NVIDIA/Cal Poly Robotics Teaching Kit with Jet

Module 1: Course Introduction

Lecture Slides

- **1.1** Course Introduction
- **1.2** Introduction to Robotics
- **1.3** Introduction to Jetson TK1/TX1
- **1.4** Jet Overview
- **1.5** Introduction to ROS

Labs

- **Lab 1**: Building the Robot

Quiz Questions

Module 2: Sensors and Actuators

Lecture Slides

- **2.1** Sonar, Accelerometer, and Gyroscope
- **2.2** Camera, Motors, and Encoders

Labs

- **Lab 2**: Sense and Avoid

Quiz Questions

Module 3: Computer Vision

Lecture Slides

- **3.1** Introduction to Computer Vision
- **3.2** Image Filtering
- **3.3** Image Moments

Labs

- **Lab 3**: Computer Vision

Quiz Questions

Module 4: Machine Learning

Lecture Slides

- **4.1** Introduction to Machine Learning
- **4.2** Neural Networks
- **4.3** Caffe

Labs

- **NVIDIA DLI Online Elective:** Image Classification with DIGITS (Link)
- **NVIDIA DLI Online Elective:** Object Detection with DIGITS (Link)
- **NVIDIA DLI Online Elective:** Neural Network Deployment with DIGITS and TensorRT (Link)
- **Lab 4**: Autonomous Driving

Quiz Questions

Module 5: Dead Reckoning

Lecture Slides

- **5.1** Introduction to Dead Reckoning
- **5.2** Calculating Positions
- **5.3** Sensor Fusion and Kalman Filters

Labs

- **Lab 5**: Dead Reckoning

Quiz Questions

Module 6: Path Planning

Lecture Slides

- **6.1** Introduction to Path Planning
- **6.2** A* Planning

Labs

- **Lab 6**: Path Planning

Quiz Questions

Module 7: Control

Lecture Slides

- **7.1** Introduction to Control Systems
- **7.2** PID Control

Labs

- **Lab 7**: Line Following

Quiz Questions

Module 8: Robot Localization

Lecture Slides

- **8.1** Introduction to Robot Localization
- **8.2** Localization with Particle Filters

Labs

- **Lab 8**: Localization

Quiz Questions

Module 9: Mapping

Lecture Slides

- **9.1** Introduction to Mapping
- **9.2** SLAM

Labs

- **Lab 9**: Mapping

Quiz Questions

Module 10: Final Project

- Harvester
- Capture-the-Flag
- ColorFollower

NVIDIA DLI Online Course with Certification: Fundamentals of Deep Learning for Computer Vision (link)