White Paper

Optimizing Machine Vision platform to enhance automated inspection and detection

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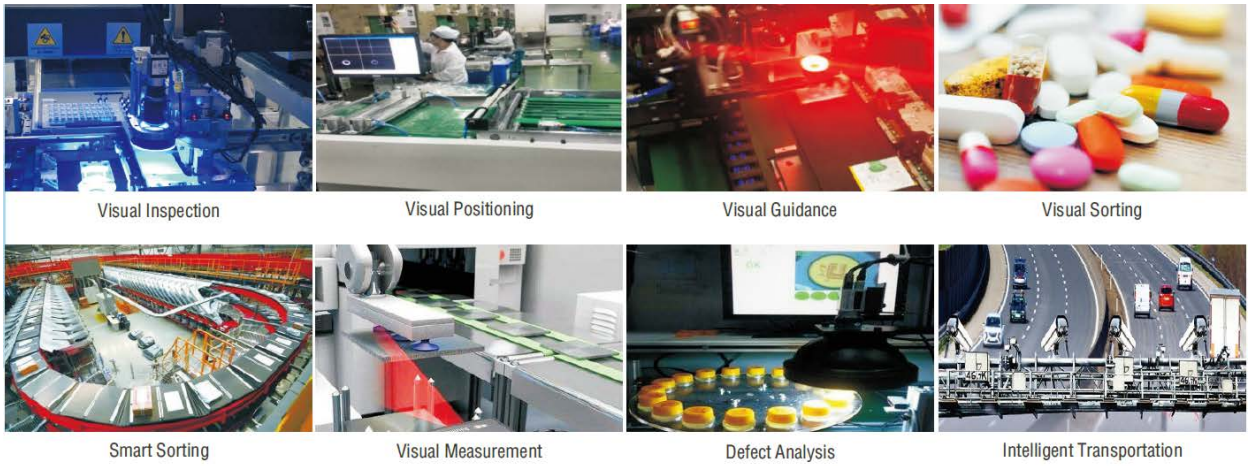
White Paper

As the actual needs of Industry 4.0 initiative encourages manufacturers to actively implement industrial automation, machine vision's been vital to quality control of automated production. The implementation of related applications has been gradually increased to take advantage of the continuous improvement of machine vision accuracy to improve productivity.

With the gradual advancement of factory intelligence, more and more factories have a wide range of application requirements in the fields of visual inspection and measurement, visual positioning and guidance, visual sorting, and intelligent transportation.
In order to meet the needs, Future Robot have developed a V300 series Vision Controller based on the x86 + FPGA platform for vision applications connected to 1 or 2 cameras. The design takes into account the actual needs of the industrial site to differentiate the design, saving costs, improving efficiency and reducing manpower.



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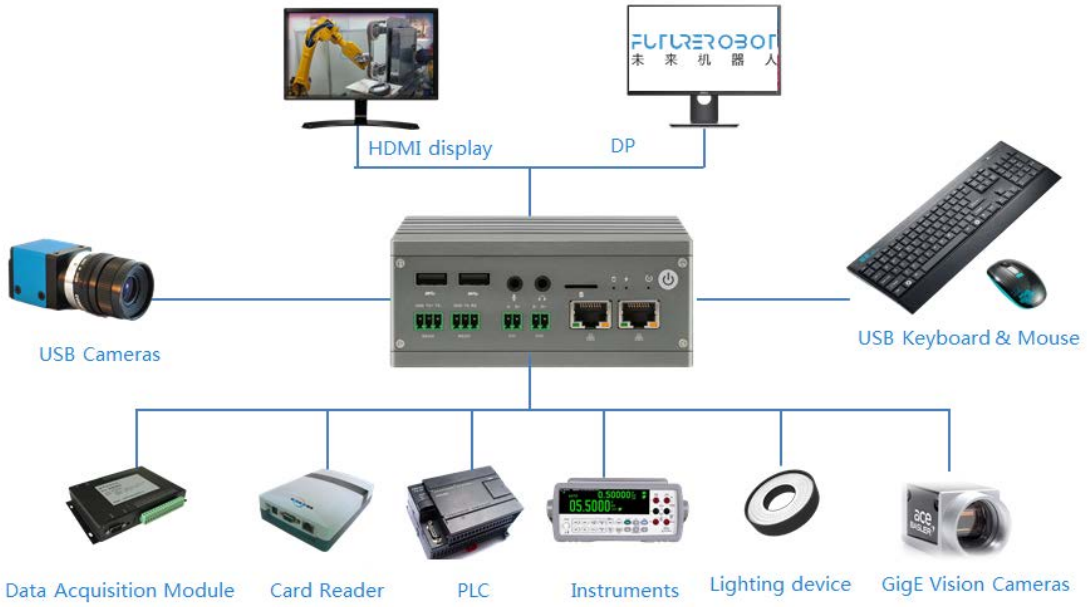
White Paper

Crafting high performance, low power consumption Fanless Embedded Computer with Intel® Apollo Lake processor

Bring powerful computer vision technology to new places with revolutionary Intel® Vision products. With the right performance, cost, and power efficiency at every node, you can scale vision technology across your infrastructure and unlock new possibilities for visual data. Intel Vision products including the Intel OpenVINO toolkit accelerate the capabilities of IoT vision systems and deep learning inference where you need it - from the camera to the cloud. This gives you insights at the right place and time, so you can make decisions faster and implement new operational strategies to drive immediate results.

Intel® Apollo Lake SoC+FPGA platform delivers high processing performance at low TDP for this highly integrated Modular Fanless Embedded IPC as a vision controller with high reliability. Equiped with Intel® Ethernet Controller I210 chips for 2 GigE cameras connection, 8 isolated digital IO and 2 light control output, all these designs are specific for machine vision applications, achieving real-time dynamic trigger and multiple cameras synchronous acquisition. Reinforced structure design can withstand the impact of the 100G and -20℃ to + 60℃ wide temperature for harsh industrial environment.

V300 series is a highly integrated, high-performance, ultra-compact professional Vision Controller, ideally suitable in Barcode Recognition, Defect Inspection, Size Measurement, Positioning and Guidance applications.



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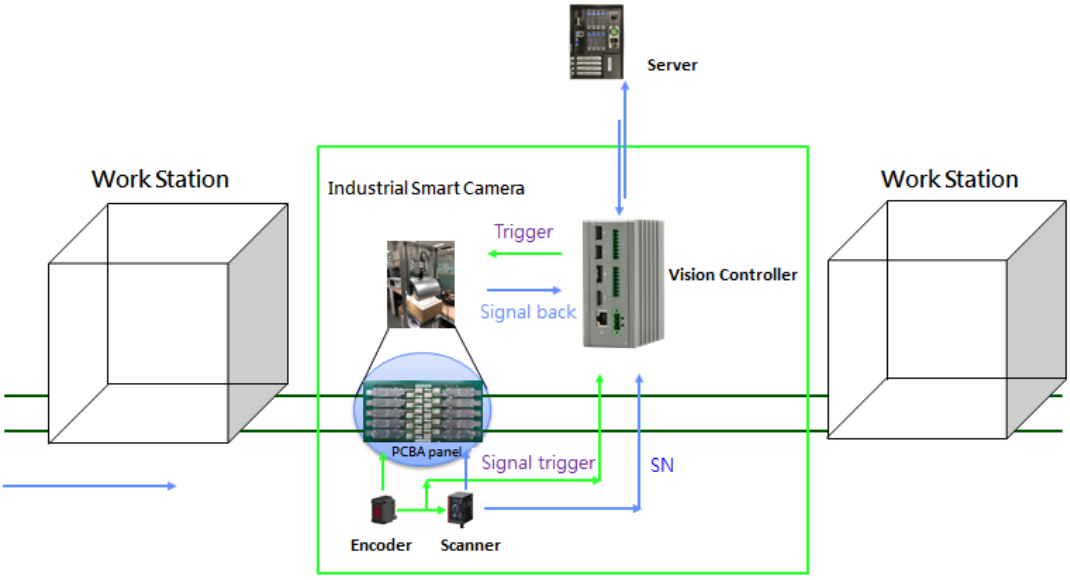
Application

Future Robot's V300 series Vision Controller is highly integrated supporting industrial automation and machine vision applications, have been deployed and tested in the field, and provided bundled hardware, software and support. The technology is scalable and designed to grow with customer requirements-enabling accelerated development and time to market.

Solution for Inspection & Detection of SMT welding as following:



Pain points and problems customer facing:

1. After the antenna is welded by automatic welder, the yield of welding spot need to be checked manually. And there was no image analysis of the cause of poor welding.
2. Manually inspection of the overall appearance yield and HDMI connector appearance defects
3. Manually inspection by antenna patch station: whether the antenna is missing & pasting position & polarity
   Manually inspection by foam paste station: whether the foam is missing & sticking position
   Manually inspection by HDMI placing station checking on placing of HDMI connector
4. Manually inspection by HDMI connector brush solder paste station checking on flux and solder paste volume and uniformity
   Manually inspection by the thermal paste dispensing station checking on the volume and uniformity of the thermal grease.

5. Evaluation to replace the original barcode scanning solution of one famous brand into its own low-cost solution

According to above needs from customer, Future Robot recommended V300 series Vision Controller based on Intel® Pentium N4200 and with all the technical supports of hardware and software, our customer got following satisfaction which met their specific request and evaluate the result of design win.

- Ultra-Compact size, easy to install into flexible positions in tight spaces
- Intel® Apollo Lake N4200 CPU supports low power consumption, save customer's development investment;
- Good compatibility, low error rate, support external network equipment;
- Easy maintenance, high reliability, data & information sharing;
- Highly integrated with DIO and light control output helping customer on high efficiency, saving extra devices and saving maintenance charges.
- Intel i210 LAN supports strongly for 2 GigE Vision cameras. Also there are 2USB3.0 for 2USB3 cameras.

Problem solved:

1. Insufficient soldering: V300 solution can accurately distinguish between good welding and insufficient of tin, and the judgment result is credible. The detection rate was over 99%
2. Excess soldering: V300 solution can accurately distinguish between good welding and excess of tin, and the judgment result is credible. The detection rate was over 99%
3. Missing soldering: V300 solution can accurately distinguish between good welding and missing of tin, and the judgment result is credible. The detection rate was over 99%
4. Missing parts: it is more accurately to distinguish between good welding and missing parts, but there will be cases where the empty welds are simultaneously rejected as missing parts, and the detection rate is about 99%.

Future Robot Technology Co., Limited (Future Robot in short) is a high-tech innovation enterprise focusing on Intelligent Manufacturing and Artificial Intelligence. Future Robot, with strong R&D capability and market demand-orientation, design and provide worldwide enterprises and individual users with embedded products which are for Industrial Automation, Robot, Machine Vision, Medical Application, Intelligent Transportation, Education and Internet of Things applications.

Expert team with rich experiences in Machine Vision, Motion Control and Edge Computing:
Hardware engineering team
- x86, FPGA, DSP, Layout and testing Engineers

Software engineering team
- BIOS engineers, FPGA, DSP, Algorithm software engineers and system development engineers.

Industrial and structure design engineering team
- structure design, multi board and model design

As a member of Intel IoT Solutions Alliance and partner of Intel IoT RFP Ready Kits, Future Robot Technology Co., Limited aim to provide reliable, high efficient and cost-effective standard and customized solutions for the customers worldwide.

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