LAON PEOPLE

스마트 솔루션과 스마트 플랫폼을 위한 고성능 스마트 비전 카메라

LaonPeople Inc.
김헌중

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LAON PEOPLE

1. Machine Vision & Technology Trend

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4. Smart Vision Camera Solution for Smart Factory

1-1. Machine Vison

Machine Vision

Machine vision (MV) is the technology and methods used to provide **imaging-based automatic inspection and analysis** for such applications as **automatic inspection**, **process control**, and **robot guidance** in industry.

Machin Vision	**Vision System**	√ **Smart Camera** √ **Machine Vision Camera and PC (Option : Grabber)** √ **Machine Vision S/W**
	Vision Camera	√ **Vision Processor + Vision Sensor + Lens**
	Optics and illumination	√ **Focusing the image of the object while lighting system illuminates**
	Frame Grabber	√ **Capturing the camera's output to transfer data to the PC**
	Vision S/W	√ **Analyzing and manipulate the image and extract information**

Application

검사 | 측정 | 불량 검출 | 위치 확인 | 로봇 가이드 | 색상 판별 | 바코드 판독 | 문자 판독

1-2. Machine Vision Core-Tech. Trend Cont.

Core Technology Trend

High Resolution

WQVGA ~ 25M(5120x5120)

High Frame Rate

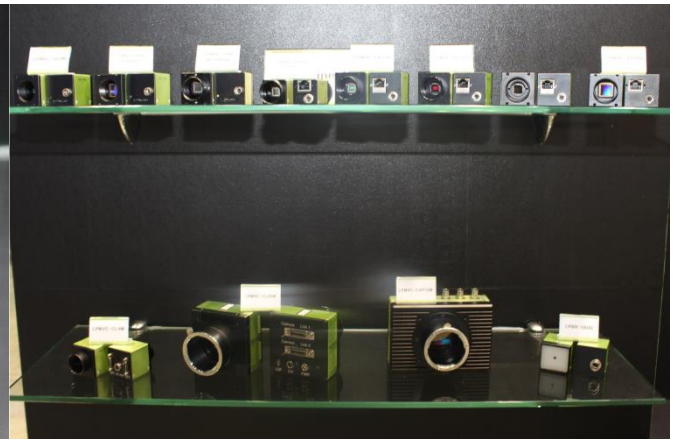
12M@190fps
.400x288(WQVGA)@2000fps

Recent Interface

. CoaXPress, Camera Link
. GigE, USB3.0, HDMI..

Enhance Image Processing

. AWB, PRNU, Defect Correction
. Noise Reduction, Color Correction, Morphology,..



1-3. Machine Vision Core-Tech. Summary

Core Technology Trend

Mixed Detection/Inspection

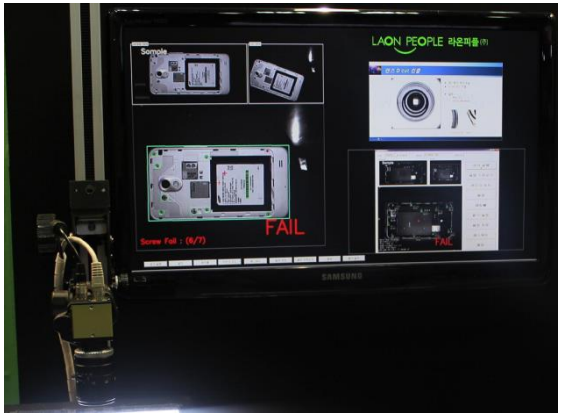
. Inspection+ OCR+ Barcode
. Shape+ Pattern+ Gaging
. 1D/2D Barcode(w/ DPM) + OCR

SW Configuration

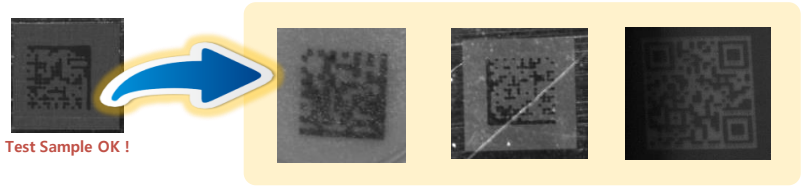
. User Friendly (More Simple)
. Auto Simulation
. Easy Configuration

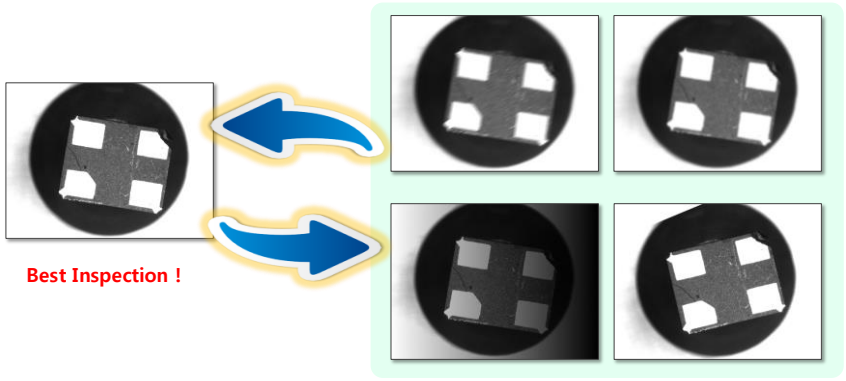
Stand Alone System

Smart Camera
. External Device Integration
. High Performance
. Mobile Connectivity



But, Real World, Tough !

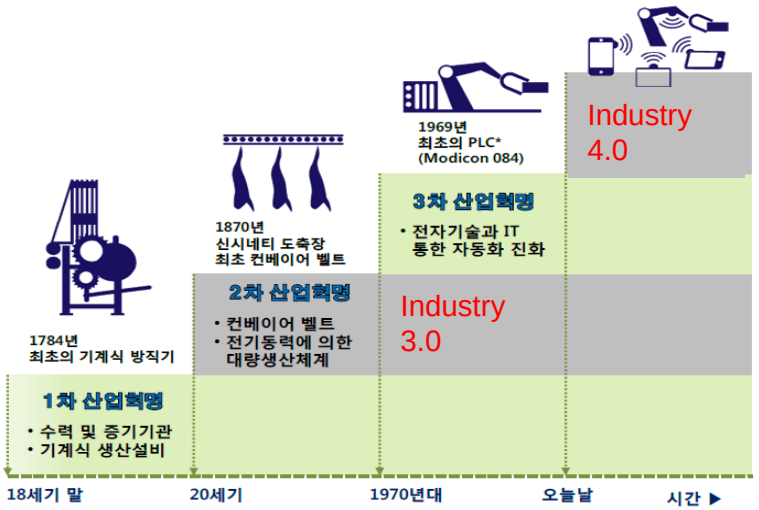




LaonPeople MTiG™ & Analyzer

2-1. Smart Factory & Industry 4.0 Overview

<산업혁명의 역사적 흐름>



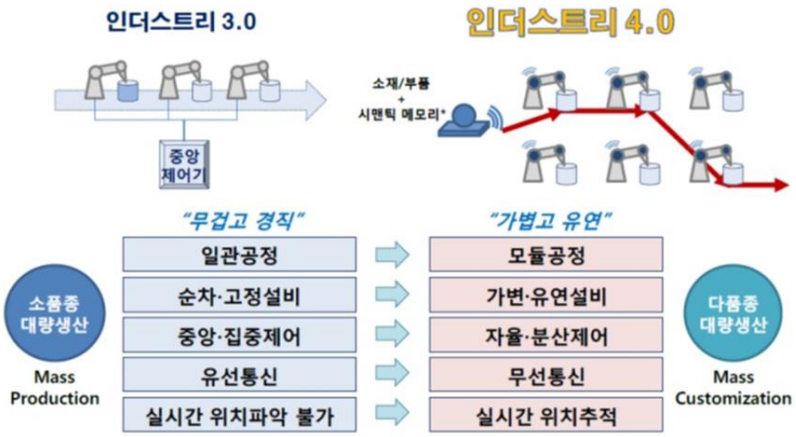
· ICT와 제조업의 완벽한 융합

·

▲사물인터넷(IoT)확산 ▼ 시뮬레이션을 통한 최적 생산 등

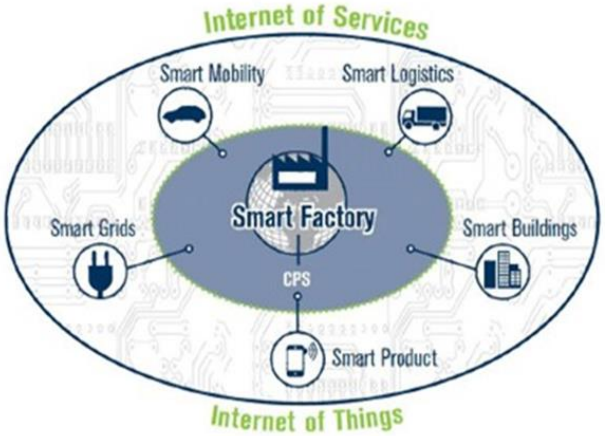
* PLC Programmable Logic Controller

자료: DFKI (독일인공지능연구소), 2011



*시맨틱 메모리: RFID 등 제품의 이동경로 등 이벤트를 기록해 저장할 수 있는 메모리 분류

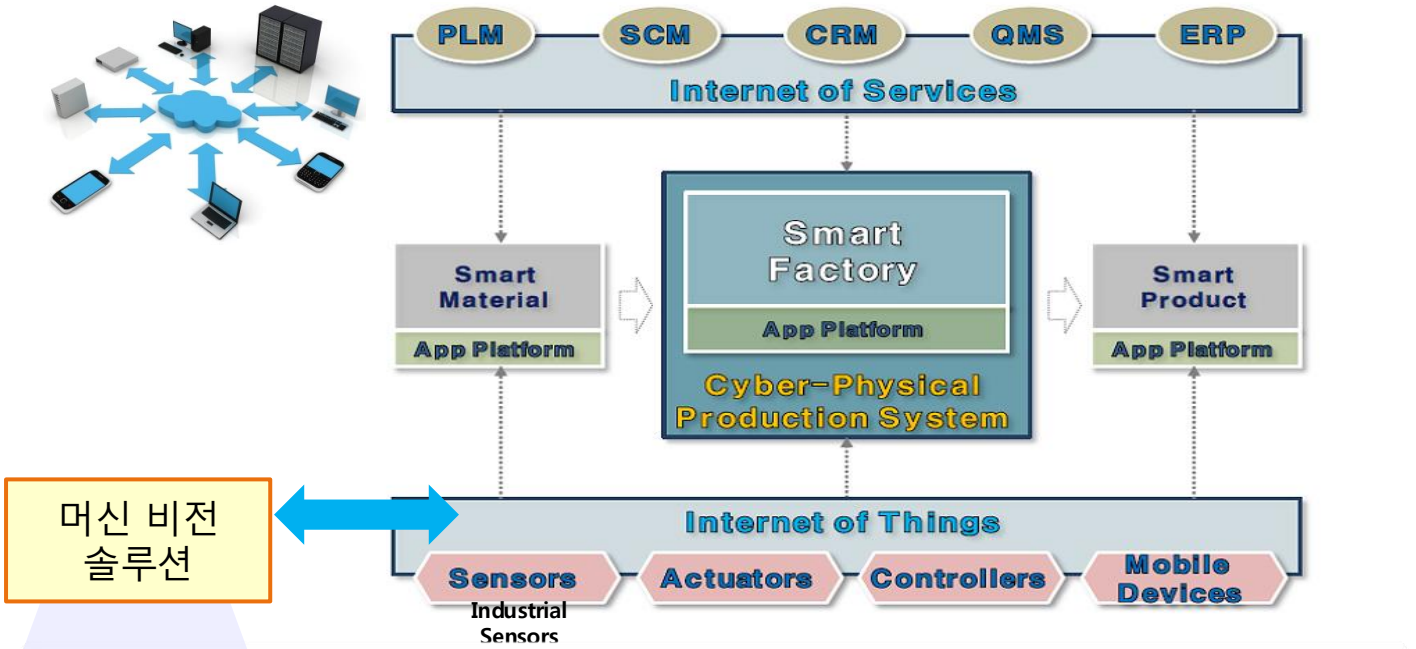
〈 IoT·IoS와 스마트 팩토리 〉



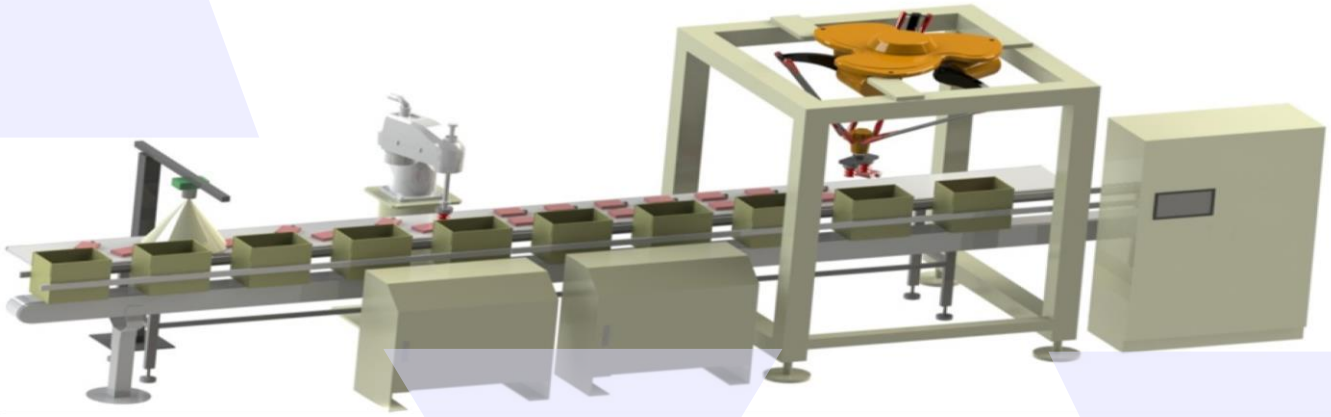
* IoT, IoS 구성 요소로서 스마트 팩토리 위치 부여

자료 : DFKI, 2011.

2-2. Machine Vision Solution with Smart factory Platform



머신 비전 솔루션



작업분배/컨베이어 컨트롤

로봇 모션 컨트롤

공정운영

3-1. Machine Vision Keyword for Smart Factory

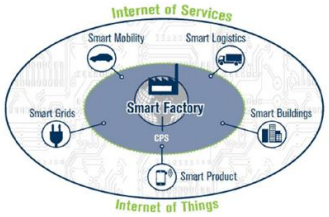
<Industry 4.0 Keyword>

- 모듈공정
- 가변.유연설비
- 자율.분산제어
- 무선통신
- 실시간 위치추적

<Smart Factory 8대 기반 기술>

- 3D Printing
- 홀로그램/증강현실
- 클라우드
- 사물인터넷
- 스마트 센서(센싱)
- 사이버물리시스템
- 빅데이터
- 에너지절감

< IoT·IoS와 스마트 팩토리 >

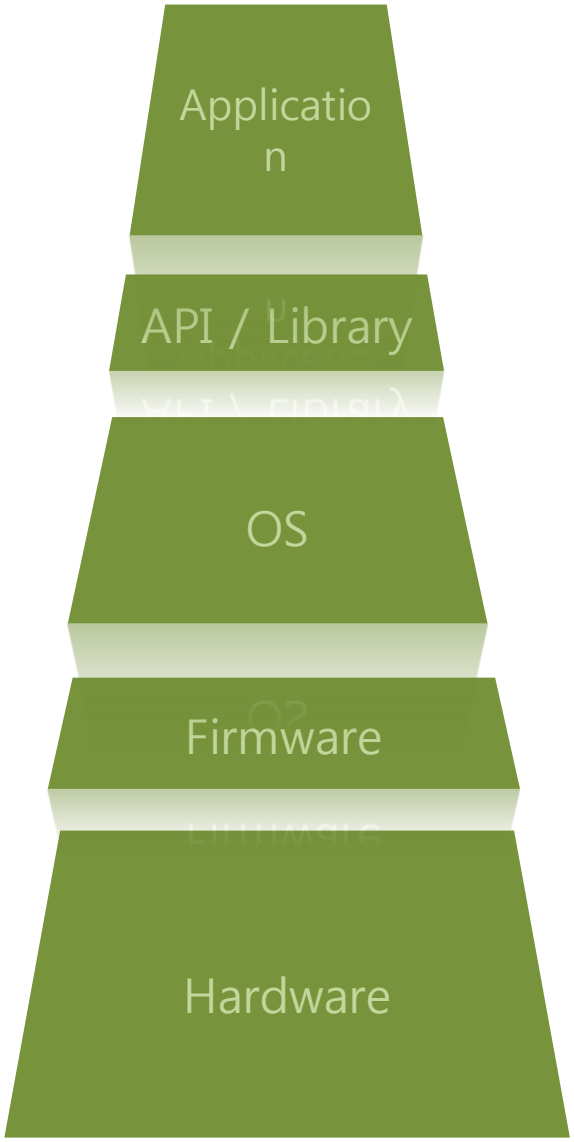


* IoT, IoS 구성 요소로서 스마트 팩토리 위치 부여
자료 : DFKI, 2011.

Machine Vision Keyword for Smart Factory

- ▶ Stand Alone System
- ▶ 여러 모듈과 동시 접속
  → Server Platform
- ▶ Solution Scalability
- ▶ Mobile Device와의 Connectivity
  (Smart Phone, Table)
- ▶ Network Connectivity (Intra to Web)
- ▶ 이종 Platform과 유연한 Open Platform 기반의 HLOS (High Level Operating System)
- ▶ Computing Power
  (Vision Inspection + Connectivity Solution)

3-2. Machine Vision Platform Movement (To Smart Factory)



Maintenance Efficiency, Remote Control

Functions Base
UI Side
Disconnected

→ **Solution Base & Scalability**
→ **UX side (More Simple)**
→ **Web / Cloud / Mobile**

User & Developer-Friendly

RTOS
PC Base

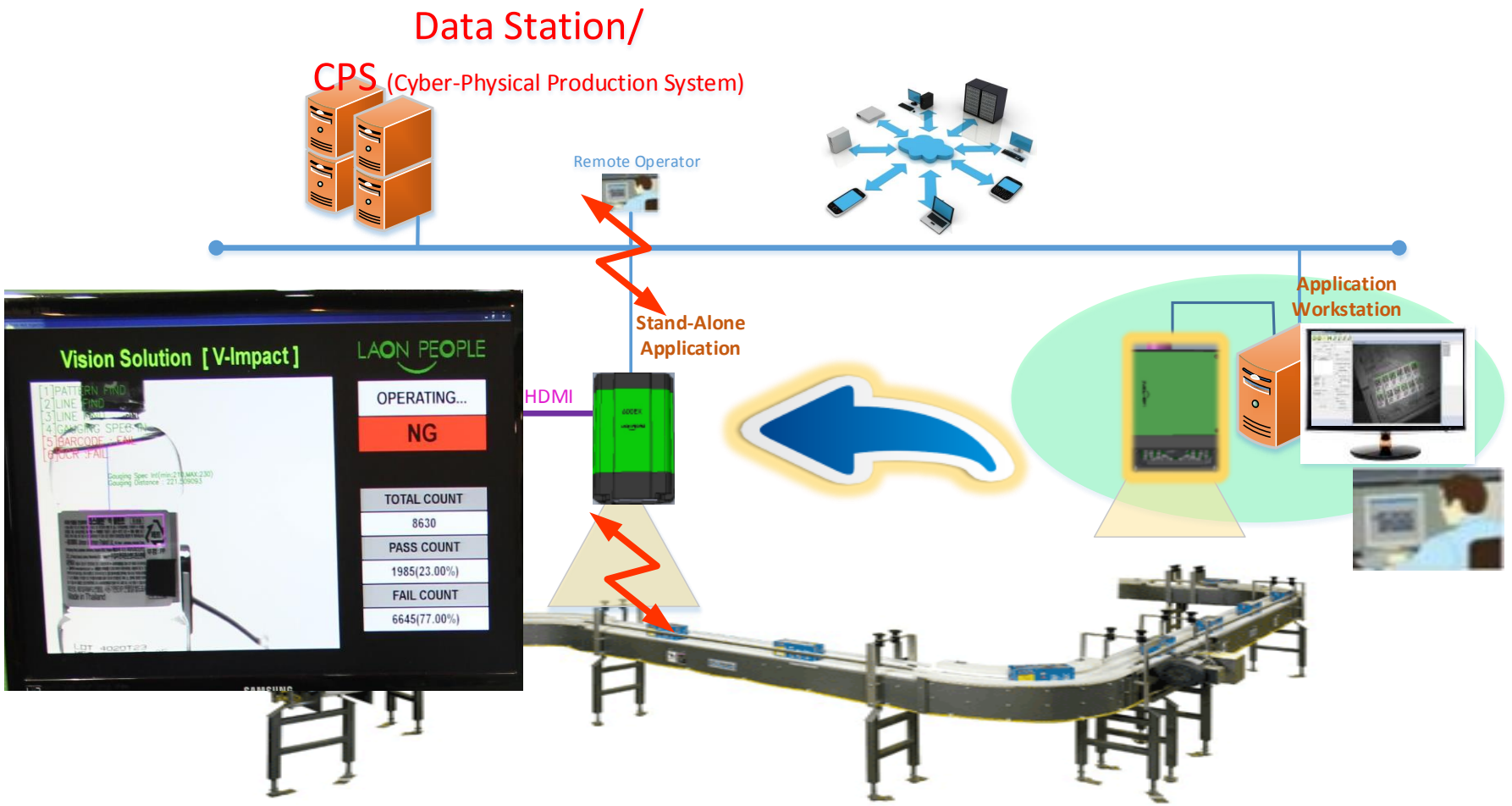
→ **HLOS**
(Android, Linux, Windows Embedded)
→ **Smart Camera /Web Base/PC**

Remote Update

Spec.
Interface
Fixed Device

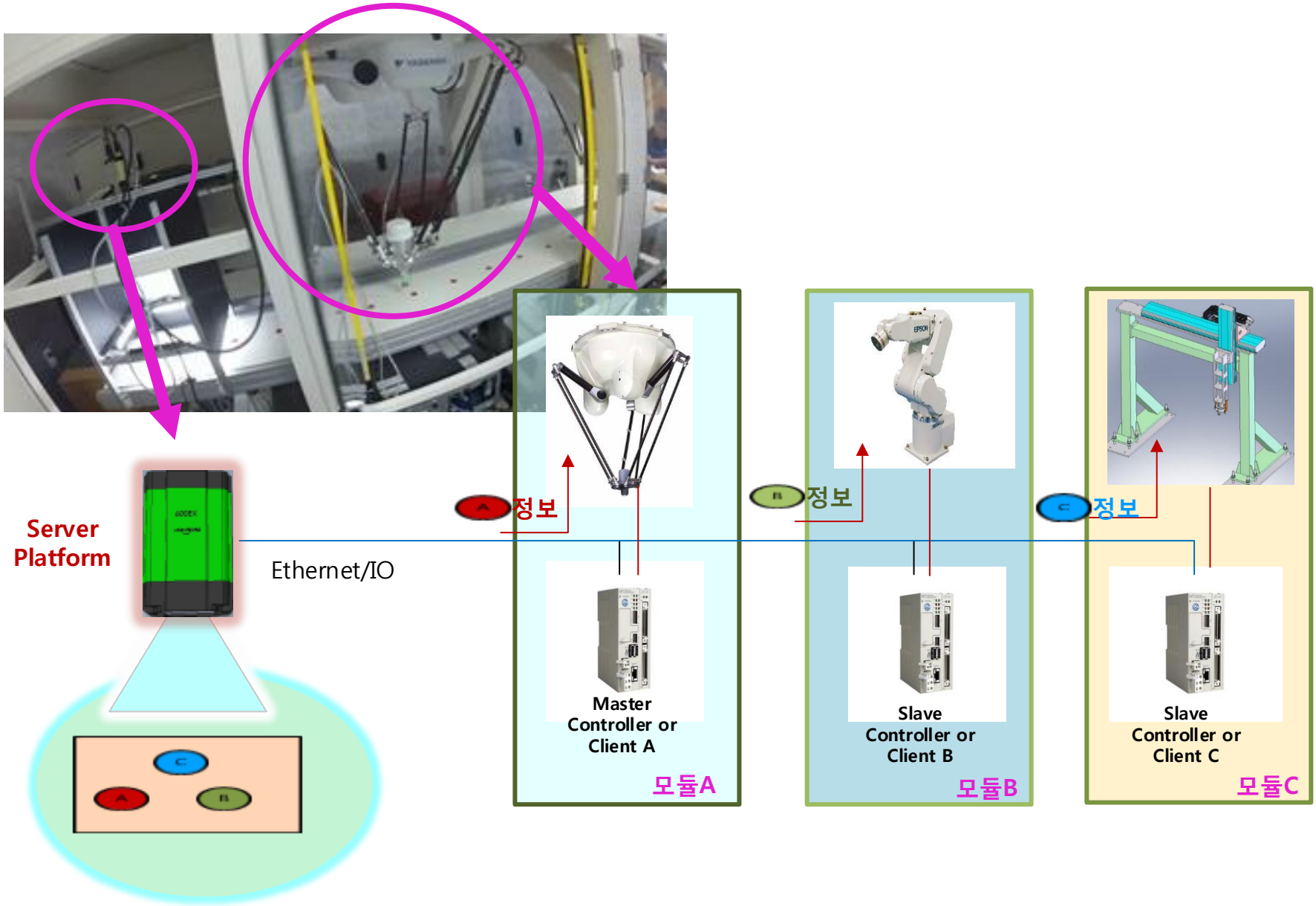
→ **Resolution ⇧, Frame ⇧, Performance ⇧**
→ **Current I/F(Wired I/F) + Wireless I/F**
→ **Adaptable**
- Configurable HW Platform
- Sensor Exchange
- External Device Embedded

4-1. Stand Alone Type Smart Camera

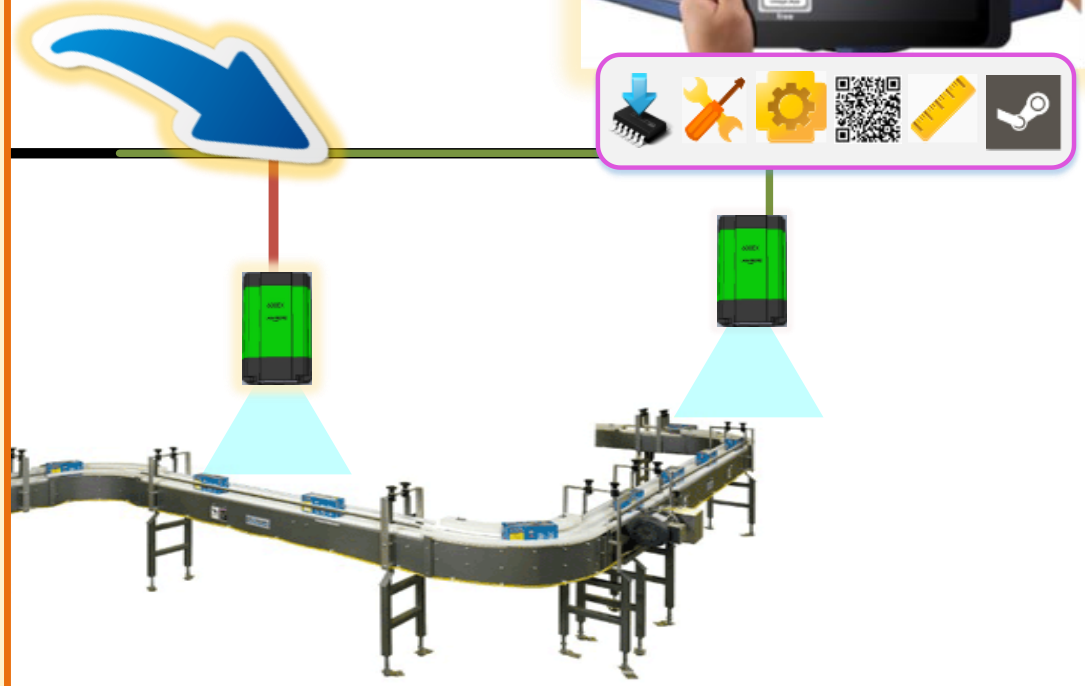


Single Device Solution Vs. Multi Device Solution
Direct Solution Vs. Indirect Solution
Single Platform Vs. Multi Platform

4-2. Server Platform for module base process

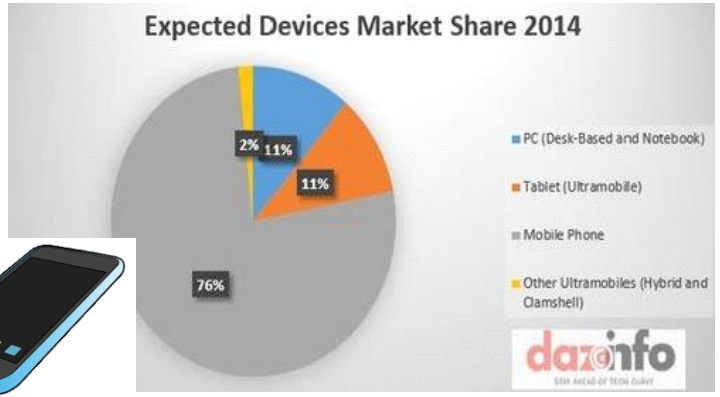


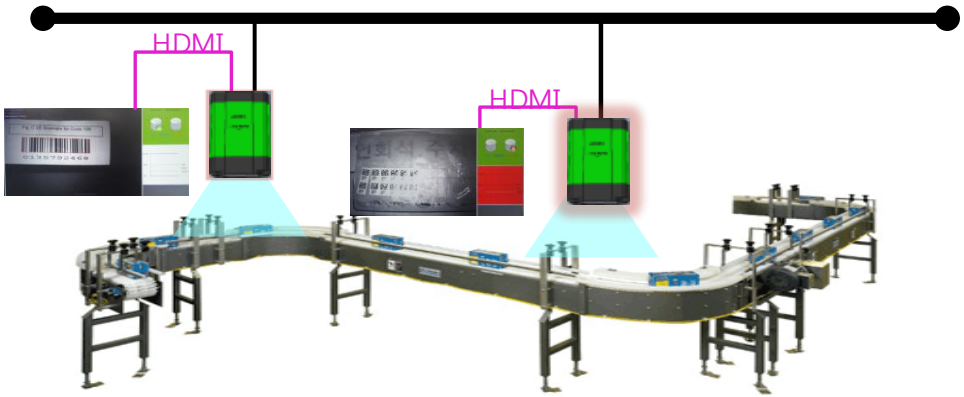
4-3. Solution Scalability



Remote Control/Update/Upgrade

4-4. Mobility & Maintenance Efficiency





4-5. High Level "OS & SW Platform"

Windows® Embedded

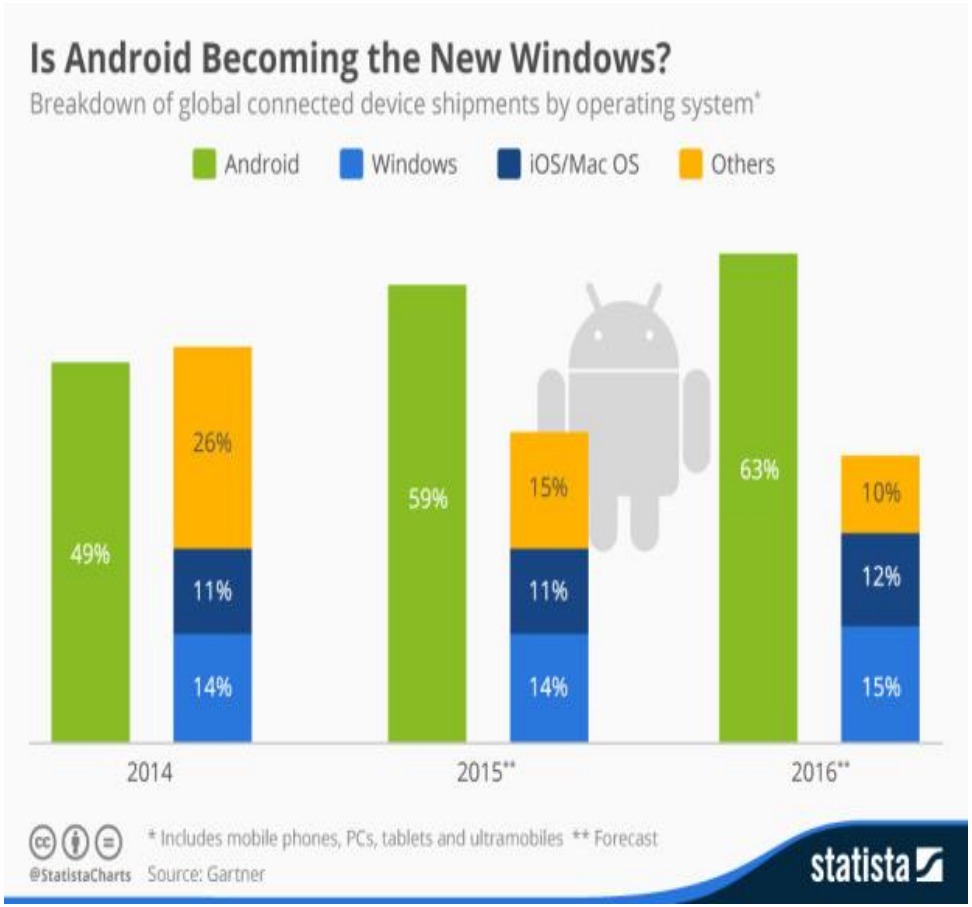
DshowFilter

Linux

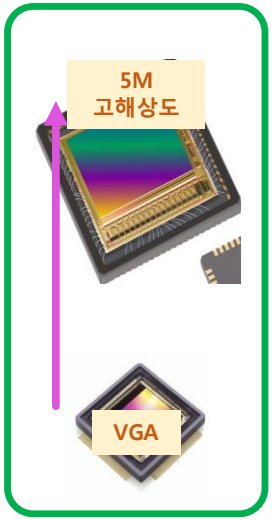
gstreamer

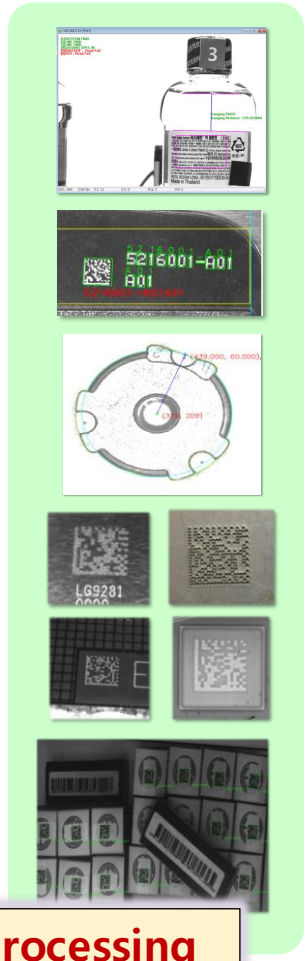
CIOFCND

OpenCV



4-6. High Performance Vision Camera and….Media, Web, Message Solution





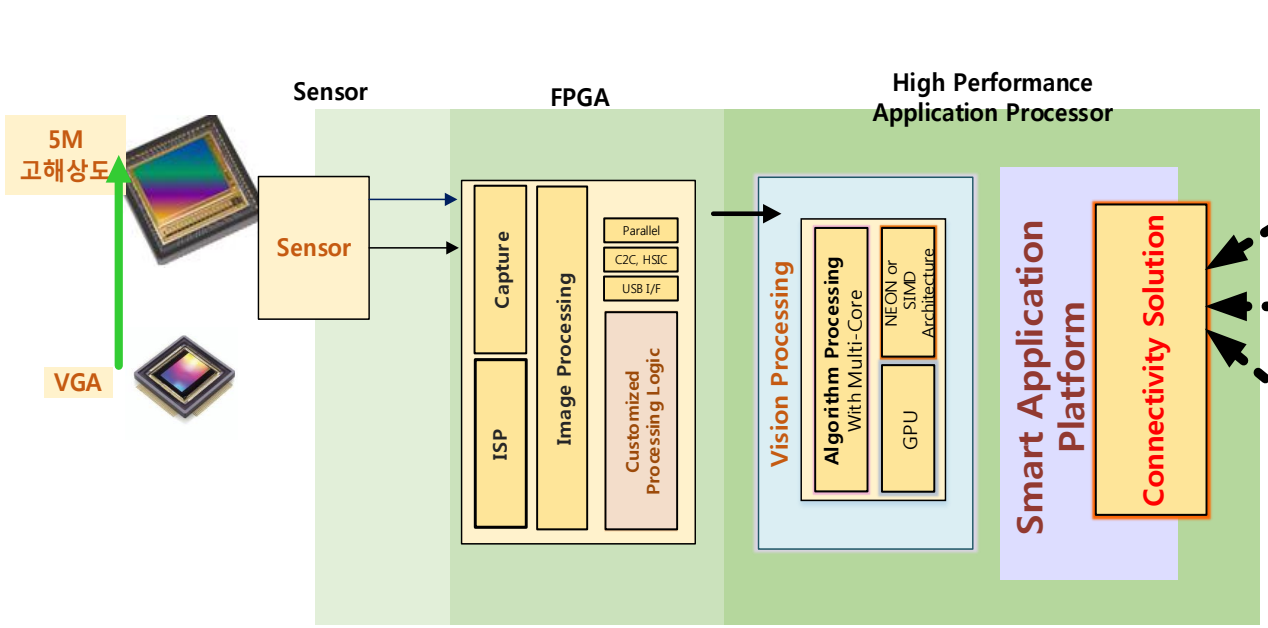
Vision Processing

Media, Web, Communication

4-7. Smart Vision Camera Structure

High Performance Vision Processing
- Sensor replaceable (...,vga..1.2M,..5M)
- Performance Scalable (w/ FPAG+Multi-Core) -
- Application Extendable

Connectivity /Communication



Q & A

감사합니다