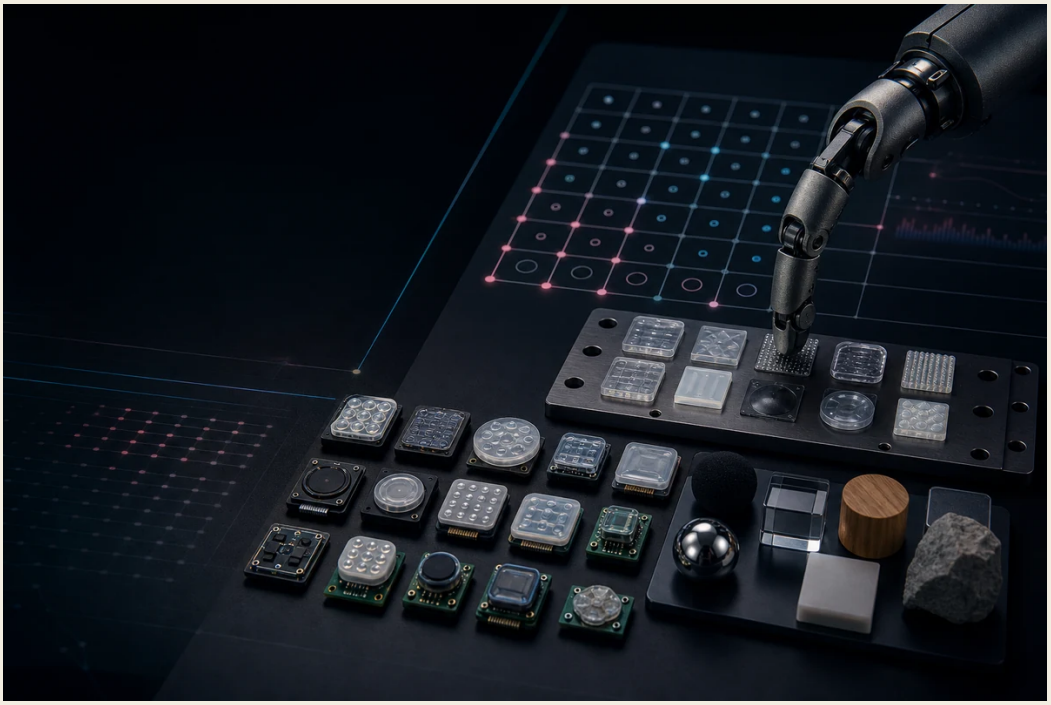
ROBOSKIN.AI / FREE SAMPLE EDITION / 2026

Tactile AI and Robot Skin Landscape

A source-backed field map of tactile intelligence layers, public robotics datasets, research signals, and evaluation questions.



6	6	17
Datasets reviewed	Research signals	Primary URLs

Prepared by the RoboSkin.ai Editorial Team

Published 17 August 2026 | roboskin.ai/research-services

FIELD MAP

Touch becomes intelligence through a complete stack.

Robot skin is the sensing surface. Tactile AI is the learning and decision layer. Physical AI is the broader embodied system in which touch changes action.

01	**Physical contact**	Contact geometry, pressure, shear, slip, temperature, vibration, damage, or proximity.
02	**Robot skin and sensors**	Flexible arrays, fingertip sensors, tactile gloves, electronic skin, and large-area body coverage.
03	**Signal and data layer**	Calibration, synchronization, transforms, logging, access terms, and comparable task labels.
04	**Tactile AI**	Representations, multimodal fusion, world models, policies, contact prediction, and corrective control.
05	**Robot action**	Grasp stability, manipulation, collision awareness, human-robot interaction, and physical-world learning.

KEY TAKEAWAY

A sensor specification is not a tactile intelligence result. Evidence must connect the physical interface, data pipeline, model, task, robot embodiment, and evaluation protocol.

RESEARCH LANDSCAPE

Five signals shaping tactile robotics in 2025-2026.

These are evidence-backed research directions, not market-size forecasts. Each signal is bounded by the systems and protocols in its cited source.

01	**Dataset scale is increasing**	HT-Bench reports millions of synchronized visual and tactile frames, while FreeTacMan reports more than 3M image pairs and more than 10K trajectories.
02	**Access quality is uneven**	Some resources provide data, code, licenses, and split tools. Others describe a dataset without a verified public download or license.
03	**Touch is becoming multimodal**	Sparsh-X combines tactile images with audio, motion, and pressure. Humanoid data can include vision, proprioception, actions, and dense pressure.
04	**Coverage is moving beyond fingertips**	Recent work targets full-hand, high-coverage gripper, forearm, and large-area surfaces, but whole-body transfer remains a separate engineering problem.
05	**Prediction is joining perception**	FeelWorld and Dream-Tac treat touch as a future state conditioned on robot action, connecting tactile sensing to planning and world-model research.

ANALYST NOTE

Do not collapse these signals into one maturity claim. Public dataset access, sensor coverage, model transfer, latency, durability, and robot-control value need separate evidence.

DATASET INTELLIGENCE

Six public research resources, compared with access boundaries.

The table separates reported scale from verified availability. A paper describing a dataset is not the same as a downloadable, licensed training resource.

Dataset	Sensor	Scale	Access and license
HT-Bench 2026	Full-hand tactile array	10M RGB frames; 7.8M tactile frames; 226 tasks	Paper verified; no dedicated download verified Not stated on reviewed paper page
RCT: Robotic Contact Tactile 2026	3 DIGIT sensors	29,279 frames; 1,832 sequences; 122 materials	Public dataset, splits, and evaluation code CC BY 4.0 data; Apache-2.0 code
TactiDex 2026	Whole-hand tactile glove	Scale not stated on reviewed project page	Project documented; download not verified Not stated on reviewed project page
FreeTacMan 2025	Modular LED visuo-tactile sensor	>3M image pairs; >10K trajectories; 50 tasks	Public dataset, code, and hardware guide MIT
Humanoid Visual-Tactile-Action 2025	1,062 tactile sensors per hand	101.9K synchronized samples; 4 soft-object tasks	Paper verified; public download not verified Access terms not stated
Sparsh-X multisensory resource 2025	Digit 360	Approximately 1M unlabeled interactions	Training resource described; download not verified Not stated on reviewed paper page

How to read this table

Reported counts follow the primary source. 'Not verified' means no dedicated public download was verified on the review date; private or request-based access may still exist.

Shortlist rule

Match embodiment, modalities, task distribution, labels, synchronization, format, license, and target robot. Scale alone is not fit.

DATASET SELECTION

Choose by decision route, not by headline size.

The same resource can be valuable for one question and unusable for another. Start with the downstream decision and remove mismatched embodiments early.

Representation learning	HT-Bench, RCT, and Sparsh-X expose different combinations of scale, material variety, and multimodal contact signals.	**Verify:** Check public access, split definitions, modality synchronization, and sensor-domain shift.
Imitation learning	FreeTacMan links contact-rich demonstrations to wrist video, tactile video, and trajectory data across 50 tasks.	**Verify:** Check whether the robot-free collection geometry transfers to the target hand, gripper, and controller.
Humanoid hands	The Humanoid Visual-Tactile-Action resource synchronizes dense hand pressure, vision, proprioception, action, and external pressure.	**Verify:** Check the narrow soft-object task set, one embodiment, signal noise, and missing public access terms.
Human-to-robot skill transfer	TactiDex combines whole-hand pressure, kinematics, object pose, language, and task-phase annotations.	**Verify:** Check release status, license, task inventory, and mapping from glove to target robot hand.

FAST SCREEN

Reject a dataset early if its license, sensor domain, task labels, or synchronization structure cannot support the intended use.

RESEARCH SIGNALS

Six developments to track without overstating maturity.

The evidence label distinguishes peer-reviewed publication from preprint evidence. The limit column prevents a result from being generalized beyond its reported setup.

Theme and work	Evidence	Signal	Boundary
Full-hand benchmark scale HT-Bench	Preprint	Large synchronized RGB and tactile corpus across 226 tasks.	Embodiment and transfer claims require independent validation.
Action-conditioned touch FeelWorld	Preprint	Predicts visual futures, contact, tactile latent state, and slip for planning.	Evidence is tied to reported tasks, sensors, and planning protocol.
Tactile world-action model Dream-Tac	Preprint	Uses action-conditioned tactile prediction for contact-rich manipulation.	Cross-sensor and cross-task transfer remains an evaluation question.
Multisensory representation Sparsh-X	Preprint	Combines tactile image, audio, motion, and pressure from Digit 360.	Downstream results depend on sensor coverage and task protocol.
Cross-sensor force GenForce	Peer-reviewed	Maps shared marker representations across GelSight, TacTip, and uSkin.	Equivalent performance is not established for every geometry or environment.
Full-hand tactile coverage Nature Machine Intelligence study	Peer-reviewed	Uses 17 vision-based tactile sensors across 70% of a custom hand's palmar surface.	Results come from one hand and one task family; coverage is not whole-body.

Research interpretation rule

Compare a result only inside its reported task, robot, sensor, data, baseline, and metric context. A lower visual prediction loss is not automatically better force control, slip recovery, safety, or hardware transfer.

EVALUATION CHECKLIST

The twelve questions that prevent expensive category mistakes.

Use this checklist before selecting a sensor, dataset, representation model, or research partner.

01 / TASK What contact event changes the decision or robot action?	**02 / EMBODIMENT** Fingertip, full hand, gripper, forearm, or whole-body surface?
03 / MODALITY Normal force, shear, slip, vibration, temperature, proximity, image, audio, or damage?	**04 / COVERAGE** What surface area, blind spots, seams, and wiring routes matter?
05 / DYNAMICS What sampling rate, latency, bandwidth, and control deadline are required?	**06 / CALIBRATION** How are drift, hysteresis, wear, replacement, and cross-unit variation handled?
07 / DATA FIT Does the training data match the target sensor, robot, objects, and contact distribution?	**08 / LABELS** Which actions, poses, forces, contact states, and task phases are synchronized?
09 / LICENSE Can the data, code, weights, and derived outputs be used commercially?	**10 / BENCHMARK** Are metrics comparable under the same robot, sensor, split, baseline, and precision?
11 / INTEGRATION How will timestamps, transforms, logging, health checks, and failure states enter the stack?	**12 / EVIDENCE** Which claims are peer-reviewed, preprint, vendor-reported, demonstrated, or still unknown?

METHOD AND SCOPE

How RoboSkin.ai keeps claims inside their evidence.

This sample is designed to demonstrate research structure. It is not a substitute for hardware testing, certification, patent review, legal advice, or investment due diligence.

Source order	arXiv and publisher pages; conference proceedings; official university or lab pages; official repositories and datasets; official technical documentation; company primary material.
Access check	Dataset, code, project, paper, and license links are recorded separately. Missing public access is labeled rather than assumed.
Evidence label	Peer-reviewed, preprint, institutional, documentation, or company primary material. These labels describe source type, not automatic truth or quality.
Claim boundary	Every summary retains the robot, sensor, task, data, metric, protocol, and transfer limits available in the primary source.
Review date	Sources in this sample were checked against the RoboSkin.ai research index through 17 August 2026.
Corrections	Readers can submit a source or correction at roboskin.ai/contact. Factual corrections do not require a commercial engagement.

Need this structure applied to one decision?

RoboSkin Research Sprint
5 business days | Pilot fee US$1,500
roboskin.ai/research-services

PRIMARY-SOURCE REGISTER

Seventeen direct URLs used in this sample.

Links point to papers, official project pages, repositories, or dataset hosts. The live RoboSkin dataset directory may contain newer review dates.

01 / HT-Bench paper https://arxiv.org/abs/2606.19161	**02 / RCT paper** https://arxiv.org/abs/2606.31694
03 / RCT project https://faerber-lab.github.io/RCT/	**04 / RCT code** https://github.com/faerber-lab/RCT
05 / RCT dataset https://figshare.com/s/a5ed417ba6602ccad0f6	**06 / TactiDex paper** https://arxiv.org/abs/2607.09190
07 / TactiDex project https://tactidex.github.io/	**08 / FreeTacMan paper** https://arxiv.org/abs/2506.01941
09 / FreeTacMan project https://opendrivelab.com/FreeTacMan	**10 / FreeTacMan code** https://github.com/OpenDriveLab/FreeTacMan
11 / FreeTacMan dataset https://huggingface.co/datasets/OpenDriveLab/FreeTacMan	**12 / Humanoid Visual-Tactile-Action paper** https://arxiv.org/abs/2510.25725
13 / Sparsh-X paper https://arxiv.org/abs/2506.14754	**14 / FeelWorld paper** https://arxiv.org/abs/2607.24267
15 / Dream-Tac paper https://arxiv.org/abs/2606.08737	**16 / GenForce paper** https://www.nature.com/articles/s41467-026-68753-1
17 / Full-hand tactile sensing paper https://www.nature.com/articles/s42256-025-01053-3	

Live research routes

Dataset explorer: roboskin.ai/datasets

Research index: roboskin.ai/research-index

Editorial policy: roboskin.ai/editorial-policy

Research services: roboskin.ai/research-services