



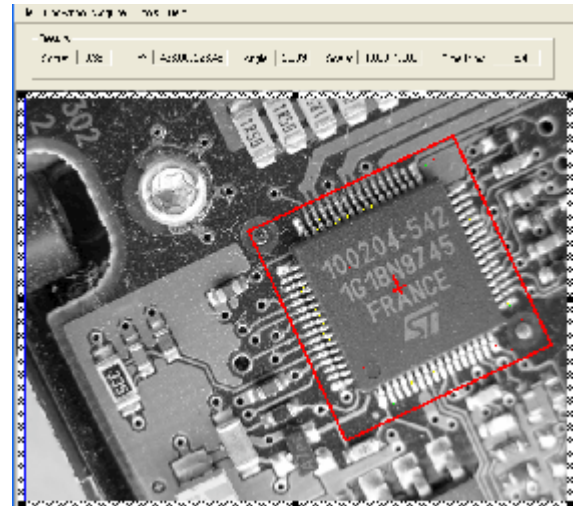
The PreciseVision™ System

Precise Automation, Inc.

The PreciseVision System is a machine vision software package that can run either in the Precise Guidance 3000 Series of motion controllers, or remotely on a PC connected to the controller by Ethernet.

PreciseVision is intended for motion guidance applications such as fiducial location on circuit boards and semiconductors, part feeding from trays or conveyor belts, fluid and solid sampling in the life science industries, and precision assembly in the electronics and mechanical parts industries.

Precise Automation controllers can be distributed throughout a work cell using Ethernet and therefore support Ethernet camera interface. An Ethernet adapter to standard analog cameras is available and multiple cameras can be accessed via the network.



Features

- Complete, Precision Optical Measurement Toolset
- Powerful Patented Object Locator
- Seamless Integration with Motion
- Embedded or Remote Execution
- Easy-to-Use Graphical Programming

Targeted Applications

- Precision Fiducial Location
 - Electronics assembly
 - Semiconductor processing
 - Precision mechanical assembly
- Part Feeding
 - From Trays
 - From Conveyors
 - From Recirculating Flexible Feeders
- Vision-Guided Sampling
 - Tray wells, solids based on image
- Quality Control
 - Measure critical part dimensions during assembly
- Vision guided motion control
 - Close position loop with vision

Specification

Object Locator

- Single Instance Training
 - Record picture of object, adjust training parameters if desired
 - Teach robot pick-up location on object
- Rotation Invariant
- Recognizes touching, overlapping objects
- Scale invariant
 - Recognize image at any scale
 - Or scale can be proxy for distance

Vision Toolkit

- Line Fitter
 - Fits straight line to edge points
- Arc Fitter
 - Fits arc to edge points, finds center
- Ruler
 - Measures distance between edges
- Normalized Grayscale Correlation
 - Both 1-D and 2D correlations
- Pixel Counting
 - Image statistics including mean, standard deviation, minimum, maximum, centroid and area of blob
- Histogramming
- Generalized Transformations
 - Rotation, scaling, translation
 - Perspective

Integration with Motion Control

- Uniform coordinate system for motion and vision
- Supports robot-mounted cameras
- Fly-over image capture without stopping
 - Simultaneous image and position capture
- Feature tracking
 - Edge following
 - Part and destination alignment
- Multiple cameras
 - Upwards, downwards, sideways
- IO control of camera
- Ability to move camera for inspection
 - Known coordinates and distances

Image Processing

- Most operations support both 8 and 16 bit pixels
- Convolutions
 - Parameterized, user-defined kernels including low pass, gaussian, laplacian
- Sobel Edge Filters
- Cross Gradient Edge Filters
- Threshold Operations
- Morphology
- Image Arithmetic
 - Addition, subtraction, maximum, minimum
- Image Copy

Image Acquisition and Display

- Full frame or field, interlaced or noninterlaced, area cameras
- Shuttered camera and strobe controls
- External trigger from digital input
- Gain and offset
- Variable image size
- Extended exposure control
- Live video display
- Image capture and save to disk
- Graphics overlay
- Zoom and Shrink functions

Calibration

- 2D calibration provides pixel-to-millimeter scaling and corrects for perspective distortion.
- Robot calibration routines

Portable

- Software can be executed locally in motion controller or in PC over network.

Cameras

- Supports both inexpensive 640x480 grayscale and high resolution megapixel cameras.