Automation and Robotics Engineering (ARE)

ARE Seminar Series



Department of Mechanical Engineering Organized by Robotics Club, AVV, Coimbatore campus

3-day Workshop on Robot Operating System

Day-1, 16th Dec, Friday 4:00 pm to 6:00 pm

Introduction to the workshop,

- Structure of the program
- Objectives
- Overview of the Robot Operating System
- Installations
- Setting Up Virtual machine
- Setting Up Ubuntu in virtual machine with useful tools for ROS installation
- Installing and getting started with ROS

s instaining and getting started with NOS

Dependencies

■ Environment setup

DELIVERED BY: ANYA ROBOTICS,

PVT. LTD.

Day-2, 17th Dec, Saturday (6 hrs)

9:30-11:00 AM

- Introduction to ROS
- An architectural overview of the Robot Operating System Framework
- Packages & Catkin workspaces
- ROS workspace structure
- Essential command line utilities
- Software Package management within a project
 15 minutes break

11:15-1:00 PM

- Understanding fundamentals of ROS using turtlesim
- Learning basic ROS tools with turtlebot simulation Lunch break

2:00-3:30 PM

- Overview of a ROS based robot
- Understanding Unified Robot Description Format (URDF) of a robot
- RViz Basics

15 minutes break

3:45-5:15 PM

- Debugging in ROS Transform Frames
- Extending a robot Creation Launch Files
- Q&A session

Day-3, 18th Dec, Sunday (6 hrs)

9:30-11:00 AM

- Gazebo Basics
- Exploring Gazebo User Interface
- Writing Launch files using prebuilt gazebo worlds
- Intro to Gazebo plugins

15 minutes break

11:15-1:00 PM

- Teleoperating the modeled robot in gazebo world
- General information about the many types of sensors that are used in robotics systems including

cameras, IMU, encoders, and more.

 A brief tour of 3D sensors used in robotics Lunch break

2:00-3:30 PM

- Intro to the localization concept
- Intro to the Mapping and SLAM concepts
- Intro to Path planning and Navigation
 15 minutes break

3:45-5:15 PM

- Teleoperating turtlebot in real world
- Implementing Localization, Mapping, and Navigation on turtlebot
- Q&A session

To do installations for workshop: Please follow the instructions <u>here</u> for the installations before coming for the workshop

 $16^{th}-18^{th}$

December 2022

Venue: CAD Lab, Ground Floor AB - 1