

FPC Tactile Sensing for Hand-Pressure Capture

MX MATRIX

Dexterous Manipulation · Robot Teleoperation · Human-Robot Interaction

RigidCore Tactile + EMF

FPC Tactile Data-Acquisition Glove — capturing interaction forces for robot teleoperation and HRI research.

Product Description

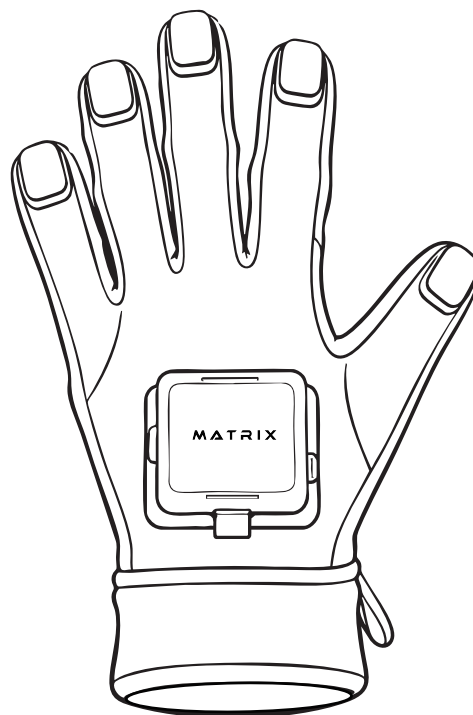
The MOXIAN FPC tactile data-acquisition glove is a tactile sensing device built on the integrated technology of flexible printed circuit (FPC) pressure sensors and a fabric substrate. Driven by FPC pressure-sensing units, it converts pressure deformation from hand-object interaction into electrical signals, enabling real-time collection of tactile pressure data over the key contact areas of the hand.

Localized rigid support structures are added to the sensing areas at the fingertips, finger pads, and palm, providing a stable mounting base for the FPC sensors. Together, the outer fabric liner and the sensing units form a stable force-transmission interface that ensures reliable pressure-signal acquisition.

Integrated Hand Data-Acquisition Glove

RigidCore Tactile + EMF

Pose x Tactile Sensing — All in One Hand



Product Advantages

842

Sensing Points

2mm

Spatial Resolution

0.1N

Trigger Force

0-20N

Force Range

120Hz

Frame Rate

■ High-Density High-Res Tactile Sensing

842 sensing points with 2 mm spatial resolution, covering key contact areas across fingers and palm for finer, more complete hand pressure distribution.

■ Low Trigger Force · Wide Measurement Range

Trigger force as low as 0.1 N with a 0–20 N range, covering everything from light contact to firm grasping across a wider span of tactile pressure variation.

■ Highly Stable Pressure Sensing

Localized rigid supports behind the FPC sensors form a liner – support – FPC – outer-shell composite structure, creating relatively independent force-sensing units that effectively reduce interference from fabric stretching, wrinkling, and finger flexion.

■ Low Noise · High Signal-to-Noise Ratio

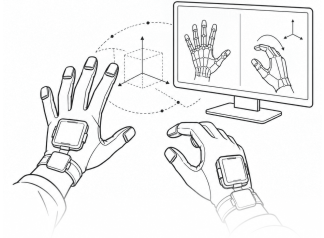
FPC sensing areas respond primarily to effective contact pressure from external objects, significantly reducing noise caused by non-target fabric deformation; valid readings reach 50–100x the noise level.

EMF Pose Sensing · Five Core Features

Spatial Positioning · Pose Tracking · Motion Capture — High-Quality Hand Data Acquisition

01 High-Precision Spatial Positioning

Each fingertip supports 6-DOF spatial position and orientation tracking with 0.2 mm positioning accuracy, capturing subtle finger movements. It provides a reliable data foundation for fine manipulation, motion analysis, and high-quality pose data collection, faithfully reproducing real hand trajectories and improving the precision and usability of motion data.



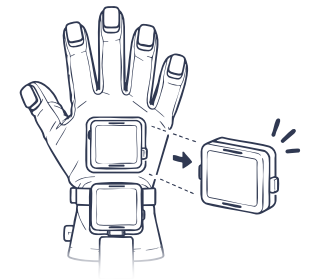
02 Whole-Hand Multi-DOF Pose Reconstruction

With only 5 VetraSense sensors, the glove achieves whole-hand 25-DOF pose reconstruction, capturing the 3D position and rotation of all five fingers. Complete hand motion capture with fewer sensors provides full spatial pose information for complex gesture recognition, dexterous manipulation, and robot motion mapping.



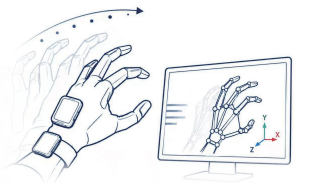
03 Modular Quick-Release Structure

The spatial positioning and data acquisition module on the back of the hand features a detachable modular design that separates quickly from the tactile glove body. When the glove wears out or its tactile parts are damaged after long-term use, only the glove body needs to be replaced while the core module stays in service. The quick-release design also simplifies maintenance, functional upgrades, and glove iteration, effectively reducing replacement costs and extending the service life of the core module.



04 High-Frequency Real-Time Motion Capture

With a 120 Hz spatial-position sampling rate, the glove continuously captures fast and subtle hand movements, recording dynamic pose changes more completely. It suits dexterous-manipulation training, teleoperation, and embodied-AI data collection, reducing information loss during rapid motion and providing high-quality data for continuous motion analysis and model training.



05 Low-Latency Real-Time Pose Feedback

Wired and wireless pose data transmission are supported, with latency of approximately 10 ms(wired) and 30 ms (wireless). Hand motion is fed back rapidly, meeting applications that demand high motion synchronization such as robot teleoperation and real-time control, reducing motion delay between the operator side and the robot side, and improving real-time performance and tracking fidelity in teleoperation.



Technical Specifications

Basic Information	
Total Sensing Points	842 points
Finger Points (One Hand)	374 points
Palm Points (One Hand)	468 points
Spatial Resolution	2 mm
Single–Point Trigger Force	0.1 N
Measurement Range	0 ~ 20 N
ADC Resolution	8 bit (0.1N)
Sampling Frame Rate	120 Hz
Power Supply	Standard USB power; optional battery power; customizable battery life
Spatial Positioning	
Sensor Count	5 VetraSense sensors, supporting 6–DOF tracking
Sampling Rate	120Hz
Positioning Accuracy	0.2mm
Data Latency	10 ms wired, 30 ms wireless
Operating Environment	
Operating Temperature	23°F ~ 104°F
Operating Humidity	0 ~ 90% RH
Measurement Performance	
Repeatability	±15% FS
Consistency	±15% FS
Reliability	
Impact Durability	1 kg impact > 500,000 cycles
Software	
Communication	Wired (USB); optional Bluetooth (requires the glove wireless receiver with battery module)
Protocol / SDK	Full–platform SDK license (Windows, macOS, Linux); open data frames, communication protocol, and point–mapping table
Supported Systems	Windows, macOS, Linux
Output Data	Tactile data: single–point ADC values; Pose data: 3–axis position and 3–axis rotation of each fingertip

Fabric Tactile Sensing for Hand-Pressure Capture

Dexterous Manipulation · Robot Teleoperation · Human-Robot Interaction

Fabric Tactile + EMF

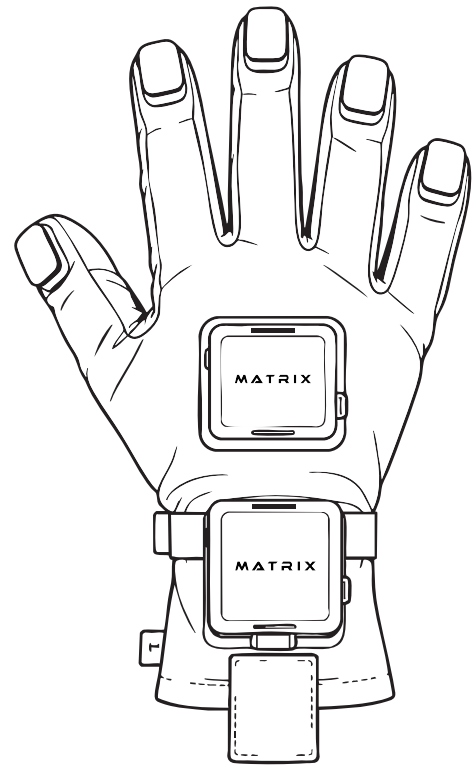
Fabric Tactile Data-Acquisition Glove — capturing interaction forces for robot teleoperation and HRI research.

Product Description

The MOXIAN tactile data-acquisition glove integrates fabric pressure sensors based on percolative materials with a high-precision spatial positioning system. Pressure applied to the glove's fabric sensing areas is converted into changes in electrical resistance, yielding pressure-distribution information: the greater the pressure, the lower the resistance. Its piezoresistive behavior follows a power-law relationship between resistance and pressure, with the reciprocal of resistance approximately linear with pressure. Meanwhile, the glove integrates a high-precision spatial positioning module that captures the 3D position and orientation (6DOF) of each finger and the whole hand in real time.

Fabric Tactile + EMF

Integrated Hand Data–Acquisition Glove



Product Advantages

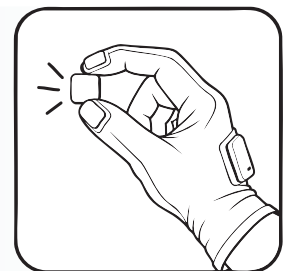


01 High–Density Tactile Sensing

360 sensing points are evenly distributed across the glove's pressure–sensing areas, with trigger force as low as 20 g and a measurement range up to 1500 g, accurately capturing the complete pressure variation from light contact to firm grasping.

02 High–Fidelity Hand Tactile Perception

The fabric glove delivers high–fidelity tactile feedback when worn, deforming in sync with grasping motions to ensure gripping stability and control precision.



03 Soft, Skin–Friendly and Close–Fitting

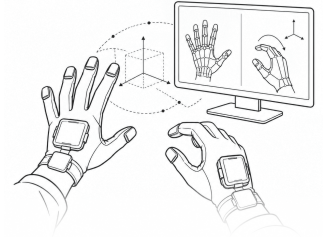
The soft, form–fitting fabric offers a comfortable wearing experience, and the glove can be customized to the user's hand size to fit different hand shapes.

EMF Pose Sensing · Five Core Features

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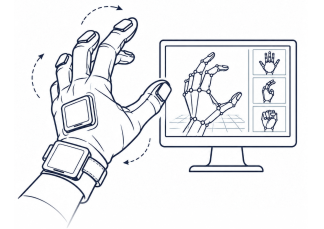
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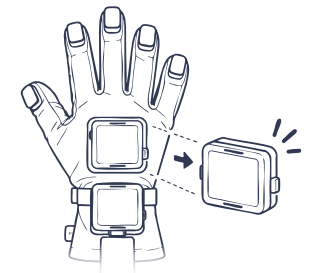
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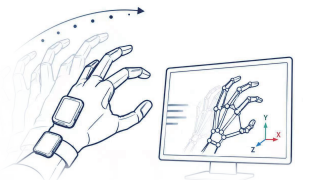
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Technical Specifications

Basic Information	
Total Sensing Points	360 points (standard configuration)
Finger Points (One Hand)	24 points: 16 at fingertips, 8 at middle segments
Palm Points (One Hand)	16 × 15 matrix layout
Point Density	9 points / cm ²
Single–Point Trigger Force	20g
Max Range per Point	1500g
Power Supply	Standard USB or battery power; 700 mAh battery, 2.5 h runtime, 1 h charging, swappable battery
Sampling Frame Rate	120 Hz (standard)
Spatial Positioning	
Sensor Count	5 VetraSense sensors, supporting 6–DOF tracking
Sampling Rate	120Hz
Positioning Accuracy	0.2mm
Data Latency	8 ms wired, 30 ms wireless
Operating Environment	
Operating Temperature (°F)	5°F ~ 140°F
Operating Humidity (RH)	0~90%RH
Measurement Performance	
Repeatability	±15% FS
Consistency	±15% FS
Reliability	
Impact Durability	1 kg impact > 500,000 cycles
Software	
Communication	Wired (USB, PID customization supported); optional Bluetooth wireless (requires the glove wireless receiver with battery module)
Protocol / SDK	Full–platform SDK license (Windows, macOS, Linux); glove data–frame protocol; secondary–development version, communication protocol, and point–mapping table available
Supported Systems	Windows, macOS, Linux
Output Data	Tactile data: single–point ADC values; Pose data: 3–axis position and 3–axis rotation of each fingertip