

LabVIEW Machine Vision and Image Processing Course (Online)

Overview

This online, instructor-led course is an adaptation of the LabVIEW Machine Vision and Image Processing course. It teaches you the fundamentals of using NI Vision software and hardware for developing vision applications. During the course, you learn image processing software techniques and the use of machine vision algorithms like pattern matching, OCR, morphology, and image calibration. This course combines online live presentations with hands-on exercises using LabVIEW and NI Vision software to analyze and process sample images. By combining interactive learning technology delivered over the Internet with live instruction, this online course delivers many of the benefits of an instructor-led classroom course while reducing your training and development costs. It also includes additional self-paced online training about the other fundamental components of a vision system: lighting, optics, cameras, and acquisition hardware.

Duration

2 days (4 two-hour online sessions)

Audience

- New users and developers of National Instruments (NI) Machine Vision products
- Users who cannot attend classroom-based NI Machine Vision training
- Users and managers evaluating NI Machine Vision products in purchasing decisions

Prerequisites

- LabVIEW Basics or equivalent experience

NI Products Used During the Course

- NI Vision Development Module software

REGISTRATION

Register online at ni.com/training or call (800) 890-2062 • Fax: (512) 683-9300
info@ni.com

Outside North America, contact your local NI office. Worldwide Contact Info: ni.com/global

NI can also hold this class onsite at your facility.

Ordering Information 910734-69

After attending this course, you will be able to:

- Develop vision applications with greater ease and efficiency
- Understand the fundamentals of building a complete machine vision system
- Determine the components of a machine vision system
- Use various resources for locating appropriate cameras, lenses, and lighting equipment for your systems
- Use NI Vision software to quantify images
- Understand the basics of National Instruments Machine Vision hardware and software

System Requirements

- Windows XP, 98, 2000 or NT
- Internet connection of 56K or better
- Internet Explorer 6 or greater
- Speakers or headphones
- Microphone

Suggested Next Courses

- LabVIEW Intermediate I: Successful Development Techniques
- LabVIEW Real-Time Application Development

LabVIEW Machine Vision and Image Processing (Online) Course Outline

Topics Covered

Self-Paced

Introduction to Machine Vision

- Learn about the different National Instruments software and hardware vision products available
- Learn how to use National Instruments Vision products to build your machine vision application
- Learn how different industries use NI Vision products for their machine vision needs

Preparing Your Imaging Environment

- Learn about the parameters of an imaging system: sensor size, working distance, depth of field, field of view, and resolution
- Prepare the appropriate environment for your imaging system
- Enhance your images with lighting techniques
- Develop techniques to choose a camera
- Learn how to select a National Instruments image acquisition device

Acquire and Display Images with NI-IMAQ

- Learn how to acquire and display images using NI-IMAQ functions
- Learn about single and multiple buffers
- Understand the triggering features of NI-IMAQ

Live, Instructor-Led Online Course

Self-Study Review

This lesson covers a short review of the material learned in the self-study portion of the course. Learn about:

- Introduction to Machine Vision
- Common Machine Vision Applications
- Choosing Your System Components
- Acquiring and Displaying Images with NI-IMAQ

Image Conditioning

- Understand when to apply image filtering
- Determine when to use spatial calibration
- Understand the calibration process
- Common calibration misconceptions

Creating and Processing Binary Images

- Use a histogram to indicate the quantitative distribution of the pixels of an image per gray-level value
- Learn how to perform a threshold to separate objects from the background
- Use primary morphology functions to observe the geometry of regions and to extract the simplest forms for modeling and identification purposes
- Particle Measurement and Classification

Using Machine Vision Techniques

- Use edge detection to identify the boundary of an object
- Define the regions of interest in an image
- Use pattern matching to find regions that match a template

Readers

- Learn about retrieving barcodes, 2-D barcodes
- Use OCR

Using Color Tools in NI Vision

- Understand color image representation
- Apply color matching to an image

Coordinate Systems

- Learn the reasons for using a coordinate system
- Learn to set up a coordinate system