PUDU

PUDU ROBOTICS

Industry Solution

Factory Industry

/ Global Leading Robotics Company /

CONTENT

01

Industry Overview

Industry Background

The Industrial Revolution 5.0

The Industrial Revolution 5.0 concept is becoming the focus of many countries and institutions

- New revolution triggered by extensive application of AI and digital technology
- Combined information technology such as AI, IoT, Cloud Computing, and Big data with traditional industry, promoting the intelligent, automated, and digital transformation of the manufacturing industry
- Compared with the previous industrial revolution, 5.0 pays more attention to collaboration and symbiosis between humans and robots, emphasizing the creativity innovation, and wisdom of the human being

Late 18th Century	Early 20th Century	In the 1970s	The end of the 20th Century	The future has arrived
1.0 Mechanization	2.0 Electrification	3.0 Information	4.0 Webified	5.0 Parallelization
Representative: Steam engine Milestone: The first textile machine Global GDP: $ 0.7 trillion	Representative: Motor Milestone: First production line at Cincinnati slaughterhouse Global GDP: $2.8 trillion	Representative: Computer Milestone: The first programmable logic controller PLC Global GDP: $20 trillion	Representative: Router Product: triggered by information and things systems Global GDP: $70 trillion	Chance and Challenge

Tips: There is no beginning time of The Industry Revolution5.0, tracing back to exploring and developing 4.0 which was raised by the German government and first mentioned at the Hannover MESse in 2011, concentrating on intelligent and digital applications for manufacturing upgrade.

Region Policy

Global Policy and Guidance for Industrial Revolution 5.0

To adapt to the challenges and opportunities of Industrial Revolution 5.0, to achieve the goal of promoting the development and application of new technologies, promoting industrial upgrading and economic development

China

Made in China 2025 aims to prompt upgrade and transformation to high-level manufacture, and promote the application of AI, IoT, and Big data in this field

The generation of Artificial Intelligence Development Plan aims to fasten the development and application of AI technology, promote the deep integration of AI and the real economy

America

The National Artificial Intelligence Research and Development Strategy aims to enhance R&D and innovation capability in the AI field, encourage public-private cooperation to promote AI development

The Manufacturing Innovation Network aims to enhance the transformation of digitalization and prompt intelligence and automation of the manufacturing industry

Japan

The Super Intelligent Society Strategy aims to prompt the transformation of digital and intelligence in Japan, encourage the application of AI IoT robotic technology, improve society's efficiency and quality

The Robot Revolution Initiative aims to promote the development and application of robot technology and foster the development of the robot industry, including industrial robots, service robots, and medical robots

German

Industry 4.0 aims to promote the digital and intelligent transformation of the manufacturing industry, encouraging enterprises to improve production efficiency and product quality via adopting technologies such as IoT, cloud computing, and AI

The Digital Industrial Platform aims to establish a digital industrial platform to promote information sharing and collaboration

Korean

The Basic Technology Development Strategy aims to enhance R&D and innovation capability in AI and prompt the application

The Smart Manufacturing Revitalization Strategy aims to promote the intelligent transformation of manufacturing to digitalization and automation

Industry Trend

Digitalization

With the development of information technology, digital transformation has become an important trend in the industrial revolution

Intelligence Manufacture

Intelligent manufacturing is one of the core contents of the Industrial Revolution

Webified and Collaborative

Enterprises and production links in the industrial revolution will become more webfied and collaborative

Sustainable Development

The trends of the Industrial Revolution also included a concern for environmental and social sustainability

Human-Robot Collaboration

The Industrial revolution emphasized cooperation and symbiosis between man and machine

Globalization and Cooperation

The development of the Industrial Revolution will further promote globalization and international cooperation

Pain Points

Intelligent Transformation

With the development of Industrial Revolution 5.0, factories need to invest a lot of time, manpower, capital, and new technology to match new technology, to achieve the goal of efficient operation

Recruitment Difficulties

With the comprehensive impact of aging, epidemic, industrial transformation, etc., the problem of recruitment of factory manufacturing personnel has become more and more serious

Low Efficiency

In traditional factories, material transportation and inspection need employees to walk tens of thousands of steps between each assembly line and machine tool every day

Management

Traditional factory management requires training, supervision, and inspection of employees, which is time-consuming and laborious, and the final result is difficult to measure and control

Value

Staff Value

Using delivery robots for transportation which is repeatable work aims to staff deal with important work matters, then to improve professional skill and self-value

Production Efficiency

The robot is self-driven and movable, delivers things accurately, and improves efficiency. Compared with humans, it can work 24 hours without tired

Data Management

Through the cloud storage capability, robotics can monitor delivery status and data, optimize the delivery process and production plan, improve the overall management

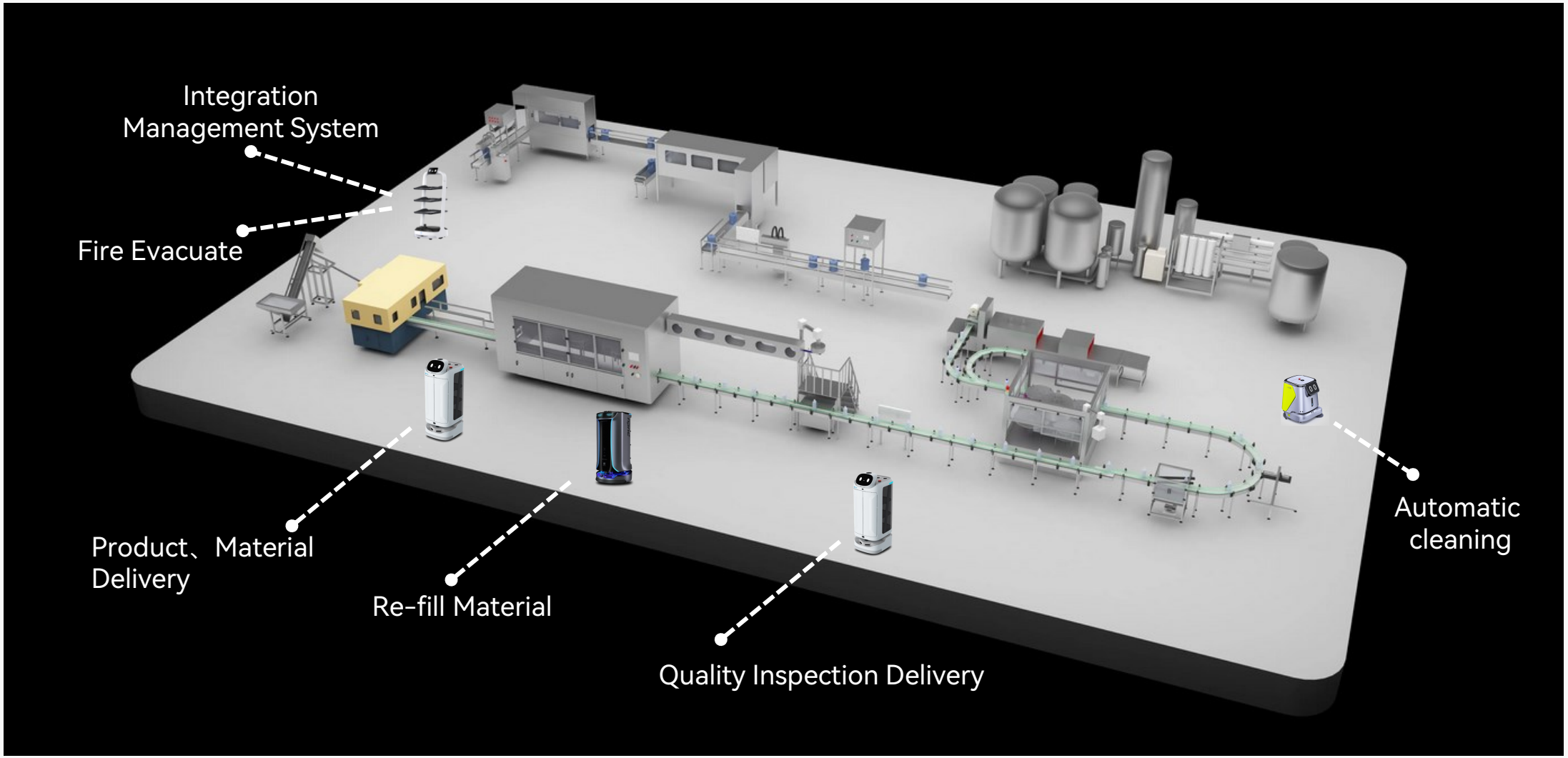
Safety

Sometimes the items need to be protected, robot can avoid the potential danger of manual operation, to ensure the safety of employees. Robots can also through technology such as lidar and sensors to avoid other safety issues

02

Scenario Solutions

Introduction



Delivery Scenario

Product、Material Delivery

Factory internal delivery requirements. Usually involve transportation of materials from one production line to another to ensure a smooth flow

01 Operation Method

Step1：Staff of Production Line A put the product or material on the robot and choose the next destination

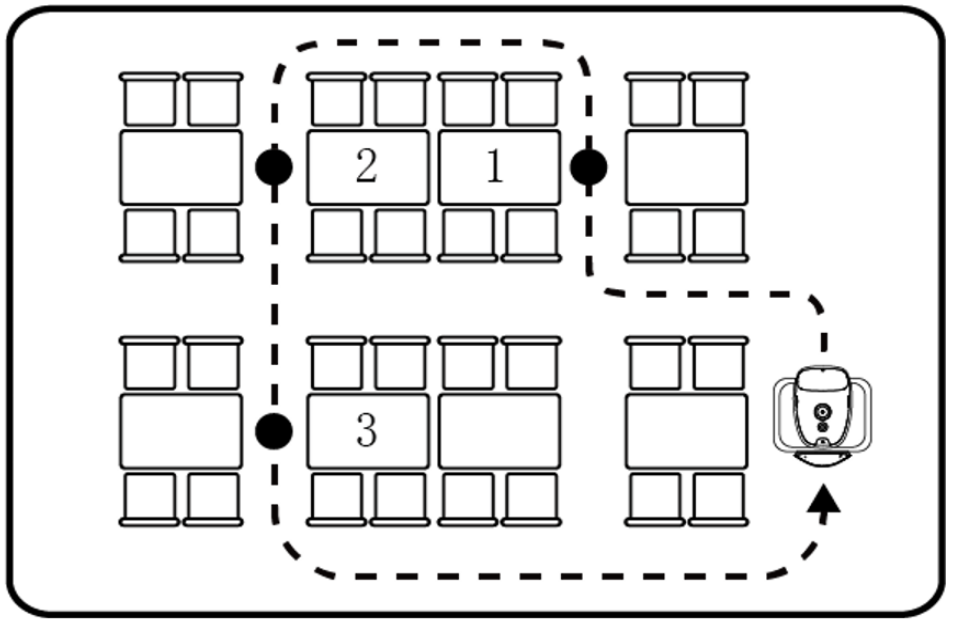
Step2：The robot runs to the next destination according to the command, the rest can be done in the same manner, until the delivery task finished

02 Recommend Mode

Delivery mode

03 Value

Reduce the loss caused by delivery materials, improve the time efficiency of delivery, ensure the smooth supply of all lines



Delivery Scenario

Product、Material Delivery

Watch/Pager

Call robot

Put the Material to be inspected

(Product Line/ Warehouse worker)

Production Line A

Production Line N

Finish the last task

Go back to the starting point

Waiting for next task

Delivery Scenario

Re-fill the Production Line

01 Operation Method

Step1：Put a basket on the robot tray, regularly re-fill the material, components, or tools

Step2：At the warehouse set the re-fill point, and stay duration, when the robot goes back, staff can re-fill those items according to usage

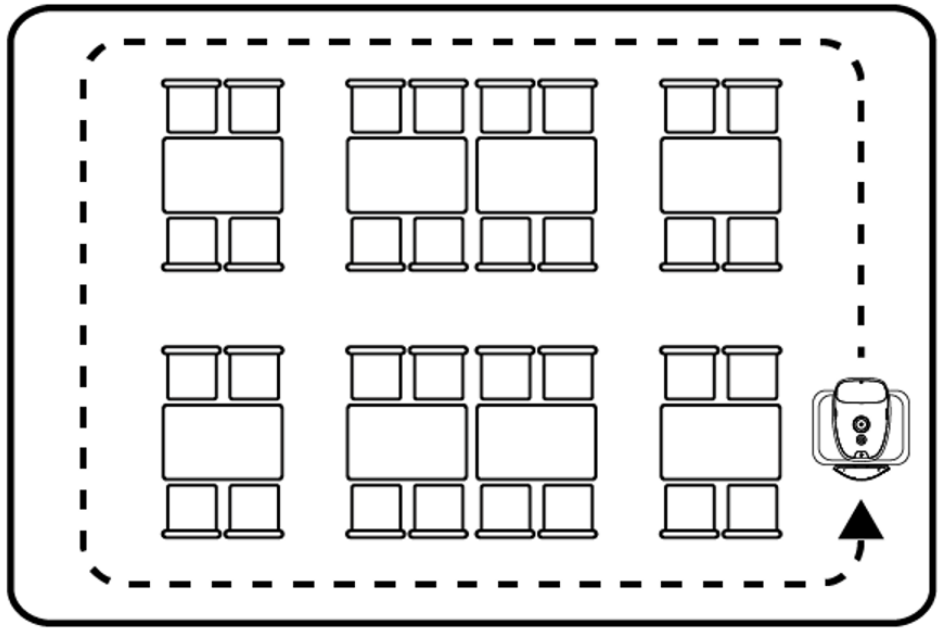
Step3：Set the route and cycle time at the production line, staff can take the items by needs

02 Recommend Mode

Cruise mode

03 Value

Reduce the time lost to take items and improve the efficiency of the production line



Delivery Scenario

Re-fill the Production Line

Robots cycle tasks between production lines

Production Line A

Production Line D

Production Line B

Production Line C

Delivery Scenario

Inspection Delivery

After the completion, the product is usually sampled to ensure that the quality of the product meets the quality standard

01 Operation Method

Step1： Set the time period of inspection and assign the robot to the fixed position of the production line

Step2： Staff put the sample on the tray of the robot

Step3：Robot goes to the inspection room

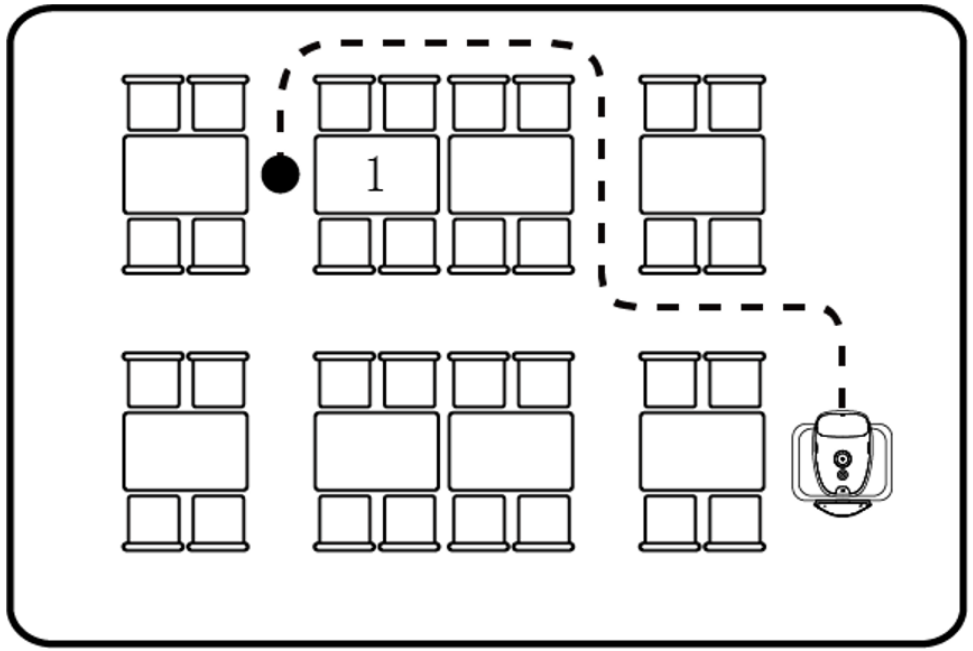
Step4： After the robot arrives, notify the staff to carry out those items

02 Recommend Mode

Direct mode

03 Value

Reduce the time, energy, and physical cost of employees caused by traditional manual inspection, ensure employees can focus more on the daily output of the production line, and improve production efficiency



Delivery Scenario

Inspection Delivery

Production Line

Warehouse

(Components)

Put the Material to be inspected

(Product Line/ Warehouse worker)

Take out material

(Inspection staff)

Warehouse

(Product)

Delivery Scenario

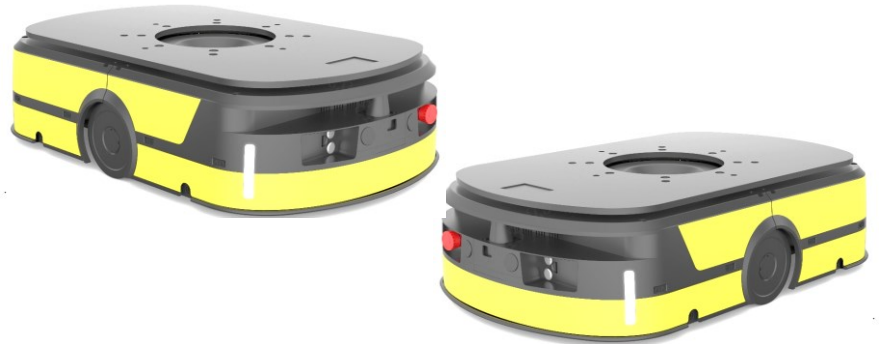
Delivery Robot

Meet the light delivery needs of factories in various scenarios

	Max Load Capacity	Min Pass Width
HolaBot	60Kg	70cm
BellaBot	40Kg	70cm
Pudu2	40Kg	80cm
SwiftBot	35Kg	80cm
KettyBot	30Kg	55cm

Delivery Scenario

AGV/AMR Robot



Vs

Delivery Robot

Type	Load Capacity	Cost	Maintenance Cost	Deploy	Pass Width	Security
Delivery Robot	↓	↓	↓	↓	↑	↑
AGV/AMR Robot	↑	↑	↑	↑	↓	↓

Clean Scenario

01 One machine, multiple cleaning modes, suitable for multiple scenarios

02 24-hour operation, fully automatic

03 Simple, user-friendly, reliable, and stable

04 Check the robot status at any time

05 Presentation of cleaning reports on mobile device

Clean Scenario

One day of CC1

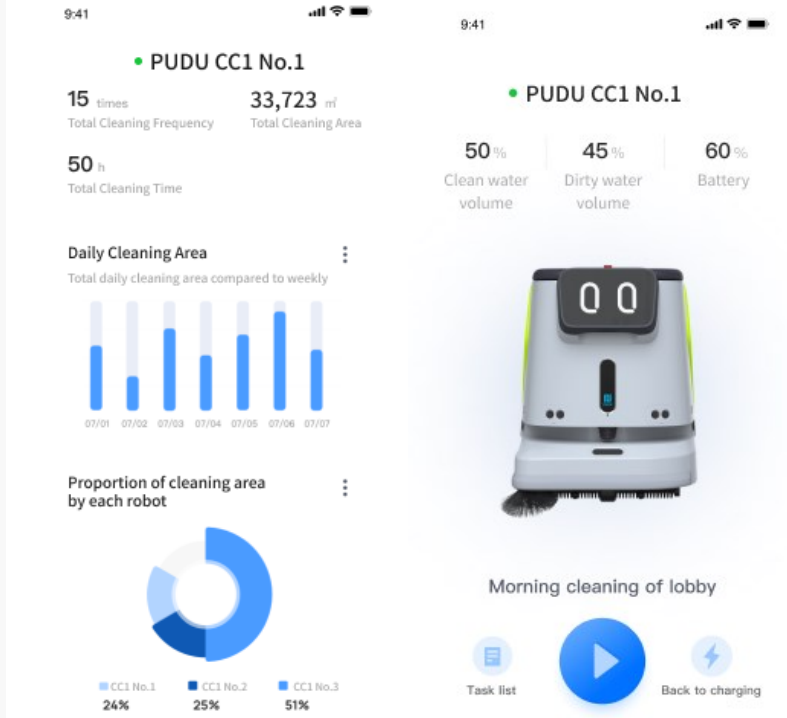
- 4:00 am — Automatically starts the scheduled cleaning task
- 4:30 am — Sweeping & Vacuuming Workshop & Hallway
- 6:30 am — Inspection room Cleaning
- 7:30 am — Send cleaning report
- 12:00 am — Product line Cleaning
- 13:00 pm — Charging and Adding clean water
- 17:00 pm — Sweeping & Vacuuming 2nd Cleaning
- 19:00 pm — Washing Repeat cleaning

1/2	3 times	2 times	100%
Manpower cost	Cleaning Quality	Cleaning Frequency	Visualization

The Others-Operation

Digital Platform

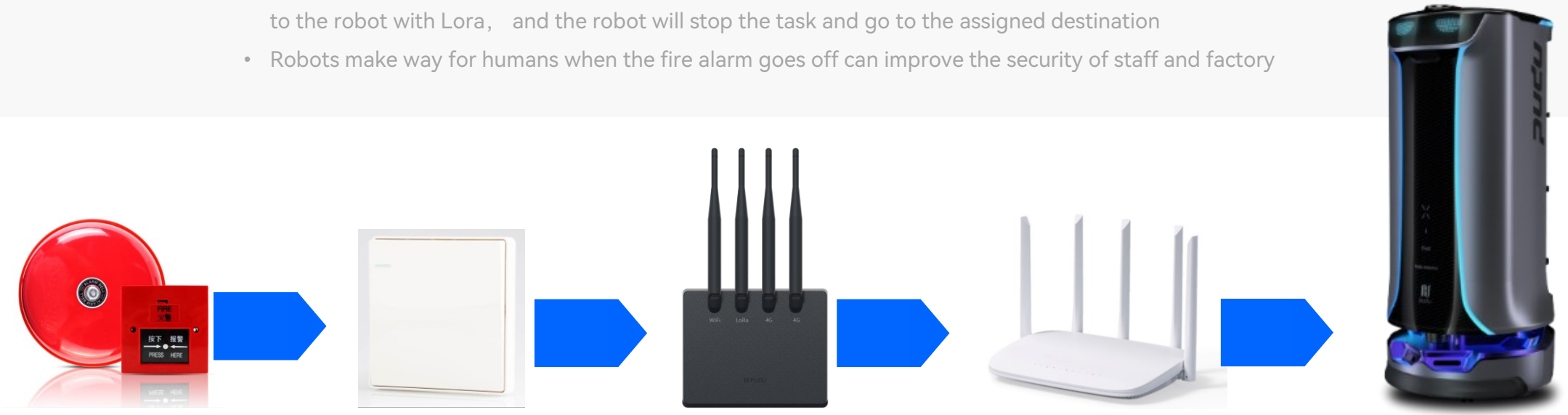
Management: One-stop operation management platform, including remote calls, remote configuration, remote monitoring, etc.
Data: Real-time synchronization of multi-dimensional data of various types of robot operations to ensure data accuracy
User-friendly: Support data and configuration management by product type, area, organization, and other perspectives



The Others-Fire Escape

Robots make way for humans when the fire alarm goes off

- In the event of a fire alarm, the controller and fire device will activate SOCS BOX, it will send a message to the robot with Lora， and the robot will stop the task and go to the assigned destination
- Robots make way for humans when the fire alarm goes off can improve the security of staff and factory



Fire device　Controller　SOCS BOX　Lora　HolaBot

The Others-Management

Integrated Smart Factory Management

MES management system

Factory ERP

Integration

android

PUDU OS

API SDK

SDK

Connection

- Through the management system, can remotely control the robot to finish the delivery task, such as from product line A to Room 001
- Through the management system can monitor the robot's location, status, battery, etc.
- Through the management system can integrate data information, such as running status, delivery, duration, etc., to better optimize the operation

03

Successful Cases

Successful Cases

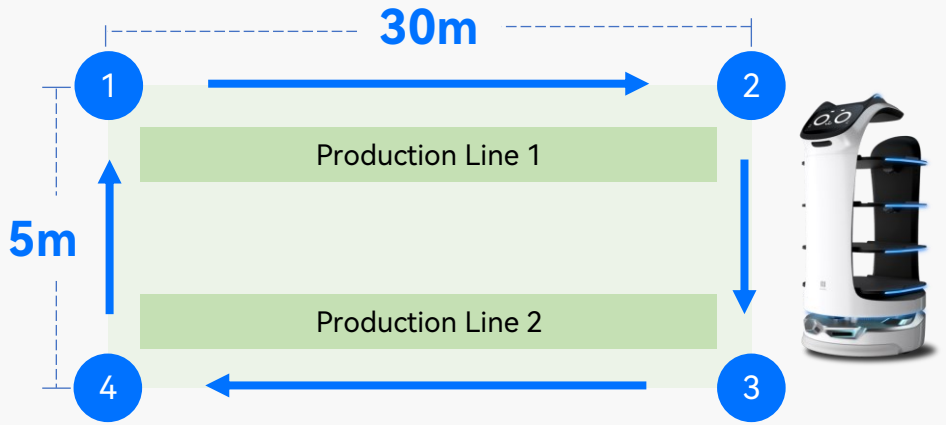
China · XX Factory

URL https://www.youtube.com/watch?v=bgk9svAuMcs

Successful Cases

Case Study

Type	Traditional Way	Human-Robot Collobrate
Headcount	2 staff are responsible for 2 production lines	1 Bellabot is responsible for 2 Production lines(and cycle back and forth 1-4 points)
Calculate	1. Delivery each 5 min 2. Send material from Point 1 to Point 2, back and forth 3. 12 hours per day	1. As shown in the diagram on the upper right, a single task is 70m 2. According to Pudu Cloud data - Period: 5th Mar. to 13th Mar. - Duration: 9 days - Total mileage: 95.68km - Daily mileage: 10.63km
Task	**1. Delivery times** 12Hour*60meter/5min*2ppl=**288**times **2. Average times of individual deliveries:** 144 times	**1. Delivery times** 10.63km/70meter*2 lines ≈**304**times **2. Delivery times of a single line:** 152 times



Data source: Pudu Cloud

Successful Cases

Shenzhen Kaifa Precision Technology Co.,Ltd

URL https://www.youtube.com/watch?v=cN4i7QDjoKg

Successful Cases

正興電機製作所のマザー工場

URL https://www.youtube.com/watch?v=fA-aNYg1sFM

Successful Cases

大野精工株式会社さん

URL https://www.youtube.com/watch?v=mqTbo54wD14

04

Product Family Matrix

Creating truly useful robot to improve human productivity and quality of life

Product Family

Delivery Robots

- Bellabot
- Pudubot 2
- Pudubot
- Kettybot
- Swiftbot
- Holabot
- Flashbot

Cleaning Robots

- CC1
- SH1

Pudu Cloud

- PUDU Merchant Management Platform
- PuduLink App
- PUDU Cloud Platform

Technology

- PUDU OS
- Positioning and navigation algorithm
- Perceptual obstacle avoidance algorithm
- Motion control algorithm
- Multi-machine scheduling algorithm
- AI interactive algorithm
- Cloud platform algorithm
- Simulation testing platform

IOT Solutions

- Pager
- Autodoor
- Elevator
- 4G/lora Watch
- Table Tracker
- Bluetooth Speaker
- ...

Accessories Solutions

- Cup holder
- Food cover
- Tray
- Display shelf
- Self-charging station
- ...

1-N Customized Solutions

- Voice
- Emoji
- Skin
- SDK
- ...

Delivery Robots

BellaBot

Novelty、cute、fully-perceptive food delivery robot

- Contactless delivery
- Multiple located
- Tray Sensor
- Flexibility
- Personalized Presentation
- Multi-interaction
- Changeable battery
- Safety
- Service

PuduBot2

Latest、high-performance、extendable、adaptable, intelligent delivery robot for multiple scenarios

- Delivery mode
- Shipping mode
- Cruise mode
- Direct mode
- Dish-recycle mode
- Birthday mode

KettyBot

With Ad screen, serving as both a delivery and receptionist

- Minimum passability
- AD
- Reception
- Navigation
- Voice interaction
- Work plan
- Delivery
- Self-charging
- Feature settings

Delivery Robots

SwiftBot

Delivery Robot for Smooth Peak Hour Operations, Redefining Social Interaction between Humans and Robots

Avoidance Reminder

Operating Status Projection

Atmosphere Projection

Foot-activated Door Projection

PuduBot

Classic Intelligent Food Delivery Robot, Pioneering the Industry of Trackless Delivery Robots

Scheduling

3D avoidance

Independent Suspension

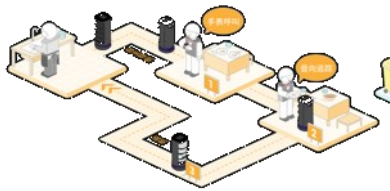
Ultra-long Endurance

Optimal Path Planning

Sun-resistant

HolaBot

First Delivery Robot with Remote Call Notification Function for Multiple Delivery Scenarios



Dish-recycle

medical waste recycle

FlashBot

Full-Scenario Delivery for Hotels, Offices, Apartments, and Residential Buildings

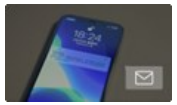
APP call

Independent cabin door

Customized disinfection time

Take elevator

Auto-door



Arrival notification

Cleaning Robots

reddot winner 2023

PUDU CC1

All-Purpose Cleaning Monster: Four-in-One Scrubbing, Sweeping, Mopping, Vacuuming

A machine that integrates sweeping, mopping, vacuuming, and dusting, easily meeting all cleaning needs with just one device

dusting

mopping

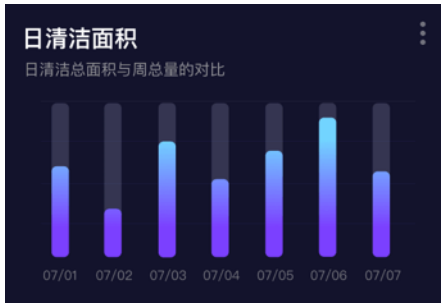
sweeping

vacuuming

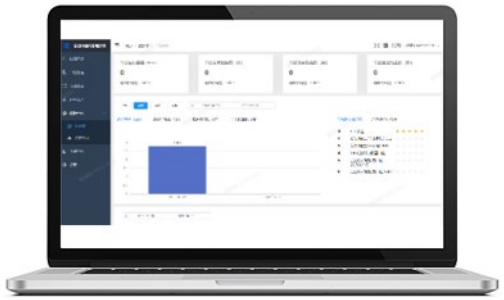
PUDU SH1

Professional Mini Digital Floor Scrubber: A More Professional and Thorough Cleaning Solution

The compact and flexible design allows for easy transition between tasks on multiple floors and surfaces



PUDU Cloud



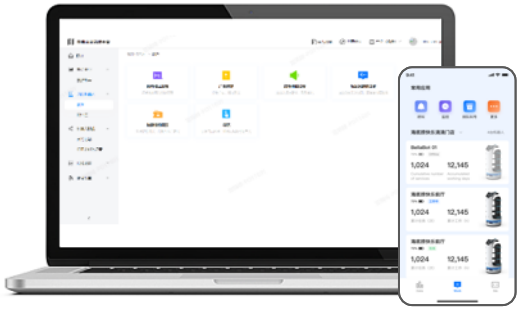
PUDU Cloud Platform

For distributors

Management platform for managing business opportunities, clues, sub-distributors, merchant customers, and selling robots.

PC – Web

1) Singapore Group: https://css.pudutech.com
2) Germany Group: https://csg.pudutech.com
3) China Group: https://cs-internal.pudutech.com



PUDU Merchant Management Platform

For end-store

A platform for robot configuration, remotely controlling, managing stores and viewing robot operation data.

PC – Web

1) Singapore Group: https://businesss.pudutech.com
2) Germany Group: https://businessg.pudutech.com
3) China Group: https://business.pudutech.com

PuduLink App【iOS】

PuduLink App【Android】

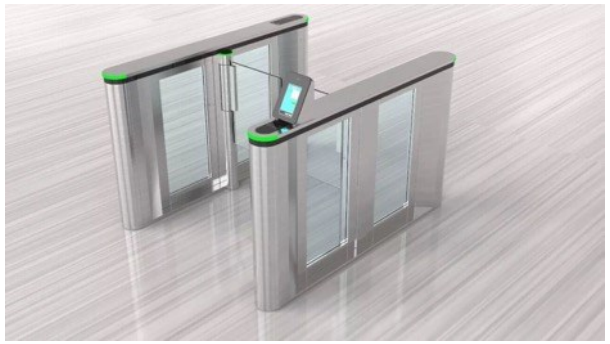
IOT Solutions

Pager

4G/Lora Watch

Elevator

Auto-door

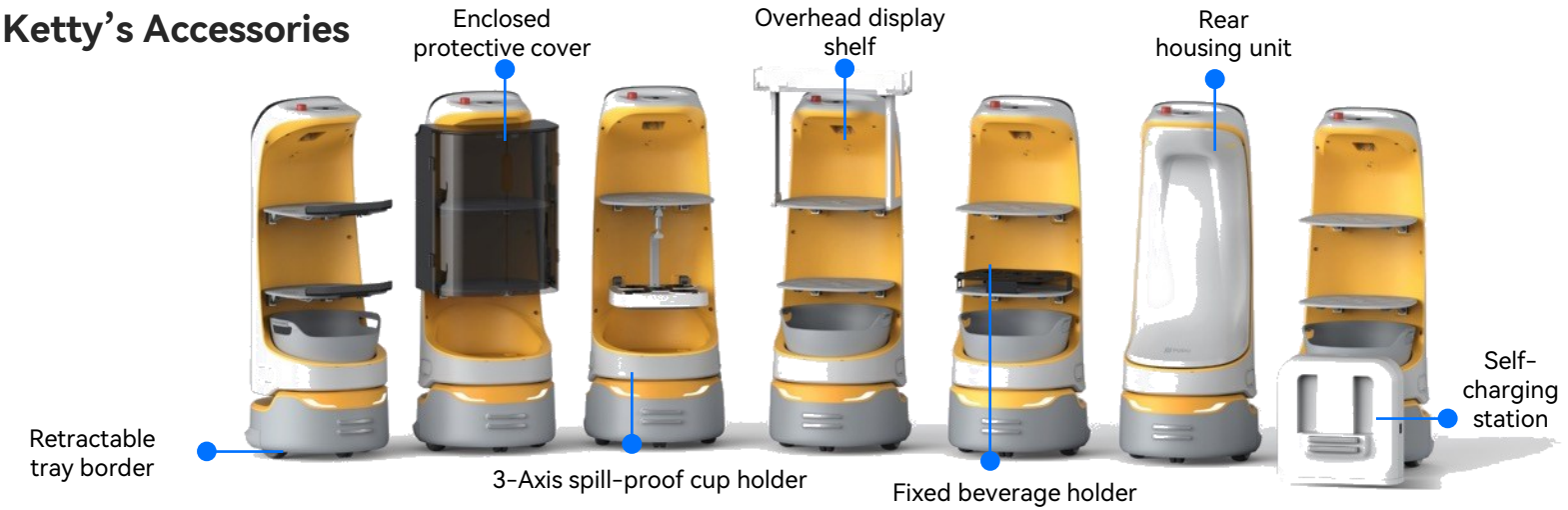


Bluetooth Speaker

Table Tracker

Accessories Solutions

Ketty's Accessories



Bearing tray（Bella）

Enclosed Protective Cover

Cup holder（Bella）

1-N Customized Solutions

PUDU OS

Robot SDK

Skin

Customized Emoji

Customized Voice

Customized Software

Combined with 3rd party hardware

More options to come soon

05

PUDU Introduction

Pudu Robotics

Shenzhen-based and founded in 2016, Pudu Robotics is a world-leading tech-focused enterprise dedicated to the design, R&D, production and sales of commercial service robots on a mission to use robots to improve the efficiency of human production and living.

Since its inception, Pudu Robotics has heavily invested in R&D, obtained multiple awards such as Red Dot and applied hundreds of core patents to lead the development of the robotics category and provide high technology products that would appeal to targeted markets. Pudu Robotics has been rapidly growing in recent years to become a “leader” in the global markets with coverage of over 60 countries and regions worldwide. The robots are widely applied in restaurants, hospitals, schools, office buildings, government halls, subway stations, waiting rooms, etc.

Culture

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

THINGKING IN THE LIGHT OF FIRST PRINCIPLES

BE ENTERPRISING & ACCOUNTABLE

PURSUING FOR THE ULTIMATE

MOVING FAST

BE OPEN-UP

EMBRACING CHANGE

Pudu Robotics: The world largest commercial service robot manufacturer

Total Sales Quantity

60,000+

60,000+ * units have been sold worldwide

Market Share in All Scenarios

TOP1

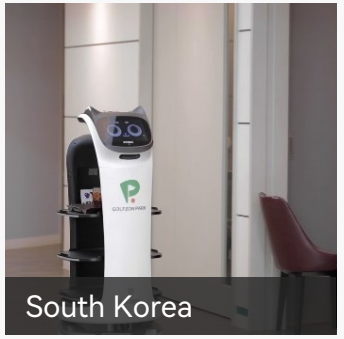
The market share in the full range of commercial service robots is No.1
(Exceeds the sum of the 2nd, 3rd, 4th, and 5th places on the market)

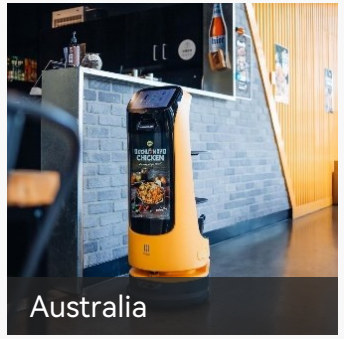
Market Share of the Overseas Catering Industry

>80%

Overseas catering industry's market share > 80%

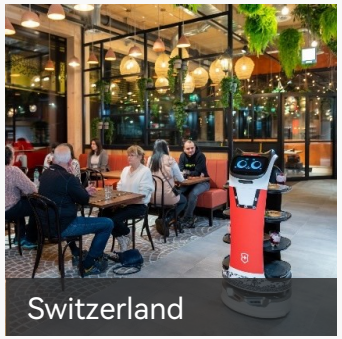
* Relevant statistics as of May 2023

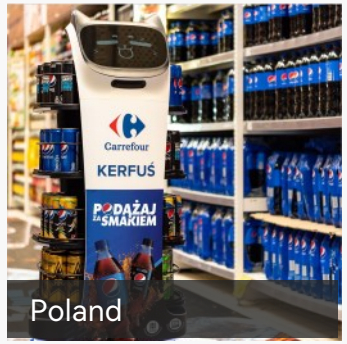

South Korea


Australia

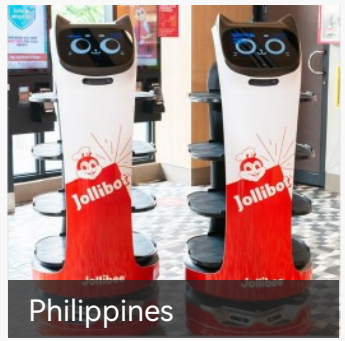

USA


Jordan


Switzerland

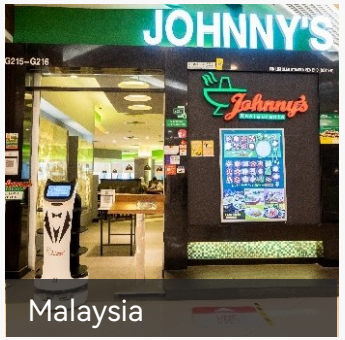


Poland

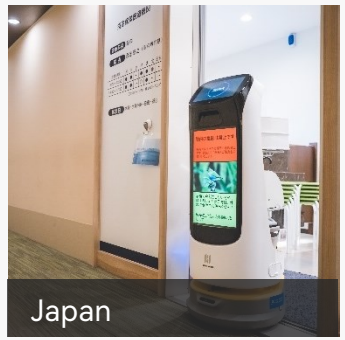


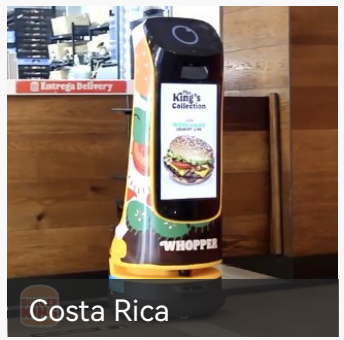
Philippines


Nederland

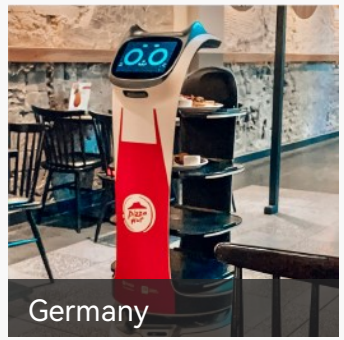


Malaysia


Japan



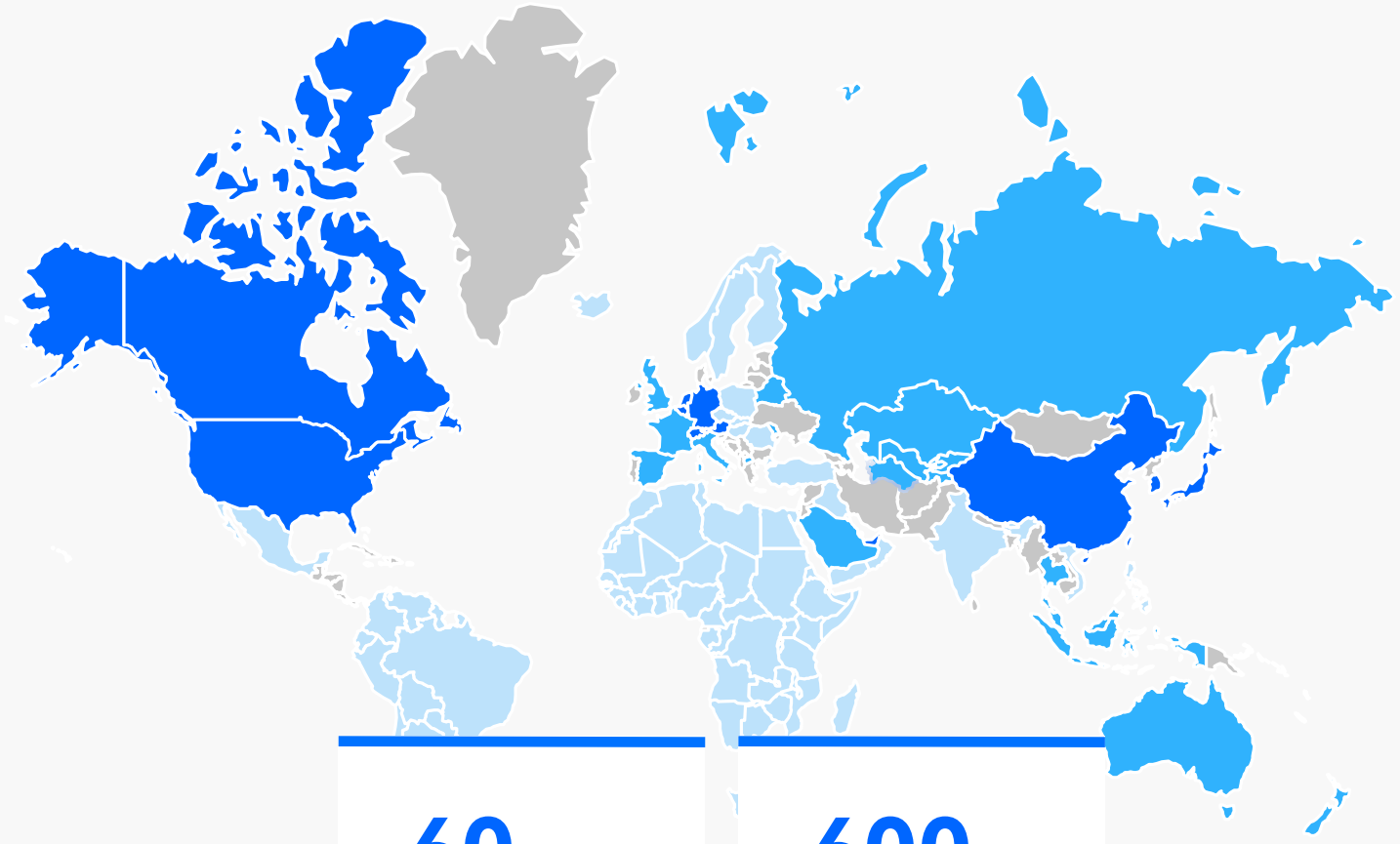
Costa Rica


Germany

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.



60+

- Cover more than 60 countries and regions

600+

- Over 600 cities

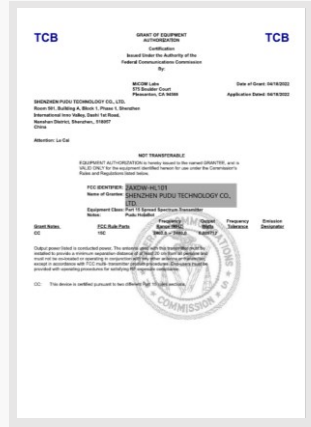
Level 1 Level 2 Level 3

* Relevant statistics as of April 2023

Global Certification

The full range of Pudu Robotics robots have the following certifications worldwide

CE FCC KC RCM IMDA NCC TELEC CR SIRIM EAC NSF



* Relevant statistics as of April 2023

Patent Advantages

Pudu Robotics has submitted a total of 1,439 patent applications worldwide.

* Relevant statistics as of April 2023

Cooperation

80% The market share of the **Top 100** restaurant clients

40,000+ Deployed Store

Catering Partners

Non-Catering Partners

Software and Hardware Partners

PUDU

Thank you!

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