AsiaInfo 亚信科技

White Paper for

AISWare AI^2 Edge Intelligence V4.1

AISWare AI^2 Edge Intelligence, developed by AsiaInfo Technologies, is a hardware-software integrated edge AI product portfolio that combines AI, IoT, and cloud-edge collaboration, tailored for key industry sectors like telecommunications, energy, and transportation, driving cost reduction and efficiency improvement.

Disclaimer Statement

AsiaInfo Technologies (China), Ltd., hereinafter as "AsiaInfo Technologies" or “AsiaInfo”, exclusively owns all intellectual property rights, including but not limited to copyrights, trademarks, and patents, as well as technical secrets related to the Product and its derivatives, along with all related documentation, including all information within this document and any attachments.

The information within this document is confidential and intended solely for use by the recipient(s) designated by the user. Without prior written permission from AsiaInfo Technologies, any user of this document shall not take any actions with respect to this Product or the information contained herein to any third party, including but not limited to managers, employees, and affiliates other than the designated recipients. The aforementioned actions encompass but are not limited to developing, updating, compiling and decompiling, assembling, lending, transferring, selling, disclosing, authorizing, distributing, or any other actions. Nor shall any such third party be permitted to use the Product and the information in this document for any purpose whatsoever.

Without prior written permission from AsiaInfo Technologies, users shall not copy, modify, or distribute this document for any purpose. Altering, removing, or damaging any trademarks used in this document is strictly prohibited.

This document is provided as original, and AsiaInfo Technologies makes no warranties regarding the correctness, accuracy, reliability, or any other aspect of this document or its consequences after use. All information in this document is subject to further modification without prior notice, and AsiaInfo Technologies disclaims any responsibility for errors or inaccuracies that may be present in this document.

AsiaInfo Technologies shall not be held responsible for any and all types of liabilities, infringements, or damages resulting from the use of the Product or the information within this document. This exclusion of liability encompasses all forms of damages, including but not limited to direct, indirect, incidental, special, or punitive damages, regardless of whether AsiaInfo Technologies was notified of the possibility of such damages beforehand. The exclusion of liability applies to all forms of legal claims, including those arising from negligence or other torts.

AsiaInfo Technologies' products may include third-party software. Please refer to the copyright statements in the third-party software documentation for details.

AsiaInfo Technologies Limited (Stock Code: 01675.HK)

AsiaInfo Technologies Limited ("AsiaInfo Tech") started in 1993 and was successfully listed on the Main Board of the Hong Kong Exchanges and Clearing Limited on December 19, 2018. As the largest provider of telecom software products and related services in China, AsiaInfo Tech has developed industry-leading R&D capabilities with a loyal customer base.

AsiaInfo Technologies (China) Ltd., as an indirect wholly-owned subsidiary of AsiaInfo Tech, is a leading software product and service provider in China, boasting extensive experience in software product development and large-scale software engineering implementation. With 30 years of deep market presence, AsiaInfo has advanced technological capabilities and numerous successful cases in 5G, cloud computing, big data, artificial intelligence, the Internet of Things (IoT), smart operations, and business and network support systems. AsiaInfo's clientele spans across industries including telecommunications, broadcasting, energy, government, transportation, finance, and postal services.

In 2022, AsiaInfo acquired iResearch Consulting Group Co., Ltd. (iResearch Consulting) and integrated it into the new brand iDigital, expanding AsiaInfo's capabilities from product development, delivery services, data operations, and system integration to consulting planning and intelligent decision-making, establishing itself as a leading provider of end-to-end capabilities in digital intelligence.

AsiaInfo is committed to empowering various industries with technologies such as 5G, AI and big data, collaboratively creating digital value with customers. AsiaInfo aims to lead in both products and services, focusing on continuous product development in the areas of data and intelligence, cloud and network, IT, and middle office products. The cloud and network products maintain international leadership, while data and intelligence products achieve domestic leadership and some international advancements. In the IT domain, AsiaInfo's products stand at the forefront within the domestic landscape.

In the future, AsiaInfo strives to become the most trusted leader in digital intelligence, leveraging its comprehensive capabilities in the field to innovate customer value and contribute to the digital transformation.

Certificates (Part)

Capability Maturity Model Integration (CMMI) Certificate Level 5

Information System Construction and Service Capability Assessment CS L4

Cloud Managed Services Capability Assessment Certificate: Excellent Level

Digital Trusted Services - R&D Digital Governance Capability Certificate

ISO9001 Quality Management System Certificate

ISO20000 IT Service Management System Certificate

ISO27001 Information Security Management System Certificate

Enterprise Credit Grade (AAA) Certificate

Service Certificate of Information System Security Development L2

Service Certificate of Information System Security Integration L2

Awards (Part)

Top 100 China Software Business Revenue List for consecutive years

Top 100 Competitive Enterprises in China Software and IT Services for consecutive years

The Most Influential Enterprise in China Software Industry

Most Valuable Brand in China Software and IT Service Industry

Most Influential Brand in China Software and Information Services

China's Most Innovative Enterprise Award for Digital and Software Services

Top 50 Social Contribution in China Electronic Information Industry

Leading Artificial Intelligence Enterprise in China

Leading Enterprise of Advanced Smart City

IDC Future Operation Leadership

Contents

1 Executive Summary

In the context of rapid growth in edge computing, computing resources and AI capabilities are shifting to the network edge to meet the rising demand for real-time data processing and intelligent decision-making. Edge AI, with its maturity and broad industry potential, is becoming a key driver of productivity.

Compared to traditional cloud processing, edge AI offers lower traffic, reduced latency, and enhanced privacy, aligning with industry needs. Many sectors are leveraging edge AI to optimize workflows, reduce costs, and boost efficiency.

AISWare AI^2 Edge Intelligence, a key component of AsiaInfo's cloud-edge ecosystem, is built on high-performance hardware-software devices, integrating AI, IoT, and cloud- edge collaboration to provide standardized solutions for specific industry scenarios. With extensive AI applications, seamless cloud -edge collaboration, and efficient AI performance, the product enables non-intrusive AI adoption for customers in telecommunications, energy, transportation, and other sectors, reducing costs and supporting digital transformation.

This white paper outlines the positioning, product portfolio, key features, customer value, and unique advantages of AISWare AI^2 Edge Intelligence. It also explores use cases and customer success stories, demonstrating how the product creates value, drives digital transformation, and maintains a competitive edge in a dynamic market.

2 Abbreviations and Terms

Terms explanation for AISWare AI^2 Edge Intelligence products are shown in Table 2-1.

Table 2-1 Term Explanation

Abbreviation or Term	Full Name	Explanation
AI	Artificial Intelligence	Artificial Intelligence
AISWare AI^2 Edge Intelligence	AsiaInfo Artificial Intelligence Edge	AsiaInfo Artificial Intelligence Edge
IDC	Internet Data Center	Internet Data Center
Edge Intelligence Cloud	AISWare AI^2 Edge Intelligence Cloud	The cloud platform for edge intelligence products, providing model management, algorithm management, and coordination of video recognition and IoT on the edge.
Edge Intelligence Computing All-in-One Machine	AISWare AI^2 Edge Intelligence Computing All-in-One Machine	The edge-side computer vision processing host within the edge intelligence product provides video surveillance and

Abbreviation or Term	Full Name	Explanation
		processing AI capabilities at the edge.
Edge Intelligence Gateway	AISWare AI^2 Edge Intelligence Gateway	IoT access equipment in edge intelligence products, providing access, parsing, and data forwarding for edge IoT terminals.
Edge Intelligence SmartEye	AISWare AI^2 Edge Intelligence SmartEye	A series of AI-powered intelligent camera products.
Edge Intelligence Smart Access or Smart Access	AISWare AI^2 Edge Intelligence Smart Access	The intelligent access control products.
NVR	Network Video Recorder	A computer system that records video footage and stores it on a hard disk.
GPU	Graphic Processing Unit	Graphic Processing Unit

3 Product Overview

AISWare AI^2 Edge Intelligence includes the Edge Intelligence Cloud, Edge Intelligence Gateway, Edge Intelligence SmartEye, Edge Intelligence Access, and Edge Intelligence Computing All-in-One Machine. By leveraging cloud-network-edge-end collaboration, these products integrate edge computing, AI, IoT, and other technologies to address industry-specific edge scenarios, helping customers achieve intelligent upgrades and improve efficiency.

3.1 Trends and Challenges

With the deepening of the industrial internet and the proliferation of IoT technologies, the centralized cloud computing confronts challenges such as the need for real-time data processing and the increasing cost of data transmission. Edge computing, with its inherent advantages of low latency, high real-time performance, and data security, is poised to meet the future needs of industrial digitization. As a result, edge computing has gained significant attention, with optimistic forecasts for its future. Factors such as the demand of intelligent transformation, the commercialization of 5G and AI, and the development of edge intelligence chips are driving the high-speed growth of the edge intelligence market. More and more businesses are adopting edge intelligence for intelligent applications. As a major application of edge intelligence, computer vision has moved beyond the initial hype and is now firmly established in industrial use. The sector is experiencing steady growth, with core companies in niche areas attracting significant investment, and some already turning profitable.

With the rise of the digital economy, trends such as the industrial internet and smart cities are sweeping across the globe. According to Gartner, by 2025, more than 50 billion connected devices will be in use worldwide, with over 50% deployed outside traditional data centers. This massive influx of device data puts significant pressure on operator networks and cloud data centers, raising the demands for real-time edge computing.

For example, in the industrial sector, equipment failures and production safety issues cause significant losses. Traditional methods that depend on post-

incident human intervention often fail to detect risks in a timely manner, hindering effective damage prevention. In campus management, conventional security models are inefficient and costly.

During their digital transformation, businesses often face challenges such as insufficient planning, complex upgrades, limited technical expertise, and fragmented integration. By leveraging core technologies in networking, hardware-software integration, and industry expertise, AsiaInfo provides tailored solutions with embedded algorithms, enabling businesses to implement smart, cost-effective, and efficient solutions through cloud-network-edge-end collaboration.

3.2 Product Definition

AISWare AI² Edge Intelligence is a core component of AsiaInfo Technologies' Cloud-Network-Edge-End ecosystem. It integrates AI, IoT, cloud-edge collaboration, and other technologies into hardware-software edge devices, forming a comprehensive product portfolio that includes the Edge Intelligence Cloud, Edge Intelligence Computing All-in-One Machine, Edge Intelligence Gateway, Edge Intelligence SmartEye, and Edge Intelligence Smart Access, covering the intelligent needs of cloud, edge, and endpoint.

AISWare AI² Edge Intelligence serves industries like telecommunications, energy, transportation, and construction, offering standardized cloud-network-edge-end collaboration tailored to specific scenarios and enabling intelligent solutions that reduce costs and improve efficiency. For instance, in telecommunications, it enables smart access management for remote data centers, boosting efficiency and security. In energy, it supports smart operations and maintenance for distributed photovoltaic systems, lowering costs and improving fault detection rates.

3.3 Product Positioning

AISWare AI² Edge Intelligence is a hardware-software integrated product portfolio designed for IoVT and IoT applications. It provides flexible combinations of cloud, edge, and cloud-edge scenarios to meet diverse

industry requirements related to latency, cost, and scenario complexity. Following its market launch, the product has been successfully deployed across various industries, driving significant advancements in customers' digital transformation. Targeted industries include:

- **Telecommunications**:
  - Edge Intelligence Smart Access for Base Station Facilities: Enables smart access control for unmanned base station facilities, improving access efficiency while ensuring security.
  - Unattended Data Centers Monitoring: Intelligent supervision of personnel activities in IDC/network data centers to detect potential risks and ensure safety.
- **Energy:**
  - Smart Operations for Distributed Photovoltaic Stations: Centralized, intelligent monitoring of equipment and environmental conditions at distributed photovoltaic plant, collecting energy generation data, detecting safety incidents such as fires and intrusions, improving operational efficiency and energy generation, and reducing the likelihood of major incidents.
  - Smart Management for Coal Trucks: Intelligently identifying key parameters of coal trucks, enabling full automation of the coal loading and transportation, improving efficiency and accuracy, and reducing personnel management costs.
- **Other Sectors:**
  - Smart Construction Site Supervision: Centralized, intelligent monitoring of construction site to enhance efficiency, reduce costs, and ensure safety and regulatory adherence.
  - Community Governance: Enhances community governance through intelligent monitoring and environmental surveillance.

- Smart Management for Campus: Intelligent security monitoring, facility management, and energy consumption control for campuses.

4 Product Portfolio

The AISWare AI² Edge Intelligence product portfolio is shown in Figure 4-1:

Figure 4-1 AISWare AI² Edge Intelligence Overall Architecture

AISWare AI² Edge Intelligence adopts the 1 (cloud) + N (edge nodes) + X (endpoint devices) model, offering tailored solutions for industry-specific scenarios. It enables scalable capacity, modular capabilities, and service orchestration, driving AI adoption and industry empowerment.

- The Edge Intelligence Cloud offers capabilities for centralized device management, operational control, remote device maintenance, and cloud-edge collaboration, supporting compatibility with third-party devices in the Internet of Video Things (IoVT) and IoT applications.
- The Edge Intelligence Gateway and Edge Intelligence Computing All-in-One Machine, available in various specifications are designed to meet the needs for data collection, processing, computing, and AI inference across different scenarios, while also enabling the control of intelligent devices at the endpoint.

- The Edge Intelligence SmartEye and Edge Intelligence Smart Access, preconfigured with algorithm scenarios, simplifying deployment and networking through intelligent capabilities at the endpoint to meet the rapid identification need.

5 Basic Functions

This chapter outlines the core components of AISWare AI² Edge Intelligence, including Edge Intelligence Cloud, Edge Intelligence Computing All-in-One Machine, Edge Intelligence Gateway, and Edge Intelligence SmartEye, and provides an overview of their key functions.

5.1 AISWare AI² Edge Intelligence Cloud

The basic functions of Edge Intelligence Cloud are detailed in Table 5-1.

Table 5-1 Edge Intelligence Cloud Basic Functions

Product	Function Module	Feature Description	
AISWare AI² Edge Intelligence Cloud	Device Management	Device Access	Adapt to various IoVT and IoT device collection protocols.
		Command Dispatch	Supports sending control commands to devices.
		Device Management	Visual management of connected devices.
	Data Management	Structured Data Management	Collects, stores, and queries structured data from devices with open APIs.
		Video Data Management	Collects, stores, queries, and provides real-time playback of video data with open APIs.
		Image Data Management	Collects, stores, and queries images from devices and analysis results with open API.
	AI Scene/Task Orchestration	Real-time AI Scene Orchestration	Supports AI analysis of live video streams, configuring algorithms and parameters, and visual management of running scenes.

Product	Function Module	Feature Description	
		Offline/Batch AI Analysis Task Orchestration	Configures AI tasks for offline video/images, with visual management of tasks.
	Event Management	Device Event Management	Manages alarm events from devices.
		AI Analysis Event Management	Manages alarm events from AI recognition.
	AI Video Analysis	AI Video Surveillance	Views live video streams and recognized events based on configured AI scenes.
		Mobile Application	Receives, processes, and manages AI recognition events and monitoring tasks via the mobile app.
	Industry AI Capability Management	Preconfigured AI Models	Offers industry-specific AI models.
		Third-party AI Service Integration	Supports integration with third-party AI/MaaS platforms.
	Operations Management	User Management	Admin privileges for creating and managing system users.
		Permission Management	Visual configuration of user functionality and data permissions.
		Black/White List Management	Manage face and vehicle license plate black/white lists.

5.2 AISWare AI² Edge Intelligence Computing All-in-One Machine

AISWare AI² Edge Intelligence Computing All-in-One Machine provides the hardware and software capabilities required for AI video analysis, with four specifications to meet varying deployment and processing needs, as shown in Figure 5-1.

Figure 5-1 Edge Intelligence Computing All-in-One Machine Main Specifications

The basic functions of Edge Intelligence Computing All-in-One Machine are detailed in Table 5-2.

Table 5-2 Edge Intelligence Computing All-in-One Machine Basic Functions

Product	Function Module	Feature Description	
AISWare AI² Edge Intelligence Computing All-in-One Machine	AI Video Analysis Engine	Video Stream Access	Supports integration of camera/NVR video stream protocols to access video streams.
		Video Decoding	Decodes video and extracts frames for AI inference.

Product	Function Module	Feature Description	
		AI Inference	Uses AI models to analyze and infer images.
		Video Encoding	Outputs video streams with integrated AI inference results.
	AI Scene Orchestration	Real-time AI Scene Orchestration	Supports AI analysis on live video streams, configures required algorithms and monitoring parameters, and provides visual management of active scenes.
		Preconfigured AI Model Management	Manages industry-specific AI models based on specifications and requirements, including model versions and operating status.
	Event Management	AI Analysis Event Management	Manages alarm events generated by AI recognition and analysis.
	AI Video Analysis Applications	AI Video Surveillance	View live video streams and recognized events according to configured AI real-time surveillance scenes.
	Operations Management	User Permissions Management	Admin privileges for creating and managing system users and permissions.
		System Configuration	Visual configuration of network parameters and system dictionaries.

5.3 AISWare AI² Edge Intelligence Gateway

AISWare AI² Edge Intelligence Gateway provides IoT device collection and edge computing capabilities, including 3 product specifications designed to meet the interface and processing power requirements of different scenarios. The main specifications are shown in Figure 5-2.

Figure 5-2 Edge Intelligence Gateway Main Specifications

The basic functions of Edge Intelligence Gateway are detailed in Table 5-3.

Table 5-3 Edge Intelligence Gateway Basic Functions

Product	Function Module	Feature Description	
AISWare AI² Edge Intelligence Gateway	Protocol Engine	Modbus RTU	Integrates Modbus RTU with link detection and point configuration import.
		IEC 104	Integrates IEC 104 protocol with point configuration import.
	Network Configuration	Resumable Uploads	Caches data during outages and auto-reports it when the network is restored.
		4G Access Debugging	Offers a UI to assess signal strength and quality.
		NTP Time Synchronization	Syncs time via NTP servers with configurable IP addresses.

Product	Function Module	Feature Description	
		APN Management	Manages APN settings via a UI, enabling manual editing of Access Point Name, proxy, network type, and authentication.

5.4 AISWare AI² Edge Intelligence SmartEye

AISWare AI² Edge Intelligence SmartEye is an AI-powered smart camera, available in 3 variants for different scenarios. The main specifications are shown in Figure 5-3.

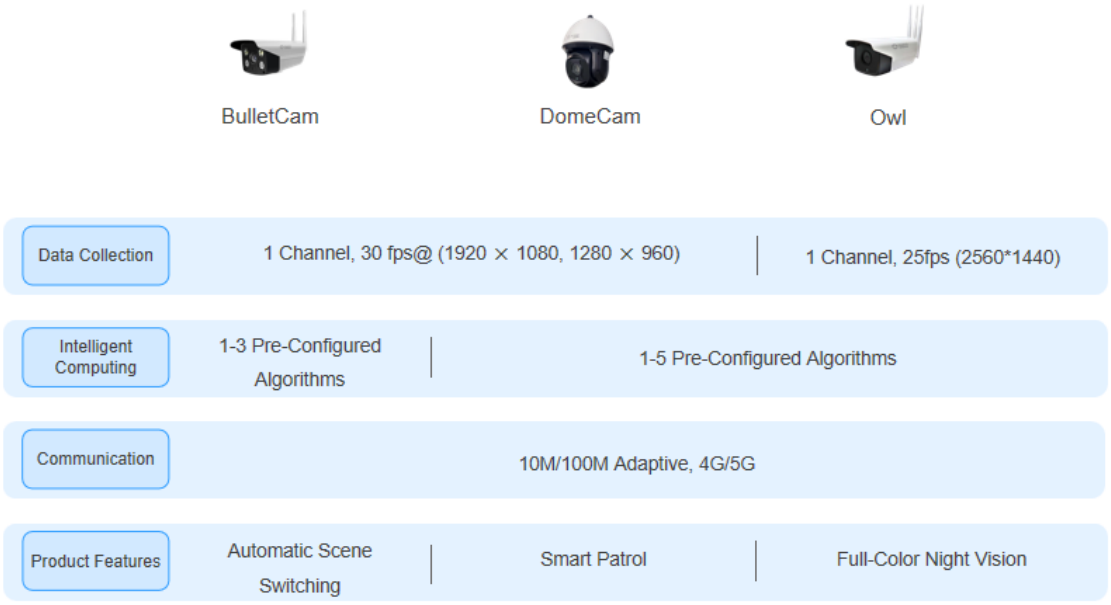

Figure 5-3 Edge Intelligence SmartEye Main Specifications

The basic functions of Edge Intelligence SmartEye are detailed in Table 5-4.

Table 5-4 Edge Intelligence SmartEye Basic Functions

Product	Function Module	Feature Description	
AISWare AI² Edge Intelligence SmartEye	Camera Management	Scheduled Capture	Supports scheduled image capture and upload.
		FTP Settings	Supports configuration of remote FTP upload address.
	System Settings	Change Password	Allows login password modification.

Product	Function Module	Feature Description	
		Remote IP	Supports setting the target address for video stream push.
		Device ID	Allows modification of device UUID.
		Factory Reset	Supports one-click factory reset.

5.5 AISWare AI² Edge Intelligence Smart Access

AISWare AI² Edge Intelligence Smart Access is an AI-powered access control suite, available in two variants for different scenarios. The main specifications are shown in Figure 5-4.

Figure 5-4 Edge Intelligence Smart Access Main Specifications

The basic functions of Edge Intelligence Smart Access are detailed in the Table 5-5.

Table 5-5 Edge Intelligence Smart Access Basic Functions

Product	Function Module	Feature Description	
AISWare AI² Edge Intelligence Smart Access	Access Control Management	Face Recognition Whitelist	Supports bulk upload of allowed face photos.
		Lock/Gate Interface	Supports integration with locks/gates and other smart switches.

Product	Function Module	Feature Description	
	System Settings	Change Password	Allows login password modification.
		Remote IP	Supports setting the target address for video stream push.
		Device ID	Allows modification of device UUID.
		Factory Reset	Supports one-click factory reset.

6 Featured Functions

AISWare AI^2 Edge Intelligence includes Edge Intelligence Cloud, Edge Intelligence Computing All-in-One Machine, Edge Intelligence Gateway, Edge Intelligence SmartEye, and Edge Intelligence Smart Access. This section highlights the featured functions of each product, providing in-depth insights for industry smart upgrades.

6.1 Edge Intelligence Cloud

Edge Intelligence Cloud provides the following features:

6.1.1 Cloud-Edge-End Collaboration

AISWare AI^2 Edge Intelligence Cloud adopts an advanced cloud-edge collaboration architecture, centralizing management of Edge Intelligence Computing All-in-One Machine, Edge Intelligence Gateway, Edge Intelligence SmartEye, and Edge Intelligence Smart Access. The edge nodes and endpoint devices handle real-time data processing and AI inference. The cloud-edge collaboration includes:

- Data Collaboration: Edge devices upload processed data to the cloud for storage and centralized monitoring. Edge nodes can also monitor connected endpoint devices in real-time, supporting a shared management scenario.
- Model Collaboration: The cloud pushes updated models to edge nodes or endpoint devices for real-time model updates and optimization.
- Task Collaboration: Tasks orchestrated in the cloud can be sent to edge nodes for execution, enabling unified scheduling and management of edge tasks for optimal resource distribution and utilization.
- Inference Collaboration: When edge or endpoint resources are insufficient, data can be pushed to the cloud for unified inference, generating analysis results.

- Operations Collaboration: The cloud can remotely monitor and maintain edge devices, ensuring timely issue detection and system stability.

6.1.2 General AI Video Recognition

The platform integrates with Visual Language Models (VLM) for general AI video recognition. No scenario-specific model development is required; a simple configuration enables adaptation to new scenarios. This approach addresses challenges such as single-task models, high data requirements, and long development cycles, significantly enhancing applicability.

6.1.3 AI Center

The AI Center manages AI services, including proprietary models, third-party services, and LLM. It provides a visual interface for parameter configuration, service packaging, and logic execution, streamlining integration and reducing adaptation efforts.

6.1.4 AI Service Orchestration

The platform offers graphical orchestration of algorithms, allowing multiple algorithms to be combined into scenario-specific sequences. These sequences are packaged as standard model services for upper-layer applications. After online inference validation, successful sequences are published for use. For example, in a security scenario, a breach detection event could trigger both face recognition and fall detection algorithms, enabling real-time identification and safety alerts.

6.1.5 Multi-Protocol Support

The platform supports a variety of protocols to ensure seamless integration with different types of devices, including MQTT, LWM2M, Modbus-TCP, JT808, OPC UA, IEC104, and HTTP for IoT devices, and RTSP and GB28181 for IoVT devices. Custom protocols can also be integrated via templates, ensuring compatibility with a wide range of devices.

6.1.6 Data and Capability Openness

The platform offers comprehensive APIs for device data, AI recognition results, alarm events, as well as device control and rule configuration. It resolves interface differences between heterogeneous devices, enabling seamless integration with upper-layer business platforms for rapid deployment of business functions and scenario-specific automation.

6.2 Edge Intelligence Computing All-in-One Machine

AISWare AI^2 Edge Intelligence Computing All-in-One Machine provides the following features:

6.2.1 Pre-Configured Algorithms

The Edge Intelligence Computing All-in-One Machine integrates algorithms for general security, safety production, and efficiency enhancement scenarios. Custom algorithms can also be developed based on industry-specific needs, addressing the unique requirements of various sectors.

6.2.2 External AI Support

In addition to utilizing the built-in AI capabilities, the Edge Intelligence Computing All-in-One Machine supports integration with external AI services and models:

- External AI Service Integration: External AI services (e.g., third-party AI platforms or cloud platforms) can be connected to the device via a visual interface to configure interface parameters, as long as network access is available.
- External AI Model Installation: Upgrades models using the AI model SDK provided by the product and deploy them onto the device.

6.2.3 Third-Party Device Support

The Edge Intelligence Computing All-in-One Machine supports compatibility with most camera models from major manufacturers, providing cross-brand device integration. This includes cameras and NVR models from manufacturers such as Hikvision, Dahua, and Uniview. Enterprises with existing monitoring systems can deploy the product without needing to modify their current setups, enabling AI-assisted monitoring to improve efficiency.

6.2.4 High-Performance AI Video Analysis Engine

The Edge AI Vision optimizes AI video analysis by integrating the AI processing flow with power-efficient chips, maximizing end-to-end performance. The key advantages include:

- Support for Heterogeneous Chip: The framework introduces acceleration components from multiple chip vendors by expanding chip components, with key components rewritten to enhance flexibility and compatibility.
- Significant Performance Boost: With hardware acceleration for encoding/decoding and inference, along with video stream merging and encoding, performance is significantly enhanced, achieving over 60% improvement in end-to-end performance compared to traditional software-based decoding.

6.2.5 Support for Audible and Visual Alarm Devices

The Edge Intelligence Computing All-in-One Machine is compatible with most sound and light alarm on the market, utilizing sound and light alarm protocols to alert relevant personnel in real-time.

6.3 Edge Intelligence Gateway

AISWare AI^2 Edge Intelligence Gateway provides the following features:

6.3.1 Multi-Device Compatibility

The Edge Intelligence Gateway supports a wide range of industrial interfaces (RS232, RS485, DI, relay) and communication options (4G, 5G, wired). It is compatible with protocols like Modbus RTU and 104, and offers custom integration for proprietary protocols, ensuring seamless connection with most IoT devices.

6.3.2 Edge-Based Data Processing

The Edge Intelligence Gateway provides local edge processing capabilities, allowing users to configure data preprocessing rules. This enables the processing of device data collected via Modbus RTU before uploading to the cloud. The supported processing rules include data calculations, data cleansing, and custom JS scripts.

6.3.3 Gateway Data Push

The Edge Intelligence Gateway pushes collected data to third-party cloud platforms. By configuring push rules, it ensures the integrity and real-time transmission of data, supporting further analysis, processing, and application by service platforms.

6.4 Edge Intelligence SmartEye

AISWare AI^2 Edge Intelligence SmartEye provides the following features:

6.4.1 Scene Switching and Intelligent Patrol

The Edge Intelligence SmartEye supports 3 to 5 AI models, compared to the single model of standard smart cameras, enabling more advanced AI surveillance. This includes scene switching based on time slots and intelligent patrolling along preset paths.

- Scene Switching: AI models can be set to activate during specific time periods. For example, a camera deployed at a construction site may use facial recognition in the morning to check attendance, detect safety helmets during working hours, and monitor for intrusions after hours to safeguard assets.
- Intelligent Patrol: Cameras can patrol pre-configured paths, applying different AI algorithms based on the viewing angle. For example, a smart dome camera may detect fence breaches when facing the perimeter and identify illegally parked vehicles when focusing on roads.

6.4.2 Nighttime AI Recognition

The Edge Intelligence SmartEye Owl features full-color night vision, capable of AI recognition even in low light conditions. Coupled with Edge Intelligence's industry-specific algorithms, it meets the AI recognition needs of environments with poor lighting.

6.5 Edge Intelligence Smart Access

AISWare AI^2 Edge Intelligence Smart Access provides the following features:

6.5.1 Robust Access Control for Harsh Environments

The Edge Intelligence Smart Access, designed for unmanned sites such as base station rooms, integrates AI-based face recognition with advanced hardware for secure, efficient access control. It offers several advantages over traditional face recognition systems:

- Made from high-strength materials for resistance to tampering and impact.
- Triggers real-time alerts in case of forced entry or abnormal door opening.
- Equipped with battery to ensure functionality during power outages, ensuring uninterrupted access.

6.5.2 Precise Face Recognition

The Edge Intelligence Smart Access incorporates advanced face recognition and liveness detection algorithms to provide high-precision, fast identification:

- Recognition accuracy up to 99.9%, with face recognition time under 300ms.
- Supports multi-angle recognition and can identify faces from low-resolution images.

7 Unique Advantages

AISWare AI^2 Edge Intelligence provides the following unique advantages.

7.1 Diverse Industry Scenarios

- Multi-source Sensor Integration**:** Connects to various sensors and smart devices across different industries, enabling cost-effective management and edge computing that reduces latency and optimizes bandwidth usage.
- Multi-dimensional Data Processing**:** Integrates vision, thermal, communication, and distance sensing for comprehensive, accurate analysis, extending beyond visible light cameras.
- Multi-modal AI Analysis: Analyzes images, sound, and text, while supporting both general and specialized AI models for more intelligent and versatile scene analysis.

7.2 Cloud-Network-Edge-End Collaboration

- Full-stack Solution: Offers a complete suite of products for industry-specific use cases with flexible deployment options for a one-stop service.
- Wide Network Compatibility: Supports private 4G/5G network access, enabling integration with AISWare AgileNet for edge AI deployment.
- Software-defined Intelligent Terminals: Redefines terminal capabilities through cloud-edge collaboration and software-hardware integration, transforming sensors and cameras into AI-driven intelligent devices.

7.3 Software-Hardware Integration

- High efficiency: Combines cutting-edge hardware, operational efficiency, and communication performance to outperform competitors.
- Simplified O&M: Plug-and-play visual control consoles and seamless integration with the Edge Intelligence Cloud for centralized monitoring and remote management, minimizing maintenance complexity.
- Robust Design: Features fanless, wide-temperature, night-vision, and explosion-proof designs to meet specific environmental demands, ensuring stable performance in diverse scenarios.

8 Scenario Solutions

AISWare AI^2 Edge Intelligence is applied across multiple industries, including construction sites, campuses, power plants, schools, transportation, etc.

8.1 Smart Construction Site

The Smart Construction Site leverages Edge Intelligence Cloud, Computing All-in-One Machine, and SmartEye for site monitoring, reducing safety risk detection time to seconds and effectively preventing accidents while saving labor costs for regulatory agencies.

8.1.1 Application Scenarios for Smart Construction Site

The Smart Construction Site is widely applied in various on-site safety scenarios, including accident warnings, personnel access management, epidemic prevention, and standardized operations.

8.1.2 Service Requirements for Smart Construction Site

Traditional site management faces challenges such as unstable personnel, complex hazards, high monitoring costs, and low safety awareness. Intelligent solutions are needed to improve site safety, standardize operations, reduce risks, ensure project quality, and increase operational efficiency.

- Personnel Management: High turnover and lack of protection awareness increase accident risk.
- Multiple Hazards**:** Risks like electrocution, collapse, mechanical accidents, and falls not only jeopardize worker safety but also lead to significant economic losses.
- Environmental Oversight: Challenges include dust control and vehicle washing require more than manual patrols.
- Safety awareness issues: Diverse workforce with varying levels of qualifications and inadequate safety awareness
- Dynamic Site Environment**:** Frequent environmental changes and the high complexity of network setups call for a flexible, scalable solution.

8.1.3 Solution for Smart Construction Site

To address site complexity while reducing costs and simplifying deployment, the solution integrates Edge Intelligence SmartEye, Computing All-in-One Machine, and Cloud to provide intelligent identification, automated patrols, and scene-switching capabilities for efficient, centralized site management. The solution is illustrated in Figure 8-1.

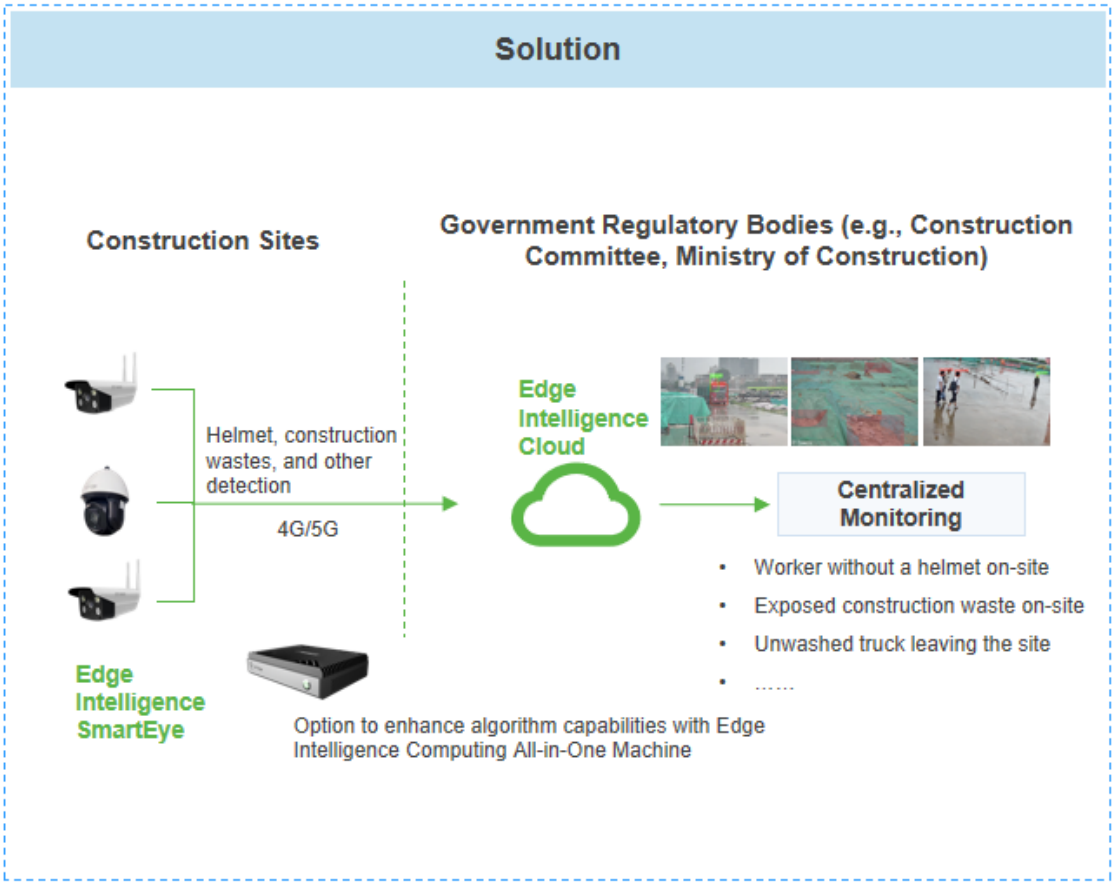

Figure 8-1 Smart Construction Site Solution

- Edge Devices/Site: Deploy SmartEye with pre-configured site-specific algorithms (e.g., helmet detection, construction waste detection) and extend capabilities with Computing All-in-One Machine Nano/Mini.
- Network Transmission: Supports 4G/5G transmission and private networks, with plug-and-play setup for real-time hazard reporting.
- Cloud: The Edge Intelligence Cloud, deployed on public or private clouds, receives hazard detection results and pushes real-time alerts. It also

integrates with existing smart construction site platforms to complete the service process.

The solution offers the following advantages compared to other market solutions:

- AI-powered Centralized Monitoring: Real-time cloud-based monitoring of multiple sites, detecting hazards such as missing helmets, construction waste, unwashed trucks, and fire risks, replacing manual patrols.
- Easy Deployment/Removal: Install cameras with power at new sites for centralized monitoring, then remove and relocate after construction.
- Intelligent Patrols: Customize patrols for different areas and times, such as monitoring helmets and wastes during construction, ensuring cost-effective surveillance.

8.2 Smart Campus

The Smart Campus leverages Edge Intelligence Computing All-in-One Machine and Gateway to provide intelligent security and energy management capabilities, covering the workflow from detection to alert.

8.2.1 Application Scenarios for Smart Campus

The Smart Campus is widely applied in various campus management scenarios, including integrated security, fire safety, facilities management, convenient access, and energy management.

8.2.2 Service Requirements for Smart Campus

Campuses are the fundamental units of cities and act as their smart infrastructure hubs. Traditional campuses often rely heavily on cameras and sensors but still depend on manual monitoring, leading to inefficiency and high labor costs.

- Labor-intensive Video Surveillance: Traditional surveillance requires security personnel to identify issues, typically after an incident has occurred, hindering timely risk detection and loss prevention.
- Reliance on Vendor Systems: Energy management is inefficient, relying on manual processes and disparate vendor systems, with no central coordination.
- High Upgrading Cost: Upgrading to smart cameras across the campus is costly and labor-intensive, while replacing multi-vendor equipment further increases costs, with long-term vendor lock-in.

8.2.3 Solution for Smart Campus

The solution integrates Edge Intelligence Computing All-in-One Machine and Gateway to provide a unified, AI-powered approach to security, environment, and energy management. The solution is illustrated in Figure 8-2.

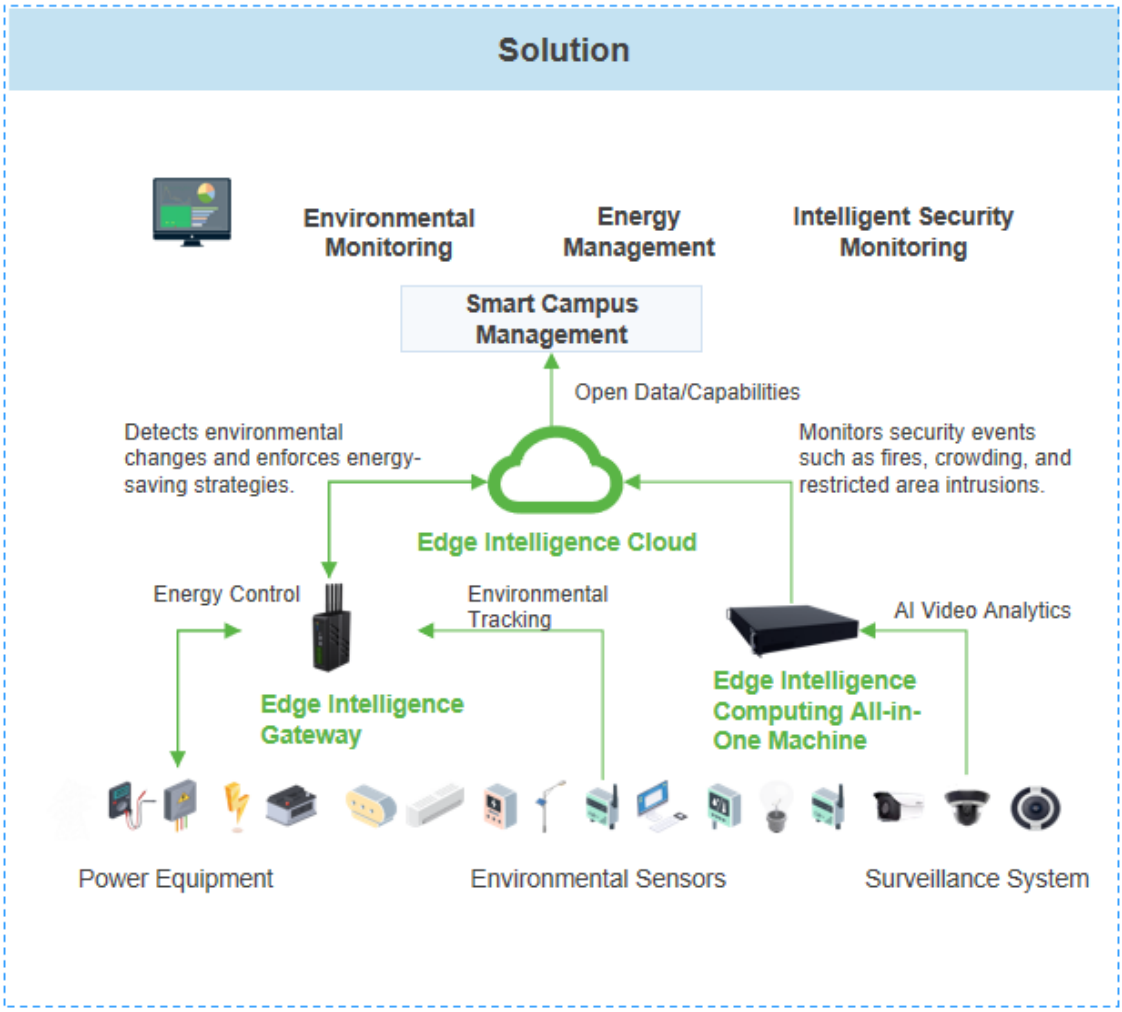

Figure 8-2 Smart Campus Solution

- Edge Nodes/Outdoor or Campus Data Centers: Pre-configured Edge Intelligence Computing All-in-One Machine enhances existing surveillance systems, while Edge Intelligence Gateway collect data from IoT devices like power and environmental sensors. These nodes enable seamless integration of heterogeneous devices.
- Network Transmission: Both Edge Intelligence Computing All-in-One Machine and Gateway support 4G/5G or wired transmission, providing flexibility without disrupting existing network setups.
- Cloud/Campus Data Centers: For large campuses or those distributed across multiple areas, the Edge Intelligence Cloud consolidates data, orchestrates monitoring, and manages energy and security. Smaller campuses can push data directly to a management platform for analysis.

The solution offers the following advantages compared to other market solutions:

- Protects Existing Investments: Enables centralized monitoring and management of devices from multiple manufacturers, across various scenarios and regions, without affecting existing surveillance or network infrastructure.
- Real-Time Response and Decision-Making: Recognition and rule execution occur at the edge nodes, enabling immediate risk detection and corrective actions.
- Energy Efficiency: Analyzes energy data and provides optimization recommendations to reduce consumption and costs.
- AI-Enhanced Security: AI video analysis combined with sensor data increases accuracy and minimizes false alarms.
- Scalability: The solution is easily scalable, adding cameras or sensors based on evolving needs.
- AI-Driven Management: Shifts from manual, reactive management to proactive, AI-driven identification and control of campus operations, such as fire detection, crowd gathering, and energy optimization.

8.3 Smart Data Center

The Smart Data Center leverages Edge Intelligence Cloud and Edge Intelligence Smart Access to provide secure, unattended access control for remote data centers.

8.3.1 Application Scenarios for Smart Data Center

The Smart Data Center is widely applied in remote, unmanned sites, such as telecom towers and renewable energy stations, addressing access and security challenges.

8.3.2 Service Requirements for Smart Data Center

Edge data centers, particularly those in remote or hard-to-reach areas, face challenges due to limited onsite staff. The complex nature of edge data center environments means that existing smart access control products and their functionality are not suited to meet the specific needs of these sites.

- Lack of Identity Management: Current systems lack real-time identity verification, leading to security risks and unauthorized access.
- Access Delays: Remote access can be delayed due to weak signals or system failures, affecting the timeliness of urgent tasks.
- Power Outages: Traditional systems depend on power and can fail during outages, leaving facilities unsecured and delaying recovery operations.
- Security Risks: Forced entry and damage to door locks pose significant security concerns, leading to economic loss. Additionally, if doors are left open for extended periods without alerts, it exposes the site to security vulnerabilities.
- Security Risks: Vulnerable to unauthorized access, tampering, and unmonitored open doors, which can lead to theft, damage, or security breaches.
- Inadequate Traditional Access Control: Current systems rely on onsite security and are limited in accuracy, range, and resistance to environmental factors.

8.3.3 Solution for Smart Data Center

The solution integrates Edge Intelligence Cloud and Edge Intelligence Smart Access to address challenges like power failure, vandalism, and environmental issues with facial recognition, offering a secure, customized access control solution for edge data centers. The solution is illustrated in Figure 8-3.

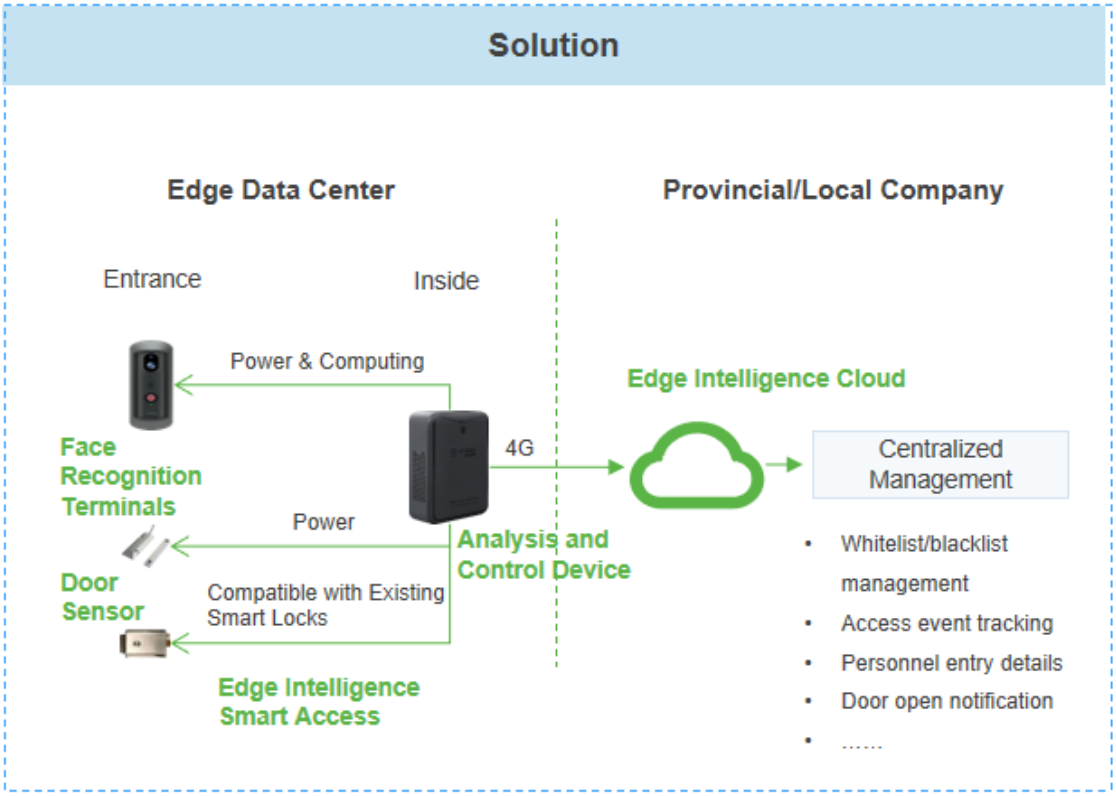

Figure 8-3 Smart Data Center Solution

- Edge Data Centers: Unattended Product Suite with facial recognition and backup power for access during outages. Integrated cameras prevent tampering and send real-time alerts to backend systems.
- Network Transmission: Supports 4G and wired connections, adapting to existing network configurations.
- Cloud: The Edge Intelligence Cloud provides centralized management of access, monitoring, and anomaly detection across all edge data centers.

The solution offers the following advantages compared to other market solutions:

- Tamper-Resistant: Integrated cameras prevent vandalism and unauthorized removal.
- Backup Power: 24-hour backup ensures access during power failures.
- Non-Intrusive: Integrates seamlessly with existing systems, using 4G for data transmission without disrupting the network.
- Security Alerts: Door sensors notify managers if doors remain open for extended periods, preventing unauthorized access.
- Accurate Facial Recognition: Achieves 99.9% accuracy with a recognition time under 300ms.

9 Use Cases

AISWare AI^2 Edge Intelligence has demonstrated significant value across multiple industries, enabling customers to reduce costs and improve efficiency.

9.1 An Edge Intelligence Case for a Campus

AISWare AI^2 Edge Intelligence helps a Beijing campus upgrade its surveillance system with AI, reducing security costs, improving efficiency, and enabling a seamless smart transformation.

9.1.1 Customer Requirements

Located in Zhongguancun Science Park, this campus spans 500,000 sqm with 20 buildings for offices, commerce, and business. It is positioned as a global hub for AI, fintech, and aerospace. The customer sought to integrate AI into 100 cameras across two plots (22 & 20), enabling crowd counting, intrusion detection, and illegal parking monitoring. The primary requirements were:

- Integrating existing surveillance with AI video analysis.
- Enabling intelligent analysis and alerts for security scenarios such as boundary crossing, crowd counting, and vehicle monitoring.
- Providing a video platform with system management functions, including data analysis, algorithm configuration, and event viewing.

9.1.2 Solutions and Effects

Utilizing the Edge Intelligence Computing All-in-One Machine Jumbo, with its capacity to process over 100 video channels, the project seamlessly integrated the campus's existing 100 surveillance cameras into Edge Intelligence Computing All-in-One Machine via the current surveillance system, delivering a non-intrusive enhancement. The entire implementation was completed within a month. The project solution is illustrated in Figure 9-1.

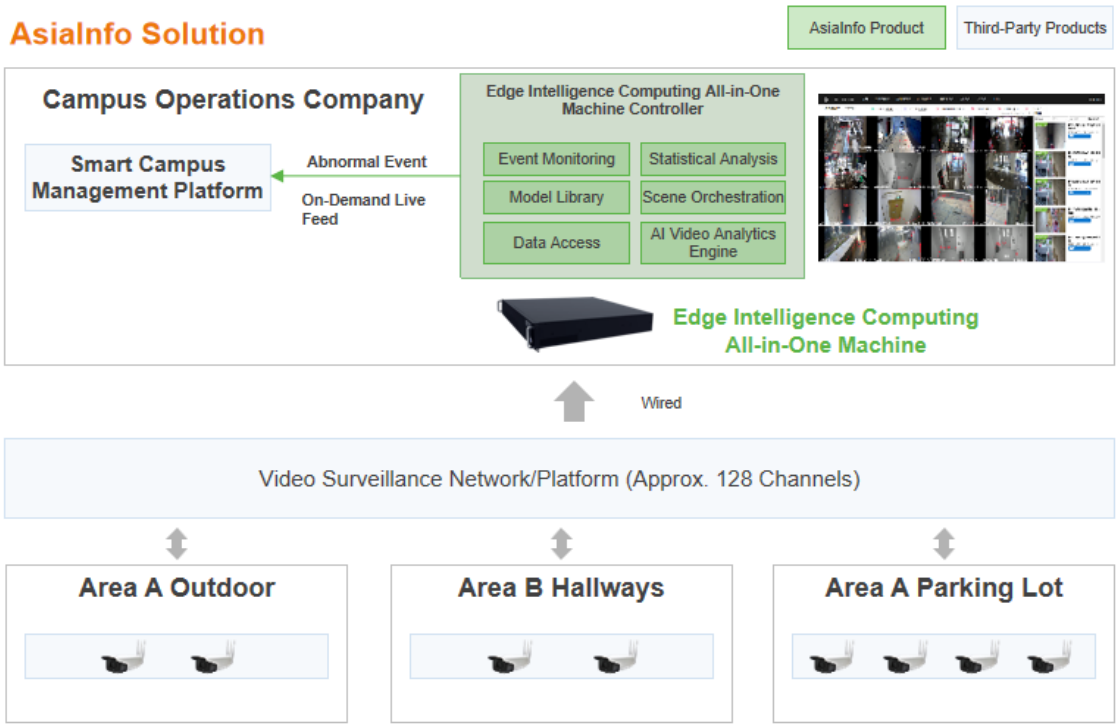

Figure 9-1 Smart Campus Solution

- Edge Nodes: Edge Intelligence Jumbo was deployed in the campus data center, utilizing the existing network to connect camera video streams from Zones 20 and 22 to the edge appliance.
- Cloud: Edge Intelligence Jumbo enables centralized AI monitoring, synchronizing detected events with the campus operation management platform.

AI algorithms for dynamic crowd monitoring, mask detection, intrusion detection in core areas, fire detection, elevator door closure monitoring, fire safety setup checks, and personnel counting were applied to enhance security management. This improved the campus's ability to respond to emergencies and boosted overall smart management efficiency.

- Reduced security staff by 3, saving 200,000 CNY/year.
- Enabled proactive fire safety, reducing the risk of significant losses.
- Risk detection time decreased from hours to seconds, improving preventive measures.
- Automated risk management enhanced overall campus safety.

9.2 An Edge Intelligence Case for a Construction Site

AISWare AI^2 Edge Intelligence helps a district construction bureau implement intelligent site supervision, reducing supervision costs and improving safety and compliance.

9.2.1 Customer Requirements

The district's urban renewal project spans multiple construction sites, demanding strict safety, progress, and environmental controls. With the pandemic intensifying, preventing transmission became a critical concern, placing heightened demands on the regulatory authorities. The primary requirements were:

- AI detection for mask wearing, helmet use, smoking, and waste management to ensure compliance with safety and environmental standards.
- A data-driven, centralized system for on-site management and real-time monitoring, replacing traditional patrols.

9.2.2 Solutions and Effects

The project deploys 4 to 6 Edge Intelligence SmartEye at each construction site, equipped with AI algorithms for mask and helmet detection, smoking behavior, and waste management. The Edge Intelligence Cloud is used for real-time monitoring and receiving alerts. Violations detected by the SmartEye are uploaded via 4G to the cloud, notifying regulators for prompt action. The project solution is illustrated in Figure 9-2.

Figure 9-2 Smart Construction Site Solution

- Edge Device/Construction Site: Installed at elevated locations on the construction site and powered on, with the DomeCam placed in open areas and the BulletCam positioned at key monitoring points.
- Network Transmission: Uses the built-in 4G network to connect to the public cloud, simplifying on-site network setup.
- Cloud/Public Cloud: Connects the powered Edge Intelligence SmartEye to the Edge Intelligence Cloud, enabling remote configuration of scene switching, smart patrol rules, and algorithms, as well as receiving alerts for detected site anomalies.

This solution significantly reduces the need for on-site patrols, easing supervision pressure, eliminating last-minute inspections, and enhancing safety and health measures on-site.

- Reduced patrol staff by 4, saving about 500,000 CNY annually in labor costs, while cutting expenses for construction and regulatory bodies.
- Enhanced environmental protection with timely waste management, improving air quality.

- Risk detection time cut to seconds, enabling proactive risk prevention and reducing safety incidents.
- Shifted from reactive to proactive safety measures, ensuring compliance with epidemic and safety protocols.

10 Certificates and Awards

The certificates for AISWare AI^2 Edge Intelligence are shown in Figure 10-1.

Figure 10-1 AISWare AI^2 Edge Intelligence Certificates

The awards for AISWare AI^2 Edge Intelligence are shown in Figure 10-2.

Figure 10-2 AISWare AI^2 Edge Intelligence Awards

11 Contact Us

AsiaInfo Technologies (China) Limited

Address: AsiaInfo Plaza, 10 East Xibeiwang Rd, Haidian District, Beijing, China 100193

Postcode: 100193

Fax: (+86) 010-82166699

Tel: (+86) 010-82166688

Email: 5G@asiainfo.com

Web: www.asiainfo.com

AsiaInfo 亚信科技

Thank you

Customer Value Innovator & Digital Transformation Promoter with Full-Stack Data Intelligence Capabilities