

2025 Oct. 16 (Thu) - AI & Robotics Strategic Innovation



Dr. **Shih-Jung Huang**

PM 02:40 - 03:10

從工業機器人邁向人形機器人新紀元

Transitioning from Industry Robots to the New Era of
Humanoid Robots

Chief Operating Officer, Techman Robot



Transitioning from Industry Robots to the New Era of Humanoid Robots

Scott Huang Ph.d | COO

10/ 16/ 2025

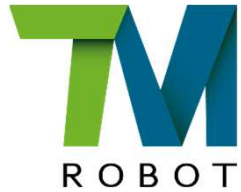
CONFIDENTIAL

TM AI COBOT

01.

Company Introduction

Techman Robot Introduction



- Techman Robot Inc. (stock code 4585) was established in 2015 and officially listed on Taiwan's Stock Market in 2025/9/26.
- Capital: 1000 million TWD
- Global Employee: ~450
- Global Sites:
 - HQ: Taoyuan, Taiwan
 - Subsidiary company & branch office:
Busan, Korea; Shanghai & Shenzhen, China; Nagoya, Japan; Alblasterdam, Netherland
- Main Product:
 - Built-in AI Vision Cobot
 - AI Software Service
 - Smart Factory System Integration Solution

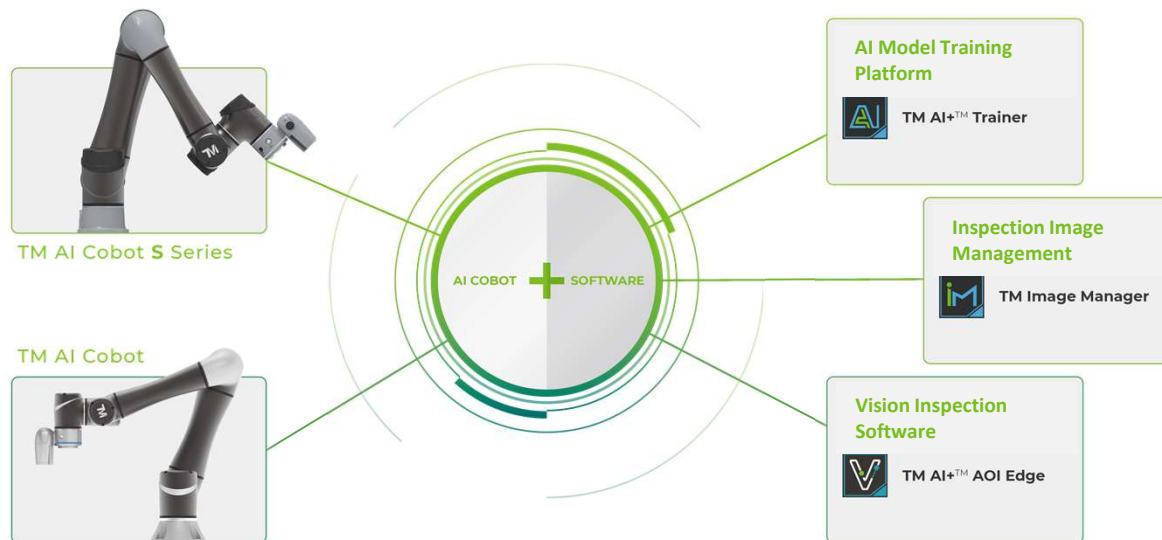


CONFIDENTIAL

TM AI COBOT

What Is An AI Cobot?

An AI cobot is a robot that combines the three technological areas of **AI, vision, and cobot**. It achieves the integration of **brain, eyes, and hands**, allowing the robot to perform tasks by **seeing, judging, and executing** like a human. Automating processes saves time and money, fosters collaboration with humans. improves production quality, and adds value to your factory.



CONFIDENTIAL

TM AI COBOT

TM AI Cobot - S Series

- Enhance motor speed to optimize **25%*** in cycle time!
- Repeatability improved by up to **70%** to **0.03 mm!***
- Qualified for **IP54** for both the robot and control box
- Certified by **TÜV** for up to **31** Safety Functions
- Approved safety certification in different areas: **UL & CSA for North America, CE for Euro**



Regular Payload Series

TM5S

- Payload: 5kg
- Reach: 946mm

TM6S

- Payload: 6kg
- Reach: 1800mm

TM7S

- Payload: 7kg
- Reach: 758mm

Medium-Heavy Payload Series

TM12S

- Payload: 12kg
- Reach: 1300mm

TM14S

- Payload: 14kg
- Reach: 1100mm

TM20S

- Payload: 20kg
- Reach: 1300mm

Heavy Payload Series

TM25S

- Payload: 30kg**
- Reach: 1902mm

TM30S

- Payload: 35kg**
- Reach: 1702mm

* In comparison with the previous version / **Under the palletizing scenario

CONFIDENTIAL

TM AI COBOT

TM Global Site & Distributor Map

With over 100 distributors and SI around the world



CONFIDENTIAL

TM AI COBOT

TM Global Sales Region - Our cobot arms and software production are selling in over 50 countries



02.

The New Era of Humanoid Robots

Industry 3.0: Traditional industrial Robots

CONFIDENTIAL

TM AI COBOT

1. Traditional Automation (Before 2018)

Traditional Industrial robot

Only **motor encoder sensor**

Blind and **unaware** of surroundings

Dangerous
(Heavy weight, high speed)

Complete on precision and repeatability
(**structured** environment)

Require components and integration

Require **expert** to design and program to meet automation requirements



Fix everything with the robot

Jigs

Traditional robot

Customized vision



Customized table

Lifter

sensors



PLC

Fence



CONFIDENTIAL

TM AI COBOT

02.

The New Era of Humanoid Robots

Industry 4.0: AI Cobot

CONFIDENTIAL

TM AI COBOT

2. AI Cobot (Now)

Built-in vision and AI for enhanced intelligence.

AI Cobot with vision
Build-in Camera and AI inference
Aware of environment
Safe (Light weight, low speed) ISO10218, 15066
Focused on flexibility and ease of use
Fully integrated & self contained
Easy to use, TMFlow(no code programming)

AI · Powerful
Built-in vision algorithms, including positioning, reading, OCR, and measurement capabilities.

Flexibility
With TM Landmark, TM robot shows great flexibility with peripheral equipment

Professional
Built-in autofocus color camera and light source

Simple

- No need to integrate additional camera and light source
- No external wiring required.
- One-click automatic arm calibration.



CONFIDENTIAL

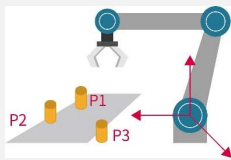
TM AI COBOT

AI Cobot – Vision capability: Positioning & AOI

■ Unique TM Landmark Features

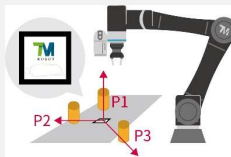
The unique TM Landmark features allow the robot to quickly update the relative position data of surrounding objects by scanning the landmark. Users do not need to re-adjust the robot.

Without Vision



All points are recorded in robot base. Once the robot changes its position then all points will need to be re-taught.

With Vision



The coordinate can be based on workpiece or any visual features. When the robot or surrounding objects changed their position, all points can be dynamically updated with just one glance, bringing great flexibility, especially for AGV applications.

■ Built-in vision application

Positioning



Identification



Measurement

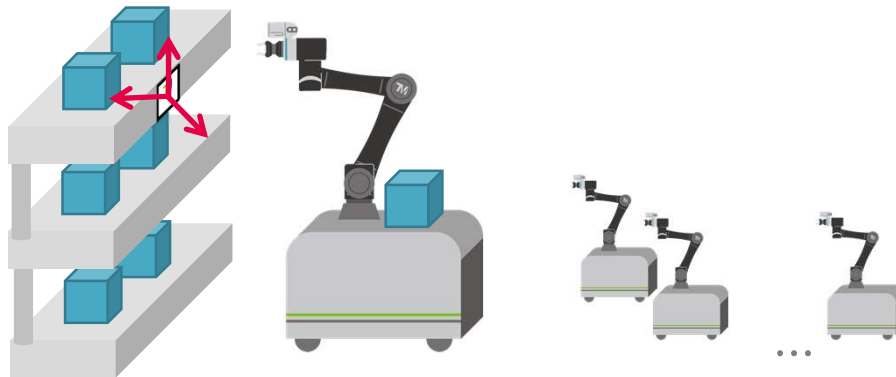


AI inspection



AI Cobot: Mobility must have visual capabilities

- Built-in vision **comes pre-calibrated before delivery** with camera intrinsic, hand-eye, and kinematics parameters, enabling easy project duplication across multiple robots.
- In contrast, aftermarket vision system integration requires extensive calibration and is difficult to replicate.
- With **TM TCP auto-calibration**, once the first robot is online, the rest of the fleet can be quickly duplicated.



First robot

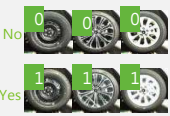
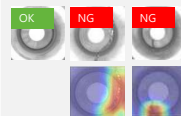
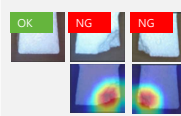
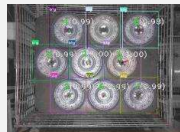
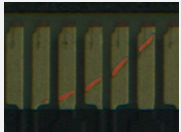
Duplicated robots



Application video

AI Cobot – AI Inspection Capability

- TM AI+ Trainer on-site is used for neural network model training to avoid the leakage of confidential images
- The arm controller is built with an AI inference engine for highly real-time operations and does not require an additional PC
- TM Image Manager is used for AOI image management and building digital resumes of products

Assembly Inspection	Classification	Defects Inspection	Counting /Detection	Scratches /Cuts /Dents Inspection
 ■ Checking if the tires are wrapped with PE film  ■ Checking if all wires are connected correctly	 ■ Sorting different materials for wooden furniture  ■ Recognition of pizza flavor and crust	 ■ Checking if there are metal scrap on the surface  ■ Identifying objects with damage on the edge	 ■ Counting the amount of the object in the tray  ■ Objects detection and 3D positioning	 ■ Checking scratches on DRAM gold fingers  ■ Checking the dents on metal parts

■ Source : <https://news.u-car.com.tw/article/63975/>



■ Example of implementation

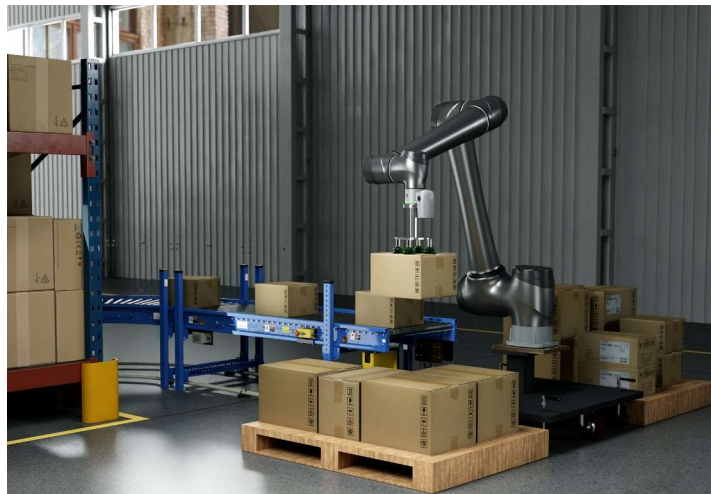
- Utilizing AI technology to fulfill diverse AOI inspection requirements

CONFIDENTIAL

TM AI COBOT

Digital Robot: Generating AI technology to make data more accessible

De-palletization Application



Manual collection



AI generates different surface features



Omniverse generates different placements



AI generates different boxes, pallets, and floor features

- Manual collection of **over a thousand** genuine data sets, enhanced through NVIDIA Omniverse and Repliator functions to generate approximately **40 million virtual data**, including different materials, printing, and pallet stacking images, training a versatile AI model.

CONFIDENTIAL

TM AI COBOT

02.

The New Era of Humanoid Robots

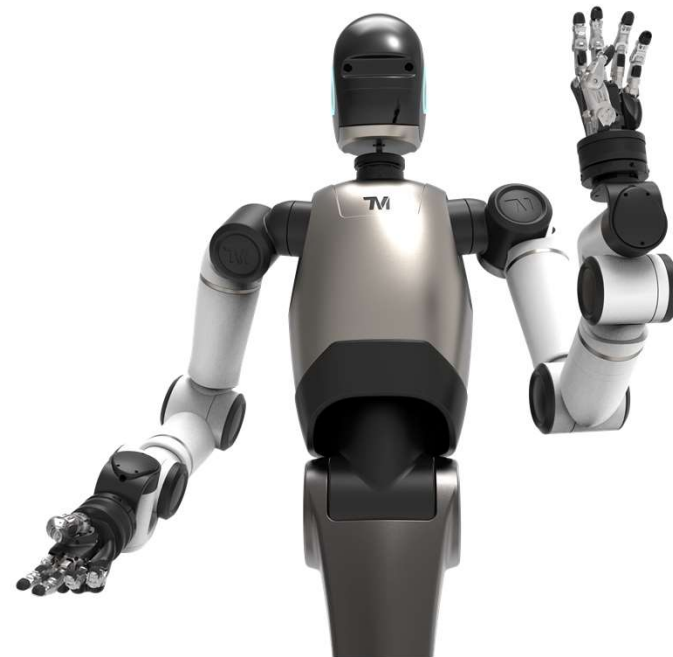
Industry 5.0: Towards Humanoid Robot

CONFIDENTIAL

TM AI COBOT

The Robotic Evolution: Moving Towards Greater Intelligence

Humanoid Robot
with diverse sensors, such as 2D/3D vision, force, and hearing
Contextual reasoning with multimodal perception
Higher safer requirement, (no ISO standard yet)
Designed for human-like dexterous manipulation (unstructured and dynamic scenarios)
AI-native and general form factor
Ready to use

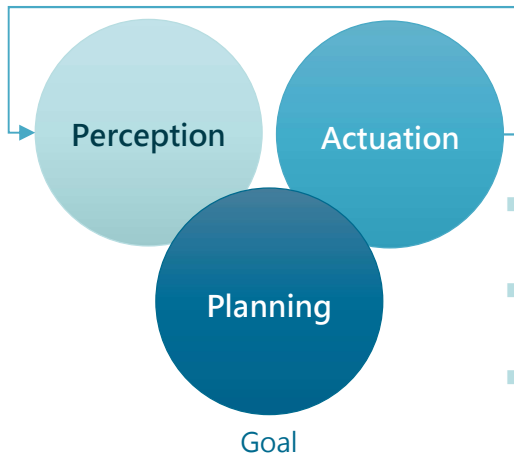


CONFIDENTIAL

TM AI COBOT

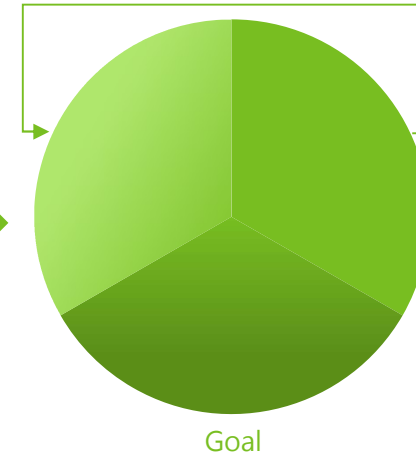
AI revolution is the key in Robotics

Tradition - the drive comes from the human brain



- Traditional algorithm pairs, Limited environmental awareness
- Humans write programs to control robots based on physical models
- Plan and implement strategies with human brainpower

Future - Powered by BigData/AI models/computing power



VLM
Environmental awareness

CLM
Generate a robot control program

Interpreting human intentions with LLMs, and generate an execution strategy



- Traditional robots can only be used in **logical and environmentally fixed environments**
- Under these conditions, it is not possible to provide flexible manufacturing and services.

Generative AI - Solutions for Flexible Applications:

Digital Twin: BigData generation

LLM: Large Language Model

VLM: Vision Language Model, image language model

Code LM: Programmatic generative AI

Advance the latest technology - End-to-End AI models



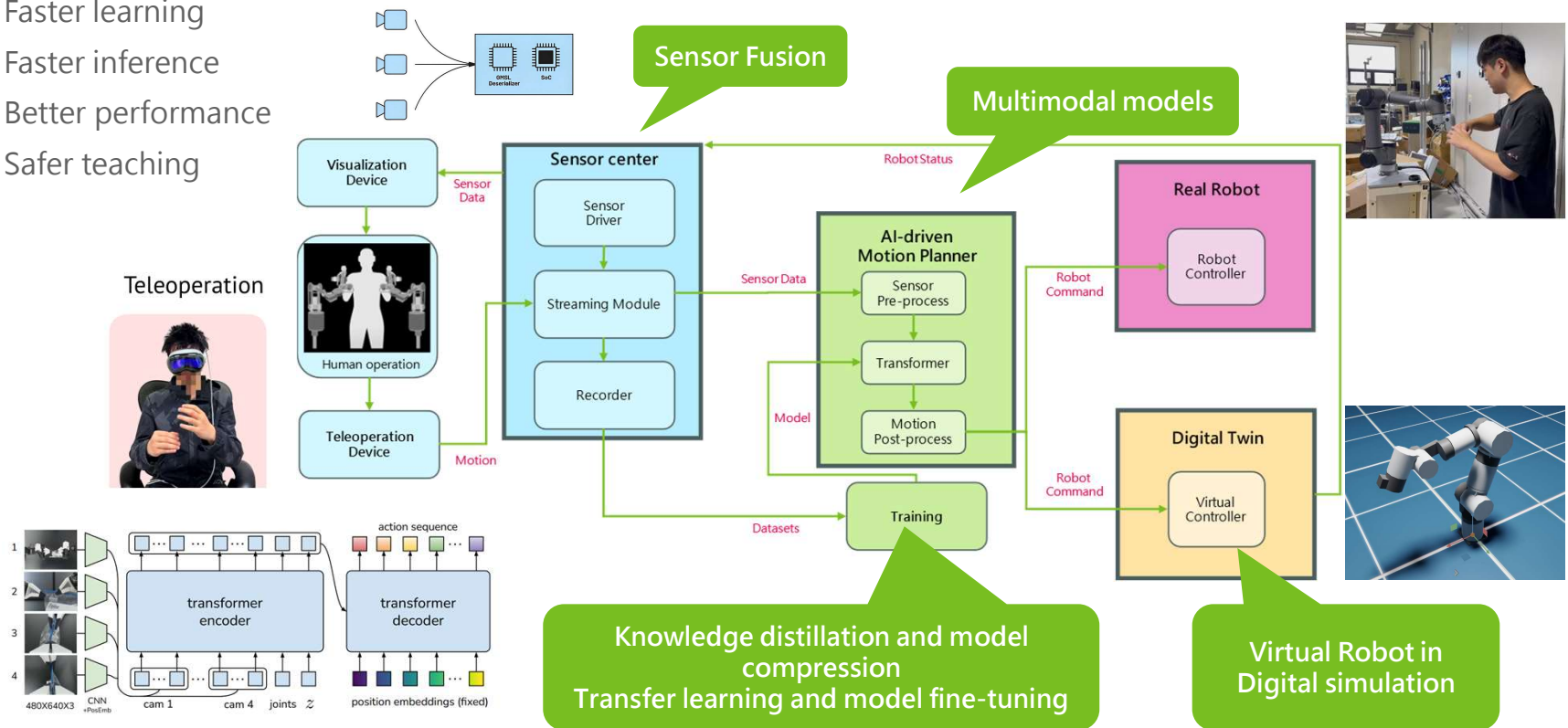
CONFIDENTIAL

TM AI COBOT

Robot learn From Demonstration: VLM/VLA AI Training and Inference system

Make it easy for users to learn new skills through teach-in systems or foundation model fine-tuning

- ✓ Faster learning
- ✓ Faster inference
- ✓ Better performance
- ✓ Safer teaching



CONFIDENTIAL

TM AI COBOT

Humanoid Robot: Product Positioning and Vision

Intelligent · AI-native

Comprehensive multimodal Reasoning
Include perception, reasoning, and
actuation into unified form factor



Capability · form factor

Mobile, Bimanual, and sensor-integrated for
complex tasks(head/hand vision, force sensing)

Potential · Partner

Powered by NVIDIA as a strategic partner, with

- NVIDIA Jetson Thor platform
- Cutting-edge AI technologies.

Value · Application

the robot is capable of handling unstructured
scenarios.

- Inspection
- Machine Tending
- services



03.

Challenges and Opportunities

Opportunities and Challenges of Humanoid Robots

Challenges:

- **Safety Concerns:** Must ensure safe operation around humans. Safety is essential.
- **High Costs:** Material, Development and Maintenance are expensive.
- **Technical Challenges:** difficult to collect Big-Data of sensors and behaviors in the physical world
- **Cyber security:** Privacy, Information security issues

Opportunities:

- **AI-enhanced capabilities:** AI is evolving rapidly and is capable of perception, reasoning, planning and action.
- **Innovation-driven:** Sensors, drive technologies, and automation technologies are developing rapidly.
- **Versatile Applications:** Faced with labor shortages, Humanoid Robot is suitable for manufacturing, healthcare, services, and other fields.
- **Cost Reductions:** Increased volume and technological maturity are accelerating cost reductions.
- **Safety and Security:** Issues will be resolved as regulations mature.



THANK YOU !

CONFIDENTIAL

TM AI COBOT