VISION EXPERIENCE HIGHLIGHTS

From 2D part identification to AI deep learning bead inspection, Patti Engineering uses our vast experience to implement the best solution and help facilities improve their productivity, safety, and quality.

Our engineers have programmed vision systems in industries ranging from discrete manufacturing to distribution. Patti Engineering has connected the cameras and sensors to traditional robots and collaborative robots for coordinate mapping, PLCs and SCADA with decision making I/O, and directly to network databases for verification and image storage.

BRAND EXPERIENCE

Several lines offer high-quality solutions. Here is a sample of the brands we work with:

• Cognex / DVT
• Keyence
• Zebra / Matrox
• IFM
• FANUC IRVision
• Siemens MV + more!

TECHNOLOGY EXPERTS

In terms of vision technology, there is a wide array of complexity. Here is a sample of our areas of expertise:

• 2D
• 3D
• Color
• Monochrome
• Smart Cameras
• Vision Sensors
• AI Deep Learning

DIVERSE APPLICATIONS

Vision systems can be used for a multitude of applications. Here is a sample of use cases we specialize in:

• Part Type Identification and Verification
• Part Location
• Part Orientation
• Bead Inspection
• Quality Inspection
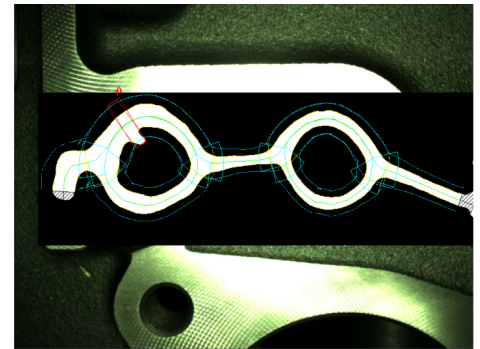• Optical Character Recognition (OCR)

COLLABORATIVE ROBOT WITH VISION GUIDANCE
Part Orientation, Bead Inspection, Cognex

Project Overview:
Vision system and sealant dispenser

- Cognex In-Sight 8400 2MP Color camera installed on a collaborative robot arm
  - Programmed with In-Sight Explorer
- Functional Specification Development
- Electrical and Mechanical CAD design for new collaborative robot station
- Collaborative robot programming, simulation, and path development
- PLC and HMI programming
- By locating the barcode on the flywheel housing from a high vantage point, the camera sent updated coordinates to the collaborative robot to move into a barcode scanning position.
- The camera also took several high vantage point images and identified a distinguishing feature on the flywheel to calculate the part location offset for the sealant dispense.
- A series of images taken from over ten collaborative robot positions were taken by the vision system to perform a quality check on the bead width and gaps in the bead.
- The flywheel housing had a reflective surface with holes causing vast differences in angles and backgrounds for the images.
- Histograms and filters were used to exaggerate the bead to perform the quality check.

PRODUCT INSPECTION WITH SERIAL NUMBER VERIFICATION
Optical Character Recognition, Cognex

Project Overview:
Final product verification

- Fixed-mounted Cognex In-Sight D900 Series AI deep learning camera
- Programmed with ViDi package
- Electrical and Mechanical CAD updates for the existing station
- Integrated into the customer's production system for image storage, part tracking, and part number verification.
- Twenty inspection point checks were completed from a single image.
- Two barcodes and a variety of text portions were read by the vision system to validate against the production system to verify both print quality and correct data printing.
- The camera communicated with the production system to verify the label serial number for each part.

CNC PROGRAM SELECTION

Part Type Identification, Part Orientation, Keyence

Project Overview:
Part identification for CNC program

- Fixed-mounted Keyence camera
- Integrated with a FANUC CNC controller
- CNC programming to incorporate the new Keyence vision systems
- Keyence vision systems were installed on three separate CNC machining stations
- The large scale CNC stations machined chassis for excavators
- The camera took pictures to identify the part type and validate the part orientation
- Each station had seven part types and two orientations
- The validation was used to avoid improperly machining the parts or damaging the CNC itself
- The results from the vision systems were communicated to the CNC in order to select the correct program

ENGINEERING STUDY WITH 3D SENSORS

Object Location, IFM

Project Overview:
Directional movement tracked with 3D sensor

- Fixed mounted IFM 03D300 3D sensors installed above loading dock doors
- Programmed with IFM Vision Assistant
- PLC and RFID programming
- Designed and built test equipment as part of the pilot proof of concept prior to large-scale development and deployment
- The vision sensor was used as a discriminating trigger for an RFID reader to scan tags located on loads of product

- The RFID reader would trigger if the vision system:
  - Detected a forklift with a product load being moved onto or off of a semi-trailer instead of a human being
  - Determined the directional movement of the forklift as either loading or unloading in order to filter out cross traffic
  - The information from the RFID tag, the dock door identifier, the read time, and the directional movement from the vision sensor as load or unload were sent to the plant ERP software to improve load accuracy and prevent errors in order fulfillment

TRADITIONAL ROBOT WITH VISION GUIDANCE

Part Orientation, FANUC IRVision

Project Overview:
FANUC integrated vision system

- FANUC IRVision camera
  - Programmed in Roboguide
- Station start-up support with I/O checking
- Robot programming, simulation, and path development
- Robot DCS creation

- PLC and HMI programming
- The FANUC robot was used to offload parts from pallets into stacks of trays
- The trays were held in a sloped position and the vision system was used to properly orient the end of arm tooling (EOAT) to pick and place the parts