

AKUSENSE AIVS

AKUSENSE AIVS(Artificial Intelligent Vision System) provides from image acquisition to model deployment and upgrade, and then to the production line for complete closed loop, through the docking with imaging equipment to achieve image acquisition, the user annotates the collected data, and then perform model training with one-click operation, Export and deploy the model to the production line to directly inspect the materials in real time Measurement. As the production line changes, AKUSENSE AIVS will conduct independent training and upgrade models, There is no need for professional AI algorithm personnel to participate in the whole process.



0 Programme 1 Deploy 2 Contents 3 Operations

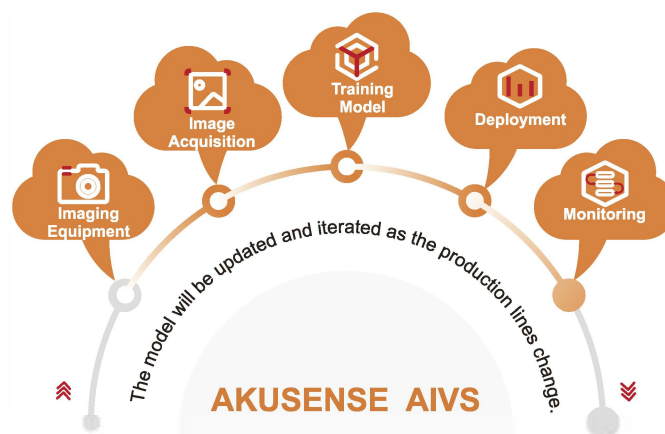
AKUSENSE AIVS(Artificial Intelligence Vision System) consists of training and running, no need programming requirements, only 3 steps to complete model training, and 1 click deployment to the production line.

Program Overview

AKUSENSE AIVS is a set of end-to-end solution for industrial vision AI, mainly with two parts: model training and operation. It can provide full flow, one stop AI empowerment and management capabilities for industrial manufacturing to create intelligent manufacturing standardized AI delivery system.

The AIVS model training platform is aimed at AI algorithm autonomous training for complicated scenes like material tracking, defect positioning, workpiece measurement of the production line, and Multi-class appearance detection. The AIVS model running platform imports the model generated by the training platform and deploys it directly to the production line, then connect with the production line equipment to achieve real-time AI detection.

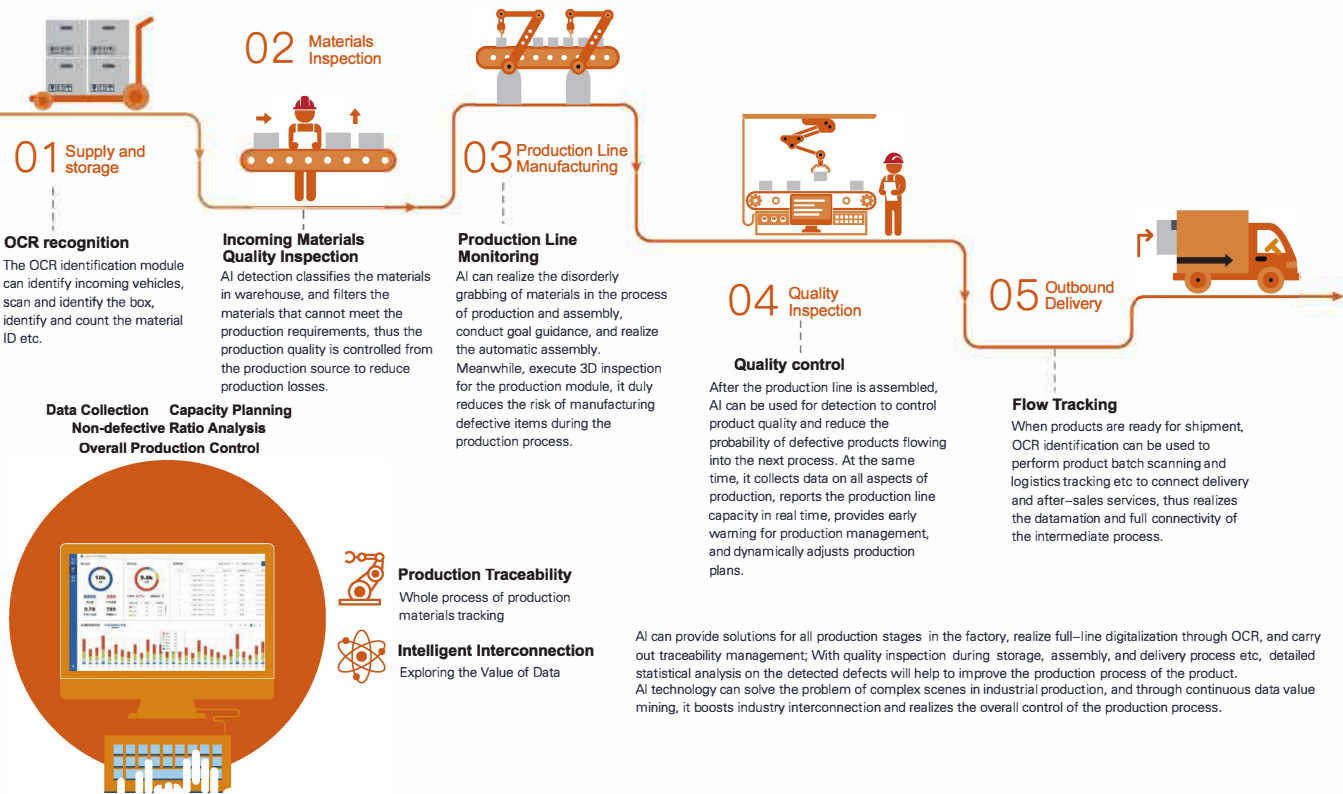
AKUSENSE AIVS decreases the industries' dependence to professional AI ability. With the program launched, the corporations do not need algorithm personnel to program on-site, the training and deployment of the AI model can be completed with simple mouse click, so that AI can be used in industrial production line to improve production efficiency, and fulfil the intelligent upgrade of traditional manufacturing. This solution can be widely used in consumer electronics, automobiles, new energy, and pan-industries. At present, it has provided services for a great number of Fortune 500 manufacturers in different fields, with production line equipments seamlessly connected to realize AI real-time detection.



Application

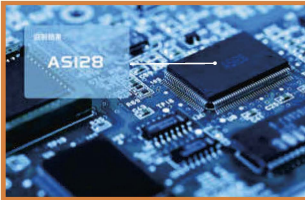
For typical cases and industry applications, please refer to P36-37

AKUSENSE AIVS provides AI services for the entire manufacturing process, and helps to improve production traceability management and industrial interconnection.



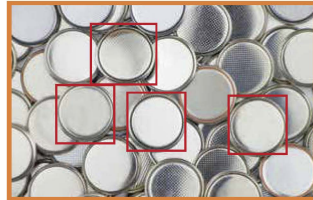
Core Algorithm Function

OCR



Adopting end-to-end solution based on deep learning, it supports single-character and multi-character labeling and recognition, and recognize different background characters, such as steel stamping, laser engraving, printing, textiles etc, breaking the technical limitations of traditional approaches and solving curved characters Recognition, low-contrast character recognition, large character recognition and other complex issues.

Detection



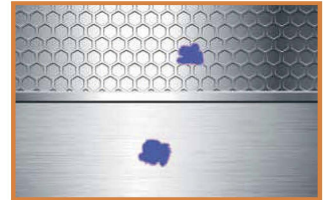
Positioning and categorizing the targets in the detected materials, it is suitable for multi-target detection, small target detection, counting etc, can be used as drug pill counting and 3C device detection etc.

Classification



Classify and analyse the tested materials, such as the OK/NG two-class judgment of materials, the color of the object, the type of food material, and the detailed classification of 3C defects etc.

Segmentation



Pixel level detection and edge recognition of the detected object. Such as identifying the crack area of the silicon wafer, and the bearing bump area etc.

Extreme Fine Recognition Capability
4 Pixels

When the detection objects are very dense, with only 4-5 pixels between different targets, ordinary algorithms cannot distinguish it well. AKUSENSE AIVS detects the label structure information of the target through the auto-encoder learning, which can identify the granularity as low as 4 pixels.

Small Sample Error Corrector
Boost 10%+

In order to solve the issue of fewer training samples, AKUSENSE AIVS solution will search for typical cases among the samples, cyclically guides and rectifies for the prediction results, so that the recognition rate of the final small samples increases by over 10%.

Super Image Processing Power
100 Million Pixels

Super model parallel capability, image processing on a multi-card machine, can handle 4 times the field of view of the normal network, and can conduct up to 100 million pixels in a single image.

Dynamic Data Enhancement
Up to 30x Enhancement

The uneven distribution of training sample data leads to poor prediction effects of the model. AKUSENSE AIVS can automatically match the optimal data enhancement strategy according to different task requirements, generate new simulation data through learning iteration, and increase the data utilization rate by over 30 times.

Core algorithm advantage

Remarks: The above algorithm effect data are calculated based on the actual measurement data of AKUSENSE's running projects. Specific to similar projects measured results may produce small deviations.

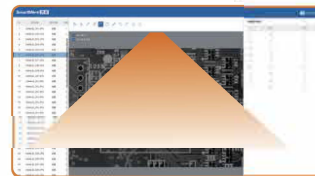
Functional Features



01

Consumer-level Product Experience

It provides data labeling, management and other functions, humanized interactive design helps to complete labeling work smoothly through guided labeling and quickly close up; the platform supports image and labeling data import and export, which can be used for data sharing and management.



02

Visual Training Process

AKUSENSE AIVS features characters such as automatic parameter tuning and intelligent data distribution. Users do not need to acquire professional AI knowledge, but conduct simple parameter configuration to perform one-click training; during the model training process, the system provides real-time model effect trend curve, Model performance is shown clearly.



03



Clear Test Results

The model can be tested after training. The test result includes model information, test indicators and visual images for users to judge the performance of the model promptly. The test report supports one-click export, which is convenient for users to conduct further deep learning analysis and summary for the report.

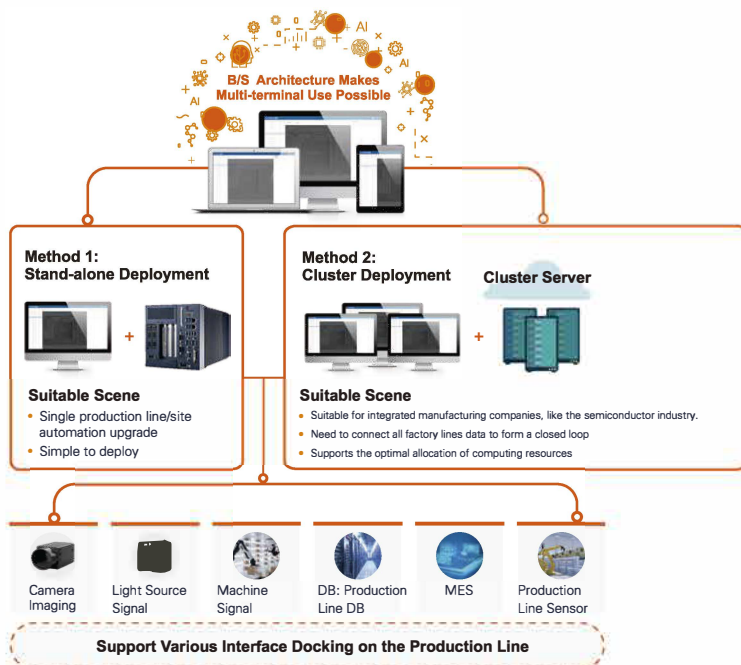
04

Agile Project Delivery

The agile project delivery model can be easily deployed to the operating platform, and the detection results can be displayed in real time. The operating platform supports docking with various camera data interfaces and multi-view configuration. The model can be operated on the production line with simple operation.



Application



AKUSENSE AIVS provides two deployment methods, and users can choose flexibly according to their needs.

For a single site/production line, only single link problem needs to be solved through AI, and then stand-alone deployment method can be used.

For production lines with high digital interconnection requirements, in addition to solve the single-point problem of the production line, it is also necessary to open up the data of the whole plant to form industrial interconnection and drive digital management, cluster deployment can be adopted.

AKUSENSE AIVS can adapt to multiple types of interfaces and communication protocols in industrial production scenarios, and supports the docking of multiple models of cameras, light sources, industrial computers, common sensors, MES and databases, etc., to open up the data link of the production line.



Stand-alone Deployment Characteristics

One click deployment, promptly used on the production line, light-weight operation, and supports cross-operating systems.



Cluster Deployment Features

AKUSENSE AIVS supports multiple server clusters (data centers), training and running machine mixing to achieve maximum sharing of computing power to achieve optimal allocation of resources and to ensure the full mobilization of idle resources. In addition, it can also provide capacity monitoring and statistical analysis of the entire production line to guide for yield analysis and process improvement.



Platform Architecture Characteristics

The platform adopts B/S architecture, no matter which deployment solution is selected, users can apply to multiple terminals under the same network segment to use various services provided by AKUSENSE AIVS.

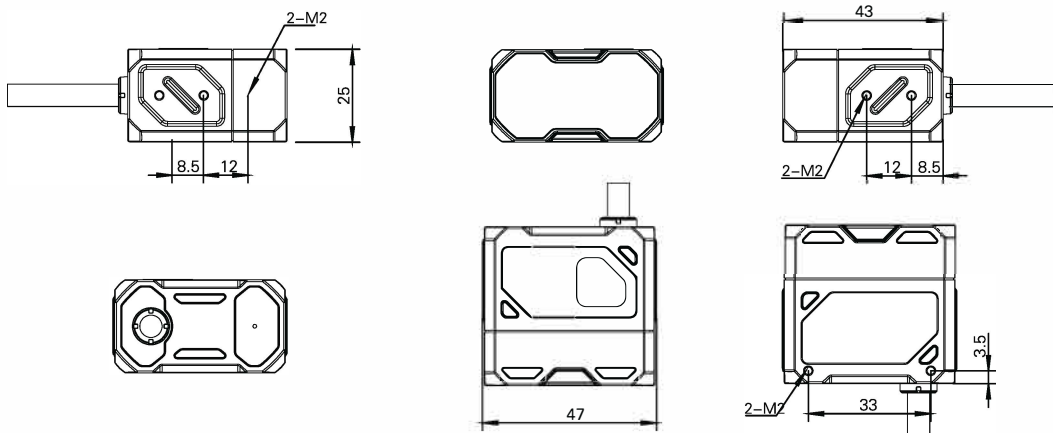


NEW!

Appearance				
Vision Tools	Presence(spot, pattern, edge, circle), Counting(spot, pattern, edge), Position correction			
Resolution (HxV)	1280*800			
Maximum capture frame rate (fps)	60			
Color / B&W	Black and White			
Shutter	Global			
Exposure time	20 μ s~10000 μ s			
Gaining	0 dB ~ 256dB			
Pixel size	3 μ m x 3 μ m			
Imager size	1/4"			
Focusing method	Focusing method		Liquid Focusing	
Focal length	6mm		16mm	
Working distance	30 ~ 300mm		40 ~ 300mm (@ 6mm) , 100 ~ 400mm (@ 16mm)	
Location indication	2 green light dots indicate the central area of the scanning position			
Status indication	3 status LEDs and buzzer			
Polarizer	Polarization integrated model			
Light source	Unpolarized red light/unpolarized white light/polarized red light/polarized white light			
Input Control	Two optical coupling isolated input, support NPN, PNP type			
Output Control	Three non-isolated outputs			
Communication Protocol	TCP Server、TCP Client、ModBus TCP、ModBus RTU、Profinet、Ethernet/IP、MELSEC/SLMP、Serial			
Communication Interface	RS232、Ethernet			
Power input	24V DC			
Power consumption	5W			
Dimension	47*25*43mm			
Weight	about 100g			
Operating temperature	0~45° C			
Storage temperature	-20~70° C			
Humidity	5%~95% RH(Non-condensing)			
Protect degree	IP67			
Model	Non-reddish light	VDS10-BH0106-RP	VDS10-BQ0106-RP	VDS10-BQ0116-RP
	Non-polarized white light	VDS10-BH0106-WP	VDS10-BQ0106-WP	VDS10-BQ0116-WP
	Polarized red light	VDS10-BH0106-RD	VDS10-BQ0106-RD	VDS10-BQ0116-RD
	Polarized white light	VDS10-BH0106-WD	VDS10-BQ0106-WD	VDS10-BQ0116-WD

Dimensions

Unit: mm



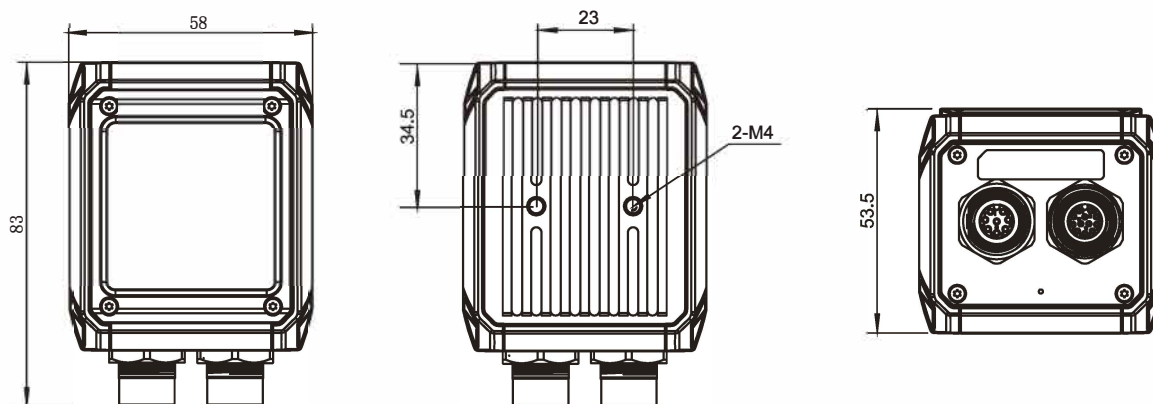


Appearance

Series	Detection: Spot, Pattern, Edge, Circle;Counting: Spot counting, Pattern Counting;Position correction, Dichotomy, OCR						
Resolution	1280*800			1920*1200			
Frame Rate	60						
Color/B&W	Black and White						
Shutter	Overall View						
Exposure Time	20 us ~ 10000 us						
Pixel Size	3um x 3 um						
Target Size	1/4"			1/2.6"			
Focusing Method	Mechanical Focus						
Focal Length	8mm	12mm	16mm	8mm	12mm	16mm	
Operating Distance	100~1000mm						
Position	1 Green Light Point Indicating the Center Area of the Detection Position						
Status	5 Status LEDs and Buzzer						
Light Source	Unpolarized Red Light, Unpolarized White Light, Polarized Red Light, Polarized White Light						
Input Control	Two Input Control, Photocoupler Isolation, Support NPN and PNP						
Output Control	Triple Output Control, Photocoupler Isolation						
Communications Protocol	TCP Server, TCP Client, ModBus TCP, ModBus RTU, Profinet, Ethernet/IP, MELSEC/SLMP, Serial						
Communication Interface	RS232, Ethernet						
Power Input	24 VDC						
Power Consumption	15W						
Overall Dimension	58*53.5*69mm						
Weight	About220g						
Operating Temperature	0 ~ 45℃						
Storage Temperature	-20 ~ 70℃						
Humidity	5% ~ 95%RH (Non-condensing)						
Protection Level	IP67						
Model	Unpartialized White Light	VDS20-BX0108-WP	VDS20-BX0112-WP	VDS20-BX0116-WP	VDS20-BX0208-WP	VDS20-BX0212-WP	VDS20-BX0216-WP
	Unpartialized Red Light	VDS20-BX0108-RP	VDS20-BX0112-RP	VDS20-BX0116-RP	VDS20-BX0208-RP	VDS20-BX0212-RP	VDS20-BX0216-RP
	Polarized Red Light	VDS20-BX0108-RD	VDS20-BX0112-RD	VDS20-BX0116-RD	VDS20-BX0208-RD	VDS20-BX0212-RD	VDS20-BX0216-RD
	Polarized White Light	VDS20-BX0108-WD	VDS20-BX0112-WD	VDS20-BX0116-WD	VDS20-BX0208-WD	VDS20-BX0212-WD	VDS20-BX0216-WD

Dimensions

unit: mm



ООО "РусАвтоматизация"

454010 г. Челябинск, ул. Гагарина 5, оф. 507

тел. 8-800-775-09-57 (звонок бесплатный), +7(351)799-54-26, тел./факс +7(351)211-64-57

info@rusautomation.ru; rusautomation.ru; www.rusautomation.ru