Machine Vision & AI Realizes Automated Inspection in Manufacturing

Moderator: Ethan Huang, IIoT Advantech
Panelist 1: Yuki Tominaga, Phoaxter (Japan)
Panelist 2: Neil Chen, IIoT Advantech
Panelist 3: Jesse Chen, CEO SmaSoft (Taiwan)
Edge SRP & Go to Market Milestones

AI Vision Inspection Solution

- Co-Creation
- 2019 3Q
- CCJV

Machine Vision Solution

- Co-Creation
- 2018 2H
- 2019 2Q
- 2019 4Q
Future Manufacturing Applications:
1) Structured data extraction, Gauge, Coordinated Pattern Recognition => Machine Vision Solution
2) Randomized image Recognition => AI Inspection Solution
Advantech VisionNavi

Agenda
1. Market demands for the Software
2. The Solution
3. Application
4. Co-Creation

Dec, 2019
Yuki.Tominaga, Phoxter
Growing needs of Machine Vision

- Increase of wage
- Labor shortage, Education cost

Report from Tsukubabank

Health, Labour and Welfare Ministry Japan
What the users really want to do with Machine Vision?

- Make more money/Save money
  - speed up the production
  - reduce the number of inspectors in the production line
  - improve quality; by categorizing defects and feedback the result to production

- Protect their own brand
  - prevent outflow of defective products to the market
  - execute reliable inspection
Industries

- Semiconductor
- Electric parts
- PWB assembly
- Logistics
- Machine parts
- Food
- Beverages
- Medical
Applications

- Measurement
  - Find defects/flaw/spot/etc.

- OCR
  - Code reading, 1D/2D

More features for various situation

- Preprocessing
  - Filter
  - Color extraction
  - Color conversion
  - Image rotate
  - etc.

- Judgement
  - Positioning
  - Count
  - Compare with good sample
  - Blob analysis
  - Matching
  - etc.
Phoxter has solutions for AOI, but no sales link to the people who need them

People with inspection problems

AOI solutions!
Co-Creating the Future of the IoT World
Vision-Based Track and Trace Solutions
$3.93 billion, CAGR 18.9% by 2023

Source: AIA Online Marketing, 2019

Electronics Manufacturing Process

PCB/SMT/DIP

Assembly

Quality Assurance

Packaging

Logistics

Major MV Application

Inspection

Guidance (High Growth)

Identification

Inspection (High Growth)

Product

Device Platform

Device Platform

Vision Sensor

Vision System, Vision Sensor, ID Reader

Reference: Bernstein analysis, 2017
Solutions in Identification

RFID
- Retail
- Handheld
- Reuse
- Expensive tag
- Dimension

Vision
- Industry
- Stationary
- Reliable
- High Price
- Multi-code, OCR

Laser
- Retail/Industry
- Handheld
- Stable
- Low price
Go To Market

Cloud Service
- Marketplace
- OEE Monitoring
- Visualization

Optics Partner
- Application Driven
- Domain Focus
- DFSI

Field Device
- Sensor, I/O, Data
- Control, Comm.
- HMI, SCADA

Value Claim/Ecosystem
Whole Process
Material/Finish Good/Assert

2D Code → 1D Code
O.C.R → O.C.V

Wireless Sensor Module
Automation PCs
I/O & DAQ Devices
Compact IPC
Vision sensor
Intelligent HMI
Gateways

WebAccess/SCADA
Vision Navi
WISE-PaaS/EdgeLink
Service Network

- **Optics, Use Case**
  - Integrate optics (Lens, Lighting), duplicate use case

- **Virtual Machine**
  - Upload images, feasibility study

- **Trial Test**
  - On site demo, verify result

DFSI

Online Evaluation

Evaluation Kit
Machine Vision Algorithm Mix

Identification: 1D/2D code
Gauge/Alignment
Present/Counting
Deep Learning
O.C.R/Defect Detection
Segmentation
Classification
Verification
Rule Base

Enabling an Intelligent Planet
Co-Creating the Future of the IoT World
Advantech AINavi

Agenda
1. Overview, Architecture
2. Selling point
3. Features
4. Applications

Dec, 2019
Jesse.Chen, SmaSoft
Company Introduction
偲健科技
With the emergence of industrial 4.0 brings a tidal wave of smart manufacturing and with this, in contrast to past production line focusing on hardware performances, the current age of smart manufacturing focuses more on hardware software system integration. It is no coincidence that Smasoft’s expertise and focus has been the system integration, both hardware and software, of an automation solution. This is done with the software LabVIEW from National Instruments (NI), and Smasoft’s proprietary SmaSEQ, that allows users to easily integrate robotic arm controls, automated optical inspection (AOI) algorithms using industrial cameras, and even AI model inferencing all without any prior programming experience.
Solve your automation problems

We are the Automation solution supplier

Developing an automated manufacturing system requires highly-trained professional software engineers who, often need a significant amount of time and effort to train; Hence, with a software integration platform like SmaSEQ, one would be able to automate any production line applications without any programming experience, which would surely increase the working productivity and efficiency, and significantly shorten the training/educating time-span required for an automation software engineer.
OUR SOFTWARE
SmaSEQ

Unlike the traditional production lines in which different hardware have distinct software and programming languages, our product offers complete design and compilation for the entire industrial automation process as a total solution, which offers many advantages such as ease-of-use when compared with solutions made up of other independent equipment; This greatly speeds up hardware integration and software development process, and also greatly enhances production performance.
OUR SOFTWARE
“SmaSEQ”

SmaSEQ allows for a highly flexible automation system integration solution, where one can easily deploy motion control, machine vision and GPIO applications. Each of these applications has its own modularized settings menu where each module application can be modified, added or removed in an automation sequence.
SmaAI Trainer
Standalone AI Model Trainer
SmaAI

AI Defect Inspection

High-speed AI inference
A high-speed and high-accuracy AI solution

Distributed AI structure
Simultaneously run multiple AI models cost-effectively
Distributed SmaAI Inference System

MIC-730AI

Model 1
GPU IPC w TensorRT

Model 1
GPU IPC w TensorRT

Model 1
GPU IPC w TensorRT

DeepStream

Vision

DIO

Motion

Robot
3rd party Passive Components Defect Inspection with WISE-PaaS/AFS

Detectable defects:
- Dark crack
- Missing angle
- Poor soldering
- Missing material
- Dislocation

1. Subscribe
2. Model Deploy
3. Operate/QA
4. Upload Data & Re-training Task
5. Model Update

Edge AI System
MIC-730AI

OK image

Result

Daily Check

Labeled data

OK

NG
Smasoft software platforms have been approved by various partners; and with partners’ support, we can supply more innovative and diverse solutions to our customers.
Edge SRP

**STEP 01**
Image Acquisition

**STEP 02**
Class Definition

**STEP 03**
AI Training

- Image Augmentation and processing
- Image Data Verification
- Preview of the results
Go to Markets

Marketing Summary

Materials
Advantech Industrial AI Solution

Live Demos

Webinar

Training
Co-Creating the Future of the IoT World