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The Full-Stack Era of Haptics

- From Perception and Data to Model Intelligence



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TASHAN TECHNOLOGY

触觉赋能千行百业

www.tashantec.com

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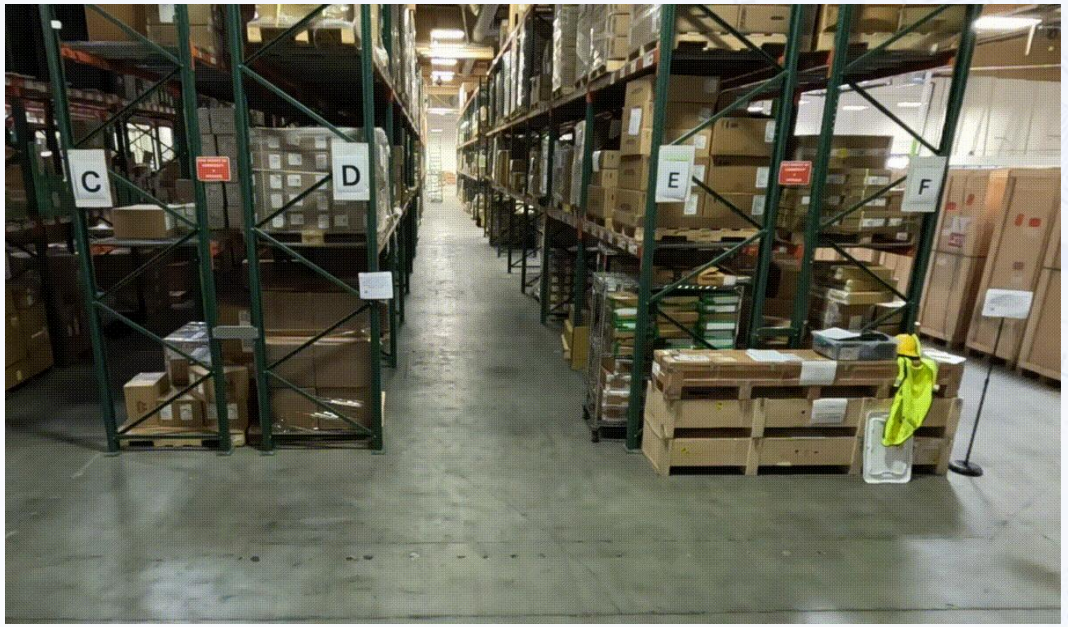
Company Profile



- Founded in 2017, the company specializes in the research and development of tactile sensing technologies;
- Developed the world's first analog-digital hybrid AI tactile sensing chip and a tactile perception algorithm, overcoming the global challenge of "simultaneous analysis of multi-dimensional tactile perception signals;
- Widely adopted in robotics, automotive, home appliances, and consumer electronics.

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How Do Robots Create Real Value?





Application Areas: Tasks humans are reluctant to perform;
The benchmark for robots is humanity itself.

1. Mobility Issues

Moving ourselves from one place to another — the lower body

2. Object Manipulation and Transformation

Moving and transforming objects in the world — the arms and hands

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In 2017, we asked ourselves our first question:

What are robots truly missing?



Boston Dynamics Atlas (2018)



Aloha (2024)

Touch is more than perception.

It is the most important channel through which humans interact directly with the physical world.

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Tactile Perception Serves as a Critical Channel for Interaction Between Robots and the Physical World.

SEE



- Understand the environment
- Object Recognition
- Motion Planning

TOUCH



- Force
- Contact point
- Slip
- Temperature
- Material
- Proximity

Connecting perception, action, and learning

ACT



- Action Correction
- Feedback Loop
- Continuous learning

Sense → Act → Feedback → Learn

Without tactile sensing, a robot can only "see" the physical world; with tactile sensing, a robot can truly "enter" the physical world.

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Tashan's Journey

Application







Chip



Fingertip



Hand

Today, hundreds of thousands of Tashan tactile fingertips are deployed across diverse humanoid robots worldwide.

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Core Technology

The research team has independently developed the "chromatic tactile sensing technology" and the "distributed brain-inspired chip architecture technology," overcoming the global challenge of "simultaneous parsing of multi-dimensional tactile sensing signals"

Heshan Technology's Emerald E10A is the world's first dynamic tactile sensing chip, as well as the first chip capable of directly converting tactile signals into pulse signals via ASC, thereby empowering robots to evolve from localized tactile perception to full-body tactile-sensory integration.

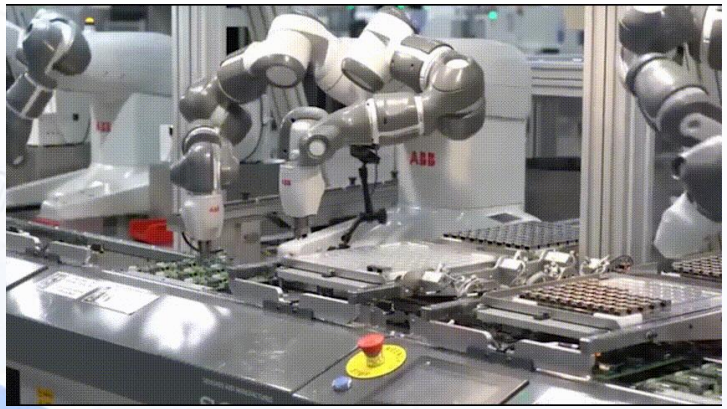
- Dynamic Tactile Feedback
- ASC simulated pulse conversion
- Low power consumption
- Asynchronous architecture
- Low latency
- Safety
- SNN
- Integrated Infection Control

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We asked ourselves a second question:

Why do robots still struggle to perform real work, even after gaining tactile perception?

Traditional industrial automation



Embodied intelligence



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Robots Need More Than a Single Success — They Need Consistent Success.

The real world will never appear exactly as it did during training.

One success is a demonstration.
Consistent success is real work.



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From Tactile Sensors to Generalizable Robot Training



In 2025, Tashan began building in Tactile and Multimodal Data & Innovation Center

- Exploring Different Paths to Robot Learning
- Starting from real-world scenarios with clearly defined prior knowledge
- Exploring model generalization across heterogeneous robot embodiments

Modalities

- Multidimensional Tactile Sensing
- Multi-View Vision
- Joint Force Perception
- Motion Trajectories

Multi-Scenarios

- Hardware Terminals
- Dexterous Hands
- Robotic Grippers
- Single-/Dual-Arm Workstations

Multi-Configurations

- Home
- Hospitality
- Retail
- General Assembly
- Precision Manufacturing
- Agriculture
- Healthcare

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Transform the Tactile Feedback from Manual Operations Into Trainable Data.

For Embodied Intelligence: Data Acquisition, Imitation Learning, Teleoperation, and Robotic Skill Training



Five-finger tactile glove
+
dorsal hand data acquisition module

Tactile Perception

Supports three-dimensional force and proximity sensing, recording contact, pressure application, sliding, and approach phases.

Hand Posture

EachofthefivefingertipsisequippedwithanIMU,andtheacquisitionboardalsofeaturesanadditionalIMUforposeestimation.

Unified Data Collection Pipeline

Convergence of multi-channel tactile inputs,time synchronization,andunified upload facilitate subsequent alignment and training.

Open Software Interfaces

It includes a host computer and provides C++/PythonSDKs,making it easy to integrate with customers'existing platforms

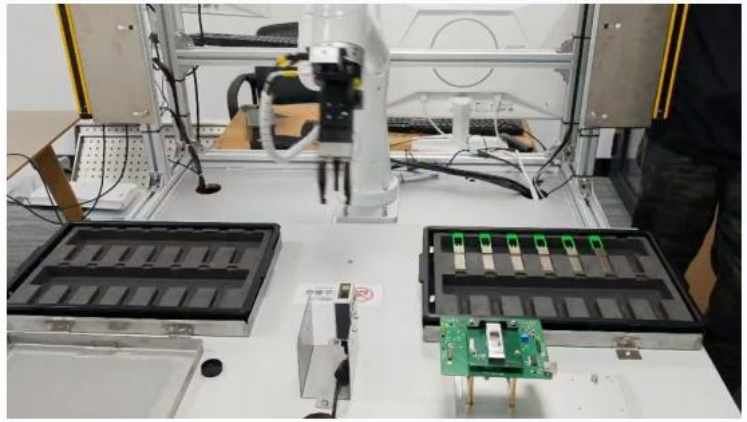
Portable | Dress-type | Multimodal | Developable

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Scenario-Based Applications

Embodied application solutions centered on haptics

Industrial





Agricultural and Secondary Industries

Chemical Fiber





Others

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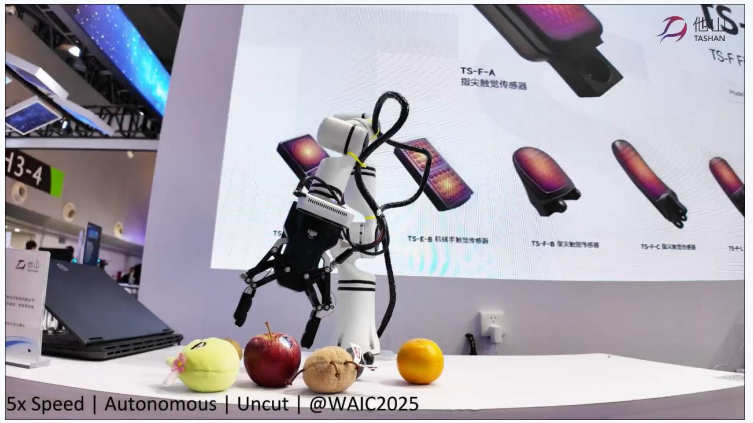
The third question: Why has extensive repetitive training still failed to produce generalization?



Imitation is only the most superficial form of learning.

What robots need is not more isolated data, but experience that can be continuously accumulated and updated through real-world interaction.

All of our successful caseshave depended substantially on autonomous embodied learning.



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Robot Kindergarten



Hishan Technology has collaborated with **Professor Richard Sutton—a Turing Prize laureate and chief scientist of the OpenMind Global Research Institute—**to jointly develop the "Robot Kindergarten" project,which aims to establish a kindergarten-like learning environment (a laboratory) where robots can learn and grow through direct experience, much like children or young animals.



Unveiling Ceremony of the Robot Kindergarten – June 29,2026



At the 2026 World Artificial Intelligence Conference (WAIC), Professor Sutton visited his booth at Huashan to share insights on the "Robot Kindergarten" project jointly developed by both parties.

The first concrete application of reinforcement learning theory in the field of embodied intelligence marks a pivotal transition for robotics—from the "data era" of passive imitation to the "experience era" of interactive trial and error.



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Together, Let Us Become the Educators of Robots

The Robot Kindergarten is an open initiative for the entire embodied intelligence industry.

We aim to build an open infrastructure for robot learning:

- **Real-world environments for interaction**
- **Stable, reliable, and durable robot platforms and hardware**
- **Multimodal data integrating vision, action, and touch**



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THANKS

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