

# Cleaning Scenario Solutions Industrial



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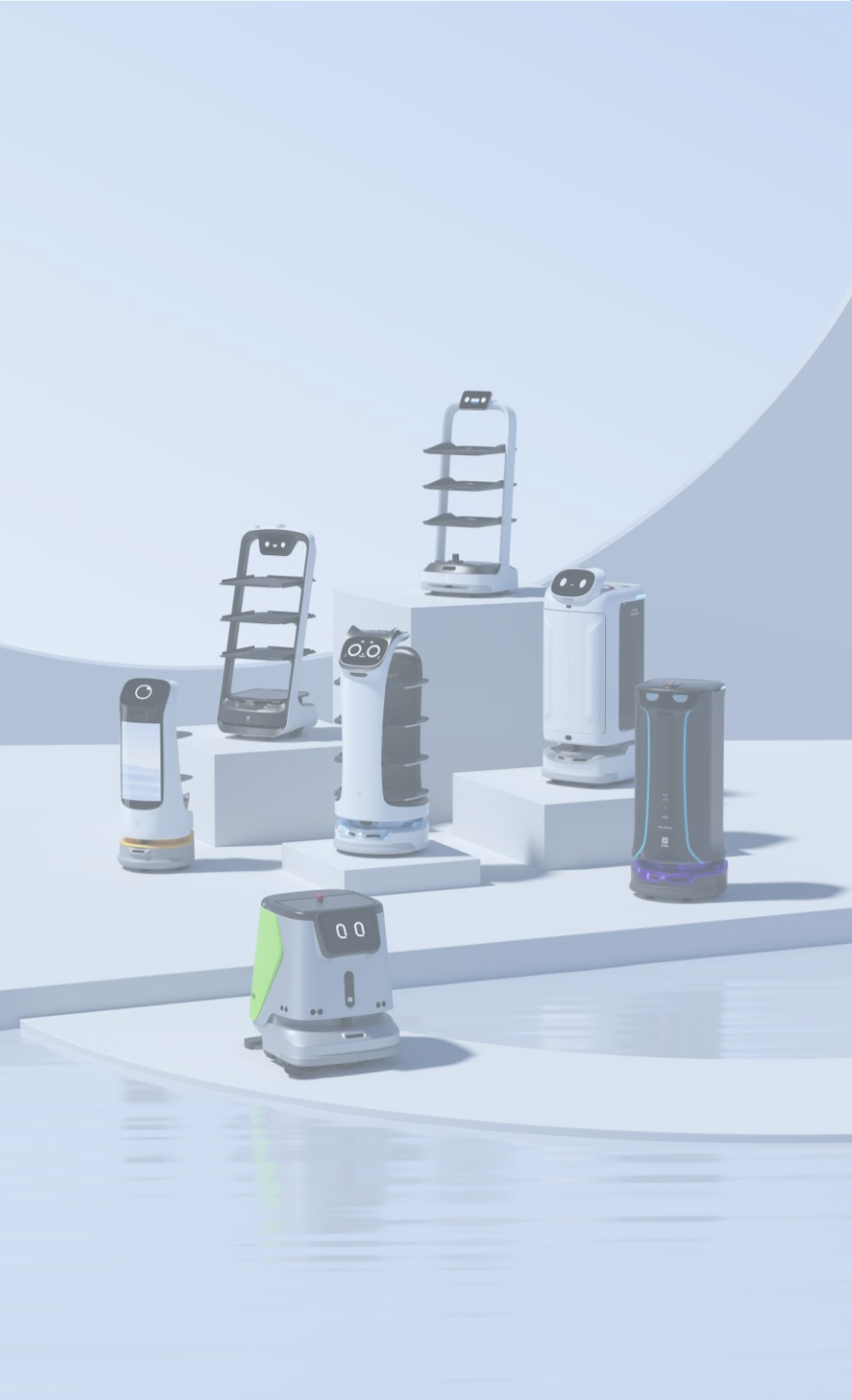
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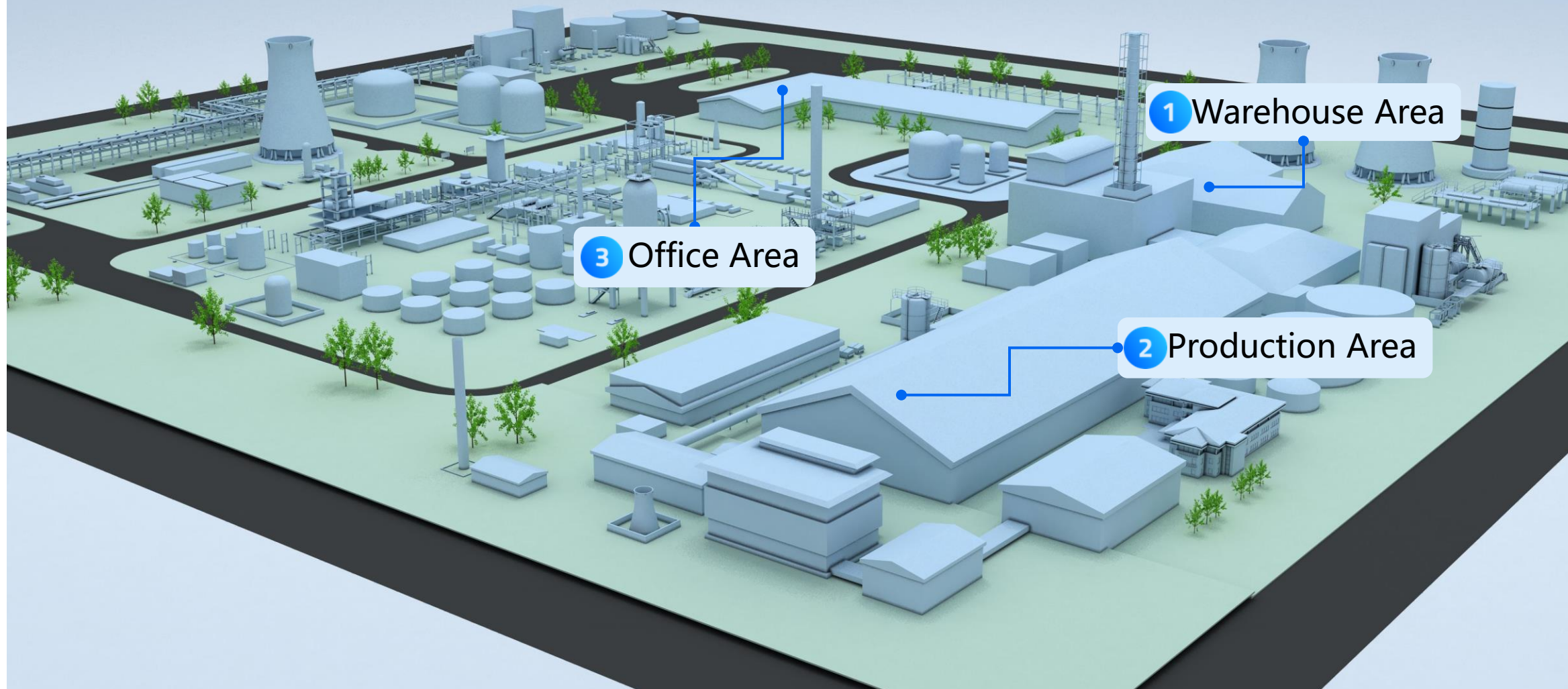


# 01

## Cleaning Pain Points

# Industrial Layout

3 main functional areas: Warehouse Area, Production Area, Office Area



# Cleaning Challenges

## 4 main cleaning challenges: Labor Shortage, Large Area, Difficult Cleaning, High Costs

**Factory cleaning** involves handling production dirt, hazardous materials and chemicals. Cleaning must be done during downtime, affecting product quality and employee health.

**Solutions require:** professional equipment, strict safety measures, regular schedules, and investment.



### Labor Shortage

According to the United Nations World Population Prospects 2022, the share of the global population aged 65 and over is expected to grow from 10% in 2022 to 16% in 2050. Most of today's cleaners are older employees, making it difficult to recruit young people for the job.



### Large Area

Inside the factory there are different specifications of the building structure, covers an area of usually tens of thousands of square feet, in order to meet the requirements of the degree of cleanliness in the factory, many factories need to be cleaned by multiple shifts, to achieve 7 \* 24 hours standby, the labor intensity is huge.



### Difficult Cleaning

In the factory workshop, there are many people and machines mixed line operation and some specific workshops, need to stop the line to clean, but the operating time is short with low efficiency, the dust and stains are deposited on the ground penetration, it is difficult to clean and affect the efficiency of the factory production.



### High Costs

For factories, in addition to the need to pay the night shift cleaner more labor costs, the purchase of different cleaning equipment (such as scrubbers, sweepers, carpet cleaners, industrial vacuum cleaners, etc.) to achieve good cleaning results also increases the acquisition and maintenance costs of the equipment.

# Pudu Intelligent Cleaning Solution

24/7 cleaning, providing a stable operational environment, ensuring product quality, and improving production efficiency.



CC1



Cleaner



Cleaner + Cleaning Equipment

## Cleaning Scenarios

## Scenario Characteristics

## Recommended Robots

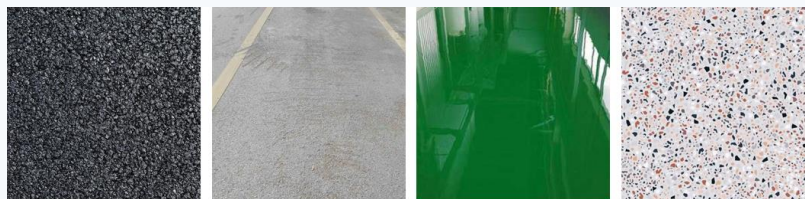
## Cleaning Advantages

Warehouse Area

Production Area

Office Area

### Floor Material



沥青路面

水泥路面

环氧地坪

水磨石

### Type of Waste



油污地面

尘土

垃圾

烟头



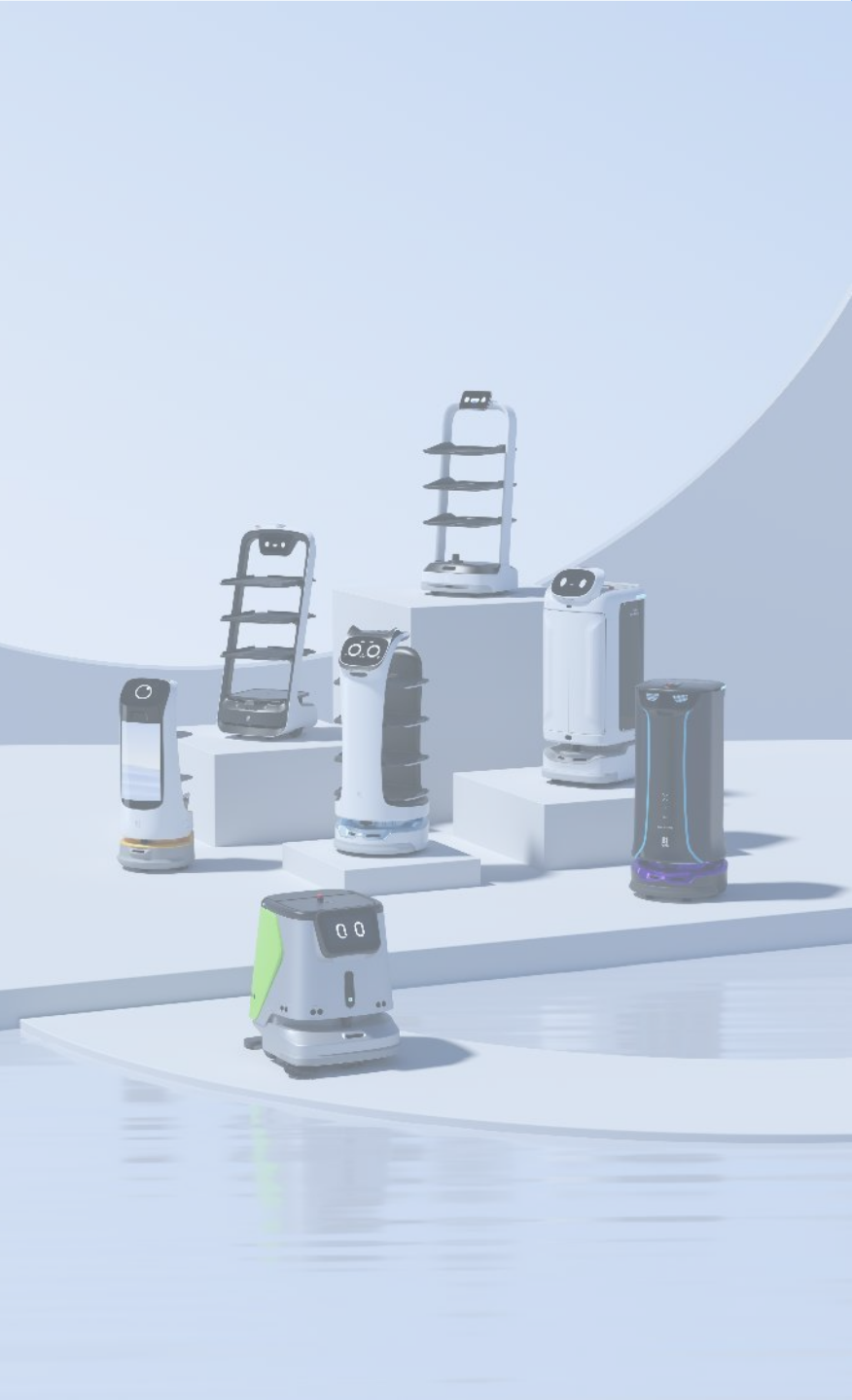
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PUDU CC1

- Night shift assistance to handle nighttime cleaning needs;
- Reduces the burden on cleaners, allowing more focus on equipment;
- Professional removal of stubborn stains;
- Integrated sweeping, vacuuming, mopping, and pushing reduces equipment costs.





02

# Product Introduction

# Product Positioning

## PUDU CC1

### Clean & Clever, 4-in-1

- Pudu Technology's first commercial cleaning robot in the cleaning field, which can wash, sweep, push and suction in one!
- Sweep-vacuum-push, sweep-push, carpet-vacuum, scrub four cleaning operation modes
- Optional all-round base station (fixed, or deployment-free (equipped with mobile water tank)), or charging pile, the real 24h round-the-clock automatic operation, free of manpower, unattended
- PC and mobile cleaning digital software, support multi-machine cloud management, mobile app remote control, cleaning data at a glance, help enterprises to move towards the cleaning digital era.
- With manual and automatic cleaning mode selection, arbitrary switching, to meet the needs of different occasions.
- When the CC1 battery is low, 30s quick replacement of the spare battery, no need to wait for charging, and immediately perform the remaining tasks after the replacement, which greatly improves the efficiency of the use of CC1 and guarantees the timeliness of cleaning.

  
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# Key Components

## CC1 Key Components



# Specification

## CC1 Spec



|                           |   |                            |   |
|---------------------------|---|----------------------------|---|
| <b>Size</b>               | 629 (L) * 552 (W) * 695 (H) mm  | <b>Weight</b>              | 75Kg (with Battery)                         |
| <b>Battery</b>            | 24V 50Ah  | <b>Charging Time</b>       | < 3.5h                                      |
| <b>Duration time</b>      | 5h (Scrubbing) ; 5h (3 Sweeping) ; 4h(Carpet vacuuming); 9h (Mopping)   | <b>Protection</b>          | IPX4  |
| <b>Speed</b>              | 1.2m/s  | <b>Pass ability</b>        | 70cm  |
| <b>Max climb angle</b>    | 8°  | <b>Max obstacle height</b> | 20mm  |
| <b>Max gap width</b>      | 35mm  | <b>Running noise</b>       | < 70dB                                      |
| <b>Cleaning path</b>      | 500mm (with brush)  | <b>Cleaning efficiency</b> | 700-1000m²/h                                |
| <b>Tank capacity</b>      | Clean water tank 15L<br>Sewage tank 15L   | <b>Dust box capacity</b>   | 2.5L  |
| <b>Screen</b>             | 10.1Inch touch screen   | <b>Operating mode</b>      | Manual, Automatic                           |
| <b>Automatic recharge</b> | Support(Charging pile required)   | <b>Self-drainage</b>       | Support(station required)                   |
| <b>Temperature</b>        | 1 ~ 40℃   | <b>Interaction</b>         | Supports announcements and voice broadcasts |
| <b>Sensor</b>             | Lidar, ultrasonic sensor, depth camera, RGB camera, infrared camera, electronic anti-collision strip, magnetic induction sensor, etc. |                            |   |
| <b>Applicable surface</b> | Hard floor: marble, tile, terrazzo, PCV, epoxy resin, etc.<br>Soft floor: short wool carpet   |                            |   |

# Key Function

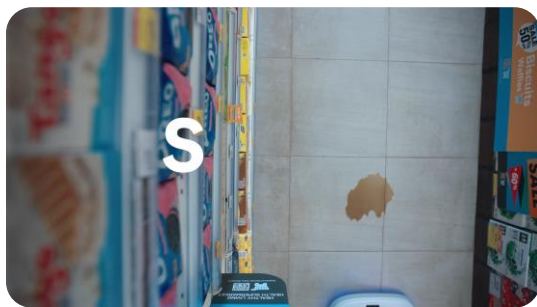
## Modular design, Ditching the single-cleaning mode to upgrade to a 4-in-1 all-in-one cleaning monster for process cleaning

It combines the functions of sweeping, washing, vacuuming and dusting in one, and the cleaning components are modular in design. Unlike traditional cleaning robots that clean in a single pass, CC1 understands the cleaning process in different scenarios, upgrading from a single cleaning mode to a process-oriented cleaning.

### 01 Scrubbing

Real-time living water to moisten the ground, high speed roller brush instantly peel off the stains, the last suction party to achieve timely recovery of ground sewage without residue

#### Hard floor wet cleaning

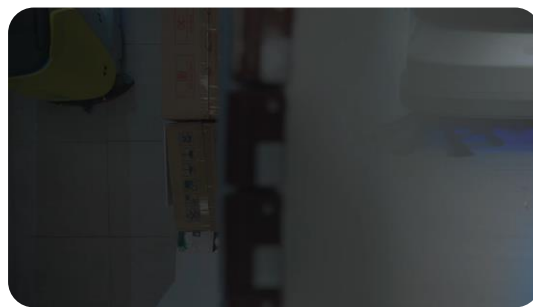


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### 02 Sweeping

Sweep-vacuum-push mode, with the help of the dust-push party specially designed for hard floor vacuuming, to achieve the front sweeping (rubbish), the middle suction (dust), and finally mopping.

#### Dry cleaning of hard floors



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### 03 Vacuuming

Carpet vacuuming mode with separate front and rear sweeping design ensures suction power is strong enough to achieve commercial grade carpet cleaning results

#### Dry cleaning of carpeted floors



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### 04 Dust Mopping

Sweep and push mode, suitable for the quiet or daytime floor cleaning requirements of the hard floor scenes, off the hard floor vacuuming mode

#### Dry cleaning of hard floors (silent)



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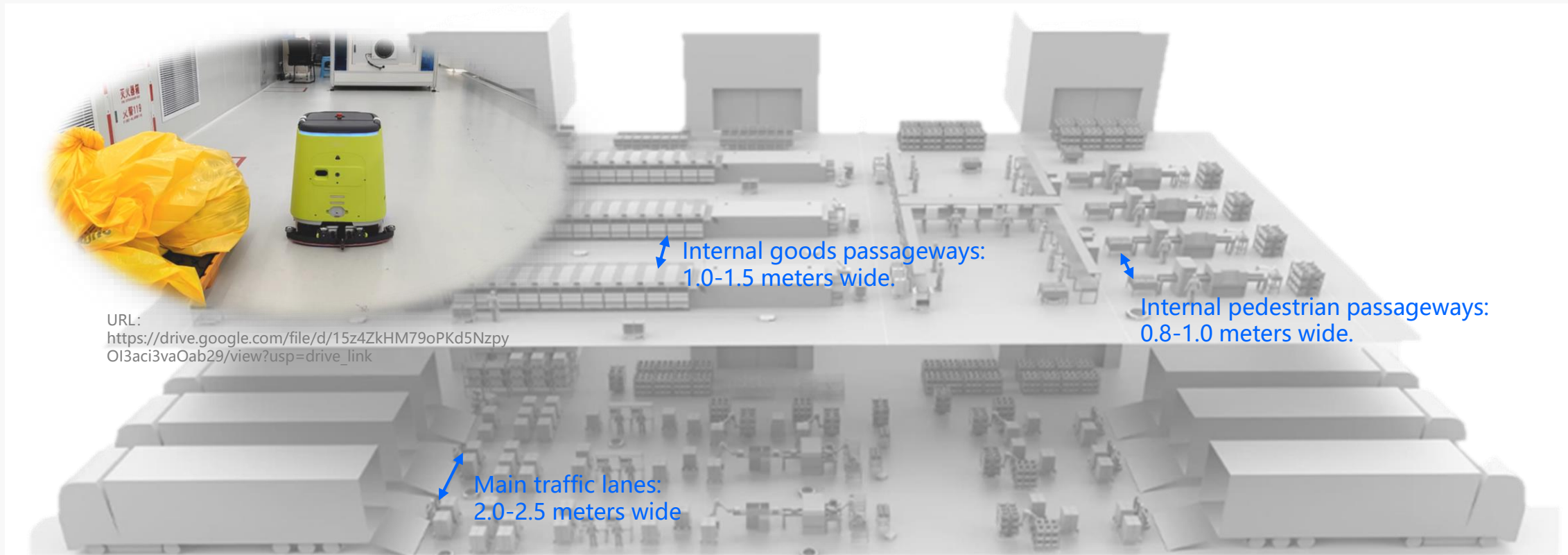
# Product Advantages:

70cm passability, 88cm turning radius, suitable for various factory passageways

Main Lanes: 2.0-2.5m (for logistics trucks)

Goods Lanes: 1.0-1.5m (for material transfer)

Pedestrian Lanes: 0.8-1.0m (for office and production lines)



# Product Advantages:

## Dynamic Environment Navigation Enhancement System – Designed for **Dynamic High-Traffic Areas With Human-Robot Coexistence**.

Specifically designed for dynamic high-traffic areas like warehouses and production workshops.

Solves navigation and positioning issues caused by environmental changes (e.g., shelf movement, temporary placement of goods).

### SLAM 2.0

Enhanced Positioning System: Maintains high stability in dynamic scenarios.

Automatic Map Updates: Robots update maps in real-time to adapt to current environmental changes.

### Perception 2.0

Multi-Sensor Fusion: Integrates RGBD, LiDAR, and ultrasonic sensors to enhance detection of suspended obstacles.

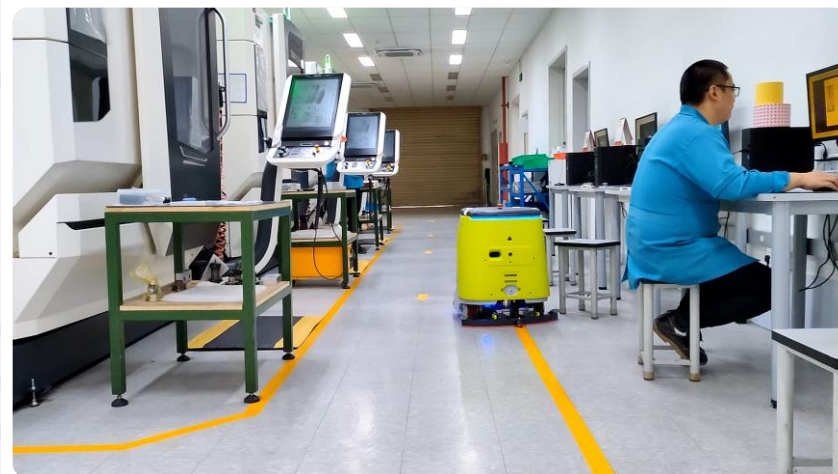
Operational Safety: Ensures safer operation in environments with suspended obstacles.

### Online Coverage 2.0

Real-Time Path Generation: Adapts to dynamic environmental changes to generate reasonable paths.

Full Scene Cleaning Coverage: Adapts to various scene changes, avoiding prolonged blockages.

### Dynamic Adaptive Cleaning for Areas with Movable Obstacles



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# Product Advantage

## Customized Teach-In Paths: Individualized Cleaning for Complex Scenarios

Provide four modes of "0-adjacent, conservative-adjacent, normal cleaning path, and non-cleaning movement path", which can be selected or modified as needed when deploying, And it can be used in sequence/combination according to the cleaning task requirements in actual scenarios to meet the CC1's cleaning and passage in complex sites, narrow passages, edges, corners, and irregular areas

### 0 Adjacent Teaching Path

For regular wall edges, the robot can get as close as possible to the edge of the wall for zero-edge cleaning.



### Conservative Lateral Demonstration Path

Suitable for edges of glass-fronted walls, black walls, reflective metal walls, etc., for safety purposes



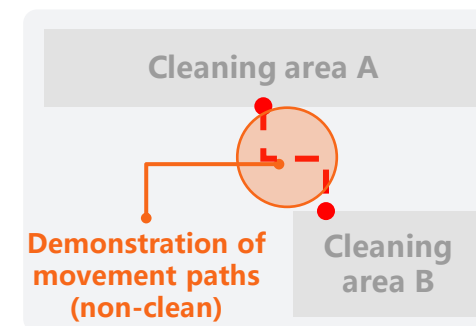
### General Cleaning Teaching Path

The robot does not actively approach the edge, but only sweeps along the taught route.



### Non-clean Movement Paths

Specifies the robot's trajectory when travelling from area A to area B and does not need to be cleaned while moving.



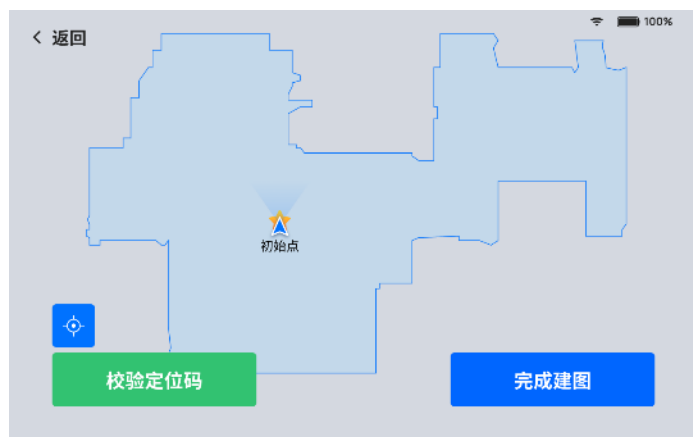


# Product Advantage

PC building tool: **The fastest way to build 30,000 square meters of scene in 25 min**

Relying on PUDU's industry-leading LiDAR push map technology, combining the machine propriety map building tool with the PC-side large map assisting map building tool. It can support up to 30,000 square meters of map resume, making it easier, less time-consuming, faster, less lagging and more stable to build large maps, and improving the efficiency of map building by 50%.

## Implementation of the map : 20min



## Optimization of maps: 2min



## Map generation: 3min

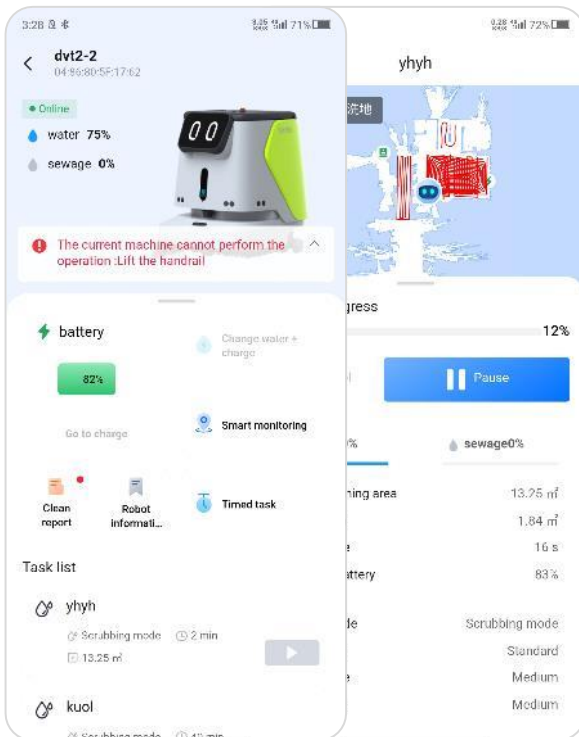


\*Test data in an open field

# Product Advantage

## Timed automatic cleaning tasks - for truly unattended cleaning

Automated timed task editing can be realized through the software that comes with the body, including cleaning area, cleaning area, cleaning time, cleaning mode, cycle cleaning frequency, cleaning duration and so on . In the process of task execution, in case of water and electricity shortage, it can be recharged at the breakpoint through the preset workstation, mobile water station, charging pile, etc. to ensure the smooth completion of the work.

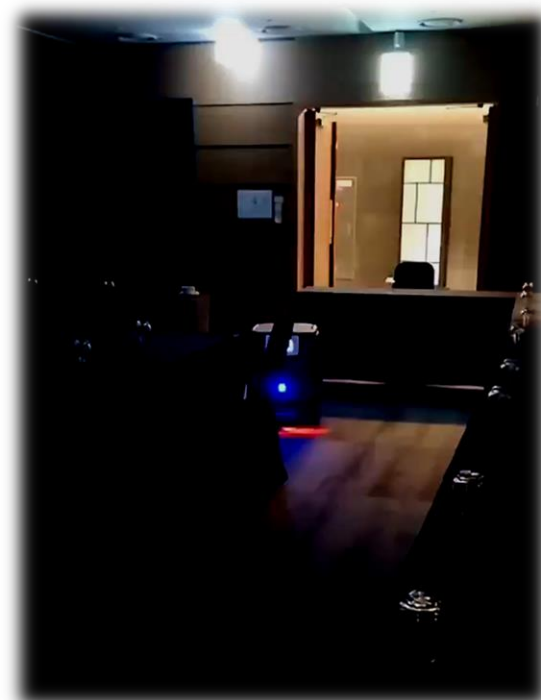


### Remote Cleaning

During busy cleaning hours, if there is an unexpected need for floor cleaning, the robot can be called remotely via PUDULINK to travel to the designated area to carry out the cleaning task, and the cleaning status can be monitored in real time.

### Night Cleaning

During non-business hours, the robot travels to the designated area for cleaning according to pre-set timed tasks, which reduces the cost of cleaning during non-business hours, increases the frequency of cleaning, and guarantees the quality of cleaning.

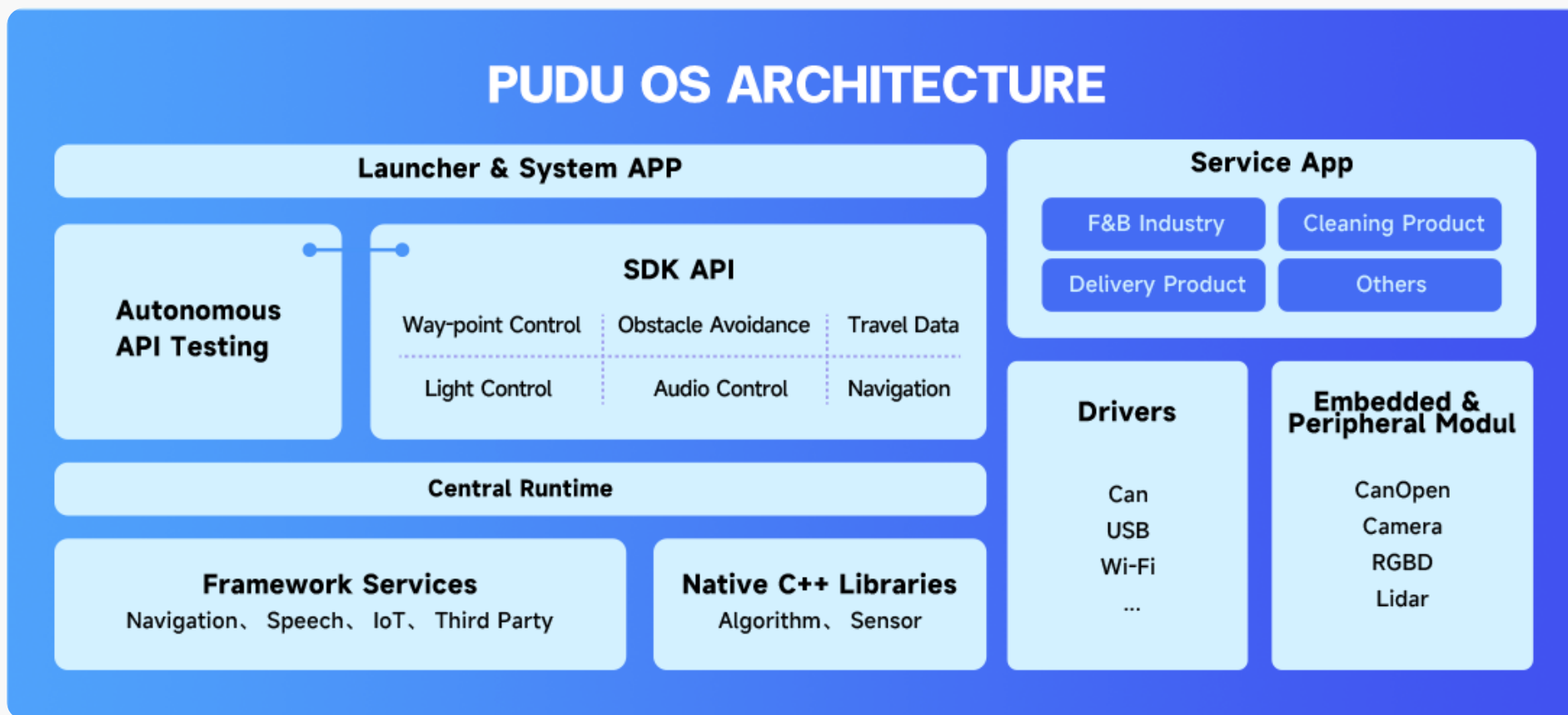


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# Product Advantage

## PUDU OS: Openness of a single system function

It supports the robot's underlying API interfaces for point-to-point movement, path cruising, customized UI, etc., which can meet the needs of robot developers for secondary in-depth development.



# Product Advantage

## Open API: CC1 mission-level openness and data privacy management

Supporting the call to the PUDU cloud platform API interface/access to the private API interface through private local deployment .

Opening up the third-party digital management system, Improve customer's robot management efficiency and usage efficiency under the protection of cleaning data privacy, accelerate the cleaning digitalization of enterprises.

### Connectable data and services

Task API

Workstation API

Map API

Motion State API

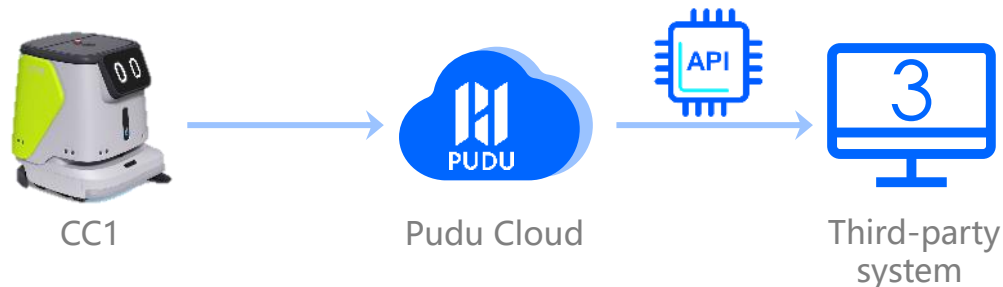
Cleaning Data API

Early Warning API

... ..

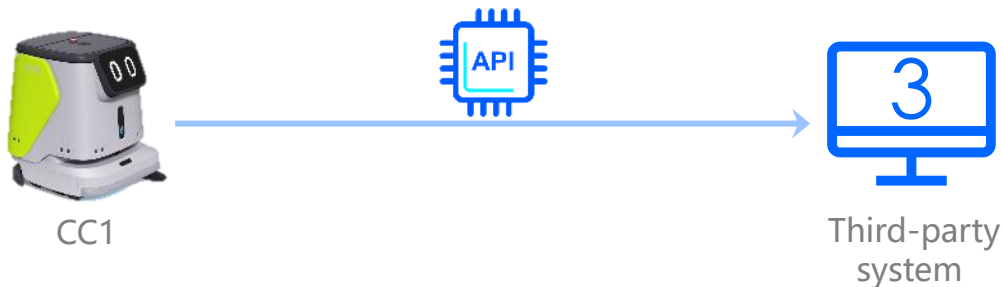
### PUDU Cloud API

Robot data is connected to the customer's system via the PUDU Cloud, which supports the use of value-added services such as PUDULINK and merchant management platforms.



### Local API

Data is only transferred between the customer's system and the machine itself for greater privacy protection.



# Product Advantage

## IoT - Fully automated cleaning requirements across regions

When it is necessary to clean across areas, it can automatically enter the target area through the gate/use the lift to quickly reach the designated floor . After the cleaning is completed, the robot can return to the original area through the gate again to achieve efficient cleaning operations. This cleaning method not only improves work efficiency, but also reduces the risk of cross-infection during the cleaning process.

### Automatic Ride Lift

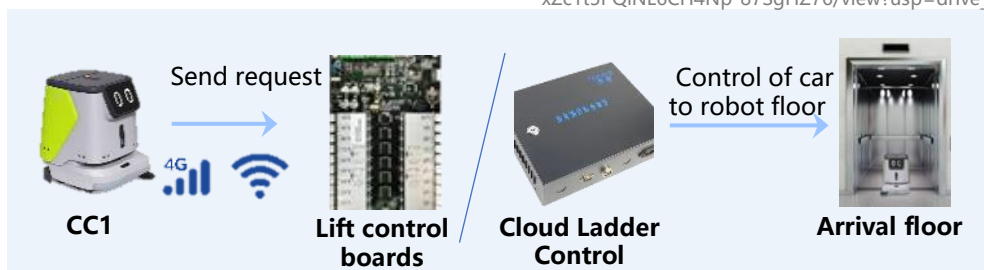
Robot automatically rides the ladder for cross-floor cleaning:

Method 1: Installation of ladder control hardware IOT module

Method 2: Cloud ladder control, through the cloud interface protocol, to achieve automatic ladder ride

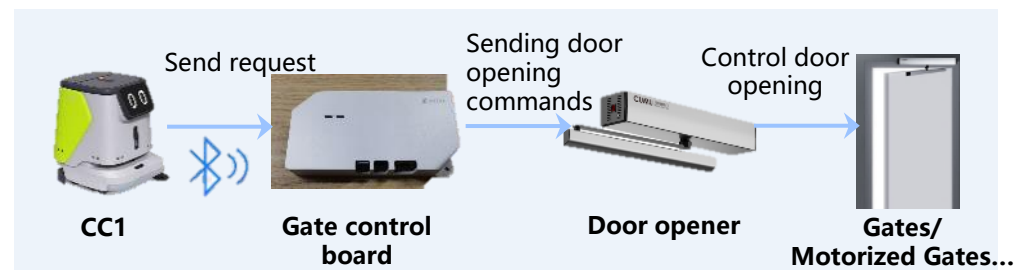


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### Automatic passage through gates

Supports robots to automatically pass through gates, motorized doors, roller shutters, etc. within the scene.



# Product Advantage

## Peripheral Docking-Expansion of Multiple Scenario-based Uses

Users can support the connection of various peripheral devices, such as pop-up lights, cameras, nebulizers, scent machines, etc. through the power supply port provided by the robot to achieve more functional applications. This design makes the robot more flexible and versatile, able to adapt to a variety of working environments and task requirements, and improves the diversity and practicality of its applications.

1

### Flashing Light • optional

Provide full amount of sound and light interaction system for the robot, CC1 pop-up light & buzzer/audio will be activated when in motion, to serve as a reminder to avoid collision with people.

Enhance CC1's role as a reminder in the scene to avoid pedestrians colliding into the robot and improve safety

2

### Camera • self-buy

Provides mounting kits and power supply interfaces for customer-owned camera equipment, supporting camera mounting above the CC1 for environmental monitoring and recording.

Support the realization of remote monitoring in the environment, driving record function, to meet the customer's safety monitoring needs, unexpected situation of damage determination and responsibility.



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# Product Advantage

## E-Management

### Clean Management Platform (PC)

#### 01 Digital Cleaning Dashboard with BI View

Real-time digital presentation of cleaning processes and results; efficiency statistics, detailed energy consumption, information, and cleaning reports

#### 02 Multi-Robot Online Management

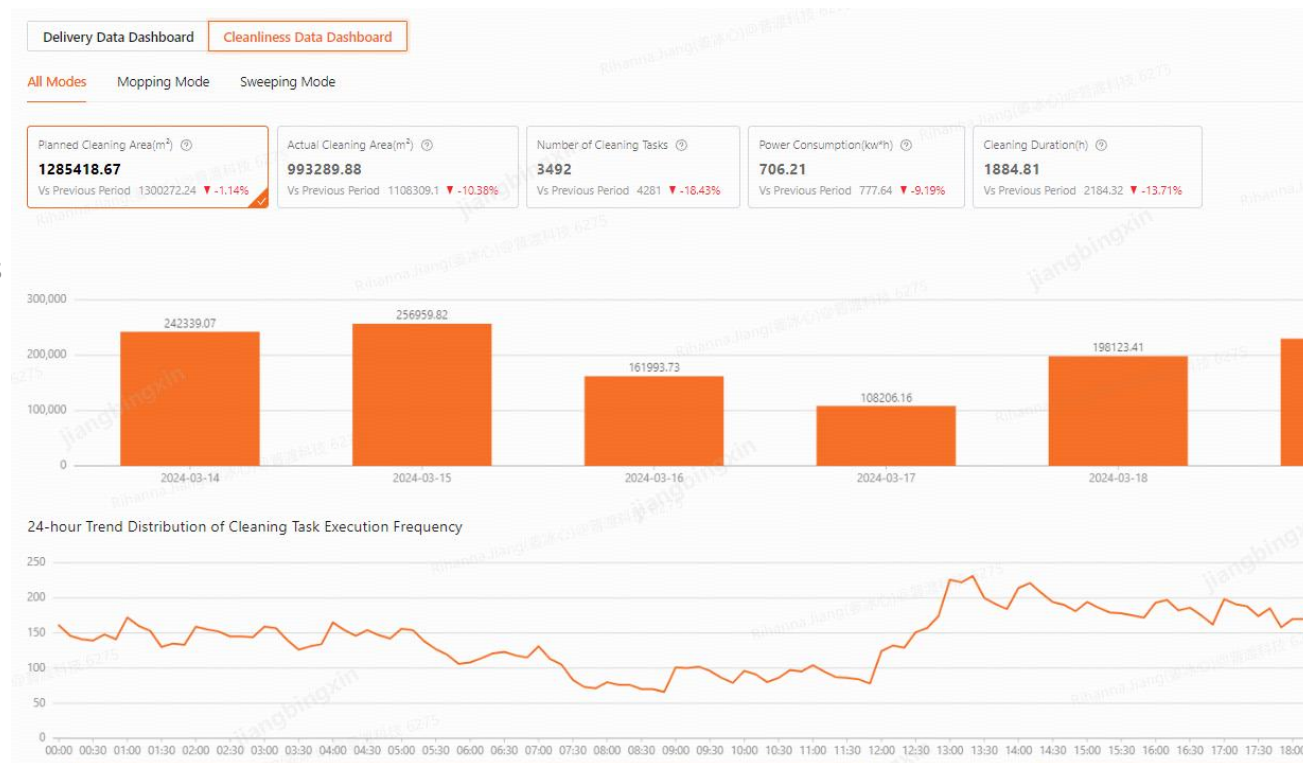
Statistics on robot task execution and peak workload periods

#### 03 Fault Information Collection/Statistical Analysis

An intelligent cloud-based system that supports remote notification to maintenance personnel for obtaining robot status and location during machine failures or maintenance, ensuring timely intervention

#### 04 Export of Comprehensive Cleaning Data

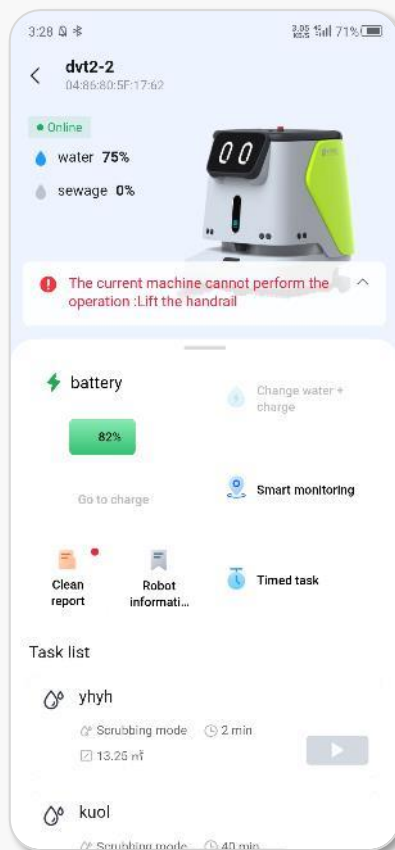
Facilitates in-depth analysis for operational managers, enabling continuous optimization of business processes based on evidence, aiming for the best and most efficient mode



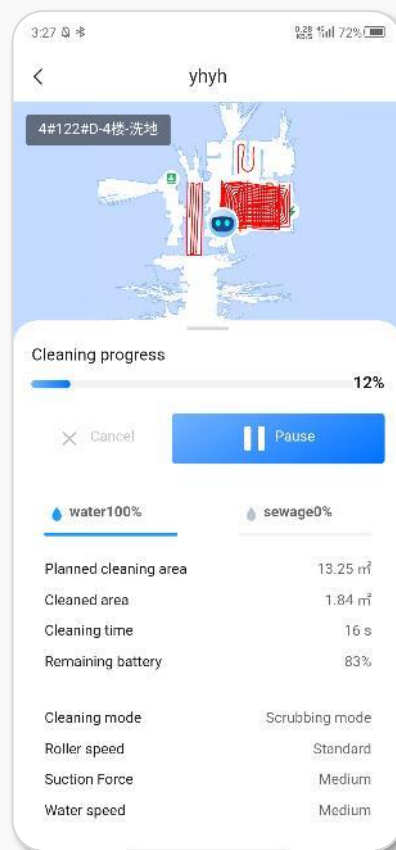
# Product Advantage

## E-Management: Clean Management Platform (APP)

### 01 Remote task management



### 02 Remote task status monitoring



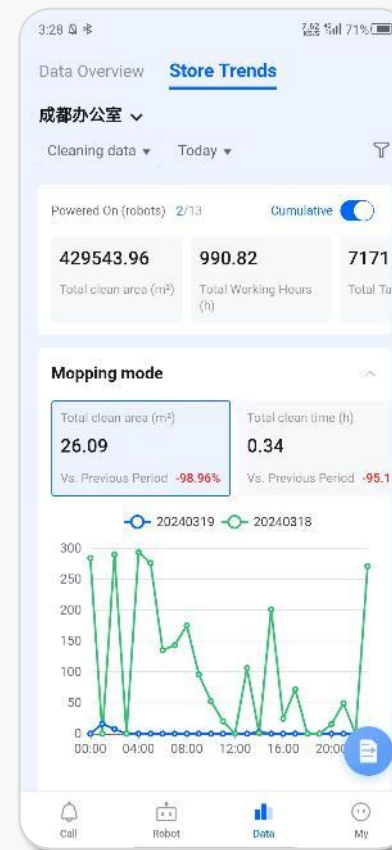
### 03 Monitor the status of robot in real time

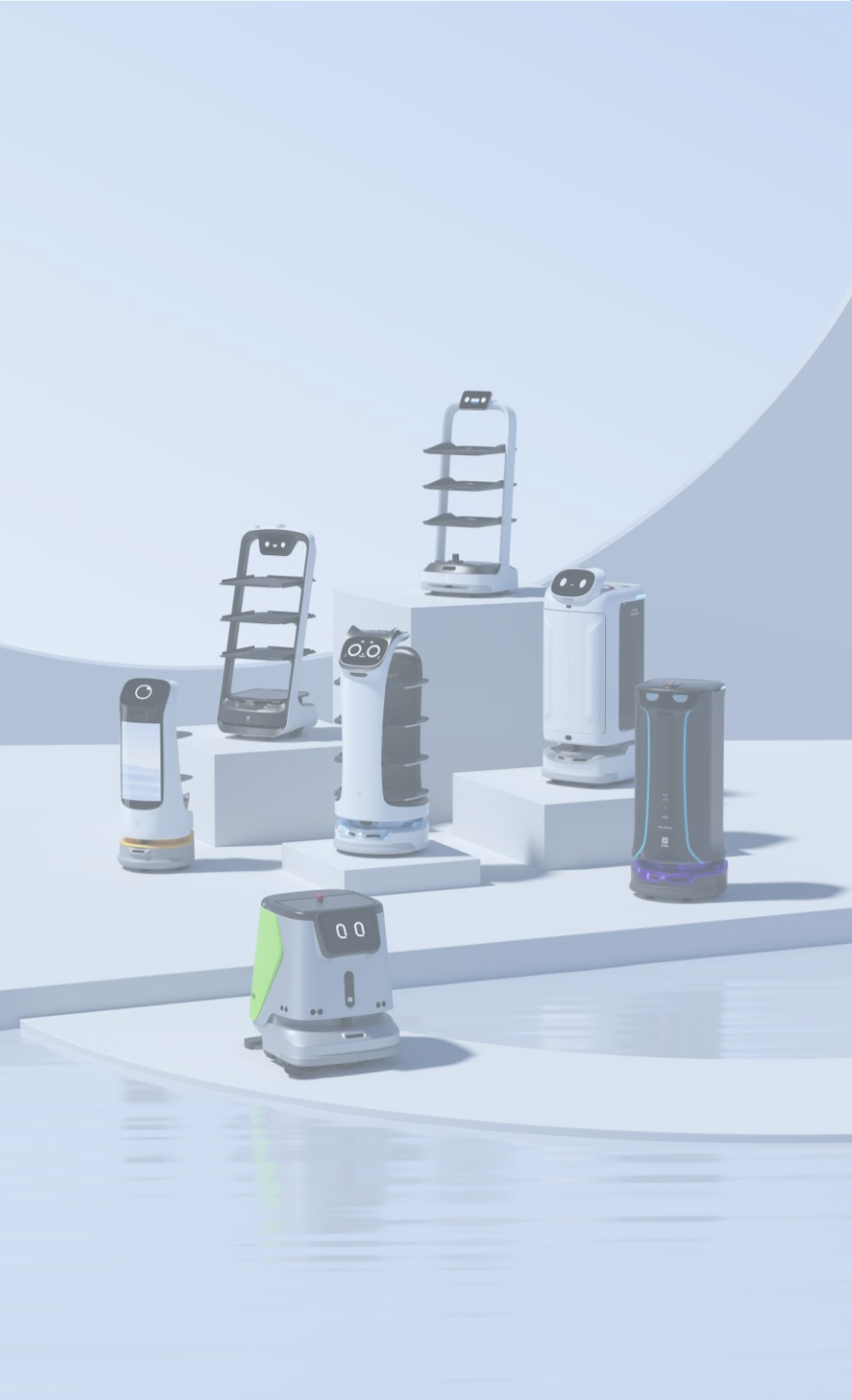


### 04 Fault alarm notification



### 05 Multi-dimensional clean datagrams





# 03 Cleaning Solutions

# Applicable to multiple factory settings

Designed for common factory floor materials such as tiles, concrete, asphalt, epoxy floors, and terrazzo.

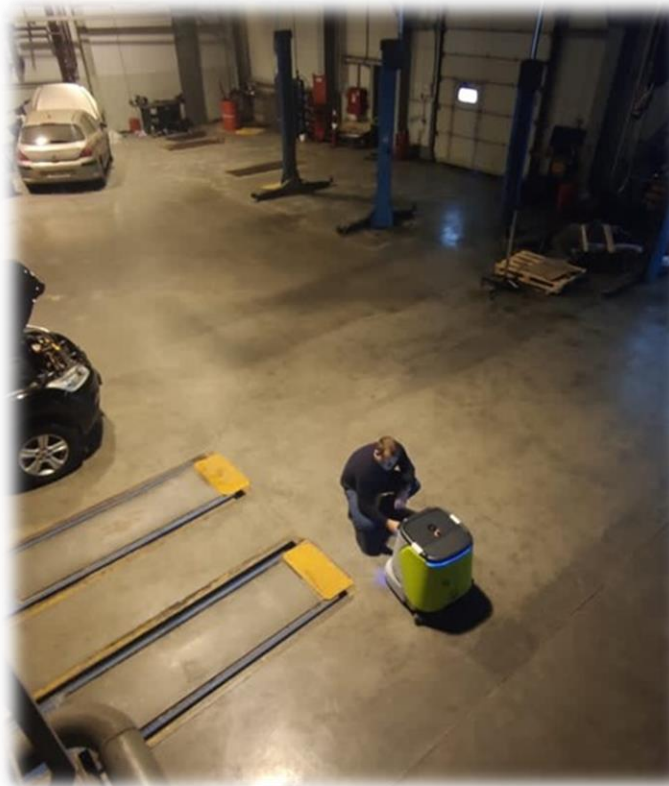
## Warehouse Areas:

Suitable for large areas with dynamic obstacles.



## Production Areas:

Effective in handling oil, dust, and other residues.



## Office Areas:

Maintaining cleanliness in common spaces and corridors.





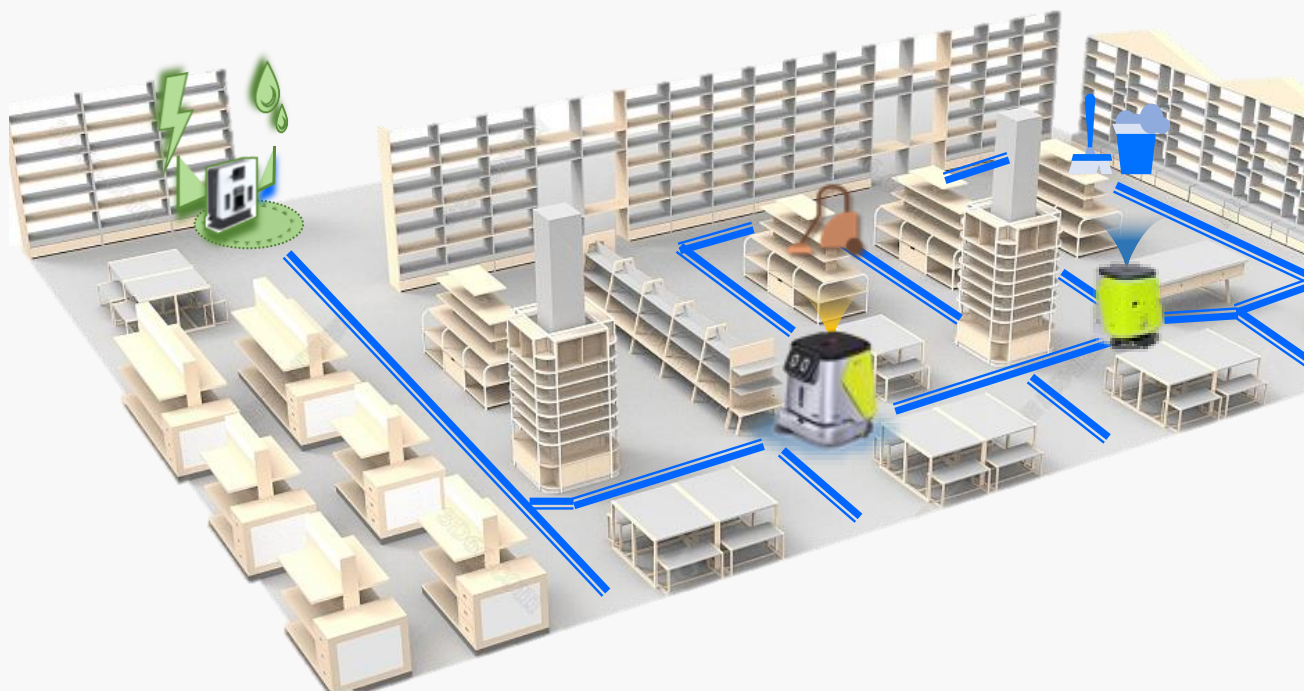
# 7\*24h Unattended cleaning solution

IoT + Pudu Cloud Platform+ Pudulink Soft and hard integration ecology to achieve true unattended

CC1 automated task scheduling can be set up via Pudulink or Pudu Cloud platform,

In the process of task execution, breakpoint recharge can be achieved through workstations, mobile water stations, charging piles, etc.,

IoT technology makes it no longer difficult for CC1 to walk freely through different areas, and it can go where it wants to sweep.



## Pudulink & Pudu Cloud platform

Automated task scheduling & remote management



## Gate connection

Interzone cleaning



## Mobile water Station & Charging pile

Automatic drainage, electricity



No water modification required

## Workstation





Automatic drainage, electricity



# Quick battery swap, supporting 24h\*365 days long-term endurance

## CC1 + Workstation + Charging Pile + Quick Battery Swap + Mobile Water Station

Therefore, adopting the CC1 + Workstation (Mobile Water Station) + Quick Battery Swap plan can achieve 24-hour full-mode endurance for CC1, meeting the demand for 24-hour full-mode cleaning in some factories.

| Endurance Combination Plan   | Combination Diagram  | Maximum Electric Endurance Time (h) | Maximum Water Endurance Time (h) | 24-Hour Multi-Mode Endurance Time (h)                               |
|--|--|-------------------------------------|----------------------------------|---|
| CC1 + Quick Battery Swap   |     | 24                                  | 5                                | Floor Cleaning: 5; Sweeping: 24<br>Dust Pushing: 24; Vacuuming: 24  |
| CC1 + Charging Pile  |    | 18                                  | 5                                | Floor Cleaning: 5; Sweeping: 15<br>Dust Pushing: 18; Vacuuming: 14  |
| CC1 + Workstation<br>IF waterway modification is inconvenient, choose Workstation + Mobile Water Station |   | 18                                  | 24                               | Floor Cleaning: 15; Sweeping: 15<br>Dust Pushing: 18; Vacuuming: 14 |
| CC1 + Workstation + Quick Battery Swap<br>inconvenient, choose Workstation + Mobile Water Station        |  | 24                                  | 24                               | Floor Cleaning: 24; Sweeping: 24<br>Dust Pushing: 24; Vacuuming: 24 |



# Warehouse Cleaning

Unloading, Packing, and Shipping Areas –  
**Large Spaces with Dynamic Obstacles Requiring Flexible and Frequent Cleaning**

**Large areas**



**significant dust and debris**

**Complex environments**  
due to workers, forklifts, and AGVs

**Elevated racks**

**Diverse floor materials**  
mainly concrete and epoxy

**Diverse Accessories Meet the Cleaning Needs of Warehouse and Logistics Environments**

| Sweeping Mode   | Scrubbing Mode  |
|---|---|
| <br>Extended Side Brush (Optional) | <br>Hard Floor Scrubbing Roller Brush (Optional) |
| Extended 13cm: longer than standard.<br>Side Brush: designed to reach and clean edges and corners effectively.        | 15kg Scrubbing Pressure with Adjustable Water Flow for Enhanced Durability and Stain Removal on Concrete and Epoxy Floors           |

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# Warehouse Cleaning

## Warehouse Workers, Forklifts, AGVs, and AMRs Transport Goods in the Warehouse

Ensuring Occupational Safety and Protecting Stored Materials are Crucial.

In warehouses, goods are transported by workers, forklifts, AGVs, and AMRs. This constant movement stirs up dust and causes tire marks on the floor. Regular vacuuming and scrubbing are essential to maintain safety, cleanliness, and to protect stored materials from dust accumulation.



**Recommended Cleaning Mode: Sweeping** • Prevents dust from becoming airborne and settling. Stops dirt from being carried into the workshop with goods.

**Cleaning Components:**  
Extended Side Brush

Before Cleaning: The floor is covered with a lot of dust and debris.

After Cleaning: Dust, accumulated dirt, and footprints are thoroughly cleaned.

**Recommended Cleaning Mode: Scrubbing** • Removes tire marks from the floor. • Enhances overall hygiene and appearance.

**Cleaning Components:**  
Hard Floor Scrubbing Roller Brush  
Special Cleaning Detergent

Before Cleaning: Dust and tire marks on the floor.

After Cleaning: New tire marks are removed, and old tire marks gradually fade after multiple cleanings.



# Production Area Cleaning

Manufacturing Workshop -Timely cleaning of oil spills on the floor;  
Prevention of slips and falls; Enhancement of operational safety

Typically requires the removal of various types of debris, including but not limited to:

Dust,Litter,Oil spills,Stains,Chemical residues,General waste and refuse,Complete removal of all debris and stains from the floor is necessary.

Special attention is required for oil spills and chemical residues, which need specialized cleaning methods and tools to ensure a safe and hygienic working environment.



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# Production Area Cleaning

## Polishing Workshop - 24/7 Dust Removal & Floor Scrubbing for Effective Dust Control and Reduced Air Pollution

During polishing and grinding, large amounts of dust from workpiece materials, grinding wheels, fibers, and paint are produced. If not handled properly, this dust can easily enter the workers' respiratory systems, leading to occupational diseases. It can also impact workshop equipment, especially metal dust, which can cause electrical short circuits or even explosions.



# Production Area Cleaning

## Cleanroom - Strict Cleaning Requirements

Cleanroom floor cleaning requirements include dust prevention, anti-static flooring, regular cleaning, dust removal before and after cleaning, and the use of specialized cleaning tools.



## Cleaning Challenges

- **Cleaning steps are complex;** manual cleaning requires time-consuming dressing changes and use of special passages and processes.
- **Cleaning is costly,** requiring numerous specialized cleaning equipment, including dedicated vacuum cleaners, dust rollers, and anti-static mops.
- **High cleaning standards are needed for floors common in cleanrooms,** such as ESD, epoxy flooring, anti-static PVC, and anti-static cement. Different areas require different equipment for proper cleaning.

**Suitable for Anti-Static and Dust-Free Floors**

**Four-in-One Multi-Function Monster, Tackles Multiple Challenges**

**Scheduled Cleaning, Consistent Quality**





# Production Area Cleaning

## Cleanroom - Enhanced Dust Filtration with HEPA Filters

Cleanrooms require filtration and cleaning measures to control dust, microorganisms, and other contaminants. They are commonly used in high-precision industries such as food, pharmaceuticals, chemicals, and electronic semiconductors.

### HEPA Filters (Optional)

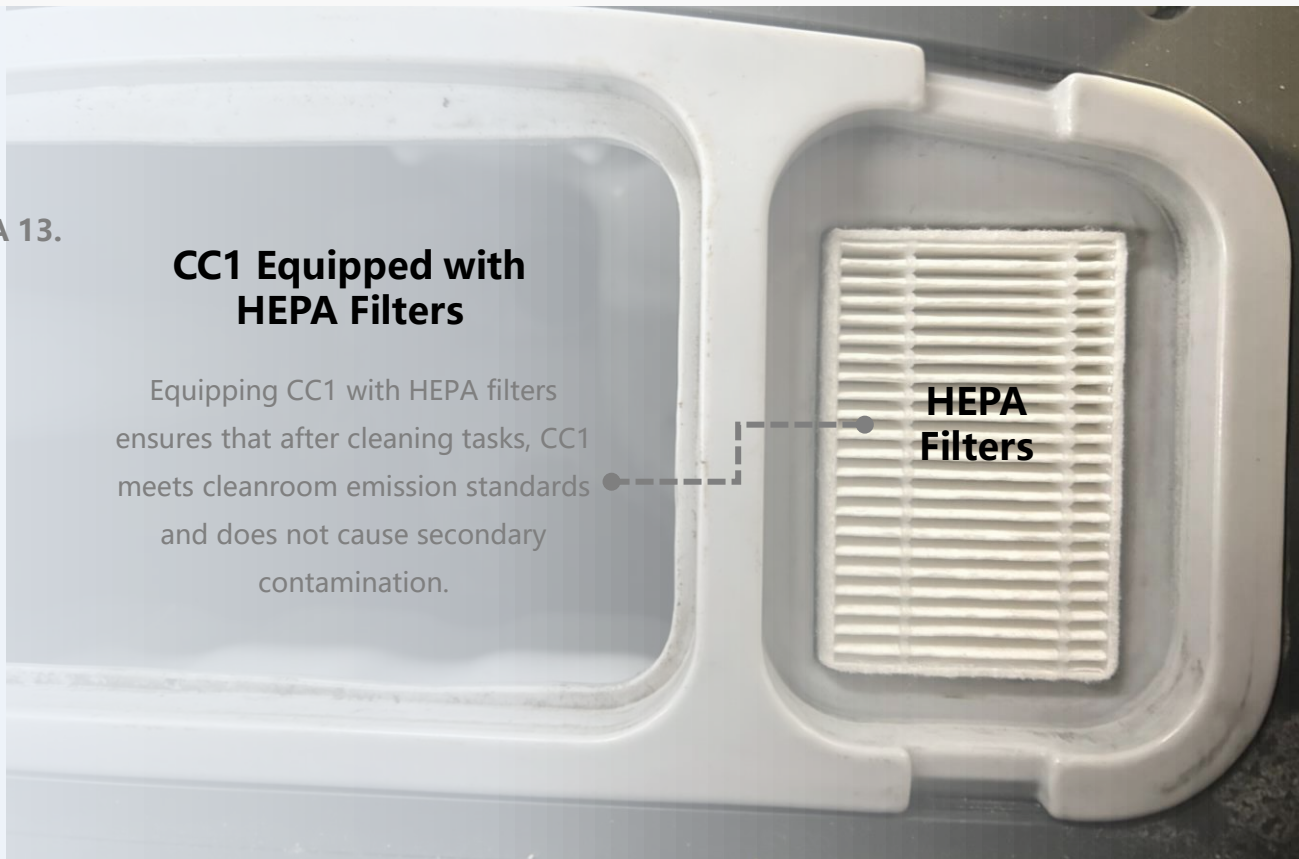
There are two optional types - **HEPA 11** and **HEPA 13**.

- HEPA 11 has a filtration efficiency of 95%, meaning it can filter out 95% of particles larger than 0.3 microns in the air.
- HEPA 13 has a filtration efficiency of over 99.95%, filtering out more than 99.95% of particles larger than 0.3 microns. Thus, HEPA 13 offers higher efficiency and stronger filtration capability, making it suitable for environments requiring higher air quality.

### CC1 Equipped with HEPA Filters

Equipping CC1 with HEPA filters ensures that after cleaning tasks, CC1 meets cleanroom emission standards and does not cause secondary contamination.

**HEPA  
Filters**

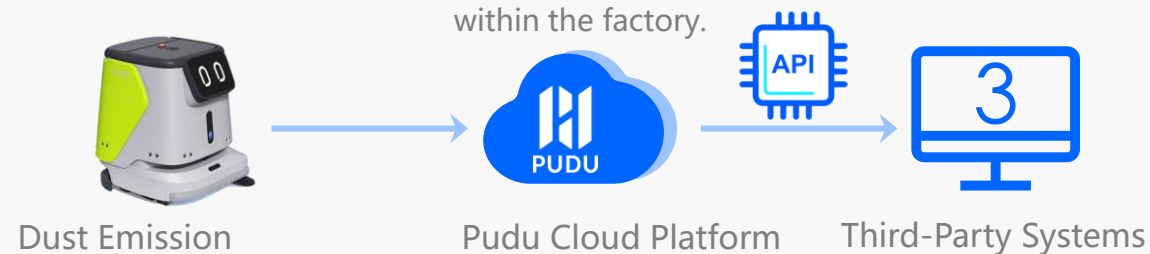




# Production Area Cleaning

## Cleanroom - Coordinated Operations with AGV and AMR

In cleanrooms, AGVs (Automated Guided Vehicles) and AMRs (Autonomous Mobile Robots) are typically used for automated material transport and handling. CC1 integrates with third-party robotic cloud systems via API, enabling 24/7 fully automated coordinated operations with robots from various manufacturers within the factory.



# Production Area Cleaning



## Fresh Agricultural Product Processing

Food residues can turn into stubborn stains. To prevent bacteria, frequently and thoroughly remove all dirt and debris, including grease, flour dust, and sugar residues.

- Meat, Poultry, and Fish Processing
- Bakery and Confectionery Processing
- Deep Processing of Fruits and Vegetables



## Liquid Product Processing

Liquid food processing often involves continuous production, multi-shift 24/7 operations, and high humidity, making regular cleaning tasks challenging.

- Dairy Processing
- Beverage Processing
- Oil and Fat Product Processing



## Ready-to-Eat and Pet Food Processing

The complex processes required for highly processed foods often leave sticky and wet residues on the floor. Professional cleaning is necessary to prevent contamination and risks.

- Meat, Poultry, and Fish Processing
- Meat, Poultry, and Fish Processing
- Deep Processing of Fruits and Vegetables

## Processing Workshop

### Sweeping Mode

- Handles large amounts of solid waste and food residues.
- Equipped with an expanded waste bin for longer operational time.

### Scrubbing Mode

- Suitable for continuous 24/7 operations.

### Scrubbing Mode

- Performs zoned cleaning with different types of detergents to remove stubborn dirt.

# Office Area Cleaning

## Offices and Exhibition Areas-Scheduled Cleaning for Public Corridors

Scheduled cleaning of public corridors is crucial for maintaining a clean and welcoming environment in offices and exhibition areas. Regular cleaning before and after working hours ensures that these spaces remain free of dust, stains, and debris, thereby upholding their overall appearance and durability.

### Floor Materials

Office: Short-pile carpets, tiles, etc.

Exhibition Hall: Tiles, marble, etc.

### Cleaning Times

Office: Automated cleaning tasks are set to operate before the start of the workday and after work hours.;

Exhibition Hall: Automated cleaning tasks are scheduled to run before opening, in the afternoon, and after closing.

### Daily Cleaning Modes

Office: Short-Pile Carpet: Sweep, vacuum, and push mode once daily.

Hard Floors: Silent dust pushing during work hours; mopping after hours for thorough cleaning.

Exhibition Hall: During Working Hours: Silent dust pushing.

Outside Working Hours: Mopping for deep cleaning.

01

Establish a High-End Brand Image



02

Create a Clean Working Atmosphere

03

Perfectly Fit the Office Environment





# Custom Skins Aligning with Brand Image

Creating personalized appearances for cleaning robots helps establish a friendly and approachable image while enhancing brand consistency.

Santa Claus Series

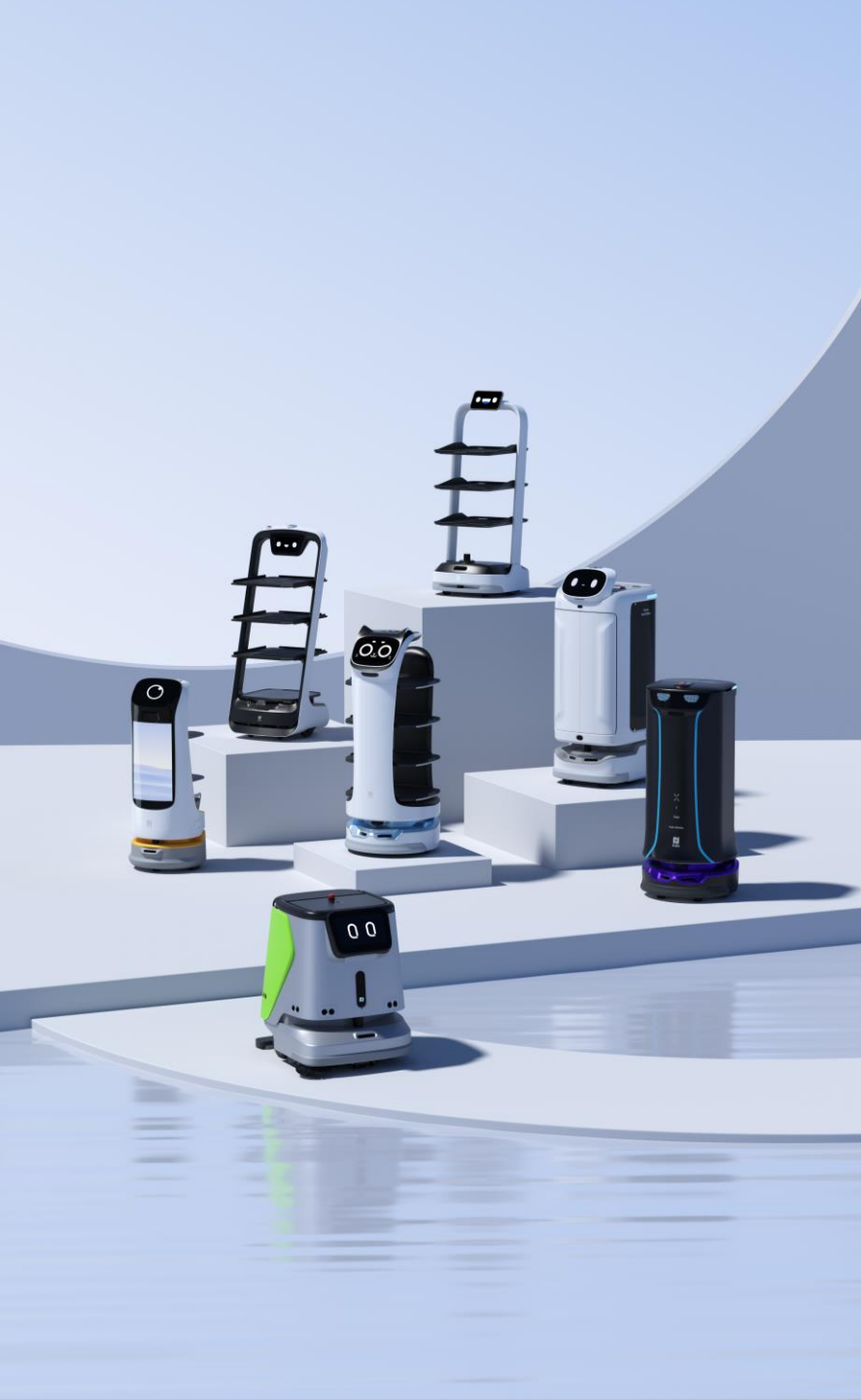


Waiter Series



Cleaner Series





# 04 Case Studies

# Case Study: A Leading New Energy Industrial Park

A global Fortune 500 new energy company

**40,000+ m<sup>2</sup>**

Industrial park area

**Factory building with  
public corridors and  
production zones**

Layout

**Cement  
self-leveling**

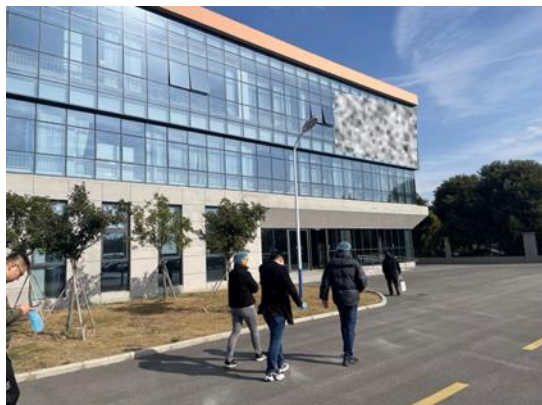
Floor Material

**4,000+ m<sup>2</sup>  
(2 floors)**

Public Corridor Area

**Workers clean the  
production lines; robots  
clean the corridors.**

Cleaning Method



Industrial Park



Factory building with public corridors



Production zone



# Case Study: A Leading New Energy Industrial Park

$$2 * \text{CC1 Robot} + 2 * \text{Worker}$$

| Robot | Cleaning Mode       | Time        | Surface | Cleaning Workers          | Area     | Duration |
|-------|---------------------|-------------|---------|---------------------------|----------|----------|
| CC1   | Dust pushing        | 8:30-10:30  | Cement  | Irregular Corner Cleaning | 2,000 m² | 2h       |
|       | sweeping, vacuuming | 12:00-14:00 |         | Daily Maintenance         | 2,000 m² | 2h       |
|       | Charging            |             |         |                           |          |          |
|       | deep cleaning       | 23:00-02:00 | Cement  | Full Map Cleaning         | 2,000m²  | 3h       |
|       | Charging            |             |         |                           |          |          |



# Case Study: A Leading New Energy Industrial Park



## Cost Reduction

Cleaning costs decreased by 10,000 RMB per month on average.



## 24/7 Stable Cleaning

Transition from twice-daily cleaning to continuous all-day cleaning, ensuring a clean environment even during night shifts.



## Safety

Reduced safety risks by minimizing the frequency of cleaning workers entering the production line.



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# Case Study: Hexiang (Changzhou) Electronics Co., Ltd.



## Manufacturing plant for electronic components

Products include electromagnetic buzzers, piezoelectric buzzers, SMD buzzers, speakers, receivers, microphones, and inductors

| Cleaning Areas       |  | Cleaning Requirements  | Work Content  |   |
|----------------------|--|--|---|---|
| Floor Material       | Production Line Main Channel and Goods Transport Channel | Core Pain Points   | Traditional Cleaning Method   | Human-Robot Collaboration   |
| Epoxy flooring       | 1st Floor (200 square meters)                            | <ul style="list-style-type: none"><li>Prohibited to use wood or ordinary flooring</li><li>Complex manual cleaning steps in anti-static work areas.</li><li>Cleaning Schedule: 4:30-12:00、12:30-17:10</li></ul> | <ul style="list-style-type: none"><li>Responsible for Daily Cleaning Tasks in Production Lines, Warehouses, Office Areas, Restrooms, Corridors, Elevator Areas, and Lobby(Including Floor Cleaning, Garbage Collection and Bag Replacement, Wall and Vertical Surface Cleaning, etc.)</li></ul> | <ul style="list-style-type: none"><li>Robots: Responsible for 24/7 automated cleaning.</li><li>Workers: Handle internal production line cleaning.</li></ul> |
| Anti-static flooring | 2nd Floor (2,800 square meters)                          |  |   |   |
| Anti-static flooring | 3rd Floor (4,500 square meters):                         |  |   |   |



# Case Study: A Global Top 100 Company

## A Global **Top 100** Company Manufacturing plant for automobile engine components

Products include EBS, motors, controllers, PE systems, fuel cell systems, lighting, airbags, etc.

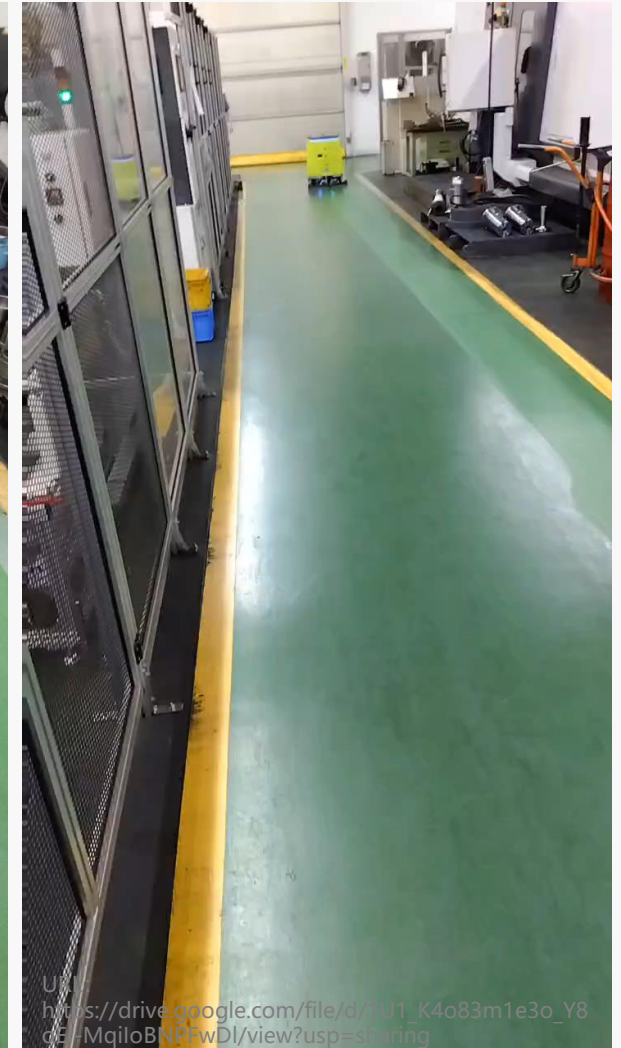
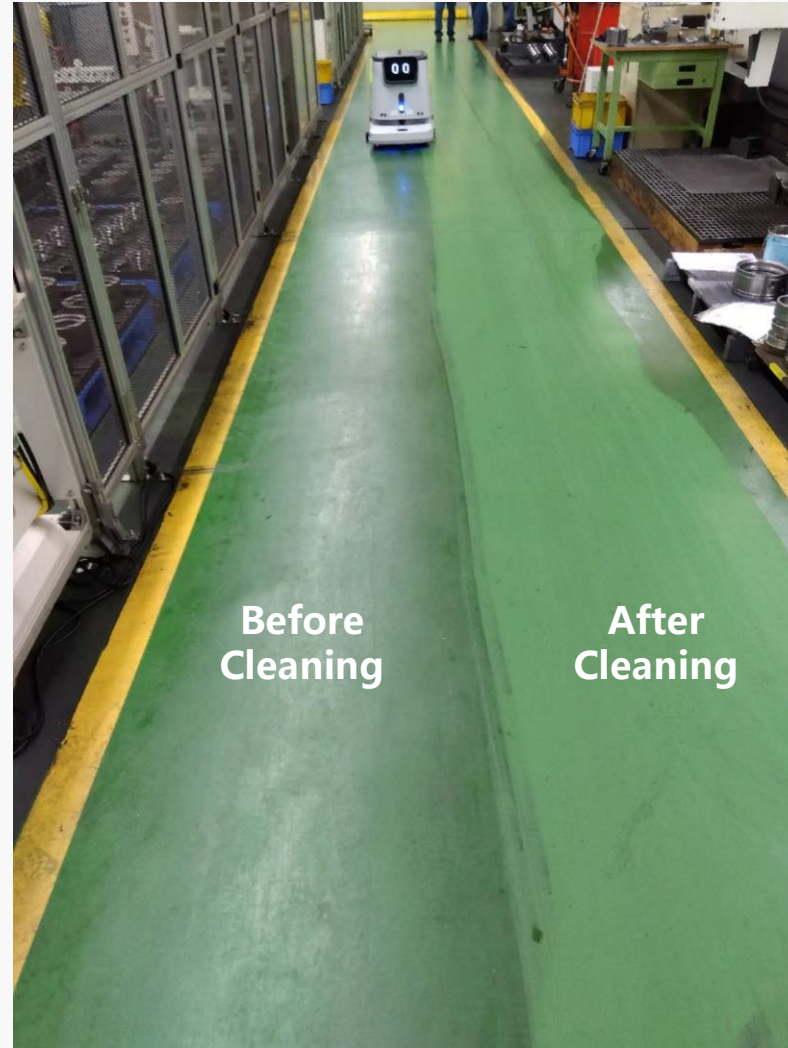
Cleaning Area: Main Channel in Production Line  
(Epoxy Flooring)

Floor Cleaning Area: 1,500 square meters.

Cleaning Mode: Automated Cleaning -  
Scrubbing Mode

Cleaning Pain Points: Accumulation of Floor  
Dust Due to Production, Noticeable Oil Film, and  
Dirt Deposits from Wear of Transportation  
Equipment Tires in the Metal Processing Plant.

Cleaning Plan: Robots are Responsible for 24/7  
Fully Automated Cleaning Tasks in the Main  
Channel of the Production Line



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[https://drive.google.com/file/d/1U1\\_K4o83m1e3o\\_Y8oE-MqiloBNPwDI/view?usp=sharing](https://drive.google.com/file/d/1U1_K4o83m1e3o_Y8oE-MqiloBNPwDI/view?usp=sharing)



# Client Case - A Korean Processing Factory

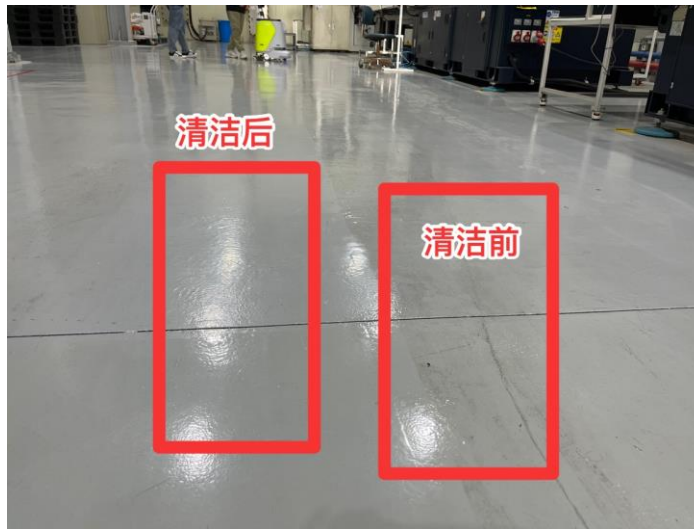
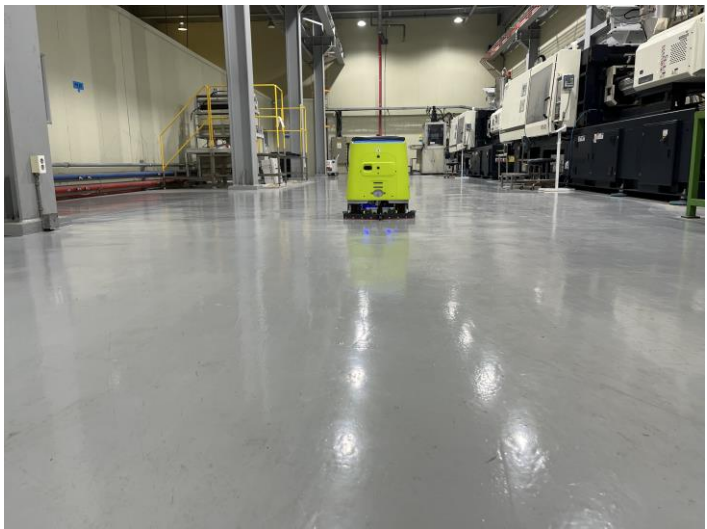


**Cleaning Area:** Main channel in the production line (epoxy flooring)

**Cleaning Mode:** Automated Cleaning - Scrubbing Mode

**Cleaning Pain Points:** Noticeable oil film coverage, dust accumulation from foot traffic, and dirt deposits from wear of transportation equipment tires.

**Cleaning Pain Points:** Noticeable oil film coverage, dust accumulation from foot traffic, and dirt deposits from wear of transportation equipment tires.



# Client Case - Knight Auto Precision Engineering



SEMICON



BALL ATTACH &  
SINGULATION



MOULDING



STAMPING



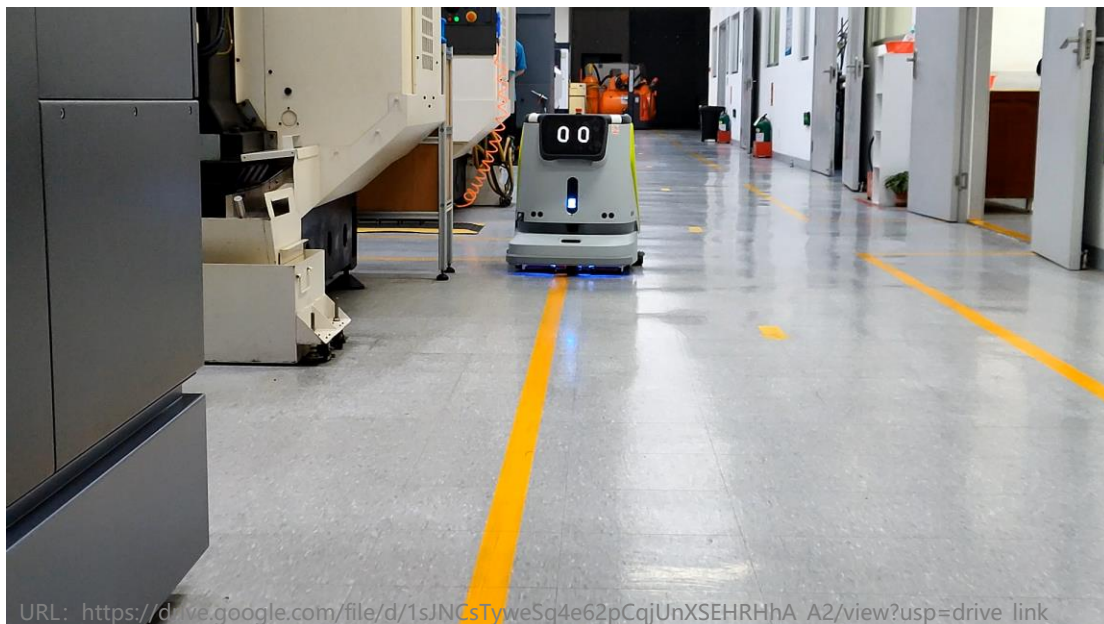
TOOL AND DIE

Knight Auto specializes in precision machining for semiconductor back-end testing products. The company develops and manufactures conversion kits, test sockets, and contact pieces made of engineering plastics for testing handlers.

**Cleaning Area: Main Channel in the Production Line**

**Cleaning Mode: Automated Cleaning - Scrubbing Mode**

**Cleaning Pain Points: Large cleaning area across multiple floors, high cleaning frequency and stringent requirements for floor cleanliness**

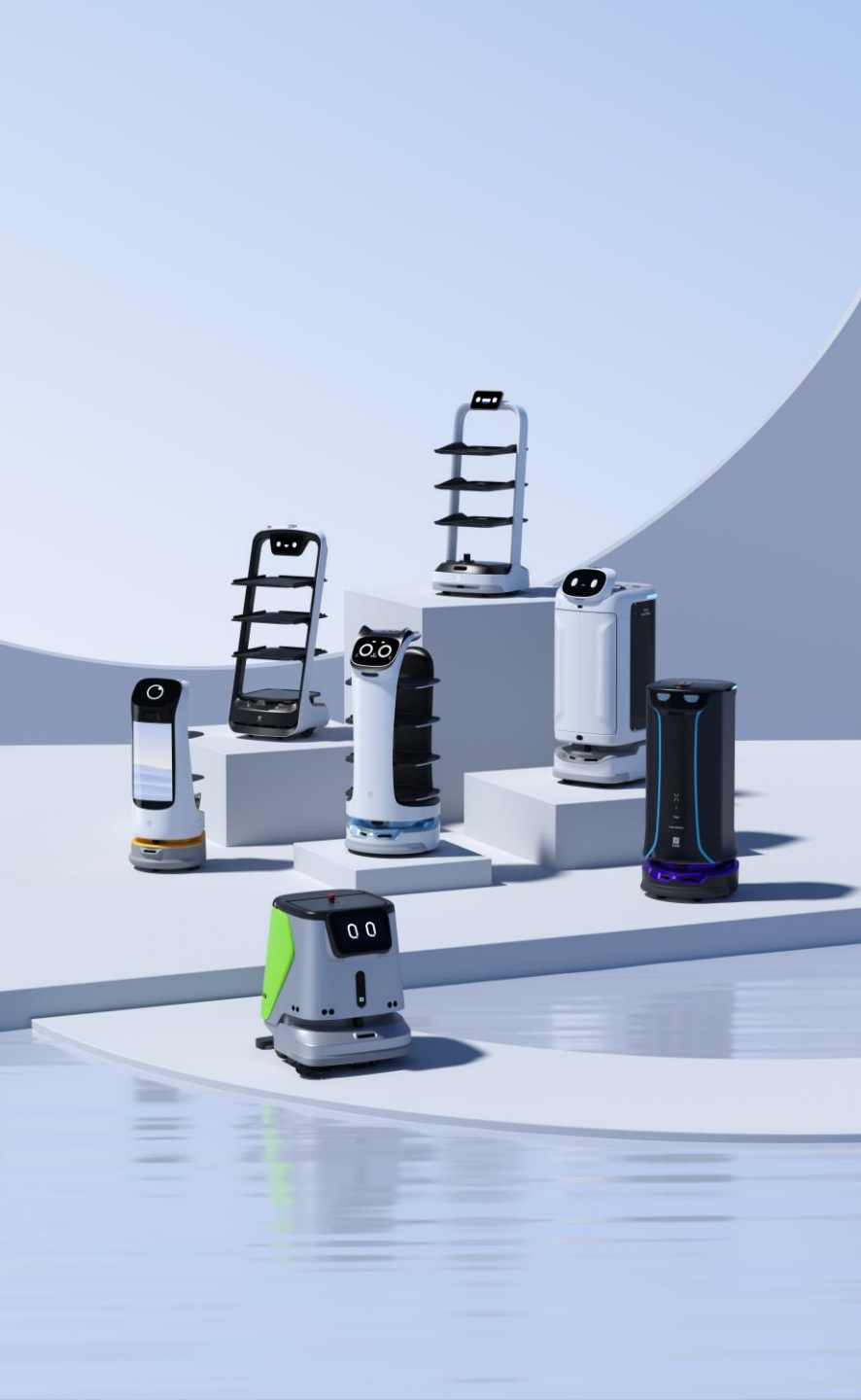


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URL: [https://drive.google.com/file/d/1a\\_Eksik5i\\_BlBoJD3v0wftPnRaL5VtC5/view?usp=sharing](https://drive.google.com/file/d/1a_Eksik5i_BlBoJD3v0wftPnRaL5VtC5/view?usp=sharing)





# 05

## PUDU Introduction

# PUDU Introduction

## Pudu Robotics

In 2016, Pudu Technology was founded in Shenzhen as a national high-tech enterprise that specializes in research, design, production, and sales of commercial service robots. After seven years of development, Pudu Technology has established hundreds of service points worldwide, with business in over 60 countries and regions, delivering more than 70,000 units. It has become a leader in the field of commercial service robots globally. In the age of intelligence, Pudu Technology will continue to uphold the "inventor's spirit" and solidify its technology, refine its products, create truly useful robot products, and enhance the efficiency of human production and life.

\* Relevant statistics as of Dec. 2023

### Mission

Use robots to improve the efficiency of human production and living

### Vision

To become the world's strongest commercial service robot company



BE INVENTIVE



BE CUSTOMER  
CENTRIC



THINKING IN THE  
LIGHT OF FIRST  
PRINCIPLES



BE ENTERPRISING  
& ACCOUNTABLE



PURSUE FOR  
THE ULTIMATE



MOVING FAST



BE OPEN-  
UP



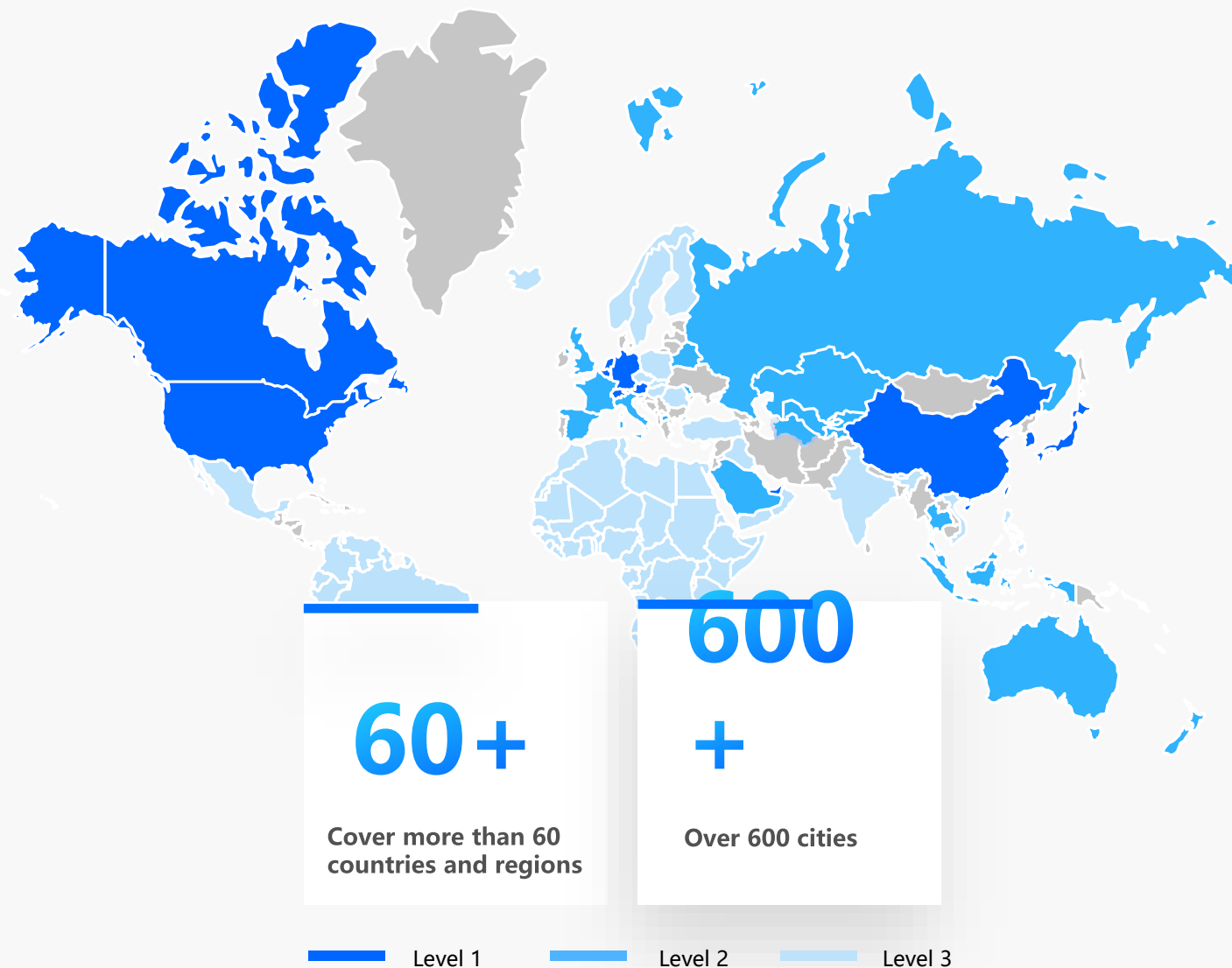
EMBRACING  
CHANGE

# Scale Advantage

## Globalization

Pudu Robotics has established a business presence in North America, Europe, East Asia, Asia-Pacific, the Middle East and Latin America. The products have been exported to more than 60 countries and regions around the world, covering more than 600\* cities worldwide. Pudu Robotics has established a trustworthy international brand image and become one of the representative enterprises of China's "intelligent" manufacturing abroad.

\* Relevant statistics as of Dec. 2023



# Scale Advantage

Total Sales Quantity

## 70,000+

70,000+ \* units have been sold worldwide

Market Share in All Scenarios

## TOP1

The market share in the full range of commercial service robots is No.1

Market Share of the Overseas Catering Industry

## >80%

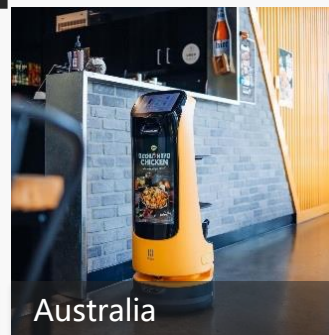
Overseas catering industry' s market share > 80%

\* Relevant statistics as of Dec. 2023

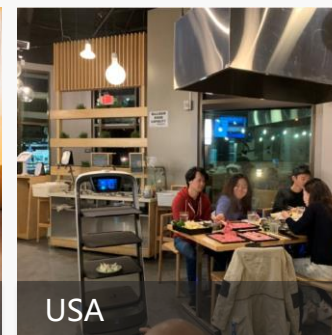
## The world largest commercial service robot manufacturer



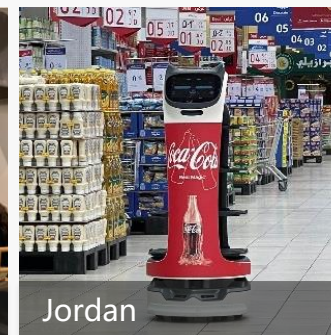
Korea



Australia



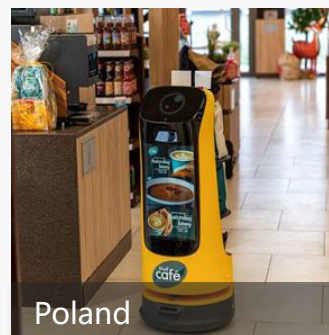
USA



Jordan



Switzerland



Poland



China-Shenzhen



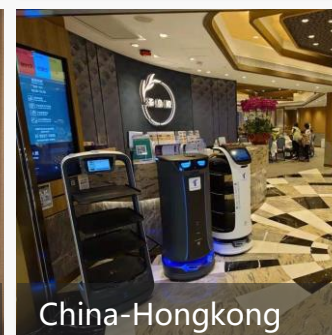
China-Xiamen



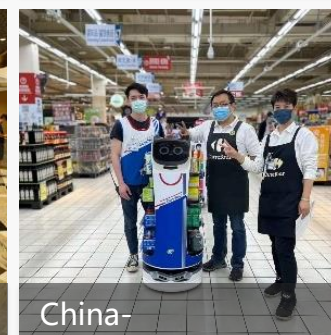
Malaysia



Japan



China-Hongkong



China-





# Horner and Certification

## Certificate & Patent

All of existing products have passed the multi-certification that match the targeting markets.



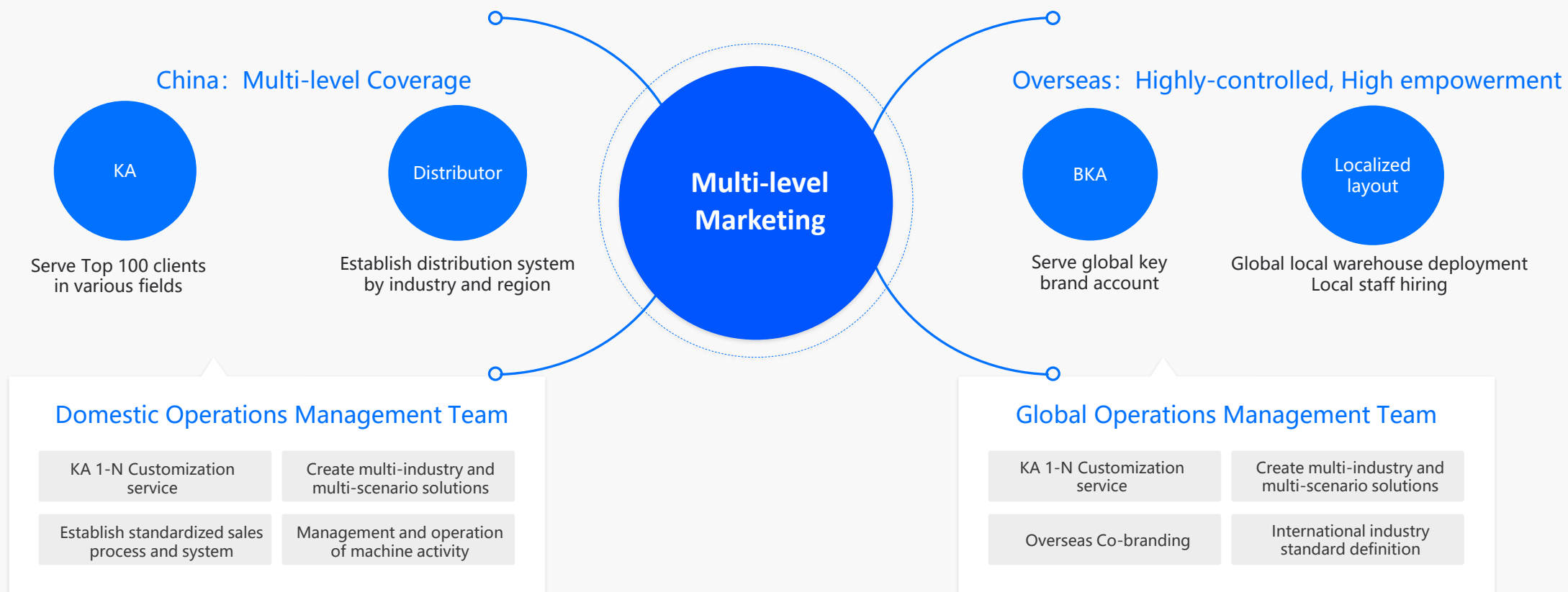
Pudu Robotics has applied for about 1300\* core patents, of which invention patents are over 60%, involving positioning, navigation, motion control, human-computer interaction, robotics arm, servo motor, computer vision, cloud platform and other technical fields.

\* Relevant statistics as of May 2023



# Operation Advantage

## Global Multi-level Sales System

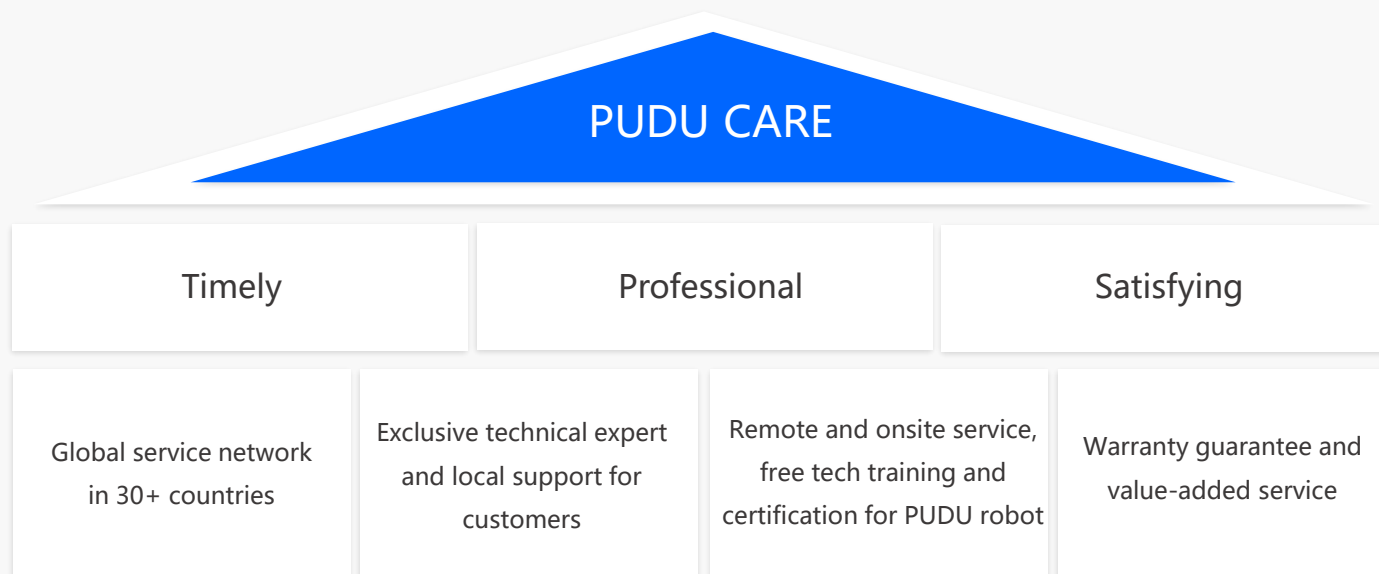




# Operation Advantage

Offline Service:

- 1 Year Free Warranty
- 7 × 24 Hours Service
- Local Service & Support



Pudu Robotics has a thorough after-sales support system and humanized after-sales policy as well, whenever it is needed, we are going all out to offer service and reach your satisfaction.

# Thank you!



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