



Computer Vision with MATLAB



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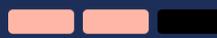
Computer Vision with MATLAB

This one-day course provides hands-on experience with performing computer vision tasks with MATLAB and Computer Vision System Toolbox.

Topics included: importing, displaying and annotating videos, detecting objects, estimating direction and strength of motion, tracking objects, removing lens distortion and measuring planar objects.

Prerequisites

MATLAB Fundamentals or equivalent experience using MATLAB. Image Processing with MATLAB and basic knowledge of image processing and computer vision concepts.

| DURATION | LEVEL |
|---|---|
| 1 Day | Medium |
|  |  |

TOPICS

Day 1

- Importing, Visualizing, and Annotating Videos
- Detecting Objects
- Estimating Motion
- Tracking Objects
- Camera Calibration

Importing, Visualizing, and Annotating Videos

OBJECTIVE: Import videos into MATLAB, as well as annotate and visualize them. The focus is on using System Objects™ for performing iterative computations on video frames.

- Importing and displaying video files
- Highlighting objects by drawing markers and shapes like rectangles
- Combining and overlaying two images
- Performing iterative computations on video frames

Detecting Objects

OBJECTIVE: Utilize machine learning and deep learning algorithms for complex object detection.

- Marking objects of interest in training images
- Training and using a cascade object detector
- Using a deep learning object detector

Estimating Motion

OBJECTIVE: Estimate direction and strength of motion in a video sequence.

- Understanding motion perception in images
- Estimating motion using optical flow methods

Tracking Objects

OBJECTIVE: Track single and multiple objects and estimate their trajectory. Handle occlusion by predicting object position.

- Tracking single objects using a Kalman Filter
- Tracking multiple objects using a GNN tracker

Camera Calibration

OBJECTIVE: Remove lens distortion from images. Measure size of planar objects.

- Estimating intrinsic, extrinsic, and lens distortion parameters of a camera
- Visualizing the calibration error
- Removing lens distortion
- Measuring planar objects in real-world units



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knowledge**

