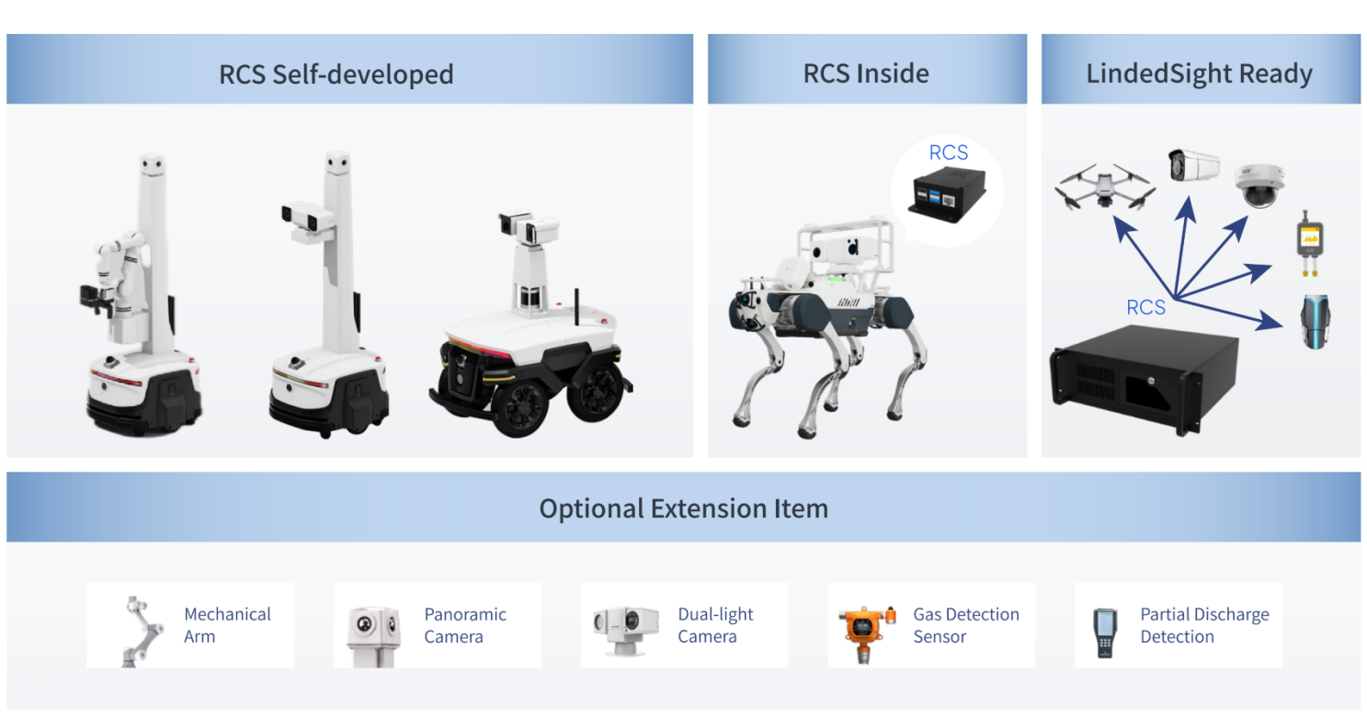
ASIMOV
STORES

Core Advantages

Core Advantages

Ecologically open, seamlessly compatible with all terminals



Core Advantages

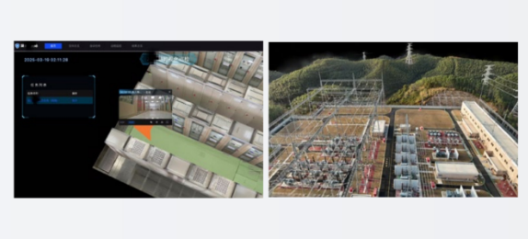
Full-stack Technology Self-developed

Application System	Inspection System
Digital Middleground	LinkedSight Digital Middleground: IoT, Artificial Intelligence, Dynamic Digital Twins
Robot System	RCS system: Map Editing, Task Establishment, Task Planning, Remote Monitoring
Software Algorithm	Mapping, Positioning, Perception, Decision Making, Planning, Control, Recognition Algorithms
Electrical Hardware	Main Controller, Secondary Controller, Domain Controller
Mechanical Structure	Two-wheel Differential Drive Chassis, Four-Wheel Steering and Four-Wheel Drive chassis
Core Components	Panoramic Camera, Stabilized Gimbal, Servo Motor

Core Advantages

Temporal sequence modeling, massive semantic models with human-machine-environment interaction

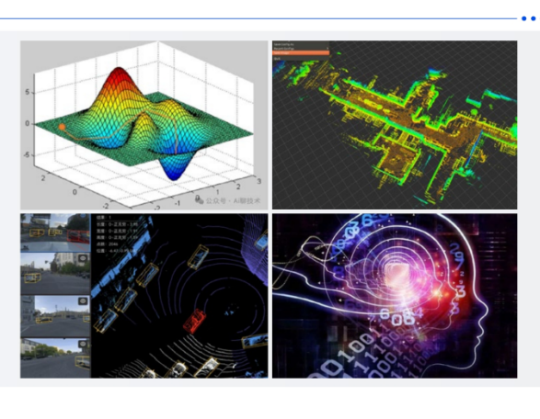
- Fully Automated Modeling: Point Cloud/Gaussian model, the algorithm automatically completes the modeling based on inspection data
- Integrated Toolchain: Flexible editing and trimming | Auto object recognition | Smart annotation | Real-time asset model generation



Core Advantages

Dual localization, enhancing robot reliability

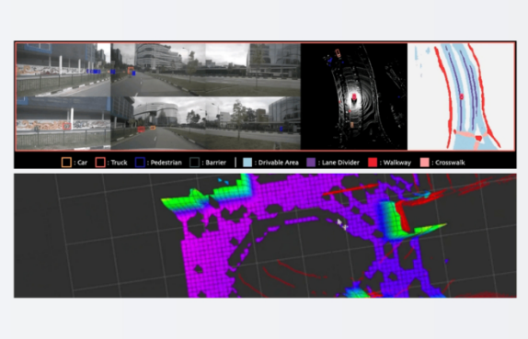
- Image + Point Cloud/Gauss: "brain-like" retrieval | DL-supervised positioning health & self-recovery
- Wheel Speed Meter + IMU + RTK + LiDAR: Multi-sensor fusion positioning | Dynamic complex road conditions | Large-scale scene support



Core Advantages

Dual perception, enabling full-scenario intelligent driving

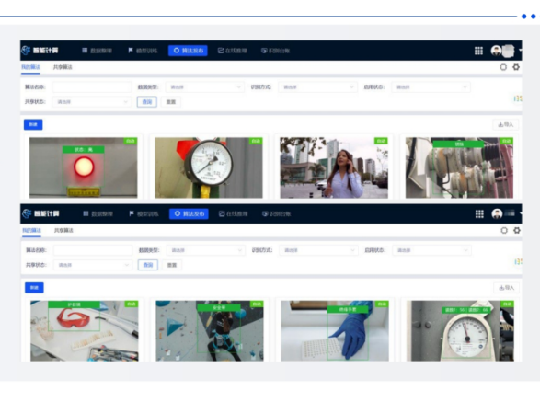
- BEV Real-Time Perception: Rich Environmental Semantics, based on temporal sequence analysis, without fear of barrier
- Elevation Real-Time Perception: High-precision local terrain modeling



Core Advantages

Powerful AI Engine, low-code platform

- Highly Intelligent and Self-Learning Capabilities: Zero-install algorithms | Online annotation and training (image, video, and audio).



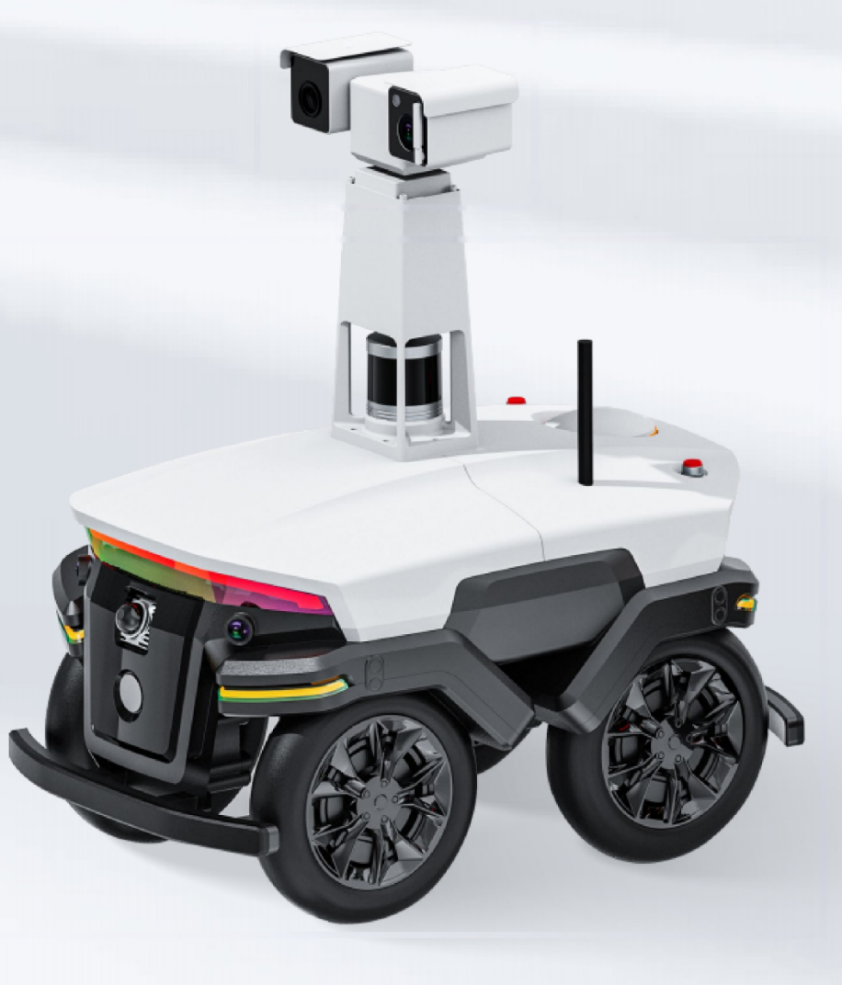
Main Function

Environmental Monitoring
Temperature and humidity, dust, smoke concentration, toxic and harmful gases, flammable and explosive gases, equipment status monitoring

Image Recognition
Leakage detection, meter readings, indicator lights, switch operations, noise monitoring, water accumulation, cable damage, etc.

Infrared Temperature Measurement
Temperature detection for key components: steam turbines, main transformers, and equipment joints; temperature rise prediction and alarm analysis

Work Monitoring
Living object detection, intrusion detection, safety helmet detection, mobile monitoring, voice broadcasting, work guidance



Technological Advantage

Powerful Mobility Performance
Equipped with a four-wheel drive and four-wheel steering suspension chassis, it supports stable movement on complex terrains such as slopes (≤ 26°), water wading (up to 100mm depth), and gravel roads.

Extreme Environment Adaption
With IP55 protection and a wide temperature range (-4°F ~122°F), it is dustproof, waterproof, and corrosion-resistant, making it suitable for extreme industrial environments.

AI Recognition
Integrated with wide-angle, zoom, thermal imaging, and laser rangefinder sensors, combined with high-precision image recognition algorithms, it achieves an accuracy rate of over 98%.

Superior Imaging Capabilities
Featuring a self-developed infrared thermal imaging enhancement system and recognition and positioning technology, it is immune to clutter interference, supports dual-channel imaging (visible light and infrared), and enables seamless day-night recognition.

Smart Path Navigation
Equipped with a multi-sensor fusion dynamic obstacle avoidance system, it has strong pathfinding capabilities, supporting trackless navigation and real-time path planning.

Technical Parameter

Dimensions (Length*Width*Height)	991x664x1064mm	attery Capability	50AH
Weight	150kg	Full Load Working Time	≥10h
Maximum Obstacle Crossing Height	100mm	Full Charging Time	2.5h
Climbing Ability	26°	Charging Modes	Automatic/Manual
Fording Depth	100mm	Communication Method	4G / 5G / Wi-Fi
Full Load Maximum Speed	1.5m/s	Navigation Form	Combined navigation (3D LiDAR + IMU + wheel speed Sensors) + RTK (optional)
Gimbal Visible Light Camera	2688X1520, 32x optical zoom	Safety Protection Mode	Laser scanning + ultrasonic testing + mechanical border collision + emergency stop button + drop detection
Gimbal Infrared Thermal Imaging	640x512, maximum temperature measurement	Protection Class	IP55
Working Voltage	DC48V	Work Temperature	-4°F ~122°F

Edge Intelligent Control Workstation

Provides functions such as edge gateway, recognition detection, and device integration, capable of simultaneously connecting to intelligent terminals for scheduling and control. In terms of video processing, it can provide device video access, collection, AI inteligent detection, processing, and distribution functions for multiple protocols.

Workstation Lite

Workstation

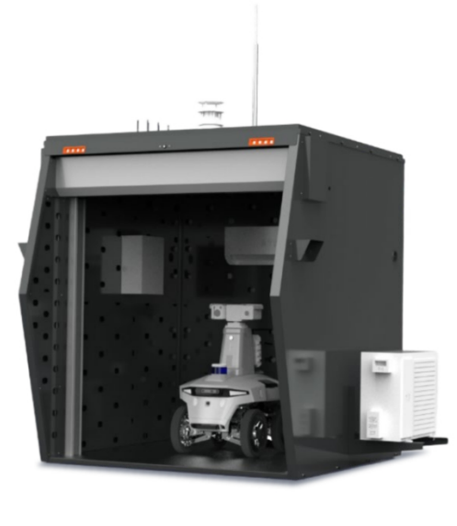
Chassis	Micro Metal Chassis
Dimensions(LxWxH)	120x70x36mm
CPU	4Cores
Memory	8G
Hard Drive	64G
GPU	/
Edge Computing Support	No
Cluster Support	No
AI Computing Power	/

Chassis	4U Industrial
Dimensions(LxWxH)	450x425x177mm
CPU	6Cores
Memory	32G
Hard Drive	512G/SSD
GPU	12GB VRAM
Edge Computing Support	YES
Cluster Support	YES
AI Computing Power	136TFLOPS

Outdoor Charging Station

An integrated smart outdoor charging station for mobile inspection robots, providing safe charging, maintenance, and parking. it incorporates functions such as a micro-weather station, micro-communication station, and security outpost,ofering features like weather monitoringm, communication signal relay, Mlesh networking, and supplementary monitoring coverage.

Dimensions(LxWxH)	2210x2412x3195mm
Weight	600kg
Air Conditioning Mode	Cooling + Heating
Sensors	Smoke, water immersion, light, micro-weather station
Working Voltage	220V
Positioning Method	Beidou/GPS
Communication Methods	4G/5G/Wi-Fi



Charging Pile

Easy to deploy, it can be put into use by simply fixing it in place and connecting to 220V mains power. With an IP44-rated enclosure, it effectively resists dirt and dust, making it adaptable to various complex environments. Built-in short-circuit and overload detection functions provide comprehensive safety protection.

Dimensions(LxWxH)	420*300*480mm
Weight	20kg
Charging Mode	Electrode contact charging
Input Voltage	110Vac/220Vac
Operating Environment	-13°F ~ 122°F

Software Service

Robot Control System

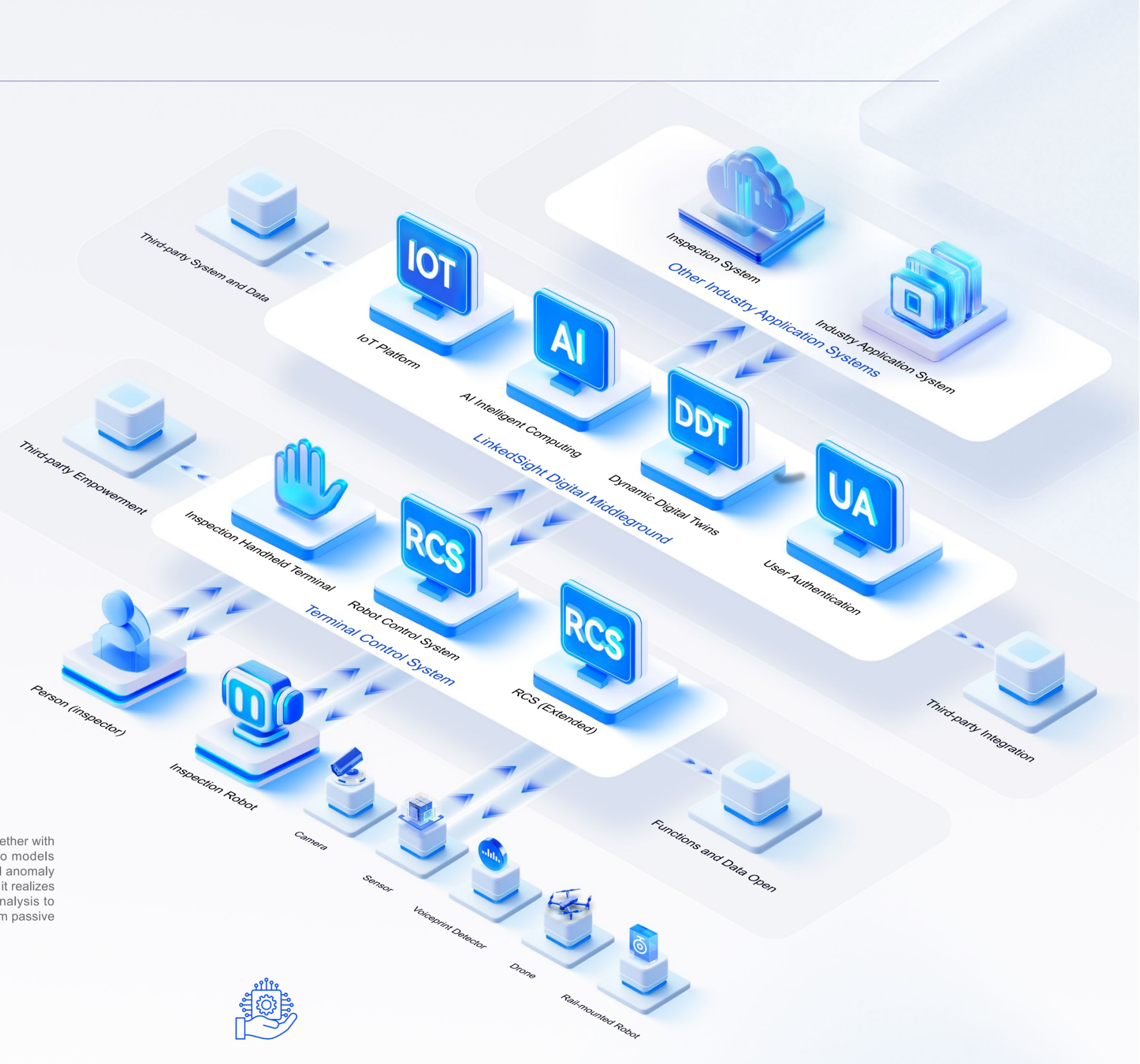
Inspection handheld terminal, the Robot Control System (RCS), extended RCS modules, unified hardware access, accurate data collection, flexible expansion and standard data port for upper layer applications.

LinkedSight Digital Middleground

This platform integrate IoT, AI, Dynamic Digital Twins (DDT), and User Authentication (UA), is capable of providing technical and data support to cross-system and application layers.

Inspection System

User-friendly configuration | Diversified data visualization | Multi-channel notification | Multi-system integration | Multi-site management



Rapid Development & Integration
The platform integrates multiple modules, providing standardized technical support. It enables seamless integration of various types of terminal devices such as robots, drones, sensors, and third-party systems. Resulting in the reduction of development and integration costs for enterprises.

Intelligent O&M Management
Data is accurately collected through terminal devices, together with pre-trained AI algorithm library (covering 100+ scenario models such as equipment defect recognition and environmental anomaly detection) and dynamic mirroring in the digital twin space, it realizes full-process intelligence from data collection and analysis to decision-making. This enables enterprises to upgrade from passive reaction to proactive prevention.

Cost-Effective Decision Making
Constructs 1:1 digital twin plant based on digital twin technology. The digital twin supports historical data retrieval and simulation deduction, and is capable of presenting real-time status of equipment, personnel, environment and safety etc. It fulfills diverse scenario needs such as substations, power plant, intelligence parks etc.

Flexible Deployment & Scaling
The terminal control system encapsulates a unified interface for upper-layer applications, is compatible with various types of hardware for lower-layer devices, and supports flexible expansion in the middle. With simple deployment and flexible adjustment, it can meet the dynamic needs of different plants and stations, ensuring the rapid launch of the system and its continuous optimization.

Granular Access Control
Through the unified User Authentication (UA) permission module, multi-level and multi-role permission control is achieved, ensuring data security and compliance of operations. Additionally, it also supports multi-channel notifications and anomaly warnings, reducing operational risks and improving the level of safety management.

Software Ecological Architecture

LinkedSight Digital Middleground

The middle platform for robot application technology support and service integrates modular functions such as IoT Platform, AI intelligent computing, Dynamic Digital Twins, and UA Authentication. It serves as the core support for the Security Patrol System and can integrate various types of robots and third-party systems.

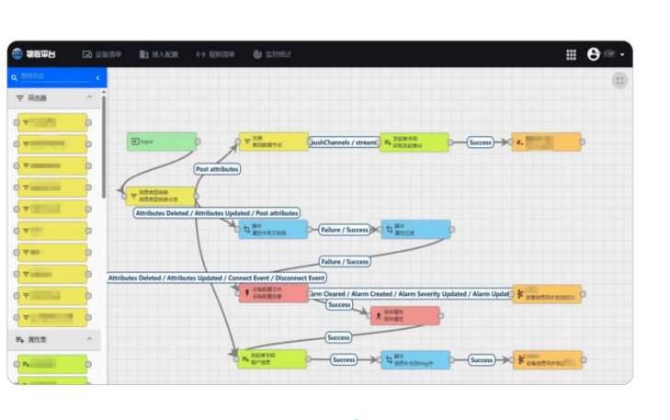
Main Function

IoT Platform
The system offers full-lifecycle management for terminals, including configuration management, status monitoring, data distribution, and instruction distribution. It can monitor the device status in real-time and trigger alarms based on user configuration.

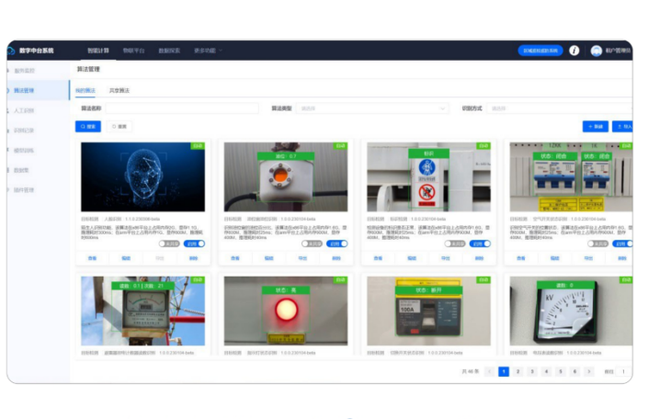
AI Intelligent Computing
This platform is capable of satisfying user requirements and customized scenarios by allowing users to expand new algorithms in a low-code manner.

Dynamic Digital Twins
Users can complete operations such as scenario building, animation editing, event configuration, and data binding without programming. It supports customized data dashboards and drag-and-drop interactive design, enabling intelligent interaction between human and machine, and dynamic data management.

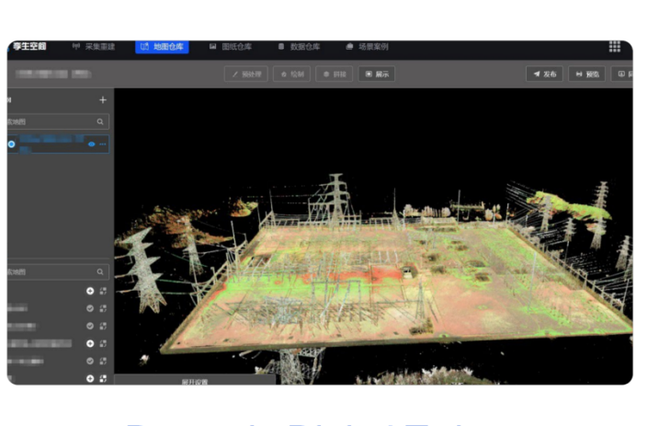
User Authentication
It features an organizational structure management system that supports unified account and permission management for multiple roles, including identity authentication, access control, data interfaces, and security auditing.



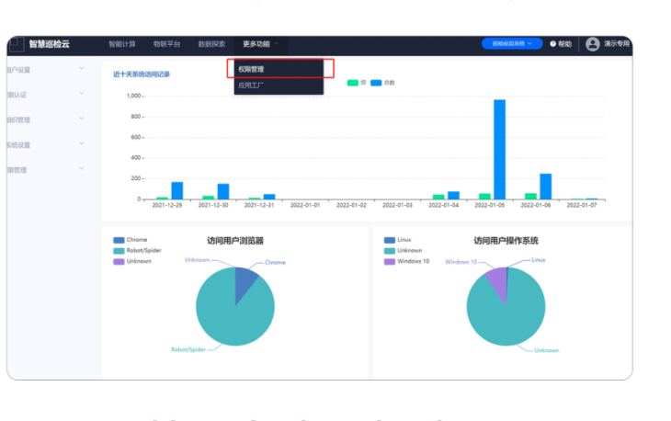
IoT Platform



AI Intelligent Computing



Dynamic Digital Twins

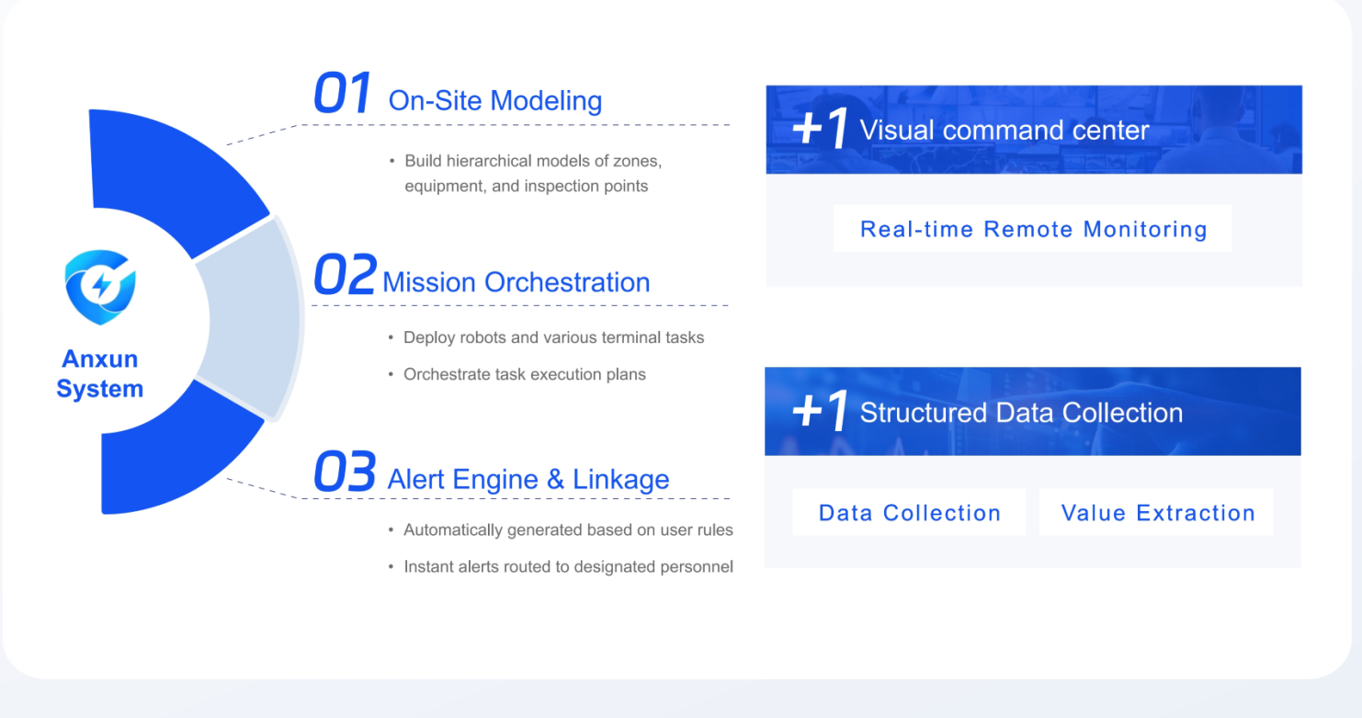


User Authentication

Inspection System

The Inspection System is a management system that employs terminal devices including robots, drones and various intelligent terminals, applied AI-based analysis to analyze the security status, deliver real-time operation status and historical record of plants and stations through means such as images, videos, inspection reports and 3D visualizations. Operation and maintenance personnel can grasp the security status and trends of on-site equipment, facilities, personnel, and environment, which enhances the efficiency of operation and maintenance, and supports the related decision-making. This system is especially suitable for various plants and stations, including substations, industrial parks, and power plants.

3+1+1 Intelligent Patrol Mode, Redefine Inspection Work



Anxun System

01 On-Site Modeling
- Build hierarchical models of zones, equipment, and inspection points

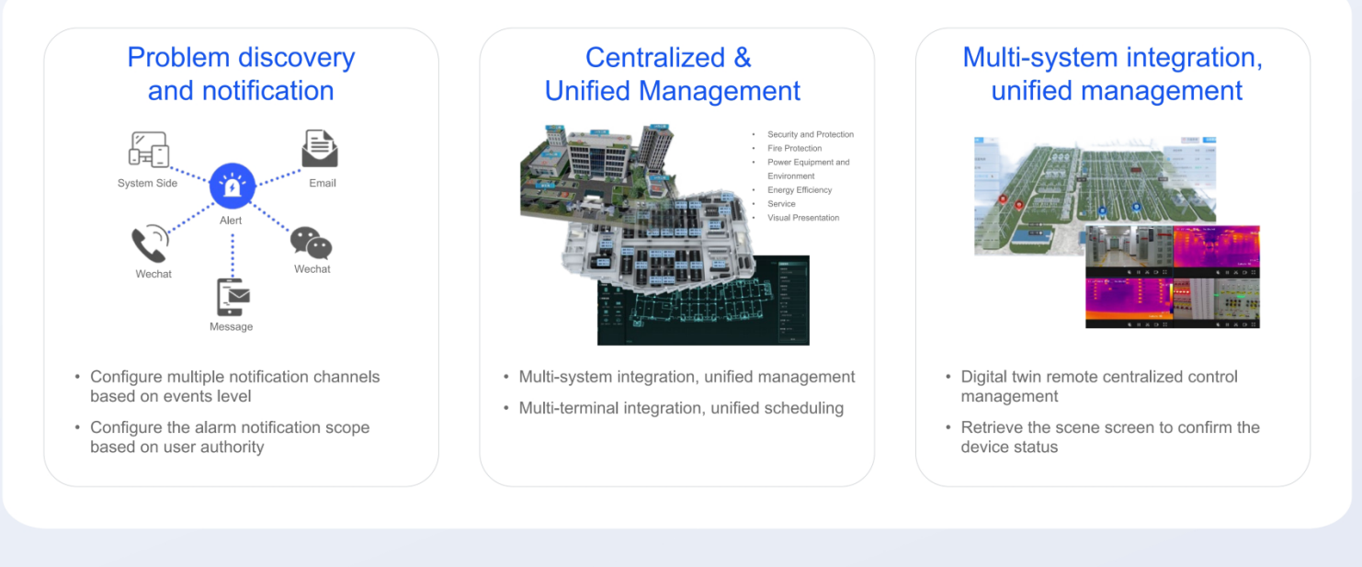
02 Mission Orchestration
- Deploy robots and various terminal tasks
- Orchestrate task execution plans

03 Alert Engine & Linkage
- Automatically generated based on user rules
- Instant alerts routed to designated personnel

+1 Visual command center
Real-time Remote Monitoring

+1 Structured Data Collection
Data Collection
Value Extraction

Multi-Channel Notification & Multi-system integration & Multi-site Management

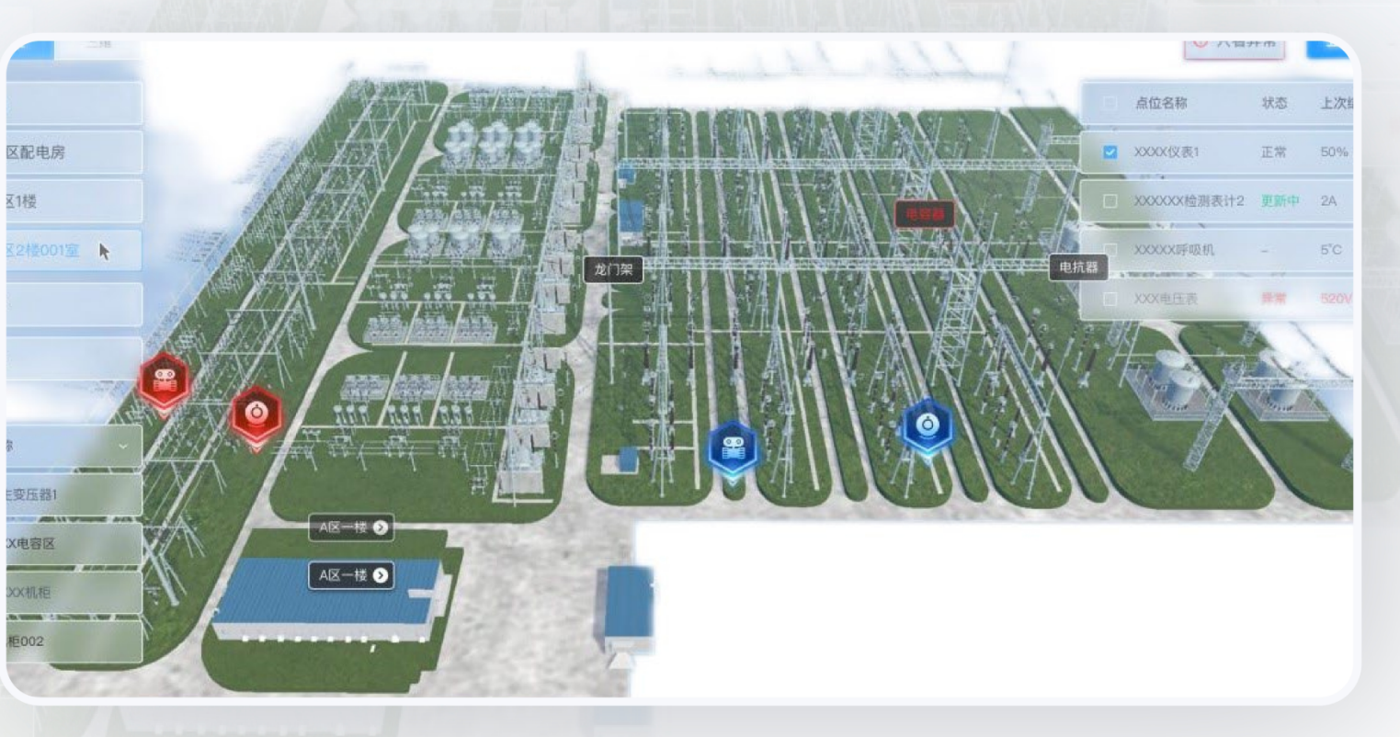


Problem discovery and notification
- Configure multiple notification channels based on events level
- Configure the alarm notification scope based on user authority

Centralized & Unified Management
- Multi-system integration, unified management
- Multi-terminal integration, unified scheduling

Multi-system integration, unified management
- Digital twin remote centralized control management
- Retrieve the scene screen to confirm the device status

Main Function



Detection Point Management
Comprehensive display of detection point information, including basic information, real-time images, historical pictures, data curves, etc., which provides you a comprehensive look of the status of detection points. It also supports the switching of detection points according to dimensions such as equipment, terminals, tasks, and alarms.

Anomaly Alarm
The flexible alarm management module allows users to independently configure and customize alarm thresholds for conventional filtered alarms. For some complex linked alarms, such as the temperature difference between three phases and the trend of data changes, they can be effectively regulated through the IoT rule engine.

Inspection Report
Intuitively inspection data presentation, and inspection results can be filtered according to dimensions such as tasks, equipment, terminals, and detection points. The inspection report supports one-click export, and users can customize the field content and names.

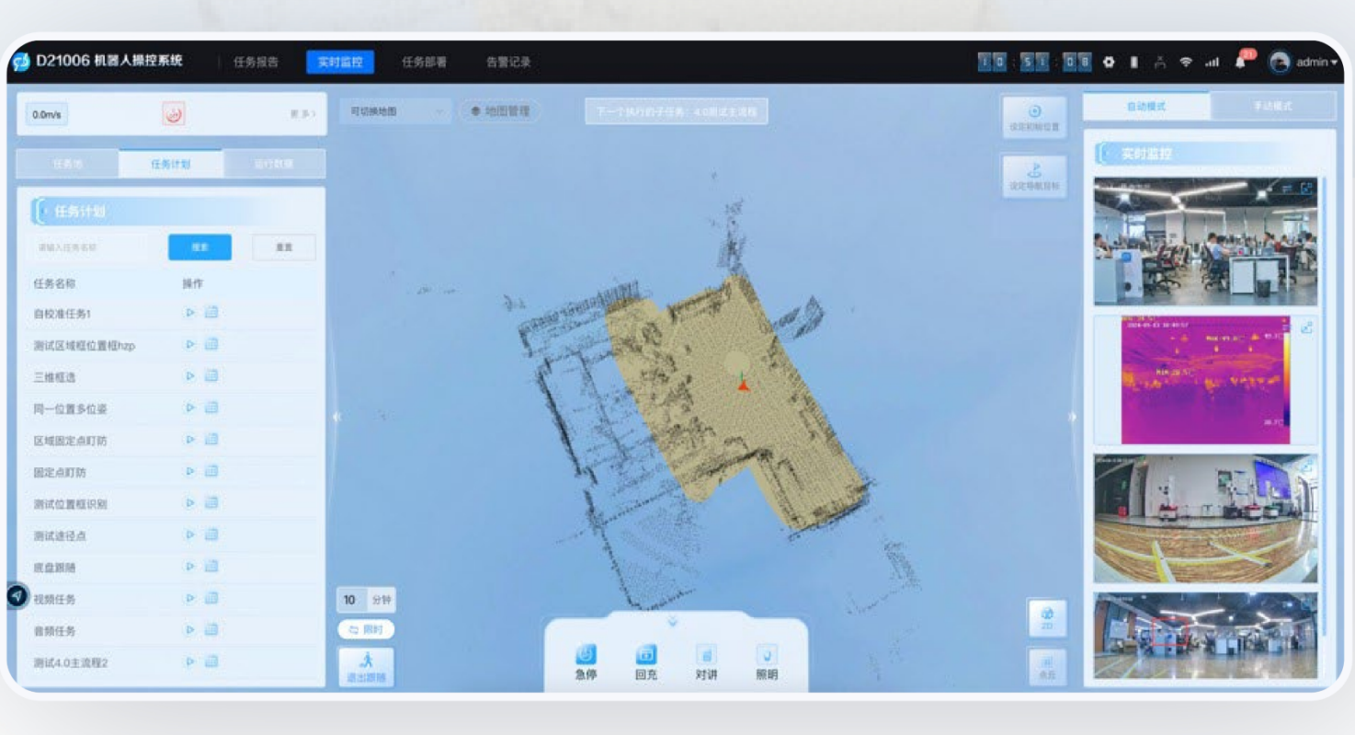
Video Surveillance
It supports multiple split-screen modes and multiple views. The picture is adjusted with the switching of detection points. Additionally, it supports manual control of the PTZ and dispatching robots to the detection point for inspection, realizing remote manual inspection.

Manual Review
The inspection results are reviewed manually to determine whether the identification is correct, Enabling a seamless assessment of the algorithm's accuracy. Error types can also be recorded to form reference indicators for the deployment and optimization of detection points.

Operation and Maintenance Center
An operation and maintenance command center is built for customers. Through large-screen dashboards and digital twins, enterprise decision-makers can "have an overall view at a glance" on one screen, immersively and quickly understanding business statistical data and real-time on-site dynamics.

RCS Robot Control System

The RCS is a comprehensive control and management software integrated within the robot. It enables full-scope control and administration of inspection robots, including: reading data from underlying sensors, motor and Input/Output control, robot positioning, navigation and motion control, parameter configuration, hardware self-tests, creating/editing maps, paths and inspection points, formulating inspection tasks, reviewing inspection results, and other critical functions.



Deployment Method

This system supports both local and public cloud deployments. Based on a high-availability cluster server solution and adopting a microservices architecture, it features outstanding disaster - recovery capabilities, reliability, and the ability to scale smoothly. It also enables high-capacity data storage and delivers robust computing power, ensuring seamless support for the Lingxi Digital Middle-platform and upper-layer application systems.

Local Private Cluster
The AXS System Cloud can be fully deployed on-site in the customer's computer room via a local private cluster. It operates within the customer's corporate private network, with relevant data and services stored and run locally only, enabling complete isolation from the external Internet.

Local Dedicated Cluster
A local dedicated server cluster extends the public cloud to the customer's computer room, integrating the advantages of both the public cloud and the local IDC. It offers functions such as near-data processing and the retention of sensitive information. Users can enjoy out-of-the-box SaaS services that require no operation and maintenance, while benefiting from local latency and data security.

LinkedSight Algorithm Library

The library provides over 100 algorithm resources that are ready to use out of the box. These resources will continuously improve as vertical data accumulates during usage.

Recognition of Moisture Ratio in Breathing Apparatus

Recognition of Oil Level in Oil Level Window

Recognition of Reading from Lightning Arrester Discharge Counter

Current Meter Reading Recognition

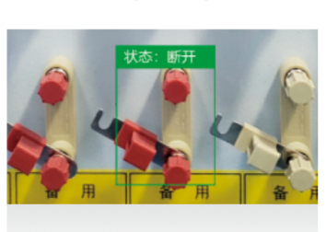
Oil Temperature Meter Reading Recognition

Digital Display Screen Reading Recognition

Oil Level Gauge Reading Recognition

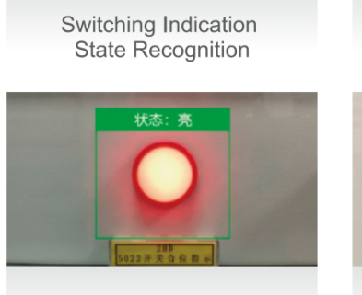
SF6 Pressure Gauge Reading Recognition

Switching Indication State Recognition

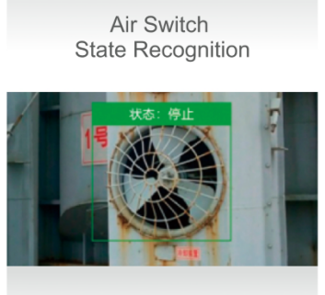

Pressure Plate State Recognition

Air Switch State Recognition

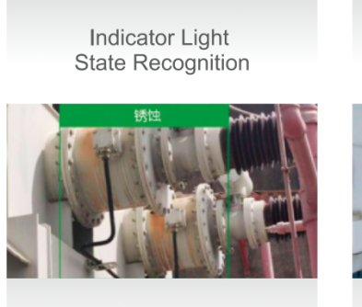
Isolation Switch State Recognition

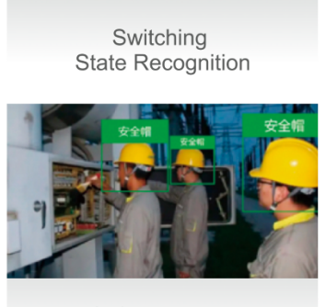

Indicator Light State Recognition

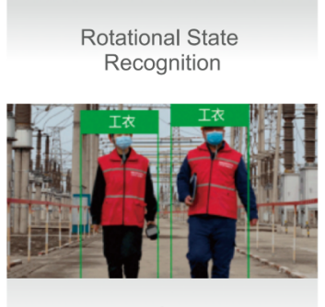
Switching State Recognition


Rotational State Recognition

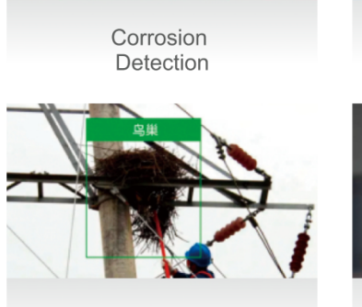
Indicator Switch State Recognition

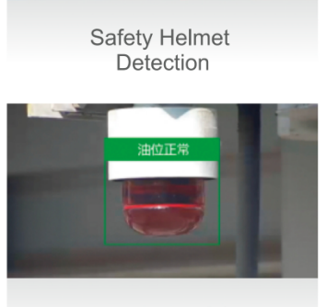

Corrosion Detection

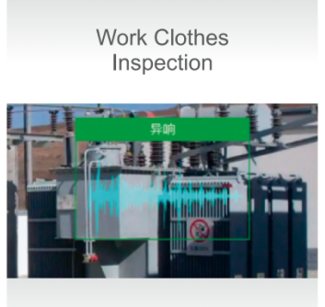

Safety Helmet Detection

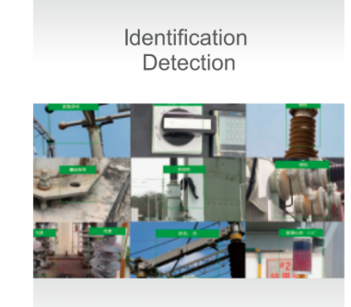

Work Clothes Inspection

Identification Detection


Nest Detection


Respirator Oil Level Detection


Abnormal Sound Detection


More Algorithms

Applications——Energy and Power Industry

Multi-Terminal Robot Patrol Inspection at a Substation in Guangxi

Pain points

- **Incomplete Coverage:** Various scenarios (multi-storey, ramp and etc.) in a substation, resulting in difficulties for one device offering a comprehensive inspections coverage for the whole.
- **Lack of Collaboration Among Devices:** Collaboration between terminal devices is difficult, resulting in an inability to achieve data intercommunication and task coordination among terminals.
- **Poorly-Integrated System:** The absences of unified hardware and communication interfaces, resulting in difficulties in achieving seamless integration between robots and other devices or systems.
- **Insufficient Application and Extension:** Lack of standardized sensors and automated analysis methods, resulting in difficulties in real-time data processing and in-depth data mining.

Deliverables

Quadruped robot, indoor and outdoor wheeled robots, drones, Lingxi Cloud Platform (Unified upstream system includes robot management and tasks scheduling system, data processing system and etc.) , electric doors (with rat - proof plates), indoor APs, etc.

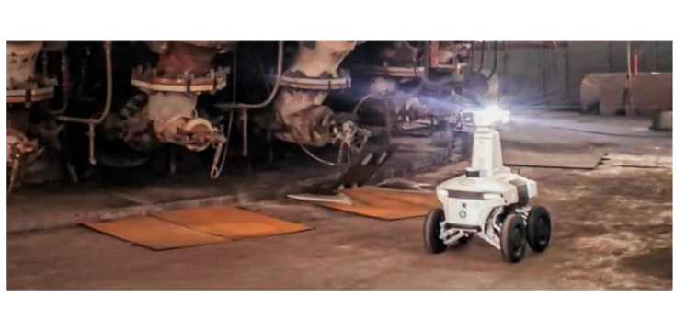
- The quadruped robots: Close-range inspection in the 220kV GIS room and fire water pump room, such as reading meter data and detecting equipment status.
- Drones: Equipment in high-altitude of substation, such as detecting appearance defects of transformers, insulators and other equipment.
- Outdoor wheeled robots: Production equipment, relay protection rooms and other areas.
- Indoor Wheeled Robots: Computer communication room and AC/DC distribution room in the main control building.

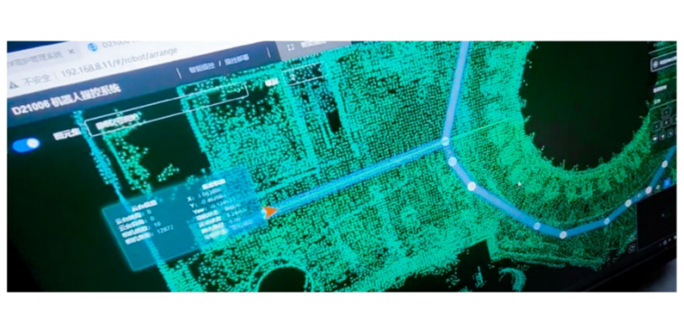
Project value

- Conduct full inspection, operation and maintenance on more than 7,000 inspection points in the station twice a day, reducing the number of manual inspections by over 95%.
- Provides a unified management system based on digital twin, enabling one-screen management for all the devices in the station.
- Integrates management and scheduling interfaces for various devices at the lower level, enabling cross-platform scheduling and management of different types of terminals.
- Provides a unified data connection interface at the upper level, enabling seamless access to the third-party management platforms and third-party data centers, etc.
- Integrates a variety of AI recognition algorithms for different meters and equipment. Additional installation and deployment are unnecessary. The system can directly recognize and record the data collected by different terminal devices, issue alarms for abnormal situations, improve the automation level of onsite management and reduce the dependence of human labor.

Applications——Mining Smelting Industry

Robot Automated Inspection Project in a Steel Plant in Guangxi





Pain points

- **Hazardous Working Environment:** Manual inspection is fraught with safety hazards including high temperatures, dust, and toxic gases, manual inspection is inefficient.
- **Incomplete Data Coverages:** Data collection is incomplete for traditional approaches. The absence of data such as sound and temperature results in inability for real-time equipment management.
- **Unstable Performance in Extreme Working Environment:** Conventional robots exhibit poor stability and a high failure rate in high-temperature environments and complex terrains. Frequent maintenance is required, leading to higher operational and maintenance costs as well as an increased risk of equipment downtime.

Deliverables

Outdoor wheeled robots, AXS management system, RCS main control system, charging room and its control system, cameras, and other servers.

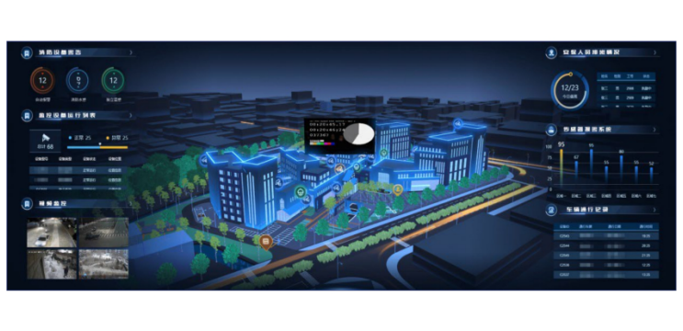
- Wheeled robots: Temperature detection and noise detection in the blast furnace and converter areas.

Project value

- The robots operate entirely autonomously without human intervention, achieving full-coverage inspections in any circumstances, significantly reducing safety risks.
- The robots can autonomously return to the charging room for charging, cooling, and dust cleaning, featuring high stability (failure maintenance ≤ 1 time per month).
- Monitor the trends of temperature and gases in real time, and issue timely warnings in case of abnormal situations, thereby enhancing the level of safety management.
- Ensured the completion of inspection tasks through advanced dynamic obstacle avoidance in complex terrains and optimal path planning.
- Delivers a user-friendly interface with an intuitive operating system, supports trend analysis of temperature and gas data, and generates automated visualized reports.

Applications——Park Management

Digital Platform Application at a Shanxi Park



Project Background

By integrating the data from various business systems in the park, including production, operation, safety, monitoring, and equipment management, and combining with 5D digital twin technology, a virtual digital twin park is created. This enables all-round state perception of the park and the construction of various intelligent applications for smart factories.
The main deliverable is a unified management system that integrates geographical location visualization, park environment visualization, equipment visualization, monitoring visualization, demonstration visualization, intelligent inspection, security management, energy consumption management, property management, and work safety, etc.

Pain Points

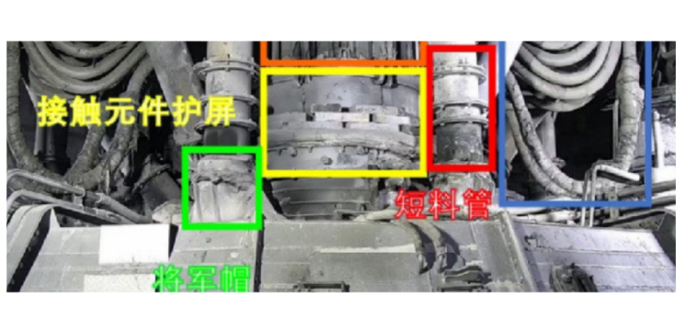
- **Poor IoT Sensor construction:** The lack of IoT sensor devices, resulting in difficulties to collect more real-time information about devices, personnel, etc.
- **Insufficient Scene Intelligence:** Traditional parks value infrastructure over intelligent construction, resulting in difficulties for transition to automated and smart production.
- **Weak Park Inspection and Maintenance Capabilities:** Traditional park management relies on human resources, resulting in low overall management efficiency.
- **Lack of Top-level Design in The Park:** Each subsystem in the park is independently constructed, resulting in data isolation between each subsystem.

Advantages of the Solution

- Create a "1+5+N" management mode to achieve "overall asset operation and maintenance and security awareness".
- Focus on one center to achieve overall control for the whole park: With Lingxi Cloud's 5D digital twin technology as the core, a park command center is established to keep track of the status and trends related to park equipment, facilities, personnel, vehicles, environment, energy consumption, and safety in real time, enabling overall planning and control.
- Manage five major needs to achieve comprehensive data understanding Relying on Lingxi Cloud's data base and AI base, data in all scenarios are interconnected, enabling accurate identification, thorough understanding, and in-depth insight. This empowers efficient and intelligent park management, achieving compliance, risk avoidance, efficiency improvement, and cost reduction.
- Equip with N terminals to achieve all-round perception and collection Using Lingxi Cloud's IoT base as the carrier, advanced devices such as inspection robots and drones serve as the vanguard. At the same time, various other types of sensors and execution devices are integrated to achieve full-coverage real-time data collection and decision-making control.

Applications——Hazardous Chemical Industry

Visualized Digital Management Application in a Smelting Plant in Xinjiang



Project Background

This project provides a solution for a unified digital management system for a smelting plant. The management system integrated personnel management, environmental monitoring, operation and maintenance management, and work safety. Our patrol inspection robot terminals are mainly applied in high-combustion and high-explosion areas such as pipeline and coke oven gas pressurization stations. Our robot is capable of providing stable performance in high-risk environments such as high temperature, high pressure, inflammability, explosiveness, heavy dust etc. , complete daily inspection tasks and data analysis, providing scientific support for personnel management, equipment management, and work safety.

Pain Points

- **Lack of Visualization:** Crucial visualization such as smelting process, equipment operation, man-machine interaction are missing, resulting in potential production incidents.
- **Poor Inspection Effect:** In traditional inspection methods, situations such as personnel dereliction of duty and missed equipment inspections often occur.
- **Difficulty in Data Analysis:** Difficult to analyze the data of personnel, equipment, and the production process. There is no scientific basis for rapid and accurate judgment.
- **Potential Risks in Work Safety:** There are significant safety hazards in the high-temperature and explosive areas, and there is an urgent need for eliminate these hazards.

Advantages of the Solution

- Full Lifecycle Equipment Management: An accurate and efficient inspection and operation and maintenance system is established, effectively avoiding the situation of missed inspection points and therefore improving the work efficiency. It also avoids the operation risks of maintenance personnel and improves the level of production safety.
- AI Precision Recognition: Images are classified and stored in real time, which is convenient for the query, statistics, tracing, and judgment of production problems. Inspection reports or statements are automatically generated, saving 90% of the data processing cost and increasing work efficiency by 10 times.
- Predictive Alarming: Through the analysis of inspection data, the operation trend of each inspection point can be presented, improving the prediction of equipment failures, preventing potential equipment hazards, and realizing early detection, early prevention, and early maintenance.
- Labor Saving: The system can replace manual labor to complete equipment inspection work, reducing the work intensity of on-duty personnel, the input of operation and maintenance personnel and the labor cost.