
SiS
Operational Technology

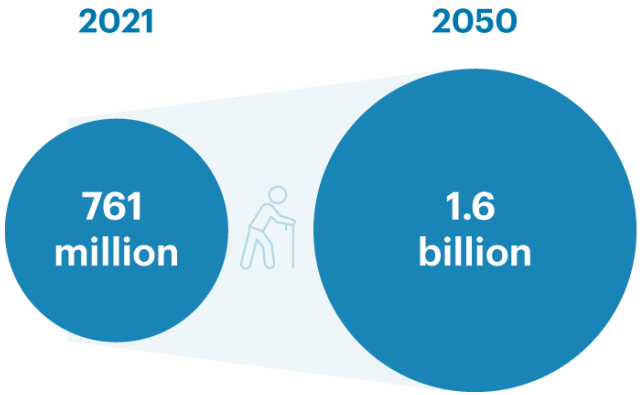
The demand case: A changing labor force

As populations age, fewer workers are available to support the rest

Population aging

In 2021, **1 in 10 people** were aged 65 or older. By **2050**, it could be to **1 in 6**.

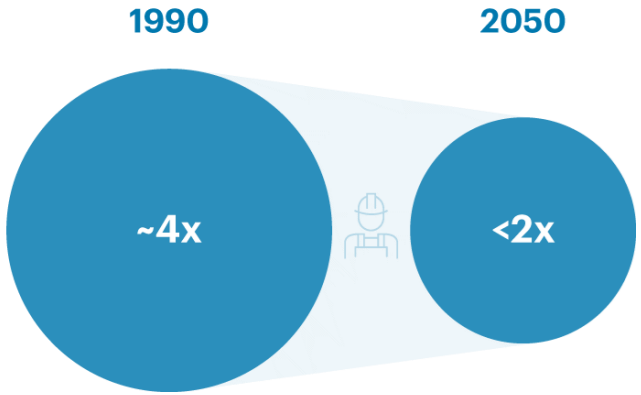
Population older than 65, global



Support ratio declining

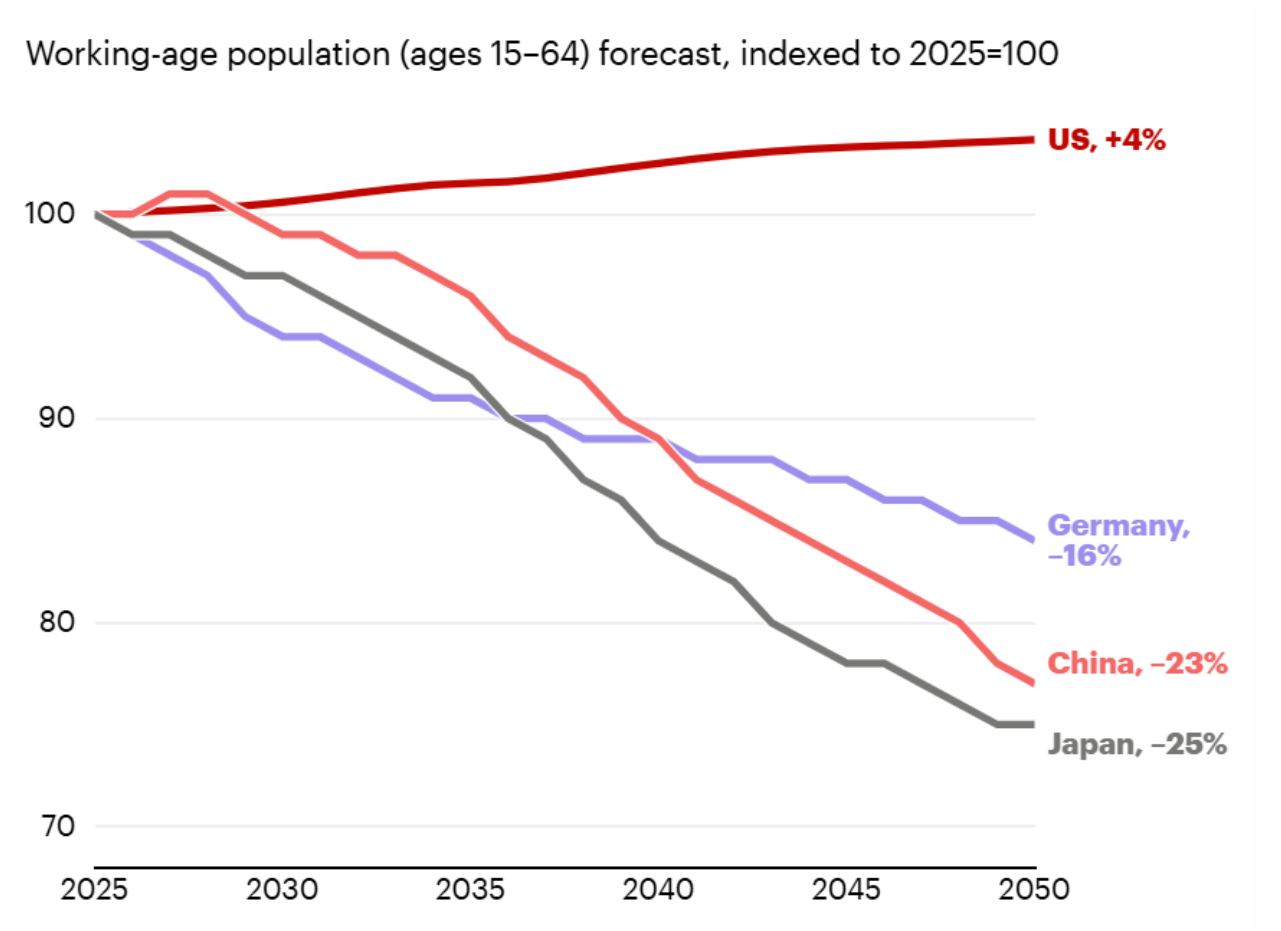
In 1990, there were about 4 people between ages 24 and 64 for each person 65 or older. By 2050, that ratio could drop to fewer than 2 to 1.

People aged 24–64 for each person 65 or older, for EU and North America



The demand case: A changing labor force

Labor shortages are anticipated



Sources: UN World Population Estimates (median); Bain Macro Trends Group analysis

The market ahead: Production rising

Leading companies are ramping up production of humanoid robots

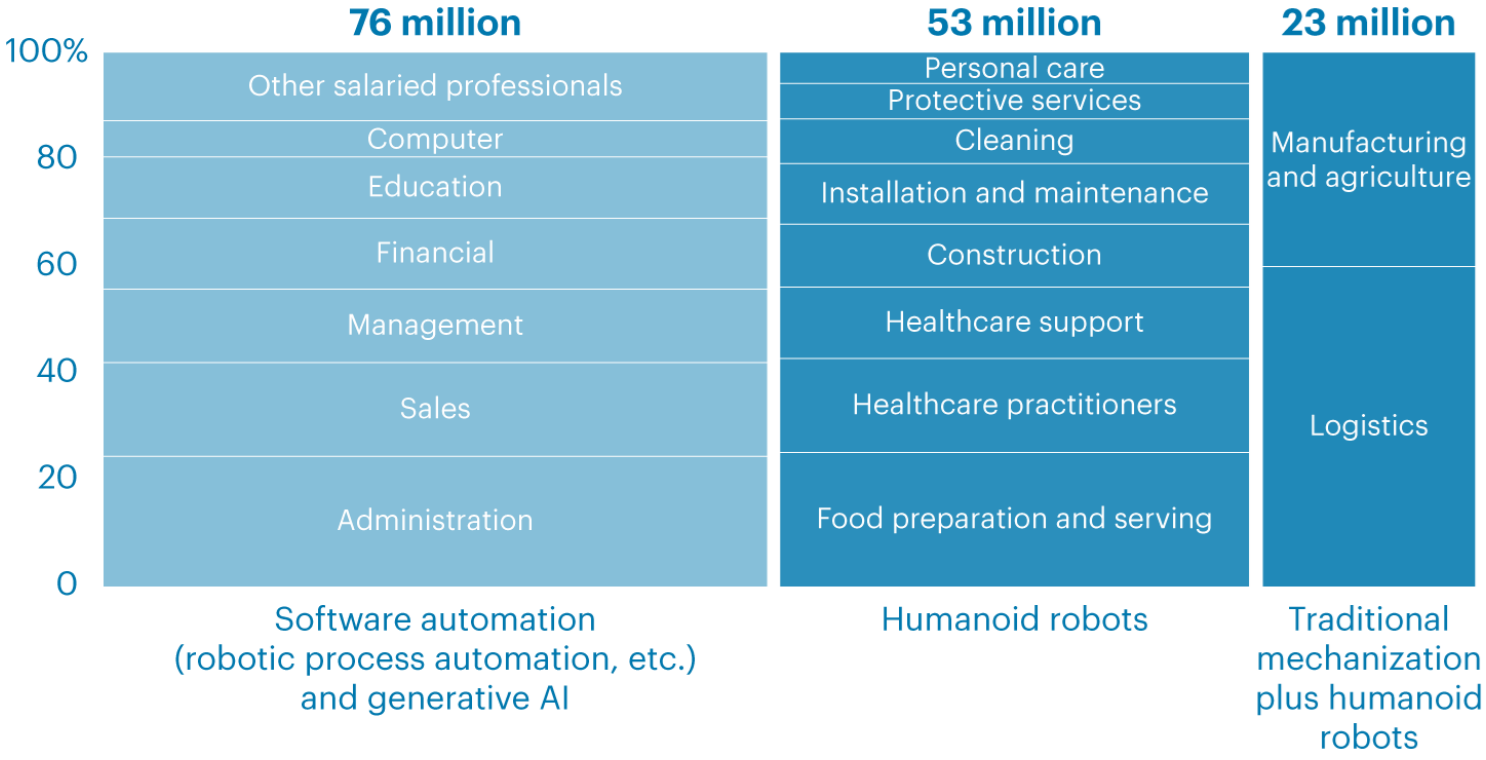
	Headquarters	Planned unit production
Tesla	US	**10,000** by 2025; **50,000–100,000** by 2026; more than **500,000** by 2027
Figure	US	**12,000** by 2025; **100,000** over the next four years
Agility Robotics	US	**10,000** (annual manufacturing capacity)
Galbot	China	**10,000** by 2028
BYD	China	**200,000** deployed in their factories by 2026
AgiBot	China	**5,000** by 2025
UBTech	China	**10,000** by 2027

Sources: JPMorgan Chase; company reports; Bain Macro Trends Group analysis

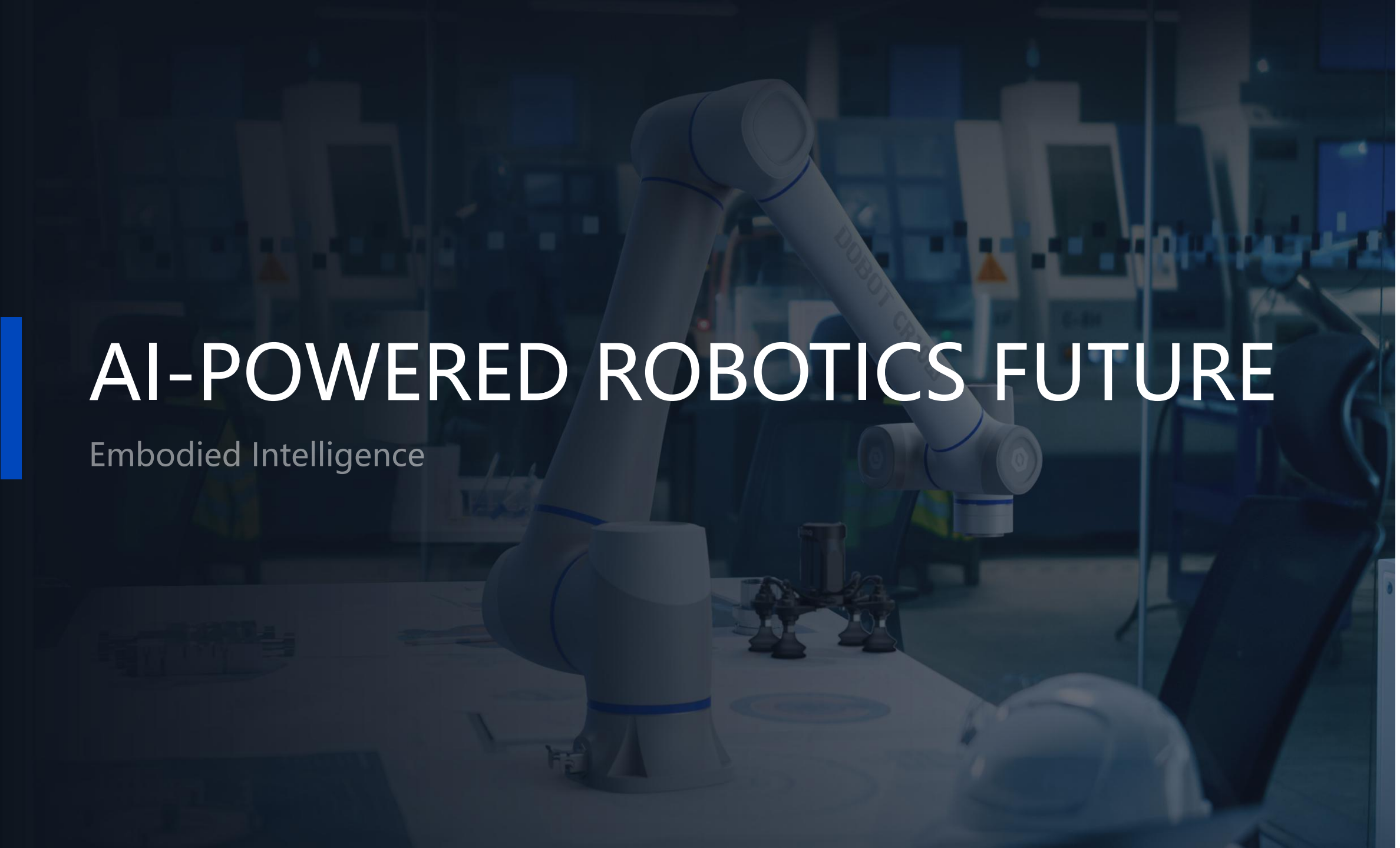
The market ahead: Production rising

Many occupations not well-suited to software or generative AI could be completed by humanoid robots

US employment by occupation, 2023



Note: The US Bureau of Labor Statistics Occupational Employment and Wage Statistics survey excludes private households and some agricultural workers
Source: US Bureau of Labor Statistics Occupational Employment and Wage Statistics survey, May 2023



AI-POWERED ROBOTICS FUTURE

Embodied Intelligence

Embodied AI Robots Open the emerging $100 Billion Market

Collaborative robots are one of the best carriers for full-stack AI technology.
AI robots are empowering various industries and will eventually reach millions of households.

Robots are the crown jewel of manufacturing, an important symbol of a country's technological innovation and advanced manufacturing level.

——**Xi Jinping**

The applications of robots are virtually limitless

——**Bill Gates**

In 30 years, the number of intelligent robots on Earth will reach 10 billion.

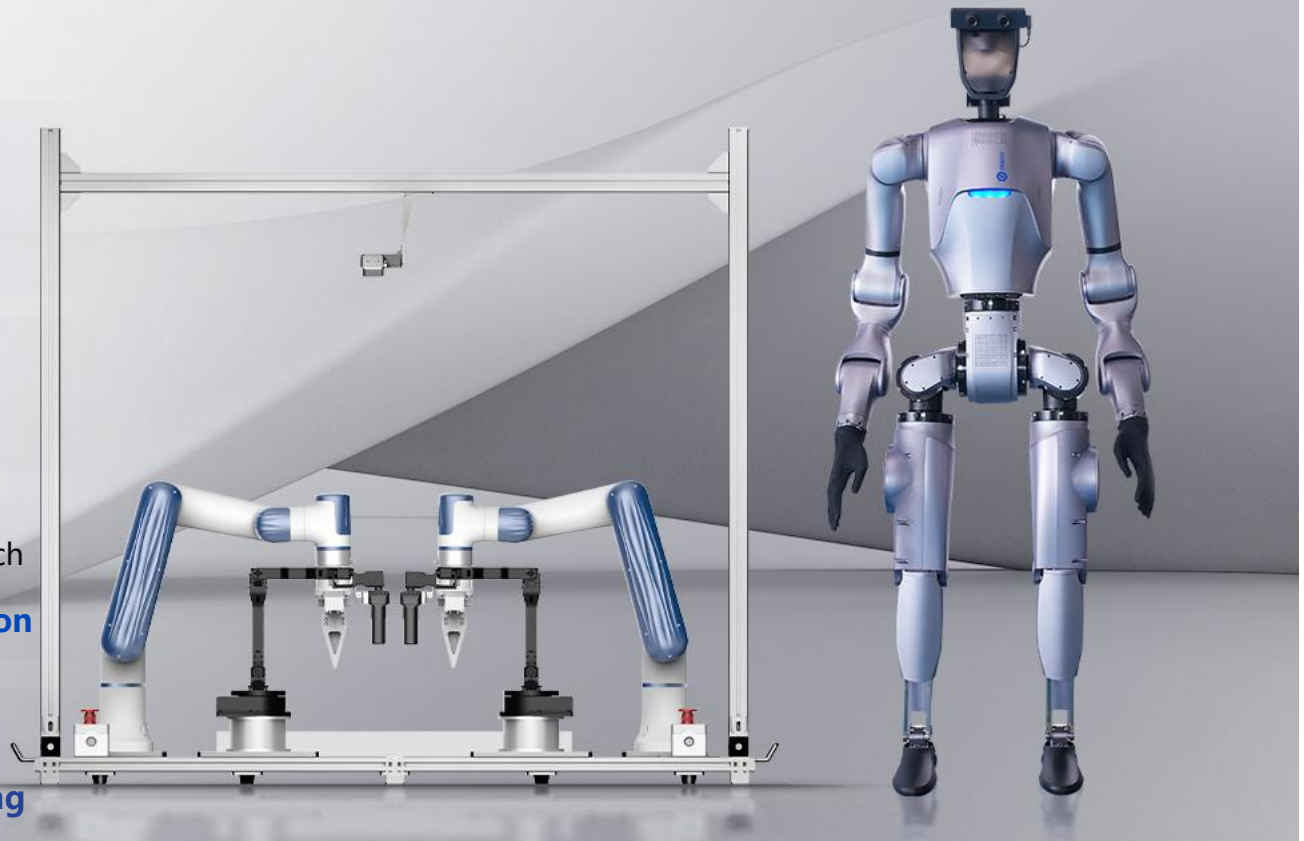
——**Masayoshi Son**

The next wave of AI is "Embodied AI

——**Jensen Huang**

The AI robot market is expected to reach $36.78 billion by 2030.

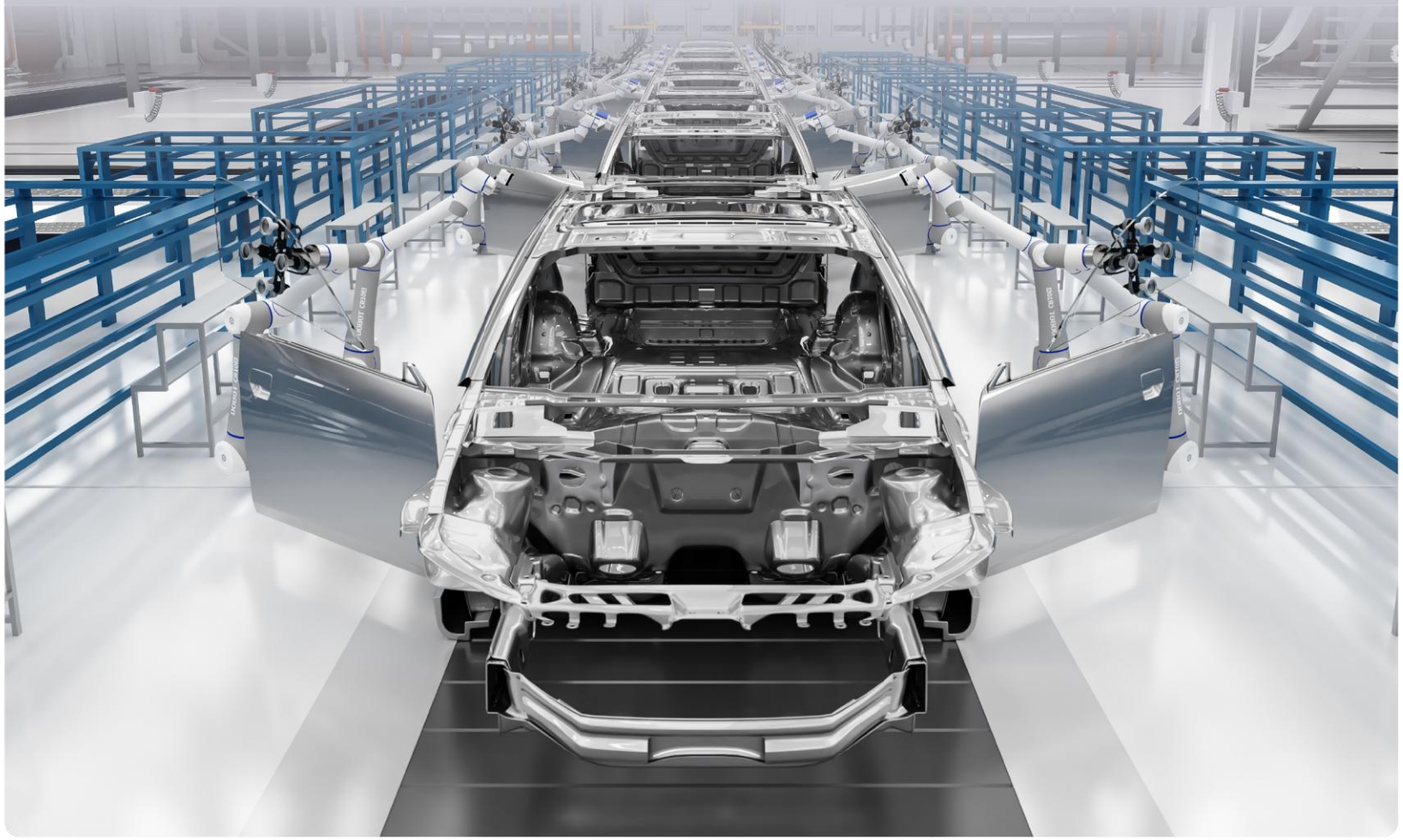
— statista



Embodied AI Robots: Four Key Application Scenarios

Industrial

Handling complex tasks in structured or semi-structured environments

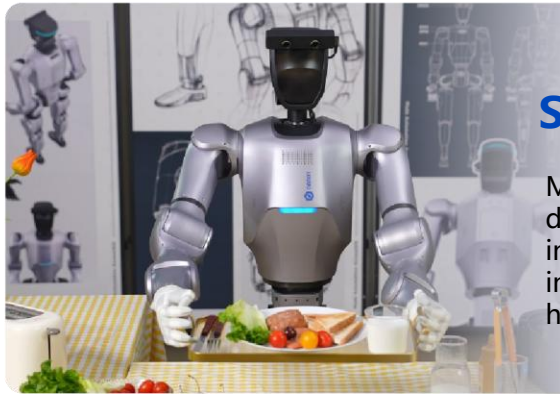


Commercial

Addressing human-robot interaction and complex scenario needs.

Medical

Adapting to complex environments and performing multiple tasks in a human-like manner.

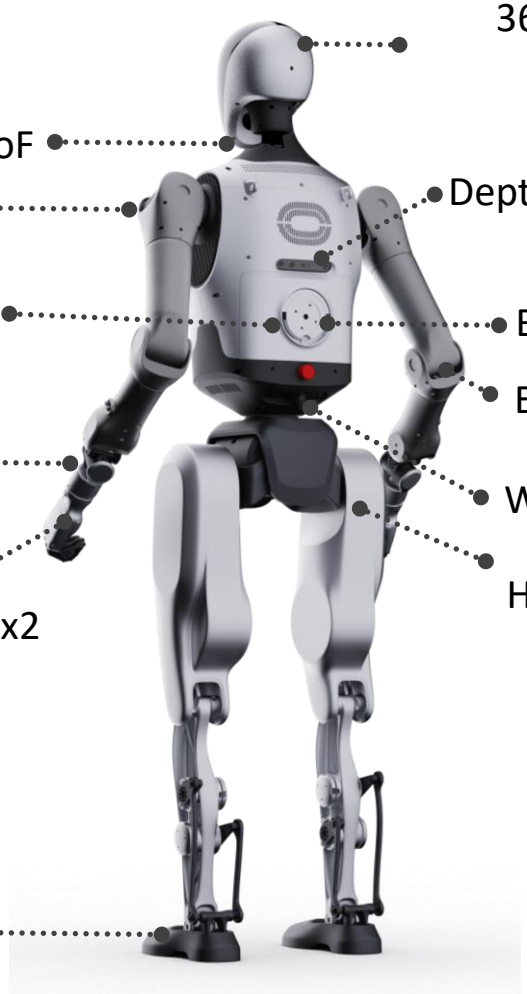


Service

Managing complex dynamic scenarios involving physical interaction with humans

Product Introduction-Body Structure

Walker Tienkung (Embodied intelligence)



360° LiDAR (Optional)

Neck: 3 DoF

Shoulders: 2x 3 DoF

Depth Camera

550 TOPS Computing Module

Battery

Elbow: 1DoF x2

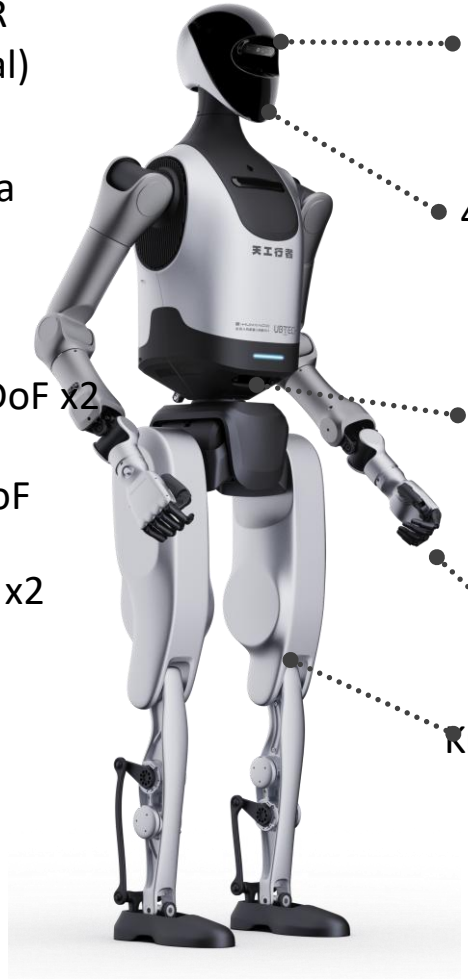
Wrist: 3DoF x2

Waist: 1DoF

Hip: 3DoF x2

Wrist 6-dimensional forces x2

Ankle: 2DoF x2



Depth Camera

4 MIC Array

Depth Camera

2x 6 DoF dexterous hands

Knee: 1DoF x2

Standard Delivery: Robot Body, Power Adapter, Remote Control, Manual, SDK Documentation

Dobot Atom - Max

- The Dobot Atom Max is a cutting-edge 41-DoF humanoid robot designed for advanced robotics research and industrial applications, featuring dexterous 12-DoF hands, a 60FPS Full HD vision system, and Intel RealSense D455 depth sensing. Its optional Embodied AI Set provides high-precision URDF models, an open-source training framework, and multi-modal data tools to accelerate development. The Atom Max adds VR/MR teleoperation with markerless tracking and dual control modes (full-body/segmented), all powered by a 1500 TOPS AI module for real-time edge computing. With sub-millimeter precision and 360° environmental awareness, it significantly lowers the barrier for AI robotics innovation while supporting complex tasks from precision assembly to dynamic locomotion research.

URDF (Unified Robot Description Format) *is an XML-based file format used to define a robot's physical structure, such as its links (rigid bodies) and joints (connections that allow movement).*

Binocular Camera
Full HD mixed reality teleoperation

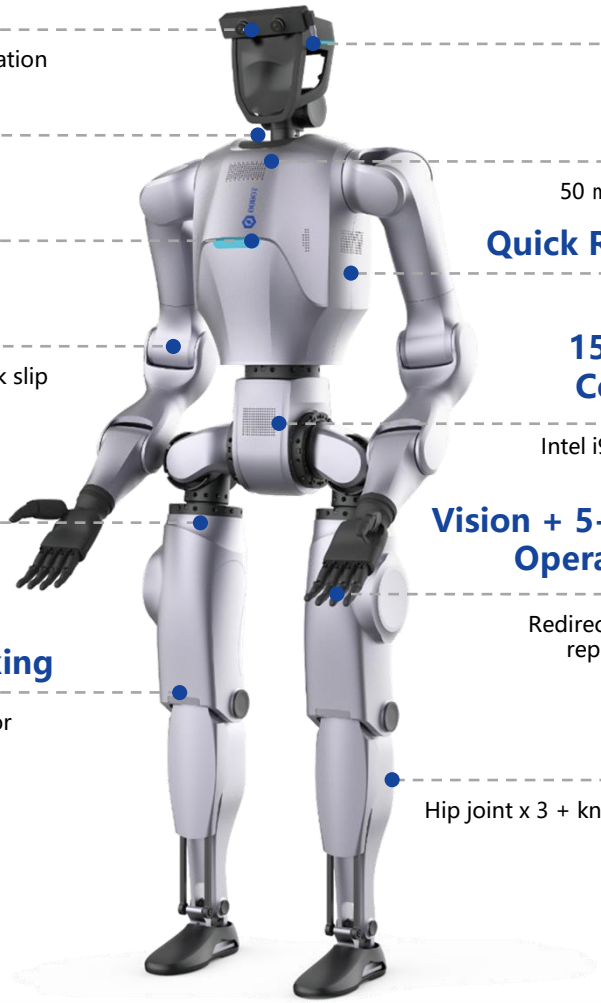
3D LiDAR
LVIOX-MID360

Stereo Speakers
5W

7 DoF Bionic Arm
Shake suppression, control silk slip

Fully Internal Cable Routing
Unrestricted movement

Straight-Knee Walking
End-to-End Neural Network for Human-like Gait



RGB-D Camera
Realsense D455

360° Microphone
50 ㎡ high fidelity sound pickup

Quick Replaceable Battery
15AH

1500 TOPS AI Super Computing Module
Intel i9 + Graphics card with 16GB 256bit GDDR6

Vision + 5-Finger Dexterous Operation Closed Loop
Redirection Technology, accurately reproducing human operations

Single-Leg DoF
Hip joint x 3 + knee joint x 1 + ankle joint x 2

Atom - Max

Open-Source Resources

SDK Software Development Kit

Application Interface

Open Platform

ROS

Hardware Interface

Vector Walking

Arm Trajectory Planning

Whole Body Control

MLLMs

Neural TTS

Neural ASR

Embodied Operation

Embodied Navigation

IMU

Joint Motor

Depth Camera

6D Force

Dexterous Hand Control

Audio Input

Audio Output

LiDAR

For Development

Basic Example

Reinforcement Learning Example

Imitation Learning Example

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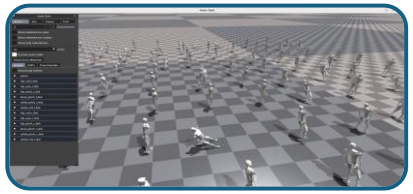
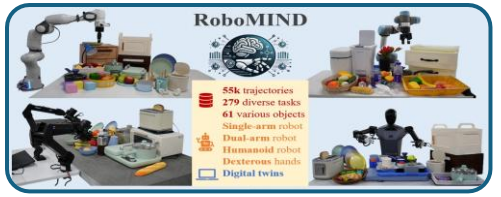
Support

High - Precision URDF



Open Source Dataset



Isaac Sim

NVIDIA

MuJoCo

MuJoCo

Advanced physics simulation

Webots

Webots

robot simulation

Research direction

Directions of Humanoid robot co-research and co-creation

Frontier research topics

Brain

- Embodied Intelligence Technology
- Large Model Voice Interaction
- Large Model Training Database
- Robot Emotional Intelligence
- Humanoid Motion Expression
- Cloud-edge-terminal Collaboration
- Collective Intelligence
- .....

Cerebellum

- Robot Balance Control
- Hand-eye Coordination Technology
- Compliance Control
- Whole-body Coordination Control
- High-dynamic Motion Control
- Robotic Dexterous Manipulation Technology
- Local Obstacle Avoidance
- .....

Physical Platform

- Vision-tactile Sensors
- Flexible Electronic Skin
- Rotary Integrated Joint Module
- Linear Integrated Joint Module
- Reducer Technology
- Motor Technology
- High Precision IMU
- .....

Generalized application scenarios

Flexible Manufacturing

Logistics and Delivery

Special Operations

Supermarket Customer Reception

More Scenarios

Product Innovation

Collaborative Robots Journey : Dobot Brand

4 Series, 29 Models, Load Capacities from 0.25–30kg

2016

Magician Series
World’ s first desktop 4-axis cobots

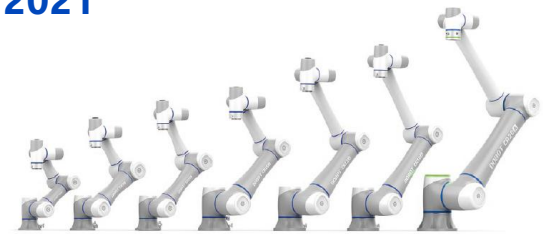
2016

M1 Series
Lightweight 4-axis cobots

2020

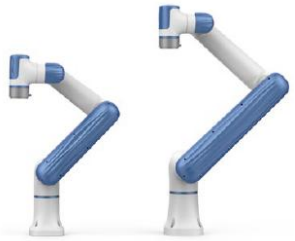
MG400
Industrial-grade desktop 4-axis cobots

2021



CR Series
Mass-production 6-axis cobots

2022

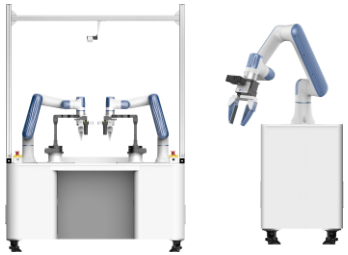


Nova Series
Designed for commercial applications

2023

Magician E6
6-axis cobots tailored for research applications

2024



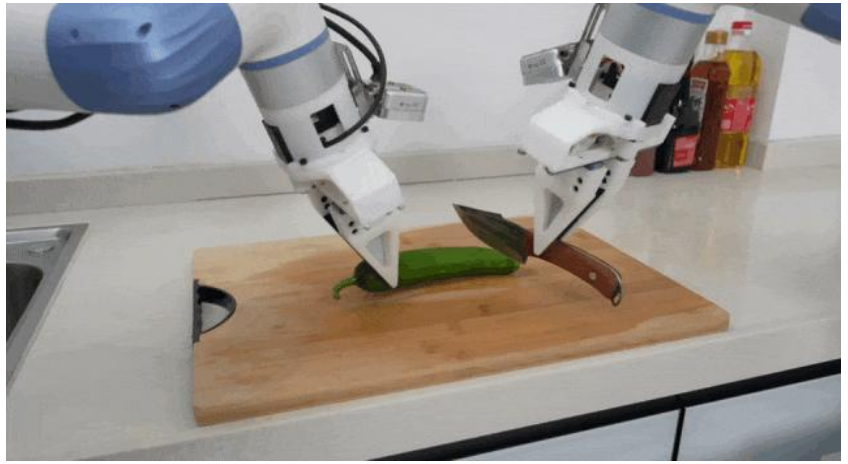
X-Trainer
Embodied intelligent robots for education

2025

AI-Powered Embodied Robots

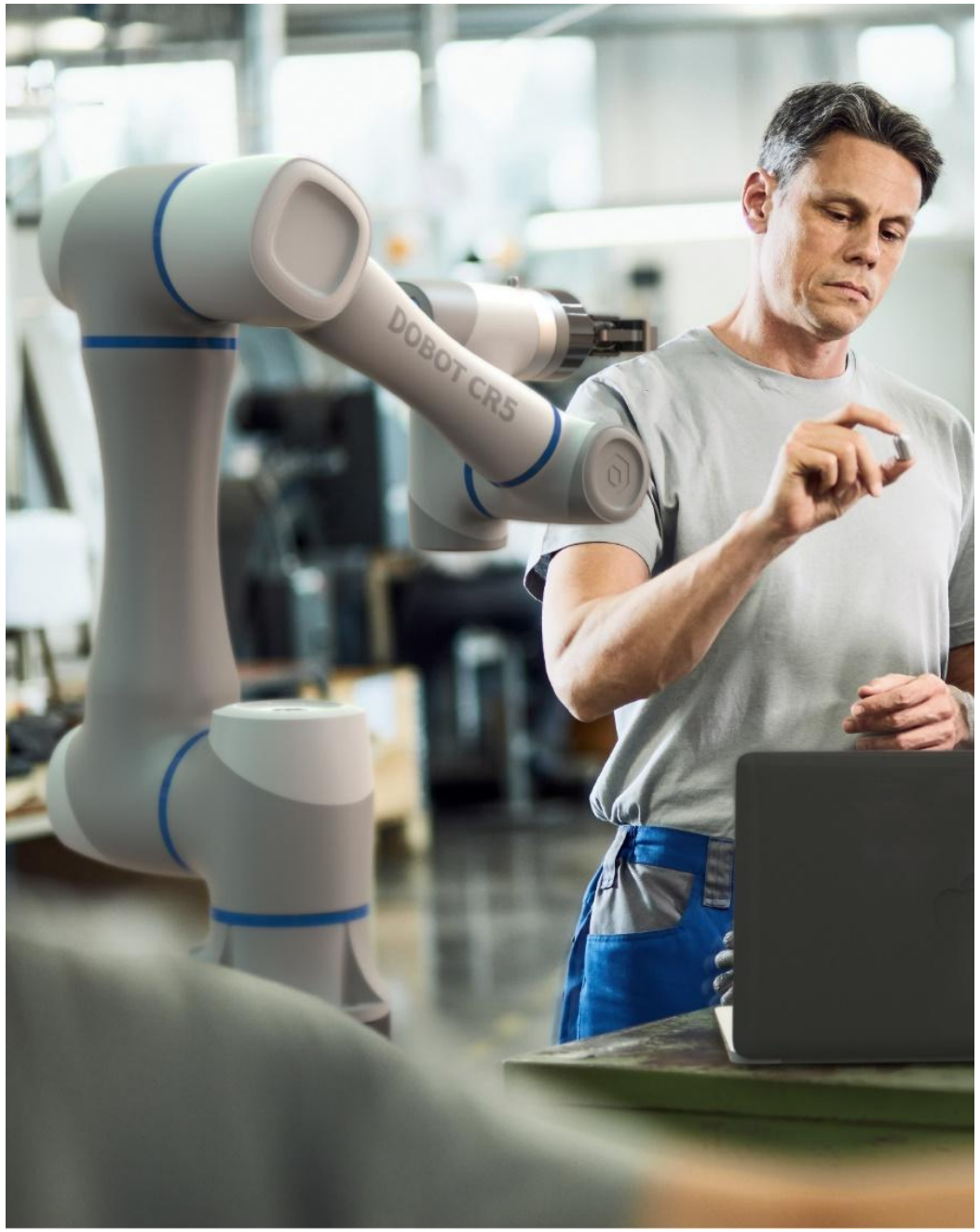
The first to commercialize AI-powered collaborative robots

The embodied AI robot, X-Trainer launched in 2024 has already been implemented by leading manufacturers such as BYD, Luxshare Precision



AI-powered collaborative robot platform, X-Trainer, offers high-quality data collection, low latency (with a 140% improvement in end-to-end response speed), and significantly more efficient learning capabilities compared to similar systems.

Solutions



Solutions

Welding

The welding solution consists of a modular robot station and the welding process package. It works with various third-party arc and laser welding machines and 3D visual guidance. This mobile solution can be easily redeployed.

- **Deploy in 30 minutes**
- **Reduce idle time with 2 stations scheduling**
- **Enhanced safety with collision detection**
- **Supports various weave patterns**
- **Supports various metal materials**
- **Compatible with mainstream welding machines**

Solutions

Palletizing

The palletizing solution consists of a robot station and the palletizing process package with all modules already connected. Users can effortlessly define pallet patterns.

- **Easy to use**
- **Built-in safety features with expansion ports**
- **Monitor live status and review operation history**
- **30 kg maximum payload**
- **10-20 objects/min**
- **2,100 mm maximum palletizing height**

Solutions

Screwdriving

The screwdriving solution consists of a robot station and the screwdriving process package to perform accurate screwdriving using M1.0 to M5.0 screws. The solution supports various working angles and quick redeployment to satisfy the needs for small batch productions.

- **Easy creation of screwdriving procedures**
- **Calibration in 2 steps**
- **Consistent quality & capable performance**
- **Safe collaboration with one click reactivation**
- **Works with various application scenarios**

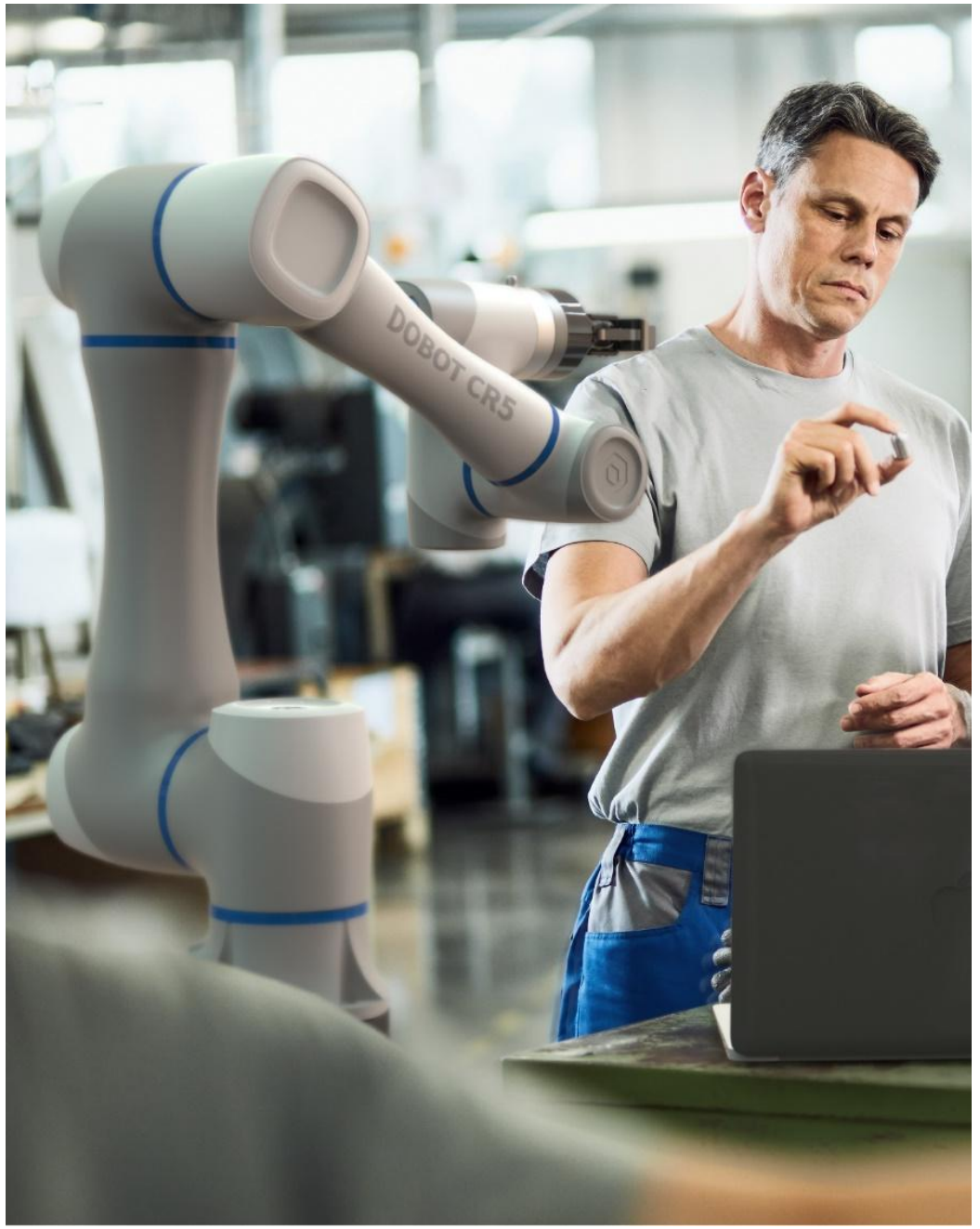
Solutions

CNC Solution

The CNC Loading & Unloading Solution supports various workstation types including Chessboard, Beveled, and T-Tooling to accommodate different workpiece trays. Its software platform enables configuring in just 30 mins without programming.

- **Supports various workstation types**
- **Easy to use**
- **No Programming Required**
- **Quick changeovers**
- **Switch production in 10s and change pallets in 30mins**

Case Studies



Global Customers - Automotive

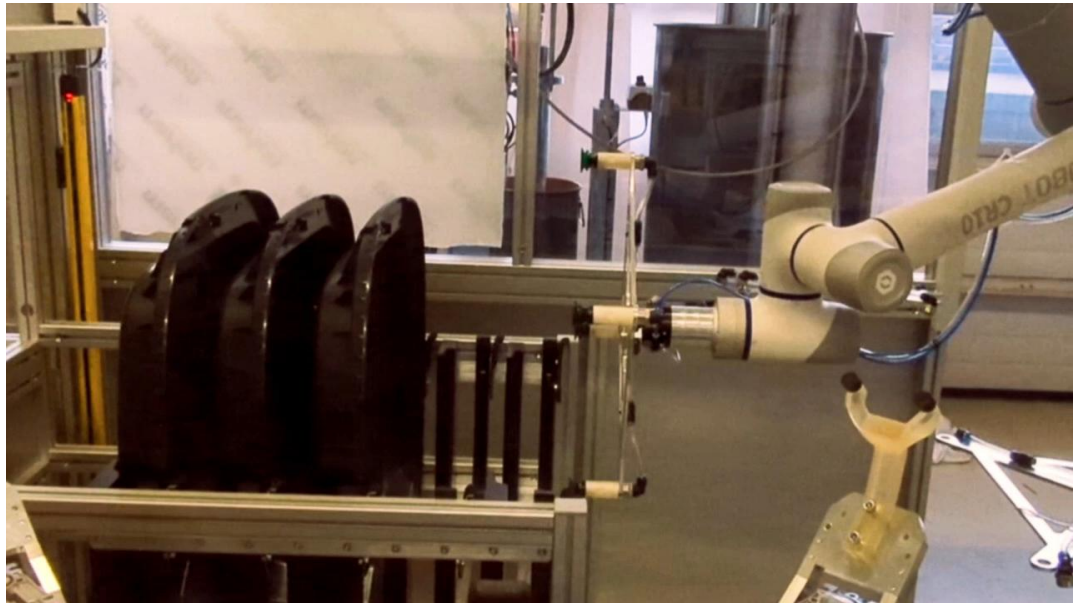
Loading/Unloading of Automotive parts suction cup for Benz

Country: Germany
Background: the world's leading car manufacturers

Customer Pain Points:
Inefficiency:
Manual sorting and handling of car parts were slow and labor-intensive, leading to decreased production rates.
Error-Prone:
Manual handling often resulted in damaged parts and incorrect placement.
Lack of Flexibility:
Traditional automation equipment lacked the flexibility to adapt to different car part sizes and configurations.

Solution:
Dobot CR10 Collaborative Robots are implemented to automate the loading and unloading of automotive parts.

Product Highlights:
The CR10 has a working radius of 1300 mm that satisfies tasks that require long reach.



Consistent Quality

Reduce Chance of Workplace Injury

Global Customers - Automotive

Gearbox screwdriving for Jatco

Country: Japan
Background: the world's third largest automatic transmission design manufacturer

Customer pain points:

1. Manual screwdriving is inefficient. Too much force can easily damage the screw holes, making it difficult to ensure product consistency.
2. The space for the transformation of traditional production lines is limited.

Solution:

The solution consists of a CR16 collaborative robot and a locking kit. The EoAT adopts a double electric gripper design and two screws are locked at the same time, helping complete the pre-tightening task of the screw set of a gearbox within 32 seconds.

1 cobot = 2 human workers

safe workforce

quality consistency

produces 1000 pcs per 8-hour shift

ROI<12 months

Global Customers - Automotive

Automatic Sorting of Cut Synthetic Board for TOYOTA

Country: Japan
Background: the world's leading automobile manufacturer

Customer Pain Points:
1. Manual sorting is inefficient and prone to errors.
2. Traditional automation equipment lacks flexibility and is hard to redeploy afterwards.

Solution:
The board cutter first cuts the boards into different sizes, then the robot sorts and places them into different rack locations. The end tip of the robot uses a combination of grippers to grab all the cut boards at once and place them one by one, greatly increases production efficiency.

Product Highlights
The CR10 has a working radius of 1300 mm that satisfies tasks that require long reach.

+20% Efficiency

Consistent Quality

Reduce Chance of Workplace Injury

Global Customers - Automotive

Upload and download solution for testing chips for BYD

Country: China
Background: the world's leading automobile manufacturer

Customer Pain Points:
1. Cramped chip testing workshop requiring repetitive loading/unloading, resulting in high manual labor.
2. Precise chip positioning and orientation required during loading/unloading, prone to human error.

Solution:
1. Utilize the MG400 industrial desktop robot to automate chip material handling - loading to testing, then unloading.
2. 24/7 robot operation with 99.9% accuracy, reducing errors.
3. 80% reduction in manual labor, 30% efficiency improvement.

1 cobot = 5 human workers

production efficiency 30%

quality consistency

ROI <6 months

Global Customers – Machinery Manufacturing

Loading/Unloading in Bearing Machining for Johnson Controls

Country: America
Background: produce fire, HVAC, and security equipment for buildings

Customer Pain Points:

1. Industrial robot solution: space-consuming and lack of safety
2. Frequent upgrades, various models, frequent changeover of production lines
3. Manual feeding is prone to errors, low in efficiency, and high in cost

Solution:

CR Robot achieves signal interaction with machine tools and feeding mechanisms through I/O, realizing a series of actions including automatic identification of incoming materials, loading, initiating processing, and unloading. The collaborative robot is equipped with a safety skin that stops when a manager approaches, ensuring both production efficiency and collaborative safety.

Customer Value:

1.The robot has excellent stability in material handling, resulting in higher efficiency in human-robot collaboration and reduced labor costs.
2.It occupies minimal space and can be easily integrated without the need to alter the production line layout.

1 cobot = 15 human workers

production efficiency 10%

safe workforce

human-robot collaboration

ROI<12 months

Global Customers – 3C Electronics

Headphone charging compartment screwdriving for Luxshare

Country: China
Company Background: Established in 2004, 78,000 staff. Focus on connectors, cables, also supply Chain Enterprise for Apple.

Customer pain points:
1. Repetitive tasks performed by a human operator are inefficient.
2. The flexibility of traditional automation is insufficient to meet the needs of small-batch and multi-variety production.

Solution:
The solution consists of the DOBOT CR robotic arm and screwdriving robotic accessories to perform the screwdriving of the headphone charging compartment. The precise positioning of the robot and the combination of electric batch torque control will help achieve efficient screwdriving automation. The program ensures the production yield rate via real-time monitoring of screw status. In addition, the program supports rapid adjustment to meet the needs of multi-variety production.

1 cobot = 2 human workers

production efficiency 20%

quality consistency

mixed line production

ROI <12 months

Global Customers – Food & Beverage

All-in-one Automation optimized production for Cadbury

Country: UK
Background: the second-largest confectionery brand in the world

Customer Pain Points:
1. Labor shortage
2. Complicated sorting require to recognize different size, color, bar and other info
3. Manual sorting is not efficient to meet the delivery timeline

Solution:
1. CR robotic arm with AI Vision was introduced to the assembly
2. The precise positioning of cobot within 0.02mm leads to zero downtime and quick palletizing
3. The blocky programming allows workers learn and quickly shift among different product lines
4. The AI vision technology of the solution enable to finish complex automation tasks
5. The Safeskin of the cobots guarantee the safe and smooth human-machine collaboration

Global Customers – Medical Laboratory

Quality Inspection Automation Solution for PerkinElmer

Country: USA
Company Background: 85 years of history, the world's largest manufacturer of analytical instruments.

Customer Pain Points:
The in-vitro diagnostics provider faced challenges in quality inspection: labor-intensive, time-consuming manual methods prone to human error, leading to incorrect assessments and potential quality issues. Growing demand and the need for high-quality standards also strained their workforce.

Solutions:
Integration: Cobot and AGV provided 24/7 smart automation
Advanced Features: IP54 protection, 0.02mm repeatability
Cleanliness: Certified for Class-100 Cleanliness, ideal for laboratory

Thank you.