NI Vision Development Module

Vision Programming Libraries

- Hundreds of high-level machine vision and image analysis functions
- For LabVIEW, C/C++, Visual Basic, and .NET
- Grayscale, color, and binary image processing and analysis tools

Vision Assistant

- Interactive vision prototyping environment
- Generates LabVIEW code
- Generates C code
- Generates Visual Basic code

Vision Acquisition (included)

- Acquires from all NI vision hardware
- Acquires from IEEE 1394 and GigE Vision cameras
- Reads and writes image files

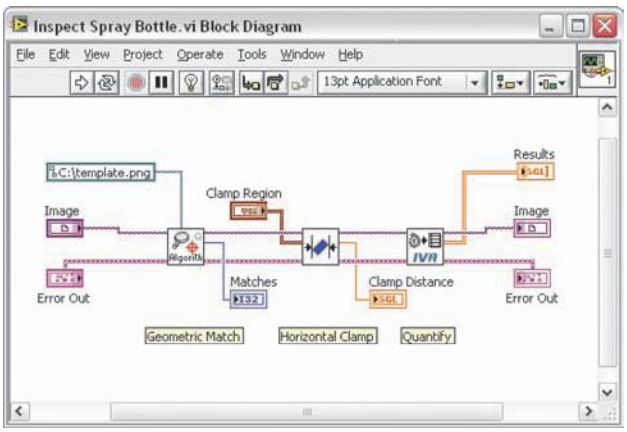
Operating Systems

- Windows 2000/XP
- LabVIEW Real-Time

Overview

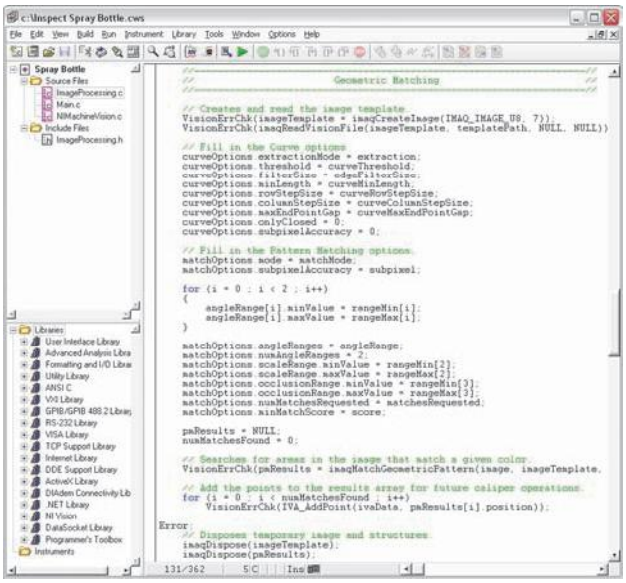
The National Instruments Vision Development Module is a collection of hundreds of image processing and machine vision functions for LabVIEW, C/C++, Visual Basic, and .NET. This module includes Vision Assistant, an interactive environment for developers who need to quickly prototype vision applications without programming. Vision Assistant and the Vision Programming Libraries work together to simplify vision software development.

Vision Assistant can automatically generate a LabVIEW block diagram and ready-to-run C/C++ and Visual Basic code. You can run the code generated by itself, or integrate it into your automation or production test application, which may include motion control, instrument control, or data acquisition. You can also take advantage of embedded capabilities with LabVIEW Real-Time, resulting in greater reliability and determinism.



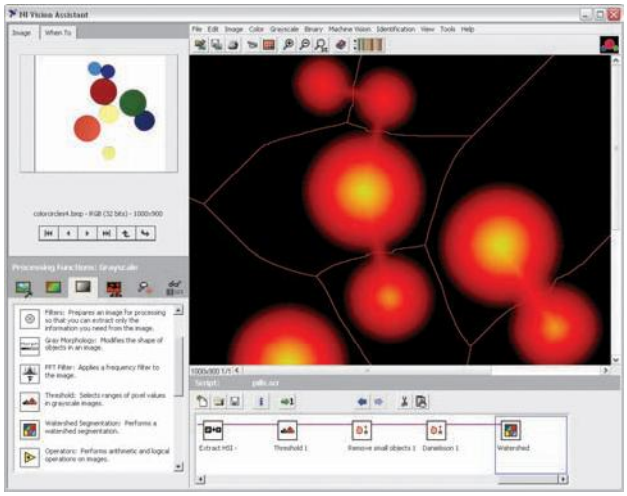
Vision Programming Libraries

Vision Development Module provides complete functionality for NI industrial machine vision and scientific image analysis. It includes hundreds of grayscale, color, and binary image processing and analysis tools that you can use in LabVIEW, C/C++, and Visual Basic. End users, integrators, and OEMs use these tools in machines as well as factory and laboratory automation operations that require extremely reliable and optimized vision systems. For a complete list of functions, visit ni.com/vision.



Vision Assistant

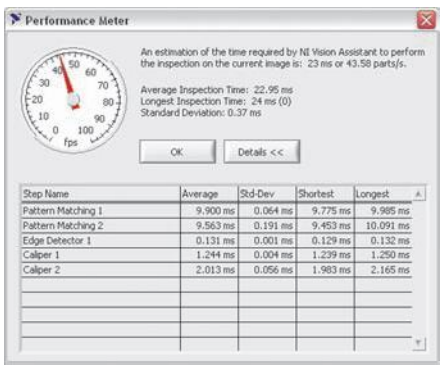
Vision Assistant is a configurable prototyping environment that accelerates vision application development. With interactive menus for more than 200 functions, you can experiment with different strategies and explore what-if conditions before you ever start to program.



Vision Assistant automatically generates a LabVIEW block diagram or code for LabWindows/CVI, Visual Basic, and C. You can run the code generated alone, or integrate it into your automation or production test application, which may include motion control, industrial I/O, and data acquisition. With these features, you can go from the drawing board to a working solution faster than ever.

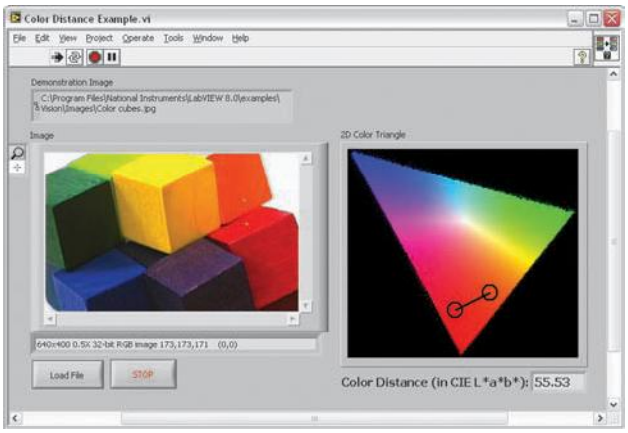
Vision Assistant also includes a solution wizard to help develop your inspection. Select from dozens of generalized solutions for automotive, biomedical, electronics, and manufacturing that show how you can use vision tools to solve a variety of inspection challenges.

Once you have developed a working inspection algorithm, use the Vision Assistant Performance Meter Tool to determine the speed of each function in your solution. Armed with this information, you can then optimize the speed of your application.



Run-Time Engine and License

The Vision Development Module includes everything you need to create, install, and run NI vision executable applications at your computer, production floor, or laboratory. The Vision Development Module integrates easily with the LabVIEW Application Builder, the LabWindows/CVI distribution kit builder, or your own custom installer. An executable application runs in evaluation mode for up to 30 days until a Vision Run-Time License is purchased. A run-time license is required for every deployed NI vision application.



Ordering Information

NI Vision Development Module 777859-03
Run-Time License 778044-00

BUY NOW!

For complete product specifications, pricing, and accessory information, call 866 265 9891 (U.S. only) or go to **ni.com/vision**.

Vision Software Overview

Vision Software

National Instruments has been a leader in machine vision and image processing for nearly a decade by making powerful software that is easy to use.

Image Acquisition

NI vision software can acquire images from thousands of different cameras. To acquire, display, save, and monitor images from cameras, use Vision Acquisition software, which is included with all NI frame grabbers and with both image processing software packages – Vision Development Module and Vision Builder for Automated Inspection (Vision Builder AI). Vision Acquisition software is also sold separately for IEEE 1394 and GigE Vision image acquisition.

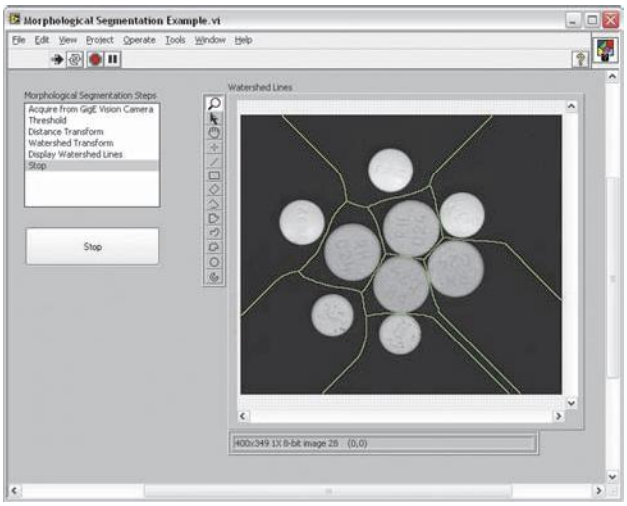


Image Processing and Machine Vision

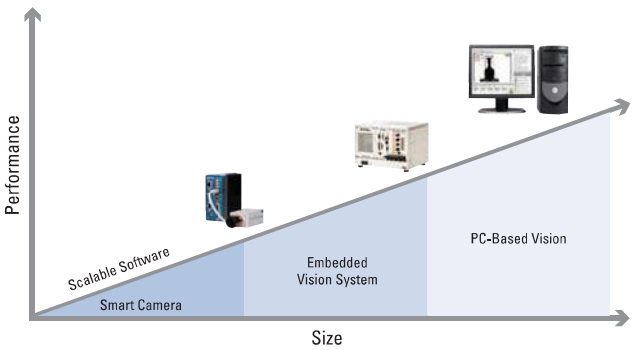
To process images, NI vision software comes in two different packages – the Vision Development Module and Vision Builder AI. The Vision Development Module is a collection of hundreds of vision functions for programmers using LabVIEW, LabWindows/CVI, C/C++, Visual Basic, or .NET. Vision Builder AI is an interactive software environment for configuring, benchmarking, and deploying machine vision applications without programming. Both software packages work with all NI vision frame grabbers and the NI Compact Vision System.

Scalable Software

As your needs change, you can always migrate between Vision Builder AI and the Vision Development Module. You can automatically generate ready-to-run LabVIEW VIs from Vision Builder AI. Conversely, you can expand Vision Builder AI with custom steps and LabVIEW VIs with the Vision Builder AI Development Toolkit. The result is a completely scalable vision platform that can expand with your needs.

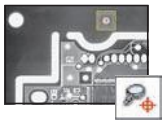
Features	Vision Acquisition Software	Vision Builder for Automated Inspection	Vision Development Module
		Configurable software	Programming libraries
One-shot acquisition	✓	✓	✓
Continuous acquisition	✓	✓	✓
Triggered acquisition	✓	✓	✓
Camera configuration	✓	✓	✓
Trigger output	✓	✓	✓
Full frame-rate display with overlays	✓	✓	✓
Write and read image files	✓	✓	✓
Write and read AVI files	✓	–	✓
Pixel manipulation tools	–	–	✓
Image manipulation tools	–	✓	✓
Image filters	–	✓	✓
Image arithmetic	–	✓	✓
Image logic functions	–	✓	✓
Advanced thresholding	–	✓	✓
Morphology	–	✓	✓
Region-of-interest tools	–	✓	✓
Particle analysis	–	✓	✓
Object classification	–	✓	✓
Gauging	–	✓	✓
Pattern matching	–	✓	✓
Geometric matching	–	✓	✓
Distortion calibration	–	✓	✓
Real-world measurements	–	✓	✓
1D and 2D bar code readers	–	✓	✓
Data matrix grading	–	✓	✓
Coordinate systems	–	✓	✓
Complex and Fourier analysis	–	✓	✓
Optical character recognition	–	✓	✓
Optical character verification	–	✓	✓
Color matching	–	✓	✓
Color pattern matching	–	✓	✓
Defect inspection	–	✓	✓
Instrument reader	–	–	✓
LabVIEW Real-Time-compatible	–	✓	✓
Performance benchmarking	–	✓	✓
LabVIEW VI generation	–	✓	✓
C Code generation	–	–	✓
VB Code generation	–	–	✓
Deterministic algorithms	–	–	✓
Customizable user interface	–	–	✓
Integration with motion control	–	–	✓
Integration with data acquisition	–	–	✓
Industrial communication protocols	–	✓	✓

Table 1. NI Vision Software Products



Vision Software Capabilities

National Instruments vision software includes hundreds of image processing and analysis functions. A subset of the tools available in the Vision Development Module and Vision Builder AI are shown below.



Pattern and Geometric Matching

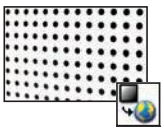
Learn and locate objects and patterns in your images. National Instruments patented matching algorithms locate patterns fast with very high accuracy.

Bar Code Reader and Grader

Read 1D bar codes as well as 2D codes like Data Matrix and PDF 417. You can decipher codes applied through ink jets, thermal transfer, laser etching, or dot peen.

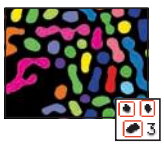
Optical Character Recognition/Verification

NI OCR functions use a trainable OCR algorithm specifically designed to identify and verify all types of fonts, characters, and symbols despite poor and inconsistent image quality.



Spatial Calibration

Using spatial calibration functions, you can calibrate your image to take accurate, real-world measurements from images, regardless of camera perspective or lens distortion.

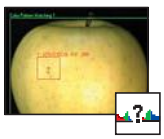


Particle Analysis

Use particle analysis to detect connected regions or groupings of pixels in an image and make selected measurements of those regions. Choose from more than 80 unique measurements that return data in both real-world and pixel values.

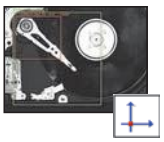
Image Arithmetic and Logic Functions

Operators perform basic arithmetic and logical operations on images. Use operators to add, subtract, multiply, and divide an image with other images or constants.



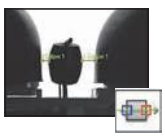
Color Inspection

Color matching quantifies which colors and how much of each color exists in a region of an image and uses this information to check if another image contains the same colors in the same ratio.



Coordinate Systems

Set up coordinate systems to ensure that all your measurements move with the object within the field of view.



Edge Detection

Use the edge detection tools to identify and locate discontinuities in the pixel intensities of an image. Find edges in order to align, measure, or detect features in the image.

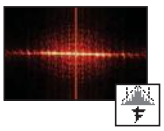


Image Filters and Frequency Analysis

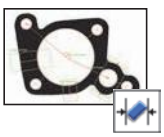
Frequency filters, such as the fast Fourier transform (FFT), alter pixel values with respect to the periodicity and spatial distribution of the variations in light intensity in the image.

Object Classification

Classification is a tool for identifying an unknown object by comparing its significant features to a set of features that represent known samples.

Image Segmentation

NI vision software comes with several options to segment and partition images into related components. Segmentation is an important part of many imaging applications that need to extract certain features or objects in order to process them further.



Gauging

You can use dimensional measurement or gauging tools to obtain quantifiable, critical distance measurements – such as distances, angles, areas, line fits, circular fits, and counts.

Golden Template Comparison

Find defects in an image by comparing a perfect (golden) sample to all subsequent samples. Golden template comparison detects surface defects, label misprints, and overall quality issues.