

Advanced LiDAR Data Processing and Object Detection in Robotics

Istanbul (Turkey)

12 - 16 January 2025

UK Traininig

PARTNER



Advanced LiDAR Data Processing and Object Detection in Robotics

Code: IT28 From: 12 - 16 January 2025 City: Istanbul (Turkey) Fees: 4600 Pound

Introduction

The Advanced LiDAR Data Processing and Object Detection in Robotics course is designed to provide participants with in-depth knowledge and practical skills required to effectively work with LiDAR technology and process point cloud data for object detection and classification in 3D. This course focuses on the most modern and advanced techniques, tools, and frameworks available for LiDAR data analysis and robotics applications.

Course Objective

- Understand LiDAR specifications and spec sheets to make informed sensor choices for specific projects.
- Select the most suitable LiDAR sensor for a given robotics application based on project requirements.
- LiDAR Technology Fundamentals.
- Utilize ROS Robot Operating System wrappers to obtain real-time LiDAR data from sensors.
- Save LiDAR data to files for further analysis and processing.
- LiDAR Sensor Specifications.
- Develop Python and C++ code using ROS and PCL Point Cloud Library to extract meaningful insights from real-time LiDAR data in a robotics system.
- Conceptualize, develop, and train AI/DNN Artificial Intelligence/Deep Neural Network models to perform object detection and classification in 3D point cloud data.

Course Outline

Day 1

1. Introduction to LiDAR Technology

- Overview of LiDAR principles and applications
- Types of LiDAR sensors and their specifications

2. LiDAR Sensor Selection

- Understanding LiDAR spec sheets and technical specifications
- Factors to consider when choosing a LiDAR sensor for a project

3. Sensor Setup on Linux



- Connecting LiDAR sensor to Linux systems
- Driver installation and configuration
- Using manufacturer-provided visualization and capture tools

Day 2

4. Real-Time Data Acquisition with ROS

- Introduction to ROS and its role in robotics
- Setting up ROS environment for LiDAR data acquisition
- Configuring ROS wrappers for specific LiDAR sensors

5. LiDAR Data Storage

- Saving LiDAR data to files
- File formats for storing point cloud data

Day 3

6. Data Exploration and Visualization

- Introduction to Python packages for data exploration
- Utilizing web notebooks for interactive data visualization
- Exploring LiDAR data characteristics and properties

Day 4

7. Processing LiDAR Data with ROS and PCL

- Introduction to the Point Cloud Library PCL
- Developing Python and C++ code using ROS and PCL for real-time data analysis
- Extracting features and information from point cloud data

Day 5

8. Object Detection and Classification in 3D

- Introduction to AI/DNN for point cloud data analysis
- Conceptualizing object detection and classification algorithms for LiDAR data
- Developing, training, and evaluating AI/DNN models for real-time object detection in 3D point clouds



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