

LabVIEW Machine Vision and Image Processing Course

Overview

National Instruments Vision products give you the flexibility to address the needs of your research, test and measurement, and industrial automated vision applications. The course teaches the fundamentals of machine vision, the components that make up a machine vision system, and the various resources for locating appropriate cameras, lenses, and lighting equipment. Students use NI Vision software and NI image acquisition hardware to acquire and quantify images. The course manual contains an additional self-study lesson covering color tools if you would like to learn more about machine vision applications.

Duration

Two Days

Audience

- New users and developers of National Instruments (NI) Machine Vision products
- Users and technical managers evaluating NI Machine Vision in purchasing decisions

Prerequisites

- LabVIEW Core 1 and Core 2 courses or equivalent experience, including understanding and application of fundamental LabVIEW programming practices

NI Products Used During the Course

- NI Vision Acquisition software
- NI Vision Development Module 8.5 or later
- LabVIEW Professional Development System Version 8.5 or later
- NI image acquisition device
 - NI PCI-8254R (IEEE 1394 Interface with Reconfigurable Digital I/O)
 - or**
 - NI PCI-14xx Frame Grabber

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
- Acquire and display images in LabVIEW using NI image acquisition hardware
- Use several image processing functions to process and analyze images

Registration

Register online at ni.com/training or call (800)433-3488 Fax: (512)683-9300 info@ni.com

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

Part Number

910540-xx
-01 NI Corporate or Branch
-11 Regional
-21 Onsite (at your facility)

Suggested Next Courses

- LabVIEW Core 3
- LabVIEW Real-Time Application Development

LabVIEW Machine Vision and Image Processing Course

Introduction to Machine Vision

- Learn how to use National Instruments image acquisition products to build your machine vision application
- Set up your camera using Measurement and Automation Explorer (MAX)

Preparing Your Imaging Environment

- Prepare the appropriate environment for your imaging system
- Enhance your images with lighting techniques
- Develop techniques to choose a camera

Acquiring and Displaying Images

- Learn how to acquire and display images using NI-IMAQ and the Vision Acquisition Express VI
- Learn how to use the multiple buffer and triggering features of NI-IMAQ and the Vision Acquisition Express VI
- Learn how to allocate and free memory and how to begin and end image acquisition sessions

Processing Images

- Learn more about the different NI Vision VIs
- Determine which NI Vision image processing function is best-suited for your application
- Quickly prototype your machine vision application with NI Vision Assistant

Enhancing Acquired Images

- Calibrate your imaging setup to make accurate measurements in real-world units
- Smooth, sharpen, and remove noise from an image to extract the information you need

Measuring Features

- Learn how regions of interest speed up your image processing
- Create a nondestructive overlay to annotate the display of an image with useful information without modifying the image
- Use edge detection, clamping, and gauging to take measurements in your images

Using Machine Vision techniques

- Learn how to use pattern matching to locate regions in images
- Learn how to use geometric matching to locate distinct shapes in images
- Learn how to coordinate systems help to analyze objects that change orientation during imaging

Processing Binary Images

- Learn how pixels are related to each other in an image
- Use histograms to determine the quality of an image
- Learn how to perform a threshold to separate objects from the background of an image
- Use primary morphology functions to observe the geometry of regions and to refine the information in a binary image
- Prepare binary images for particle measurements
- Learn how to use golden template comparisons for defect detection

Identifying Images

- Use binary particle classification to train and classify unknown binary samples
- Use optional character recognition to train and read characters in an image