Tachin Technology – Flexible Tactile Data Acquisition Glove - EMF Version TachinGlove Pro-E

1 Product Description

The TachinGlove Pro-E Flexible Tactile & EMF Pose Data Acquisition Glove integrates high-density full-hand tactile signal acquisition with EMF electromagnetic spatial positioning, achieving high-precision tactile signal collection and hand motion capture. The product features an ultra-thin flexible electronic skin sensing array that collects multi-modal tactile signals (such as normal and tangential forces) and records contact force distributions during gripping, pressing, and sliding across the five fingers and palm. Meanwhile, it incorporates 5 built-in EMF positioning sensors to achieve 25-DOF hand pose reconstruction and output 6-DOF poses (3-axis position + 3-axis rotation) for the fingertips, enabling hardware time synchronization for tactile force data, hand spatial posture, and joint angles.

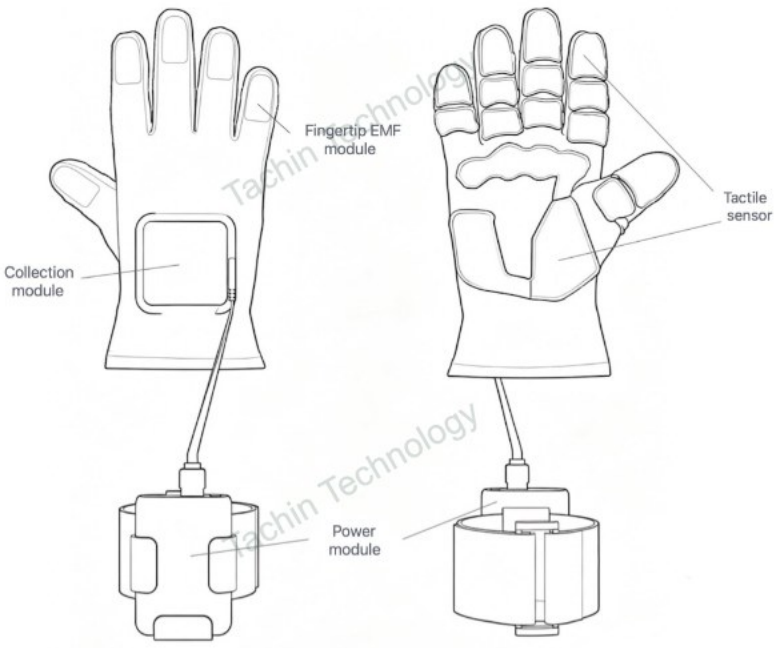
The product adopts a biomimetic high-density array layout covering the five fingers and palm; its flexible substrate adapts to natural hand bending and grasping, while a structural low-noise design suppresses air-grasping signals to reduce invalid data interference. Featuring a unique quick-release design, the acquisition module, EMF module, and glove body can be rapidly separated for easy replacement of glove consumables, making it ideal for high-frequency testing and multi-batch collection. It supports dual communications via wired USB and wireless Wi-Fi, and comes with a detachable battery module to eliminate cable constraints. The product can be applied in scenarios such as embodied AI training, robotic teleoperation, rehabilitation assessment, and industrial operation data collection, providing high-precision and high-reliability full-hand tactile and pose signal acquisition and data recording solutions for related systems.

2 Product Features

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- Multi-dimensional Tactile Sensing: Normal force, tangential force
- High Force Resolution: 0.05 N/cm²
- High-Density Sensor Array: 783 sensing points
- High Coverage Area: Full coverage of all five fingers and palm, featuring a biomimetic palmprint layout
- Wide Force Range: Up to 30 N/cm²
- High Spatial Resolution: < 2 mm
- Low-Noise Data Acquisition: Suppresses air-grasping signals, reducing dirty data generation
- EMF Spatial Positioning: 5 positioning sensors, 25-DOF hand pose reconstruction
- Fingertip Output: 6-DOF (3-axis position + 3-axis rotation), positioning resolution < 0.2 mm
- Tactile & Pose Hardware Synchronization: Hardware clock synchronization for tactile force data and EMF pose data streams
- Modular Quick-Release Structure: Independent disassembly and maintenance for glove body, fingertip EMF sensors, and acquisition module
- High Flexibility: Wi-Fi connectivity, free from cable constraints

3 Product Structure



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Component	Description
Glove Palm	The palm and five fingers contain 783 pressure sensors arranged in a biomimetic palm-print array layout for collecting contact pressure distribution data during grasping, pressing, sliding, and other operations. The system supports low-noise acquisition during free-grasp conditions, reducing false trigger signals and invalid data interference in non-contact states, thereby improving data stability, usability, and purity.
Glove Back	Integrated high-precision data acquisition module for sensor signal collection, processing, and transmission, supporting high-frequency data acquisition requirements; integrated Wi-Fi communication module supporting wireless data transmission; supports a quick-release design, allowing rapid replacement when the glove becomes worn.
EMF Fingertip Sensing Unit	Features built-in electromagnetic positioning sensors at the fingertips with internal wiring routing, supporting 6-DOF (3-axis position + 3-axis rotation) acquisition per fingertip. Can be independently detached and replaced from the glove body.
Power Module	Equipped with a high-capacity replaceable battery supporting continuous sampling time of more than 5 hours.

4 Product Specifications

Parameter Category	Parameter Item		Typical Value
Appearance & Weight	Glove Size (L×W)		210×150 mm
	Glove Thickness (Single Layer)		40±0.5 mm
	Battery Size		76.5×53.2×15 mm
	Glove Net Weight		140 g
	Battery Net Weight		90 g
Tactile Sensor	Sensor Size	Sensor Thickness	1.0±0.1 mm
		Sensing Dimensions	Normal Force + Shear Force

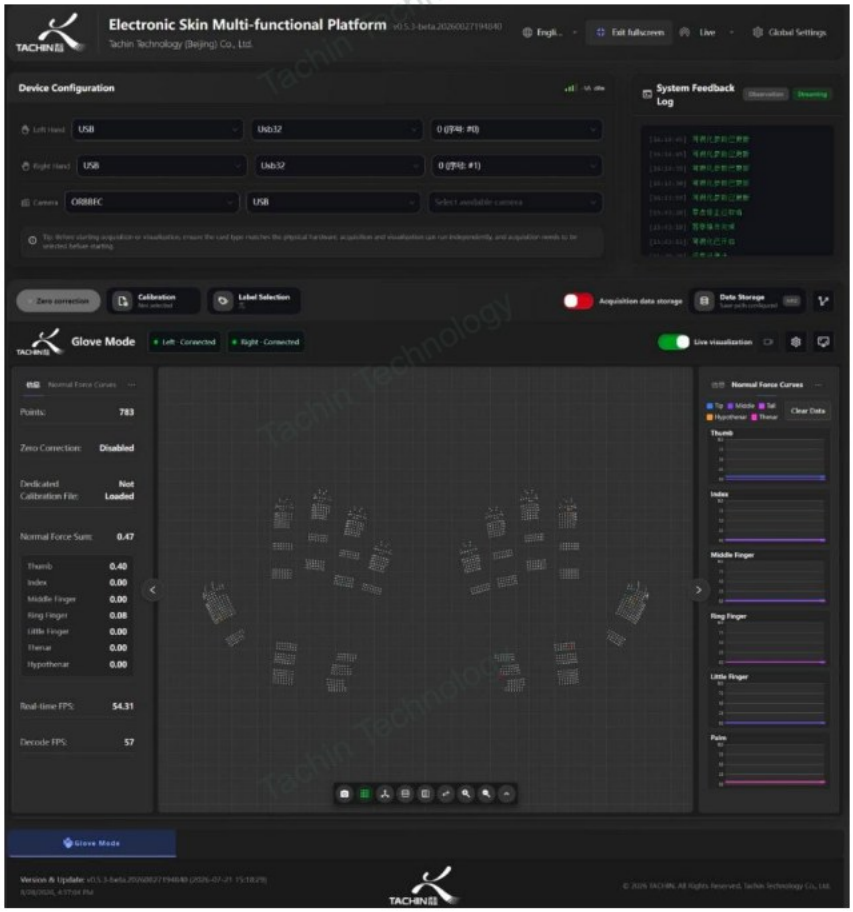
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		Single Sensor Size	1.5×1.5 mm
		Number of Sensors	783
		Single-point Press Lifespan	300,000 cycles
	Normal Force	Measurement Range	0.2-30 N/cm²
		Average Measurement Accuracy	< 20% FS
		Measurement Resolution	0.05 N/cm²
		Spatial Resolution	< 2 mm
		Electrode Blind Area	0.5 mm
	Stability & Uniformity	Point Consistency	< 20%
		Constant Pressure Drift	< 10% FS
	Polling Rate		50 Hz
EMF Pose Parameters	Positioning Sensor Configuration		5 EMF sensors, supporting 6-DOF tracking
	Positioning Resolution		≤ 0.2 mm
	Pose Data		3-axis position and 3-axis rotation per fingertip
	Effective Data Output Frequency		≥ 180 Hz
	Five-Finger Average Drift		≤ 0.2 mm per hour
	Positioning Repeatability		Five-finger average deviation ≤ 0.2 mm
	Thumb Absolute Positioning Accuracy		Component RMSE
			3D Distance ≈ 2 mm
			Rotation Angle ≈ 4°
Electrical & Communication	Power Supply		Battery or USB Type-C, 5 V / 1 A

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	Power Consumption	3.5 W
	Telecommunication	WiFi or USB Type-C
Environmental Requirements	Operating Temperature	-5-45 ℃
	Storage Temperature	-10-45 ℃
	Operating Humidity	< 55% RH
	Storage Humidity	< 55% RH

5 PC Software User Guide



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The flexible tactile data acquisition glove supports two communication modes: Wi-Fi wireless connection and USB Type-C wired connection, which can be selected according to acquisition needs to flexibly adapt to different usage scenarios. The wireless mode is free from cable constraints and meets mobile acquisition needs; the wired mode provides a higher sampling rate, suitable for high-precision, long-time acquisition scenarios. Both connection modes support communication with the upper computer software to realize tactile data collection, display, storage, export, and other processing procedures.

The upper computer software is used for data reception, real-time display, storage, playback, export, and calibration management of the flexible tactile data acquisition glove. Its main functions include:

- Real-time visual display
  - Supports real-time display of tactile data such as 3D force, tangential force, and pressure distribution, showing data change trends and spatial distribution characteristics through dynamic waveform charts, heat maps, etc.
  - Supports real-time rendering of a 25-DOF 3D hand model via EMF, simultaneously displaying 6-DoF position and pose for each fingertip.
- Data management
  - Supports real-time storage of collected data, historical data playback, and data export, compatible with mainstream data formats, facilitating subsequent analysis and secondary processing by users.
- Zero correction
  - Supports sensor zero drift correction to reduce the impact of initial offset, environmental changes, or baseline drift caused by long-term use on collected data, ensuring the accuracy of data acquisition.
- Sensor calibration
  - Built-in standardized calibration process, users can complete sensor accuracy calibration with simple operations, compensate for performance fluctuations caused by manufacturing tolerances and aging, and improve the consistency of long-term measurement and data reliability.
- Operating Environment & Usage Instructions
  - Operating Platform: Host GUI software and SDK support Windows, Ubuntu, and other operating systems. Please verify that your computer's operating system matches the software version requirements before use.
  - Detailed operations: GUI interface operation procedures, API interface calling methods, parameter configuration, graphic tutorials, and troubleshooting are

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detailed in the User Manual.

7 Precautions

- Equipment Protection
  - The device is a precision electronic device; avoid collision, dropping, and extrusion.
  - Avoid contact with water, oil, and corrosive liquids to prevent equipment damage or sensor failure.
  - Avoid using in high-temperature, low-temperature, high-humidity, and dusty environments.
- Glove Usage
  - Avoid pulling the glove hard when wearing it.
  - Avoid sharp objects scratching the glove surface to prevent sensor detachment or damage.
  - Do not wear it for too long (rest for 10 minutes every 1-2 hours is recommended) to avoid compressing hands and affecting blood circulation.
- Data Collection
  - Ensure sufficient light and a simple background in the acquisition area.
  - Avoid strong light directly shining on the camera lens and hand occlusion.
  - Otherwise, it will affect motion capture accuracy and tactile data collection effect.
- Charging & Maintenance
  - Use the matching charging cable; avoid non-original charging equipment.
  - Avoid touching the device during charging to prevent short circuit or overheating.
  - Charge the lithium battery regularly (at least once a month is recommended) to avoid battery damage caused by long-term power loss.
- Software & Maintenance
  - Update the PC software regularly to ensure compatibility with the device.
  - Do not disassemble or repair the device by yourself when it fails; contact after-sales service personnel.
  - Turn off the device power in time after data collection and organize the equipment components.
  - Store in a dry and ventilated environment.

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