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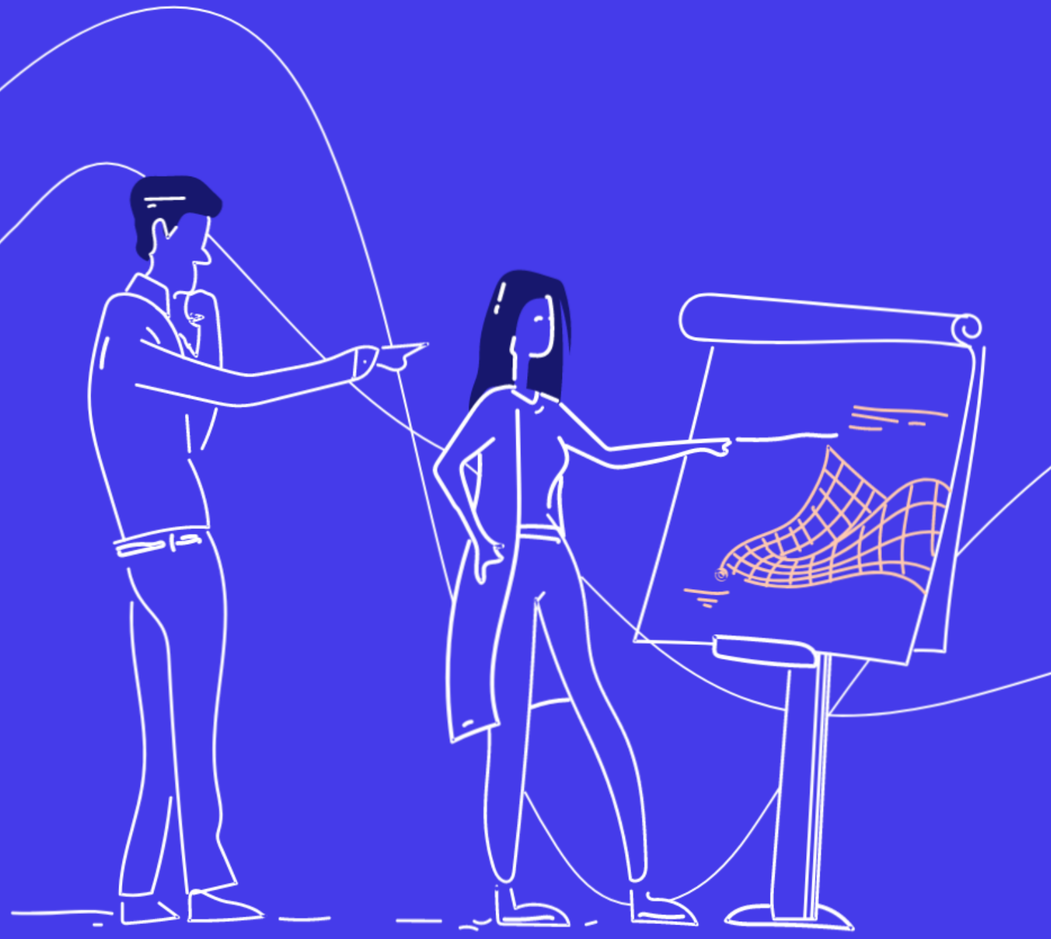
Sensor Fusion and Object Tracking with MATLAB



SciEngineer's training courses are designed to help organizations and individuals close skills gaps, keep up-to-date with the industry-accepted best practices and achieve the greatest value from MathWorks® and COMSOL® Products.

Sensor Fusion and Object Tracking with MATLAB

This one-day course provides hands-on experience with developing and testing localization and tracking algorithms. Examples and exercises demonstrate the use of appropriate MATLAB® and Sensor Fusion and Tracking Toolbox™ functionality.

Prerequisites

MATLAB Fundamentals or equivalent experience using MATLAB; basic knowledge of tracking concepts

TOPICS

Day 1

- Localization for Orientation and Position
- Scene Generation and Detection Import
- Filters and Motion Models
- Data Association
- Multi-Object Trackers
- Appendix A: Trackers for Passive Sensors

Localization for Orientation and Position

OBJECTIVE: Fuse IMU and GPS sensor data to estimate position and orientation.

- Model measurements from accelerometers, gyroscopes, magnetometers, and GPS.
- Fuse sensor data to estimate the pose in terms of position, velocity, and orientation.
- Visualize the pose estimation and plot platforms and trajectories.

Scene Generation and Detection Import

OBJECTIVE: Import and process detections or generate scenarios used in multi-object trackers.

- Preprocess and package collected sensor detections.
- Create a tracking scenario with multiple sensors and platforms.
- Define waypoint or kinematic trajectories.
- Customize sensor parameters.
- Generate detections used in sensor fusion algorithms.

Filters and Motion Models

OBJECTIVE: Select and tune filters and motion models based on tracking requirements.

- Evaluate filters against scenario requirements.
- Compare and contrast different motion models.
- Configure an Interacting Multiple Model (IMM) filter to track different maneuvers.

Data Association

OBJECTIVE: Determine the appropriate data association method for different tracking situations.

- Select from among Global Nearest Neighbor (GNN), Joint Probabilistic Data Association (JPDA), Track-Oriented Multiple Hypothesis (TOMHT), and other data association methods.
- Determine how multiple detections are assigned to different tracks.

Multi-Object Trackers

OBJECTIVE: Create multi-object trackers to fuse information from multiple sensors such as vision, radar, and lidar.

- Configure trackers and parameters.
- Perform track association and management.
- Visualize the tracked objects.

Appendix A: Trackers for Passive Sensors

OBJECTIVE: Create multi-object trackers and fusion systems that receive angle-only or range-only measurements from passive sensor systems.

- Triangulate multiple line-of-sight detections.
- Perform static fusion of passive synchronous sensor detections.
- Track with range-only measurements.
- Track with angle-only measurements.

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Expand your knowledge