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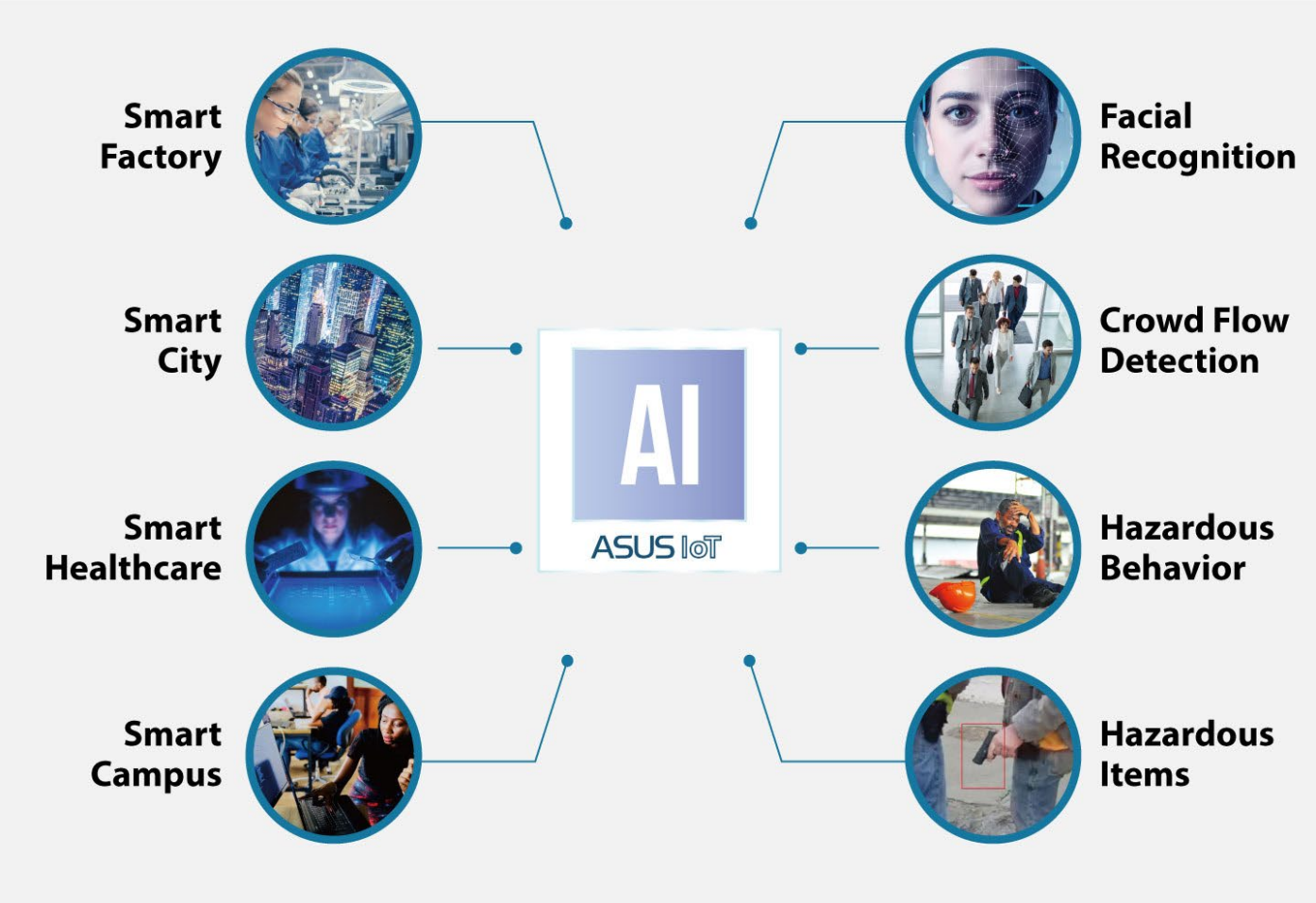
Artificial Intelligence (AI) is increasingly being applied in both work and daily life. Through visual image analysis, AI can achieve functions such as license plate recognition, crowd detection, facial recognition, dangerous behavior detection, hazardous item identification, and feature recognition. These applications are widely used in areas like smart cities, smart factories, smart healthcare, and smart campuses. Additionally, AI can predict the condition of machinery and equipment through sound or vibration waveform analysis, enabling preventive maintenance.

ASUS AI Smart Manufacturing Comprehensive Solutions provide a "smart, safe, and high-productivity" work environment. The solution features a "visual interface, low-code, and rich libraries," allowing users without programming or AI knowledge to easily build AI models through a visual operating interface. Furthermore, it enables easy integration of required hardware devices using the rich libraries and simple code.

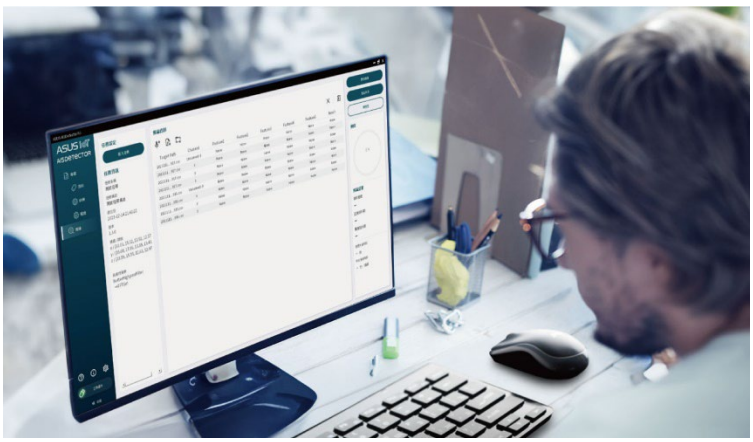
Multiple Application Fields

From smart factories and smart cities to smart healthcare and smart campuses, AI technology is widely applied across various fields. Whether it's facial recognition, crowd detection, or the identification of dangerous behaviors and hazardous items, these diverse applications can meet the varied needs of different scenarios.



Quick Setup, Easy to Use

The intuitive interface design allows users, even those without an AI background, to easily get started.



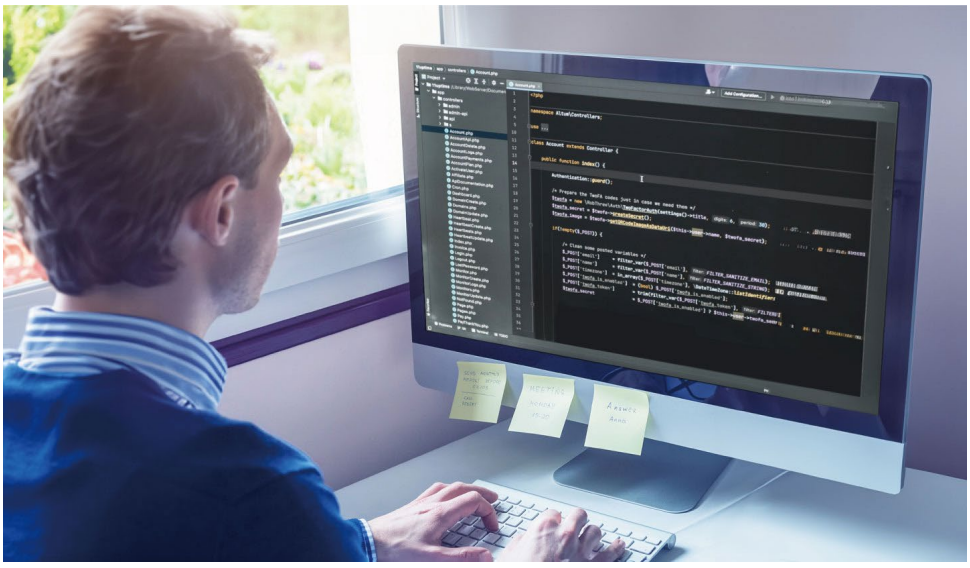
Multiple Pre-built Models

With a variety of pre-trained models, various tasks can be easily executed, enabling rapid deployment and flexible adjustments, thereby enhancing productivity and competitiveness.

AI Vision Algorithms: Rotating Object Detection, Segmentation Applications, Object Detection, Classification Applications, Anomaly Detection.

Low-Code

Users do not need AI expertise or coding skills; they can easily create their own AI models within minutes in a low-code development environment.



Accelerate Project Development

By integrating ASUS's exclusive AI algorithms, model training can be completed quickly, accelerating automated production planning, shortening development time, and improving training efficiency, further driving the rapid development of AI projects.

Data Analysis and Predictive Prevention

Through data collection and integration, subsequent data analysis, visualization, database management, and related services are carried out.

AI Smart Factory vs Traditional Manufacturing Factory

Comparison

Comparison Items	AI Smart Factory	Traditional Manufacturing Factory
Technology Application	**Artificial Intelligence (AI), Machine Learning, Internet of Things (IoT), Big Data, Cloud Computing**	Reliance on Traditional Machinery and Manual Operations
Production Flexibility	**Highly Flexible, Quickly Adjust Production Plans Small Batch, Multi-Variety Production**	Low Flexibility, Difficult Production Line Changes, Suitable for Mass Production
Production Efficiency	**Achieve 24/7 High-Efficiency Automated Production, Reducing Downtime**	Low Efficiency in Manual Operations, Long Downtime
Product Quality Control	**Smart Monitoring and Automated Detection to Ensure Quality Consistency**	Manual Inspection, Prone to Human Errors and Quality Fluctuations
Data-Driven Decision Making	**Real-Time Data Monitoring and Analysis for Accurate Decision-Making and Market Forecasting**	Reliance on Experience-Based Decisions, Lacking Data Support Low Decision-Making Efficiency and Accuracy

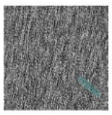
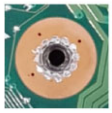
AI Security Protection and Quality Inspection Solutions and Benefits

Item	Application	Software				Solution	Benefits
		AISVision	AISDetector	AISPHM	AIEHS		
Personnel	Safety Protection				V	**Personnel Safety Gear Detection Motion Safety Protection Analysis**	**Ensure Personal Safety:** Prevent workplace injuries by identifying the usage of safety gear and analyzing movements.
Machine	Equipment Maintenance			V		**Waveform Analysis for Prognostic Diagnostics**	**Reduce Unnecessary Downtime:** Identify potential faults early through waveform analysis, enabling preventive maintenance and reducing unplanned equipment downtime.
Material	Quality Inspection	V	V			**Quality and Defect Inspection**	**Avoid Rework:** Detect and correct defects in the production process in a timely manner, reducing rework frequency and improving production efficiency and product quality.
Method	Data Monitoring		V	V		**Equipment Condition and Parameter Monitoring**	**Flexible Production:** Enable real-time monitoring and adjustments of the production process through connected devices and data analysis, enhancing production flexibility and efficiency.
Environment	Safety Protection				V	**Smart Industrial Safety Protection**	**Establish a Safe Environment:** Enhance workplace safety by using electronic fencing and personnel tracking technologies to prevent unauthorized access and accidents.

AISVision: AI Vision for Building Inspection Models

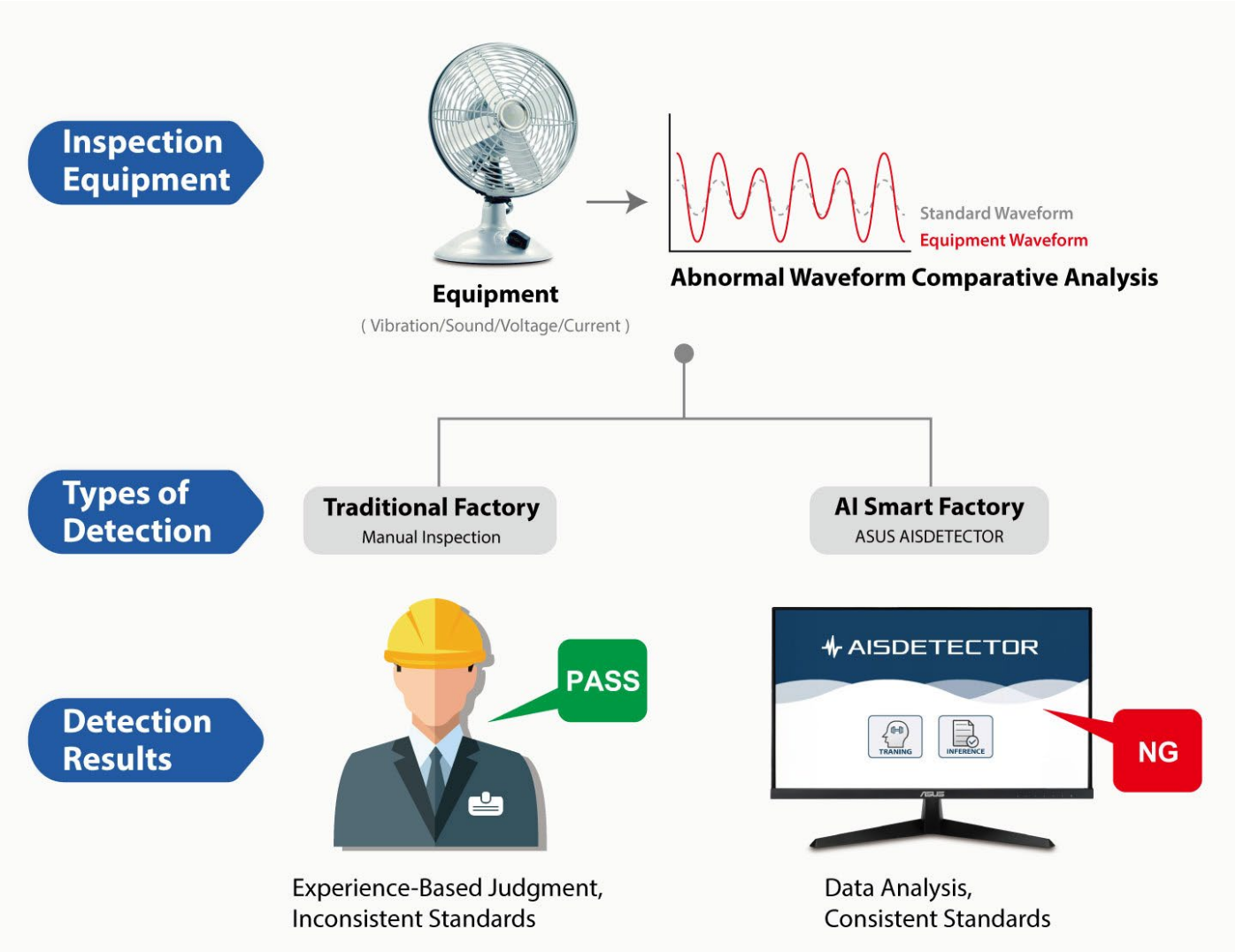
- Image Capture and Model Building on the Production Line:
  Through image capture on the production line, labeling, training, and validation, AI vision recognition models can be quickly established.
- Quickly Distinguish Between Good and Defective Products:
  By leveraging AI technology, products can be quickly classified as good or defective, enhancing inspection efficiency.
- Assisting AOI Defect Rejudgment and AI Quality Inspection:
  Effectively assist Automatic Optical Inspection (AOI) in defect rejudgment and integrate AI quality inspection to enhance the level of quality management.

Here are five common AI vision algorithms

Algorithm	Application Scenarios	Illustration or Diagram	
Oriented Object Detection	• Suitable for scenarios with multi-angle object arrangement • Addresses the issue of difficulty in aligning defect markings with objects of various angles	OK	NG
			
Segmentation	• Applicable for precise defect detection where defect areas constitute a small proportion of the overall image	OK	NG
			
Object detection	• Suitable for images with well-defined object boundaries • Delivers high-accuracy defect recognition	OK	NG
			
Classification	• Applicable for scenarios with clear image feature regions that are not too small relative to the entire image	OK	NG
			
Anomaly Detection	• Suitable for situations with limited defective product and defect sample data • Simple detection for distinguishing between good and defective products • Capable of handling detection requirements for unknown defects	OK	NG
			

AISDetector: Signal Analysis and Anomaly Detection

- Efficient AI Model Training and Validation:
  With just a CPU and five good product samples, AI models can be quickly built and validated.
- Simulating Human Defect Judgment Ability:
  Accurately detect defective products and effectively prevent defective items from being released.
- Multi-Signal Anomaly Detection:
  Anomaly waveform detection can be performed on signals such as vibration, sound, voltage, current, and more.



AIEHS: AI Early Warning for Hazard Prevention

- Real-time Monitoring and Early Warning:

Utilize AI technology to quickly detect mechanical failures, fires, or hazardous behaviors, and issue timely alerts.

- Proactive Hazardous Behavior Detection:

Shifting from passive response to active prevention, effectively enhancing safety and risk management capabilities.

- Cross-Factory Management and Incident Integration:

A platform-based management model that promotes the integration of safety incidents across multiple facilities and enhances operational efficiency.

On-Site Crowd Flow Monitoring

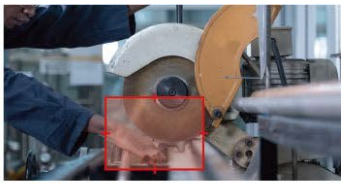
Monitor crowd density within the area, control the number of personnel in the region, and manage the maximum and minimum number of workers per area.

Personnel Crossing Line Monitoring

Directional monitoring of the number of personnel entering and exiting an area (In/Out).

Production Line Monitoring

Monitor the output of each production line to ensure accurate production quantities and assess production volume over specific time periods.



Human-Machine Collaboration Risk Identification

Identify complex operational behaviors during human-machine collaboration, assess risks, and provide real-time alerts in hazardous situations.

Operational Safety Action Verification

Verify whether personnel fully perform the required safety inspection actions, such as looking, pointing, and verbal confirmation, during operations.

Personnel Protective Equipment Identification

Check whether appropriate personal protective equipment, such as helmets, masks, and safety vests, is worn during operations.

Personnel Electronic Fence

Monitor whether personnel enter restricted areas.

Vehicle Electronic Fence

Monitor whether vehicles (large/small cars, trucks, motorcycles, trains) enter restricted areas.

Hazardous Item Detection

Monitor the environment for hazardous items (e.g., knives, guns) and promptly report to the management center.

Hazardous Behavior Detection

Monitor the environment for hazardous behaviors, including falls, violent actions, and signs of fatigue.

Flame Detection

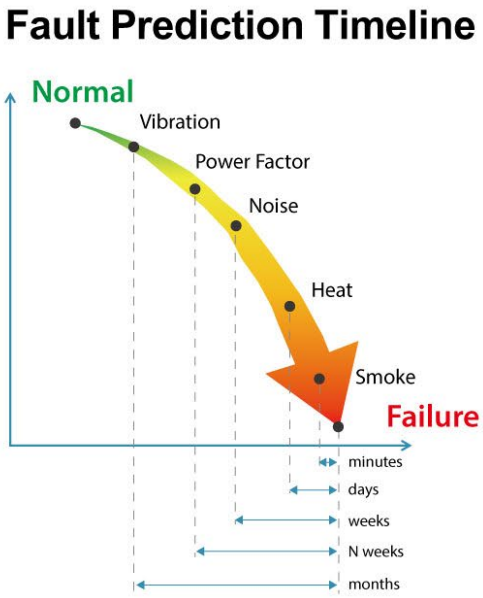
Monitor for the presence of flames within the designated area.

Smoke Detection

Monitor for the presence of smoke within the designated area.

AISPHM: Fault Prediction and Condition Monitoring

- High-Quality Vibration Sensors and Exclusive Algorithms:
  Provide a more comprehensive data sampling model to accurately capture changes in equipment status.
- Custom AI Model Creation:
  Develop exclusive AI models for each piece of equipment to continuously monitor and predict the operational status of the equipment.
- EdgeX API Support:
  ASUS edge computers are equipped with the open-source EdgeX API, enhancing data acquisition efficiency and IoT application integration capabilities.
- Anomaly Event Notification:
  Quickly diagnose anomalies based on input data and promptly notify of abnormal events, enhancing response efficiency and operational intuitiveness.



Diverse Applications


Factory


Retail


City


Traffic


Agriculture


Healthcare


Campus


Military