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LabVIEW Machine Vision and Image Processing Course

Overview:

National Instruments' IMAQ and Vision products give you the flexibility to address the needs of your research, test and measurement, and industrial automation vision applications. The course will teach 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 vision software and hardware to calibrate coordinates and to acquire and quantify images.

Audience:

- New users and developers of National Instruments IMAQ and Vision products

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
- Understand the basics of National Instruments IMAQ hardware and software

Prerequisites: LabVIEW Basics I course or equivalent experience

Duration: Two Days

Ordering Information: 910540-XX (-01 NI Corporate or Branch, -11 Regional, -21 Onsite)



Course Topics:

Introduction to Machine Vision

- Learn how to use National Instruments IMAQ products to build your machine vision application
- Learn how different industries use IMAQ products for their machine vision needs
- Set up your camera using Measurement and Automation Explorer

Preparing Your Imaging Environment

- 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 IMAQ image acquisition device

Acquire and Display Images with NI-IMAQ

- Learn how to acquire and display images using NI-IMAQ functions
- Learn how to use the multiple buffer and triggering features of NI-IMAQ

Using IMAQ Vision and IMAQ Vision Builder

- Determine which IMAQ Vision image processing function is best suited for your application
- Quickly prototype your IMAQ Vision application with the IMAQ Vision Builder
- Read and write image files in IMAQ Vision and IMAQ Vision Builder

Performing Basic Vision Tasks

- 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

Using IMAQ Vision Morphology Functions

- Use primary morphology functions to observe the geometry of regions and to extract the simplest forms for modeling and identification purposes
- Learn how pixels are related to each other in an image
- Determine the location of blobs and their shape features with particle measurements

Particle Analysis and Spatial Calibration

- Learn how to prepare your images for particle analysis using primary morphology functions
- Use quantitative image analysis functions
- Use calibration to correct errors caused by the imaging setup
- Convert pixel measurements to real-world measurements



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Using Machine Vision Techniques

- Learn how machine vision applications are used in various industries
- Learn how to use IMAQ Vision's edge detection and clamping functions
- Use IMAQ Vision Builder's batch processing and performance meter capabilities

Using Region of Interest and Pattern Matching

- Learn how to select a region of interest in your image
- Learn how to use pattern matching
- Use region of interest in pattern matching applications

Using Color Tools in IMAQ Vision

- Learn the basics of color image representation
- Use the color matching, color location, and color pattern matching tools in IMAQ Vision Builder

Coordinate Systems

- Learn how coordinate systems help to analyze objects that change orientation during imaging
- Learn how to set up a coordinate system