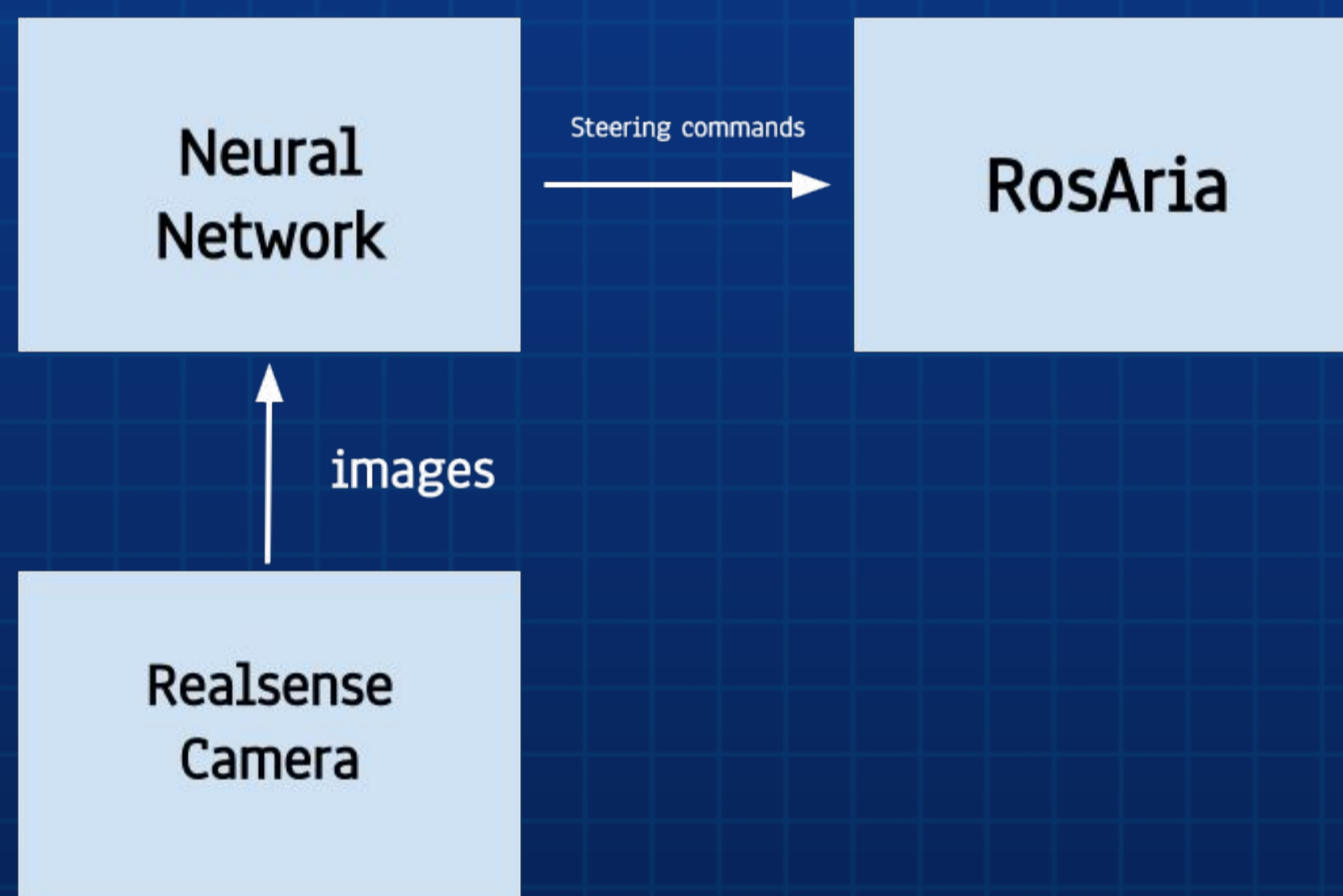
The robot's camera point of view

The operator's point of view

Convolutional Neural Network

- Convolutional Neural Network (CNN): A deep learning algorithm that is widely used for image/object recognition and classification.

- Training and Testing:
  - Wrote a custom data loader class to load training data into model
  - Built training class to train the model based on inputted data
  - Saved weights file (values that are used to transform inputted data) which are used in testing the CNN model

Future Work

Implement the data acquisition and convolutional neural network such that they can be used to autonomously drive a robot around in more complex environments:

- Stops signs
- Traffic lights
- Pedestrians

Implement the autonomous driving system onto the mini smart car made by car hardware group, which can properly fit into the lanes and make turns around the orbit city environment

Any Questions?