Open Source 西门子

Beijing · 2026

Oct. 29
Industrial Open Source

Oct. 30
Open Source Robotics

Agenda

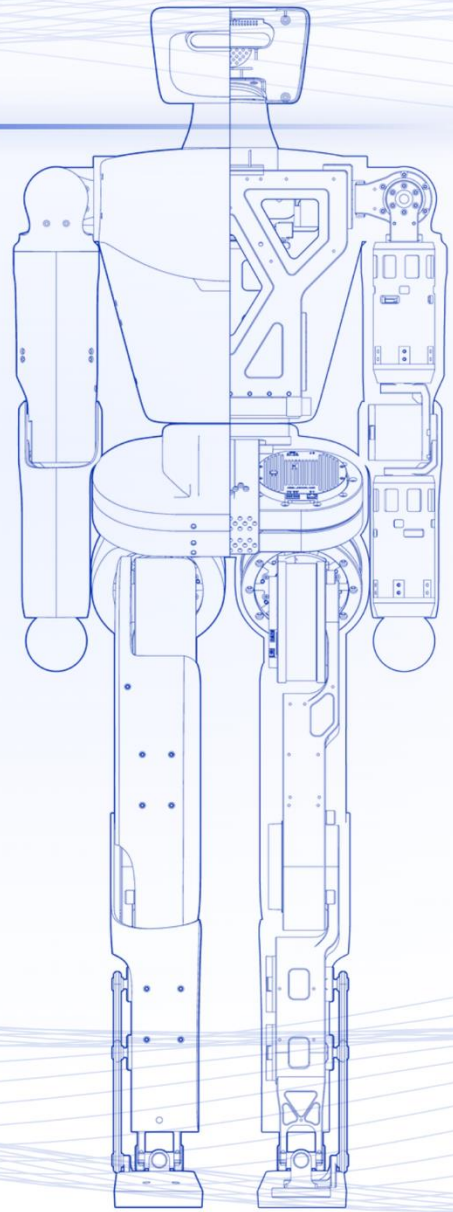
ROBO PARTY | LAB

RoboParty Lab

Give every capable individual the spotlight of the world

The frontier algorithm lab of RoboParty

Open Source | SOTA Operations | SOTA Algorithms | SOTA Ecosystem



Presented by Yaojie Shen · lab.roboparty.com

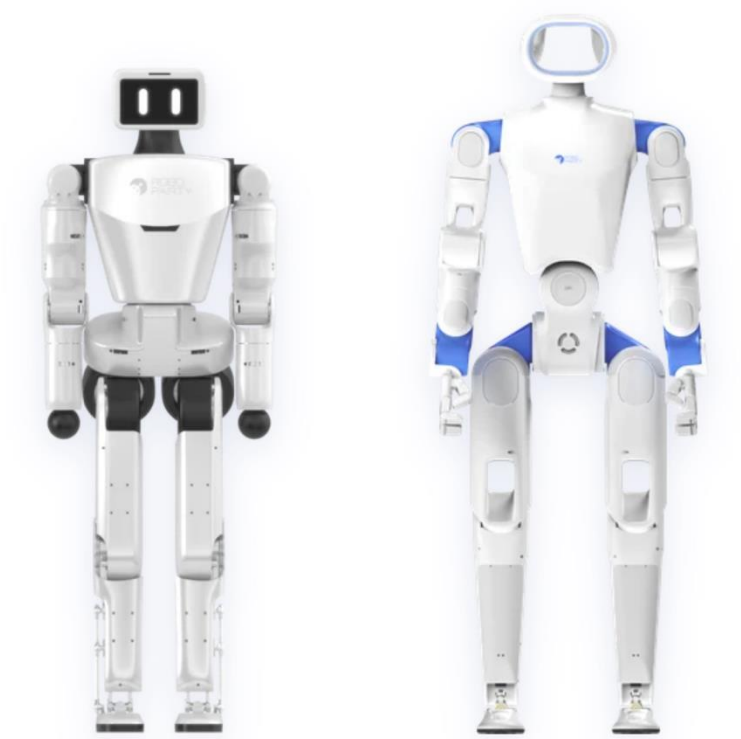
RoboParty: An Open, Full-Stack Embodied AI Platform

About RoboParty

Open Body × Party OS × Developer Ecosystem Accelerating the industry through open source and innovation

Open Body Open-Source Robots

Built In-House



RP0 RP1

Robots → R&D foundation

Developer Ecosystem

Open Community

- Individual developers
- Universities
- Robotics Labs
- Embodied AI firms
- ...

Results → better robots

Party OS Open R&D Foundation

01 System0 · Dynamic + Tracking

High-dynamic motion and tracking: contact & force, terrain generalization, precision, robustness, dexterous hands

02 System1 · Representation + Composition

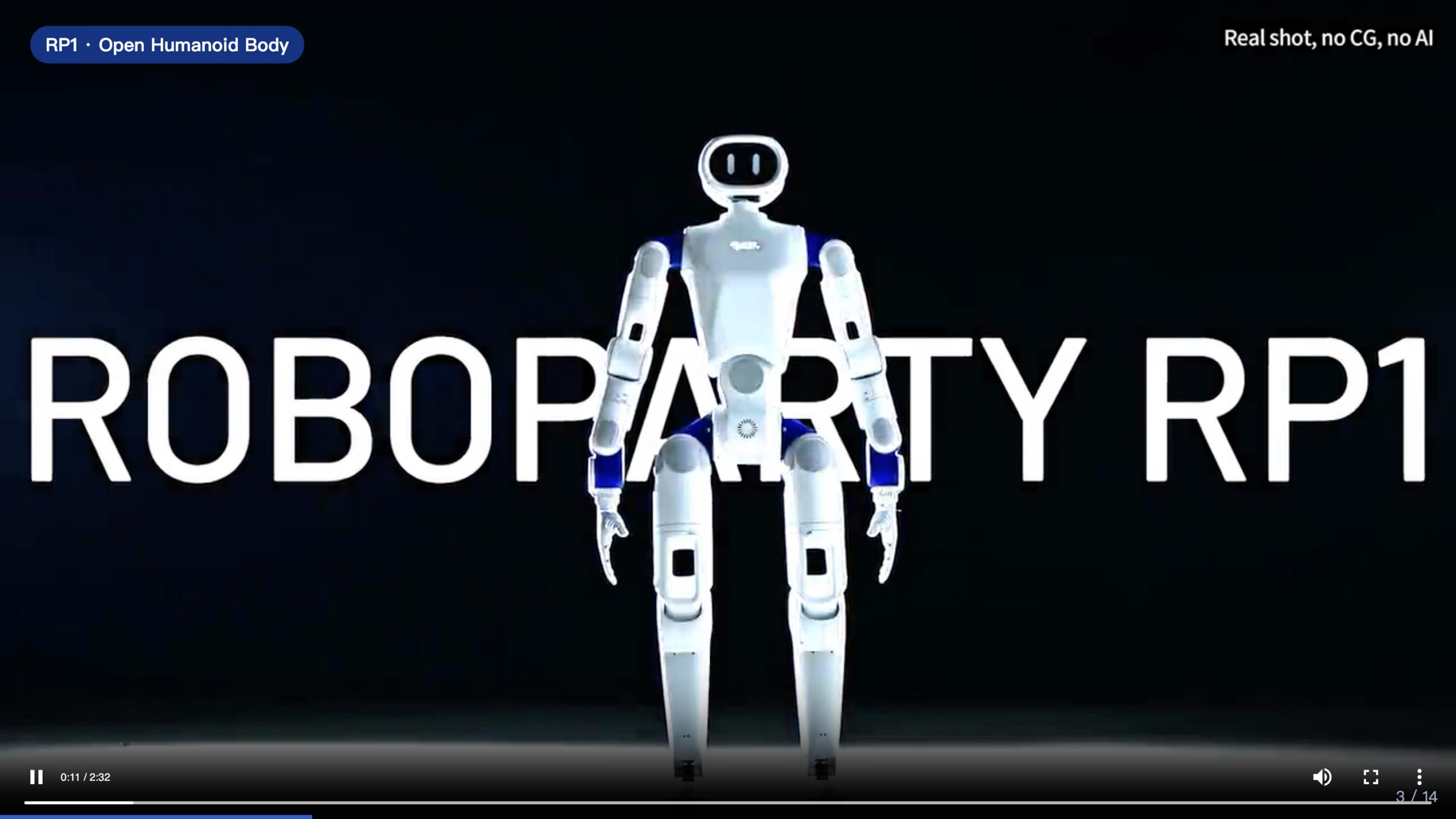
Unified skill representations aligned with tasks, composed into complex behaviors

03 System2 · Planning + Memory + Reasoning

Embodied memory and spatial understanding for long-horizon planning and replanning

04 Party Infra

Real2Sim2Real closes the real—sim loop; Agent Work brings agents into R&D


RP1 · Open Humanoid Body
Real shot, no CG, no AI
ROBOPARTY RP1
0:11 / 2:32

Open Humanoid Body: Built for Developers and Models

Designed from day one around data collection, model training and algorithm validation, by a team that knows models

Open by Design

- **Full-stack open source**, hardware to inference
- Open parameters, configurable SDK
- Every version is customizable

Vertical Integration

- In-house joint modules and core parts
- In-house testing and manufacturing
- **Clear BOM cost edge**

Fast Iteration

- Gen 1: proved the open-source model
- Gen 2: optimized, ready to mass-produce
- Full R&D loop in **25 days**

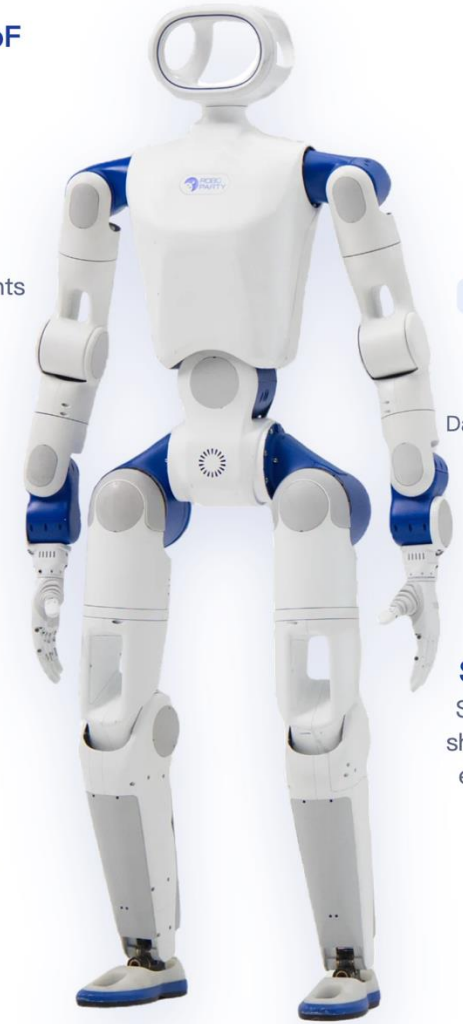
Neck · 2 DoF

Two-stage planetary
inner-rotor joints

1.3 m
Height

35 kg
Weight

30
DoF
6×2 + 2 + 2 + 7×2



Modular
Head and hand units swap per scenario

4 head options
Control · Data · Perception · Interaction
Data head fits ego-view data

Choice of dexterous hands

Standardized
Symmetric arms, shared leg molds; easy to maintain and upgrade

Model-ready

Open SDK, APIs and control interfaces for any model to plug in and iterate

Data-ready Data head co-designed with devices for high-quality, multimodal, trainable real data

Whole-body Ready Human-like range of motion that unlocks loco-manipulation and BFMs

Reliable Stable and consistent, MTBF over 100 hours

Scalable Cost-controlled and deployable at scale

Developer-friendly Open toolchain, simulation and community

Pipeline

2026 Q3
RP0 volume delivery
RP_HFM model release

2026 Q4
RP1 launch

2027
RP1 delivery at scale

What the Lab Is: An Open Platform

Open Source

ROBOPARTY

Robot Hardware
Joint modules · Robots · SDK
Open Source

RoboParty Lab
Frontier algorithm lab
Open Source

1 Core idea: the Lab is a lever

Anyone with **ability, skills and ideas** can use RoboParty Lab as a lever to get seen by the world, fast.

2 Infra first

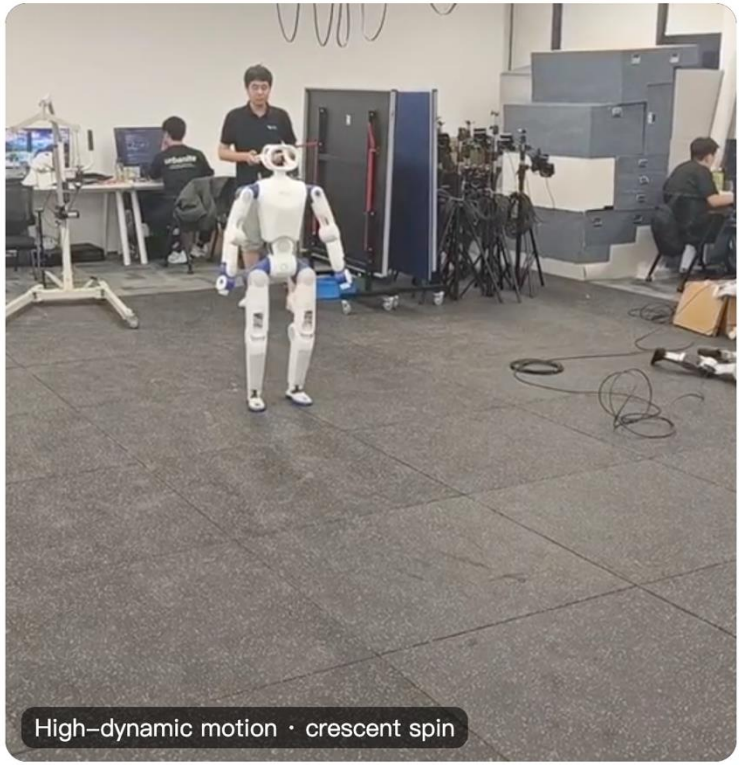
Here, researchers don't have to worry about:

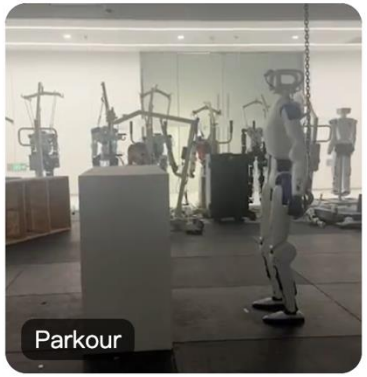
- ✕ No good robot
- ✕ Getting and processing data
- ✕ Good work going unnoticed
- ✕ No access to frontier insight

"Good infra is the most important factor behind solid open-source work"

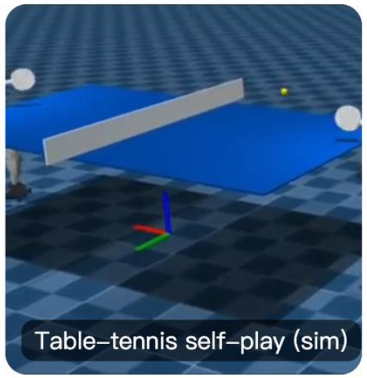
3 Do meaningful work

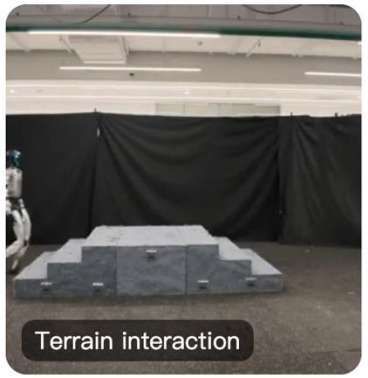
Whether it's pure open-source work or great papers —
a group of genuine people doing meaningful things.

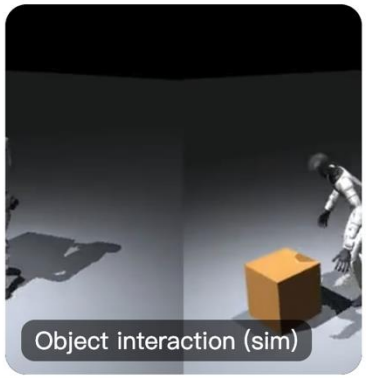

High-dynamic motion · crescent spin


Parkour


Box jump

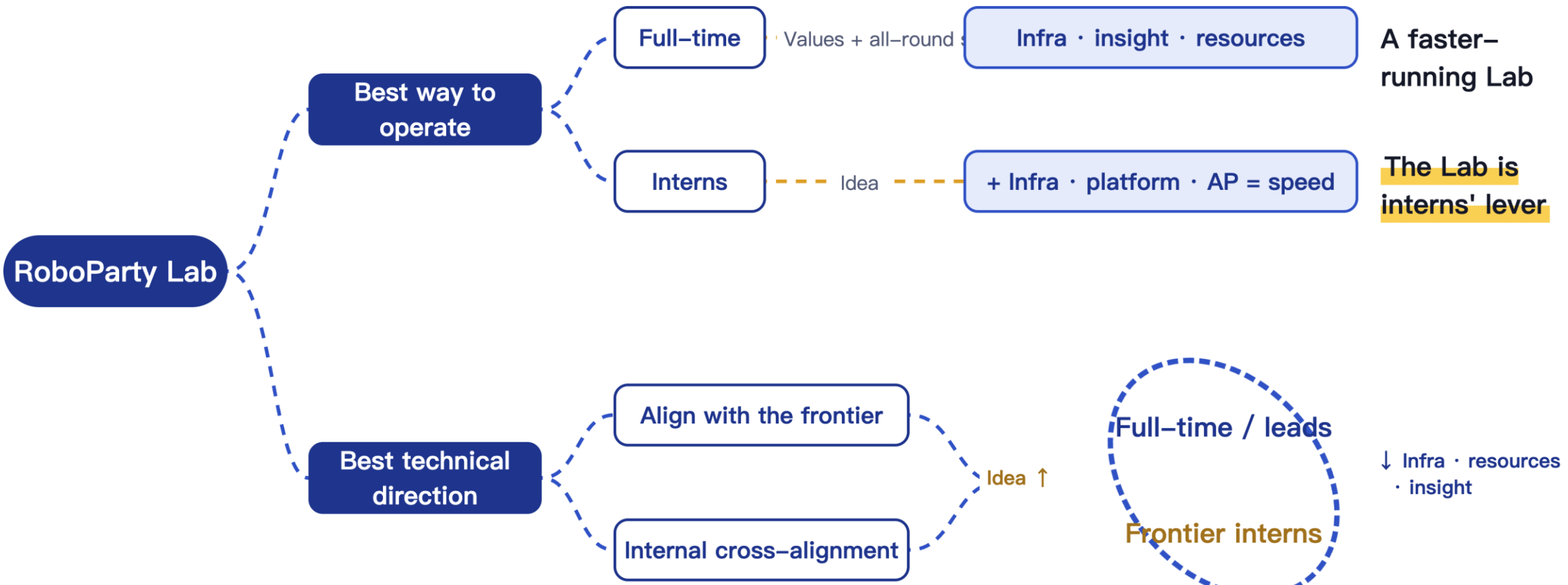

Table-tennis self-play (sim)


Terrain interaction


Object interaction (sim)

Operating Model: Best Way × Best Direction

SOTA Operations



Who does what: full–time staff build infra, integrate insight and match resources; interns bring ideas and use the infra and platform directly.

How we set direction: align externally with the frontier and internally across directions, so no one works in isolation.

Why it's fast: ideas flow up from interns; infra, resources and insight flow down from full–time staff — the shortest path from idea to output.

Technical Map: Party OS

SOTA Algorithms

Party OS Robots → System0 / 1 / 2 + Party Infra

Click a dot to focus on one direction, click again to reset; click a colored tag to jump to that project

RoboParty Robots

Joints · Robot · SDK

System0
Dynamic + Tracking

Motion tracking · BFM
Precision · robustness · motion generalization
MimicLite · UFO · PREDACTOR · MimicAll

Contact & force · terrain generalization
Perceptive locomotion · scene / object interaction
P-BFM · Parkour · I-BFM · Table tennis

Next directions
Dexterous hands · adaptation · self-awareness

System1
Representation + Composition

Representation learning
Unified skill representations aligned with tasks
INTACT

Primitive & Composition
Skill primitives composed into complex behaviors

System2
Planning · Memory · Reasoning

Embodied memory
Memory and reasoning for long-horizon tasks

Replanning
Multi-task decomposition & polling · Task Planner
PartyDojo

Spatial understanding
Scene semantics and navigation · agent VLN
VIStream

Party Infra
Across the stack

Real2Sim2Real
Reconstruction → motion gen → sim training → data feedback
Open-sourcing soon

Agent Work
Agents take part in R&D, engineering and operations
Next in operations

Data · deployment
Retargeting · ego data capture · sim2real · on-device inference
HHtools · KnowHow

Next: From Agentic Humanoid to Agentic Company

SOTA Operations

01
Agentic Humanoid
Tech validation
Agents run: one robot

02
Agentic Engineer
Engineering delivery
Agents run: one engineer

03
Agentic Department
Resources & information gaps
Agents run: one department

04
Agentic Company
Values & vision
Agents run: one company

What agents run keeps growing →

Human–in–the–loop Humans execute

Human–on–the–loop Humans supervise

Closed–loop Humans define values

Core logic: agents multiply output, so we must get Evaluation & Feedback right, and every stage needs Real2Sim2Real.

Agents handle
Plan → execute → verify

Humans handle
Values · authorization · oversight

KnowHow | HHtools | MimicLite | UFO

4 open-source projects · **670+** GitHub Stars

Humanoid Locomotion & Control Know-How

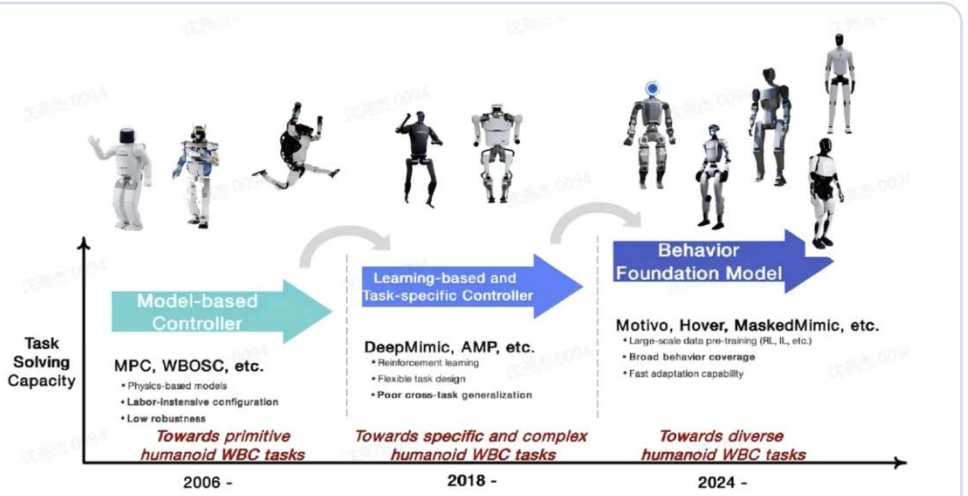
50,000 words, open to everyone

A complete guide for hobbyists and developers to how humanoid control evolved.

1. How do humanoids differ from other robots, and why are they hard?
2. How did humanoid control evolve, and what is the learning path?
3. How to understand and derive every formula
4. First-hand details from people who built these methods

Open document — Lead · Jagger

Scan to read (in Chinese)



人形机器人运动控制Know-How

- 人形机器人运动控制发展趋势
- 人形机器人运动控制学习路线
  - 传统运动控制学习路线
  - 强化学习运动控制学习路线
- ▸ 人形机器人控制问题解决思路
- 人形机器人技术框架路线展望
- ▸ 传统运动控制方法（Model Base）
- ▸ 深度强化学习运动控制方法（Learning Base）
- ▸ （Data based）BFM行为基础模型算法

KnowHow | **HHtools** | MimicLite | UFO

4 open-source projects · **670+** GitHub Stars

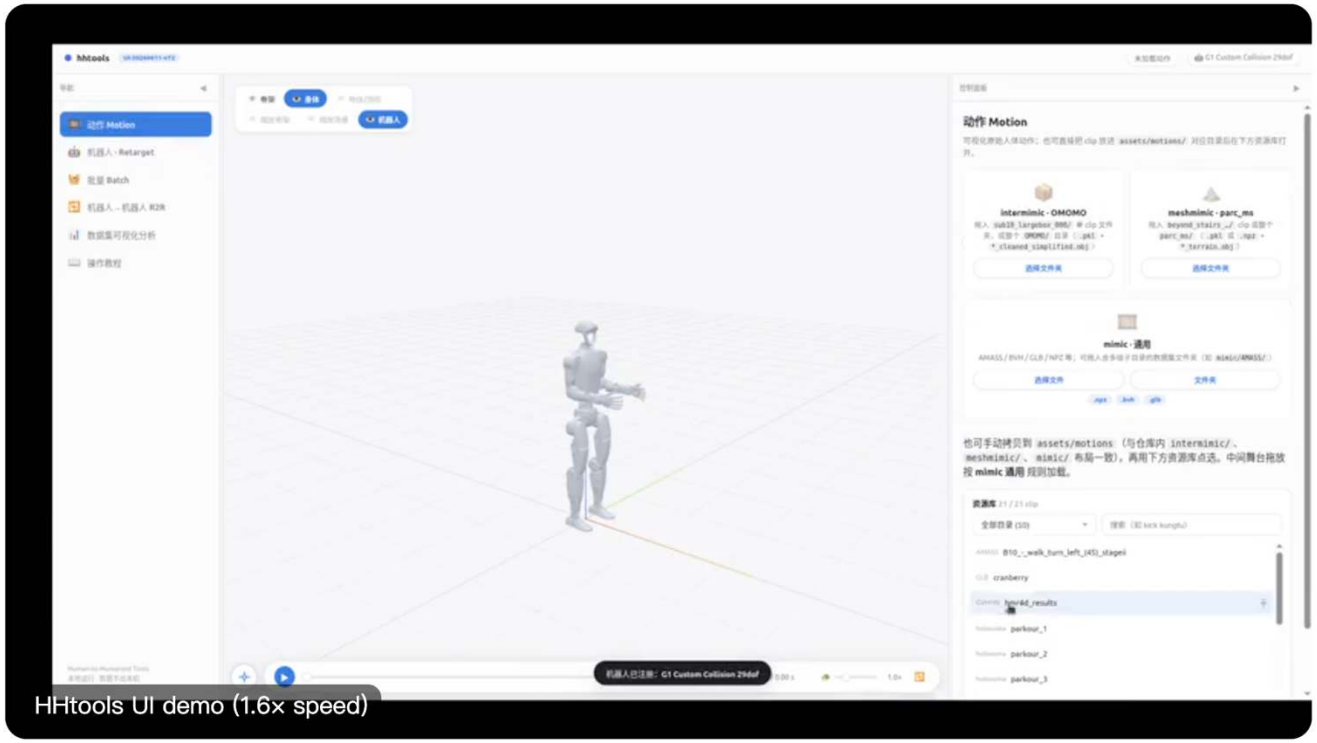
HHtools (human-humanoid-tools)

A low-barrier, fast and practical retargeting tool for **human data → robot data**.

1. Auto-fit your own robot **AnyURDF**
2. Map any open dataset you download **AnyMotion**
3. Transfer from other robots **R2R**
4. With terrain and objects **Mimic / MeshMimic / InterMimic**
5. Fast, large batches **Fast / Batch Retarget**
6. Filter data (e.g. 3 m/s motions) **Analysis**
7. Hackable source code **Open source**

● ★ **221** Stars · 27 Forks | Open Source | Lead · Jagger

Next release: Linux / Windows / Mac support as a standalone open-source app.



HHtools UI demo (1.6× speed)

KnowHow | HHtools | **MimicLite** | UFO

4 open-source projects · **670+** GitHub Stars

MimicLite: 8× RTX 4090 · 4 hours to a SONIC-level humanoid BFM

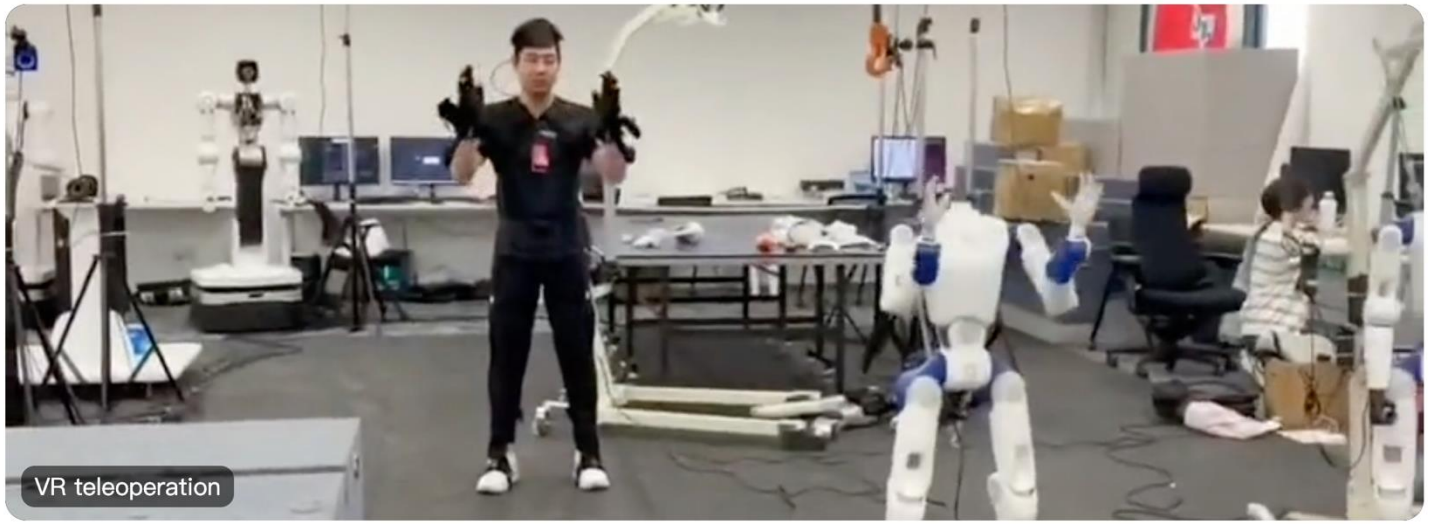
1. Switch the sim backend to **mjlab / MuJoCo Warp**
2. Unify tracking compute with **torch.compile** to cut Python dispatch and intermediate kernels
3. Share large datasets across GPUs (FP16 shards); cache FK only
4. Don't treat root drift as the real failure

The essence: cheap steps, high parallel throughput and careful termination semantics — teleoperation and high-dynamic motion at low cost.

● ★ **183** Stars · 14 Forks Open Source

Lead · Haoyang Weng





KnowHow | HHtools | MimicLite | **UFO**

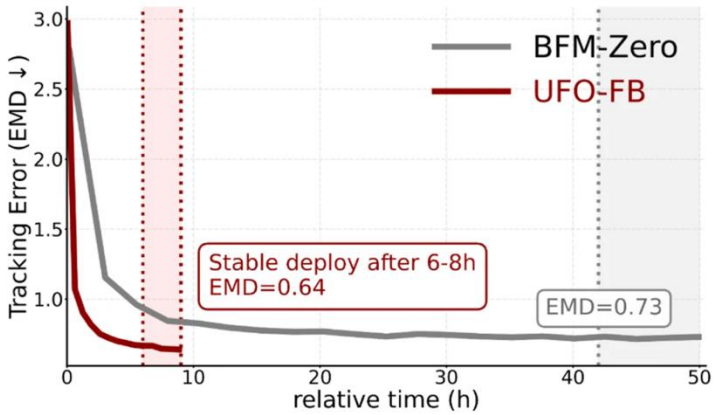
4 open-source projects · **670+** GitHub Stars

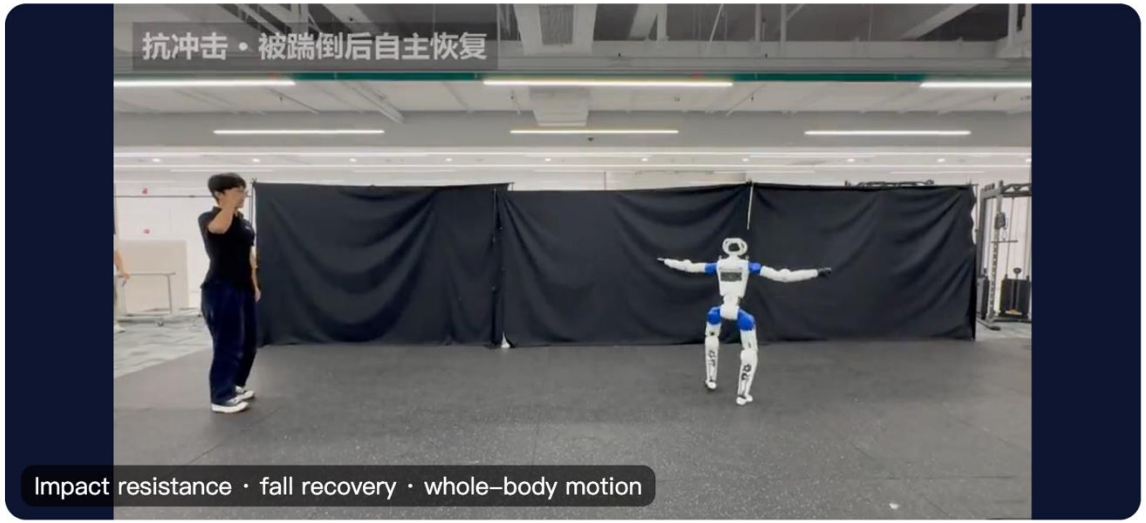
UFO: an unsupervised-RL BFM, unlike SONIC

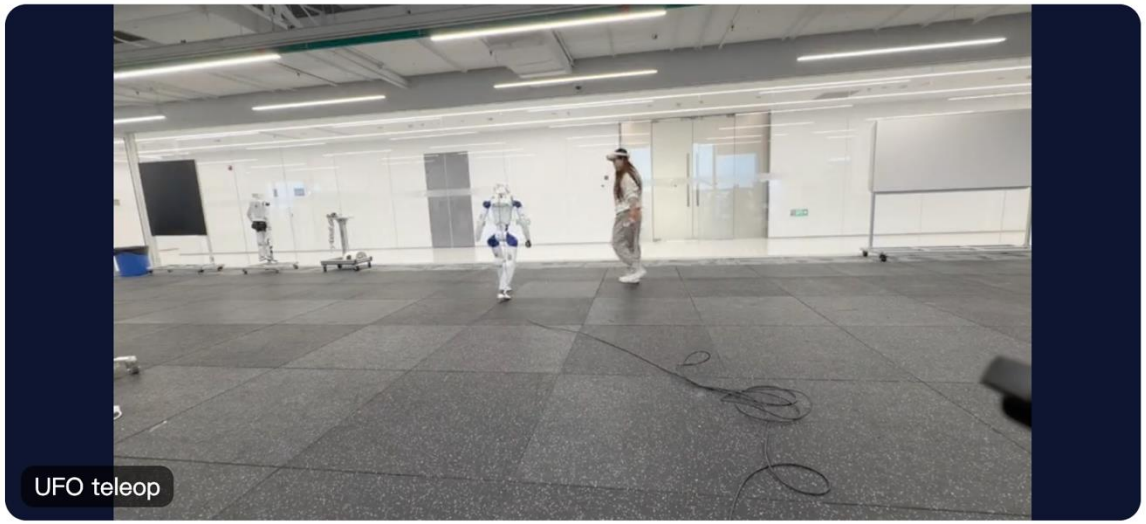
Builds on BFM-Zero to **integrate algorithms, training and teleop deployment** into an easy-to-use unsupervised pipeline.

1. Efficient unsupervised RL training for humanoids (8× 4090 48G)
2. Multi-robot support
3. A collection of unsupervised algorithms (FB, Tech)
4. Soft deployment & teleop deployment

● ★ **270** Stars · 28 Forks Open Source Lead · Yitang Li







PREDACTOR | MimicAll

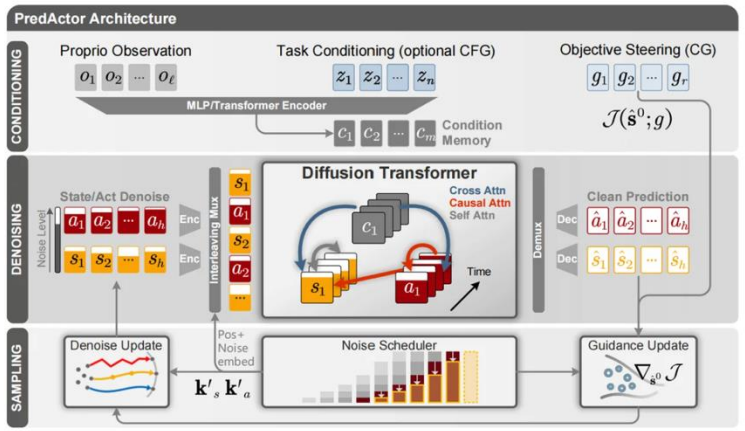
Under review: ICRA / ICLR

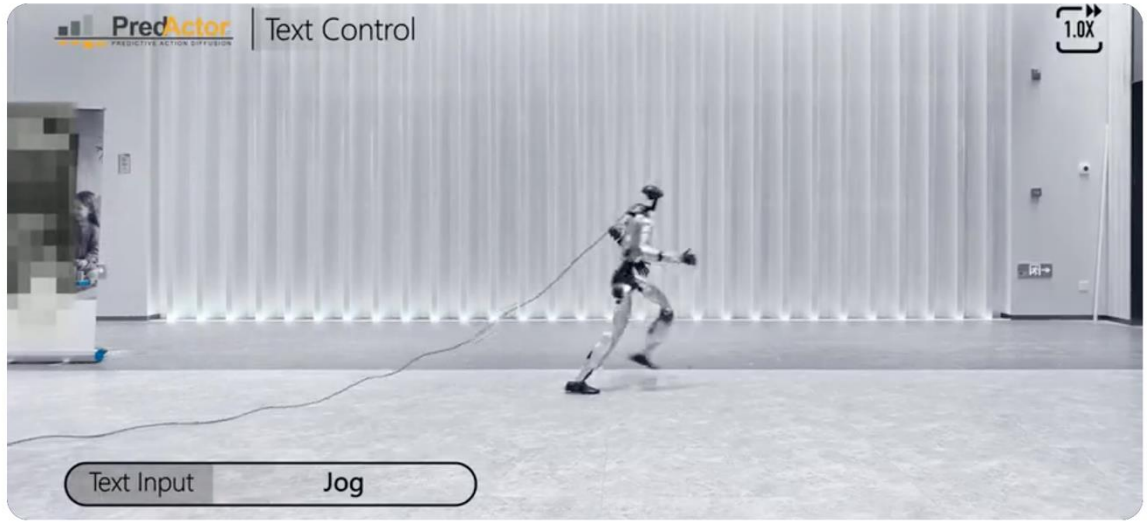
PREDACTOR: Beyond Generate + Track

Action–level diffusion that directly generates dynamically feasible actions — **the first humanoid diffusion architecture running State–Action Diffusion on–device.**

1. Outputs feasible actions directly, keeping future states internally for guidance
2. Teacher–student DAgger ensures the robot sees enough future states

ICRA sub Lead · Lei Ye







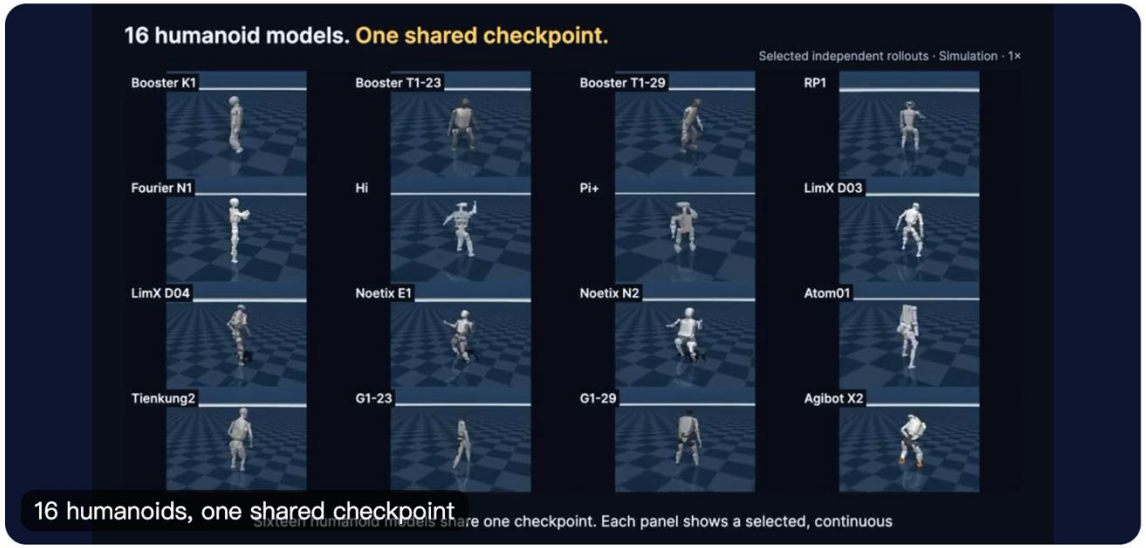
PREDACTOR **MimicAll**

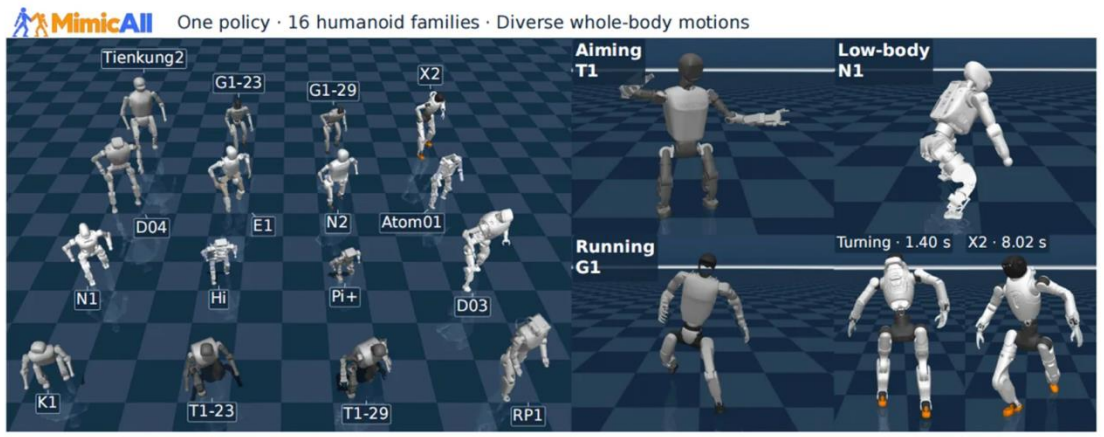
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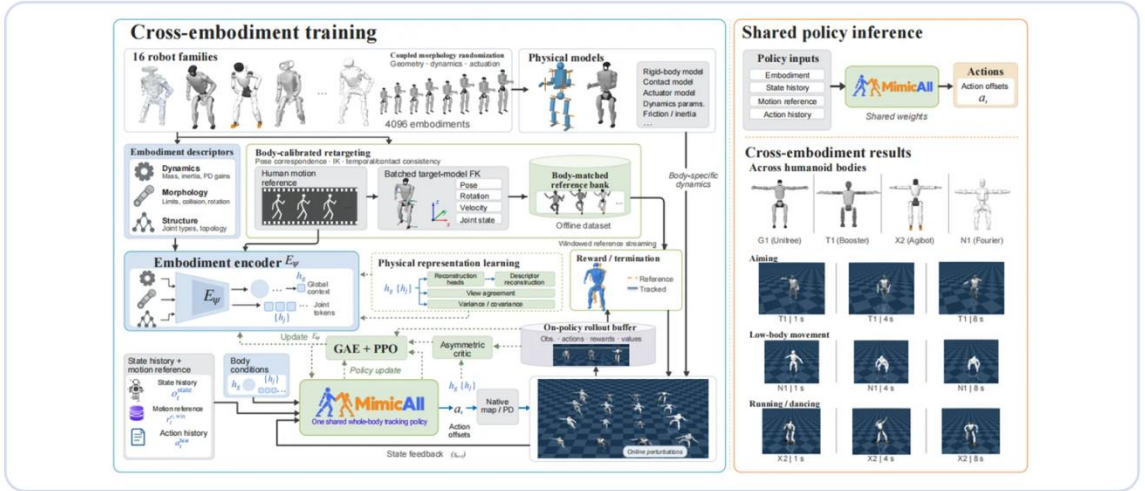
MimicAll: Structured Embodiment Conditioning for Cross–Humanoid Whole–Body Motion Tracking

1. Shared semantics across embodiments
2. Joint—action embodiment self–attention
3. Pretrained humanoid model (large multi–embodiment dataset)

ICLR sub Lead · Jia Li







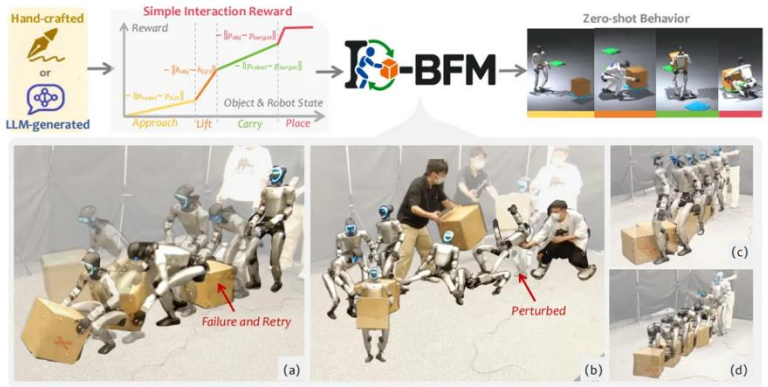
I–BFM · Objects | P–BFM · Terrain | Table Tennis | Ball Sports | Parkour

Built on FB unsupervised learning

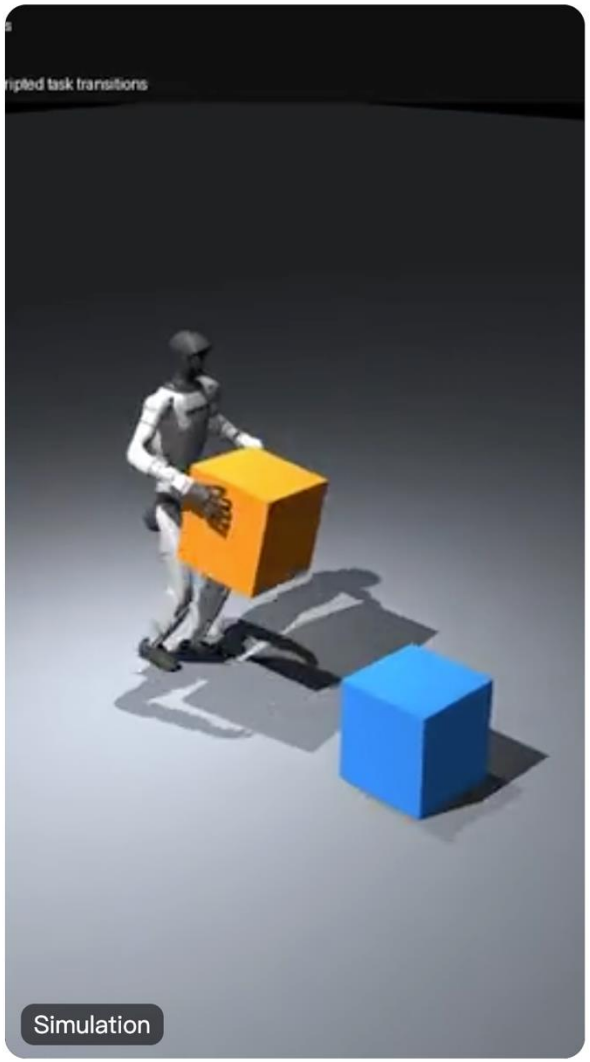
I–BFM: Reward–Conditioned Robust Humanoid Interaction via Unsupervised RL

Exploring **object interaction** with FB unsupervised learning.

ICRA sub Lead · Ziqi Han







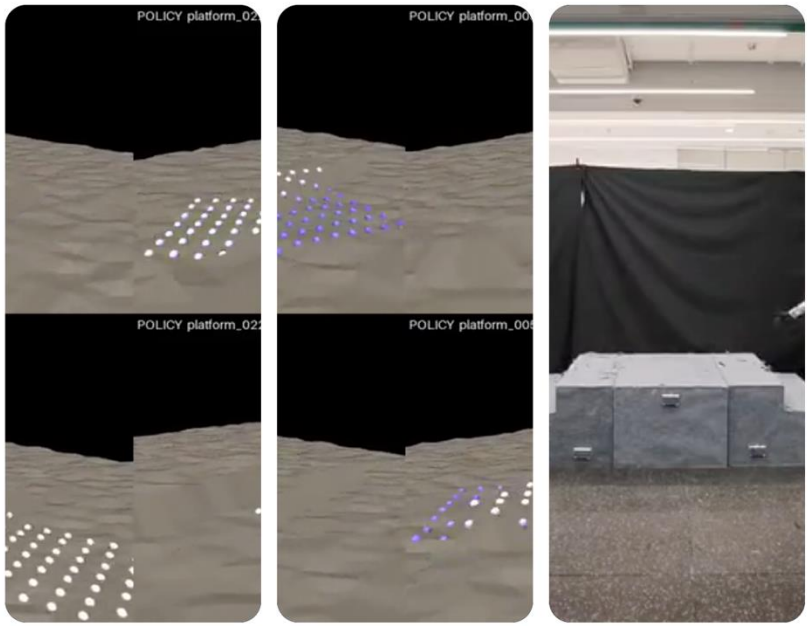
I–BFM · Objects | **P–BFM · Terrain** | Table Tennis | Ball Sports | Parkour

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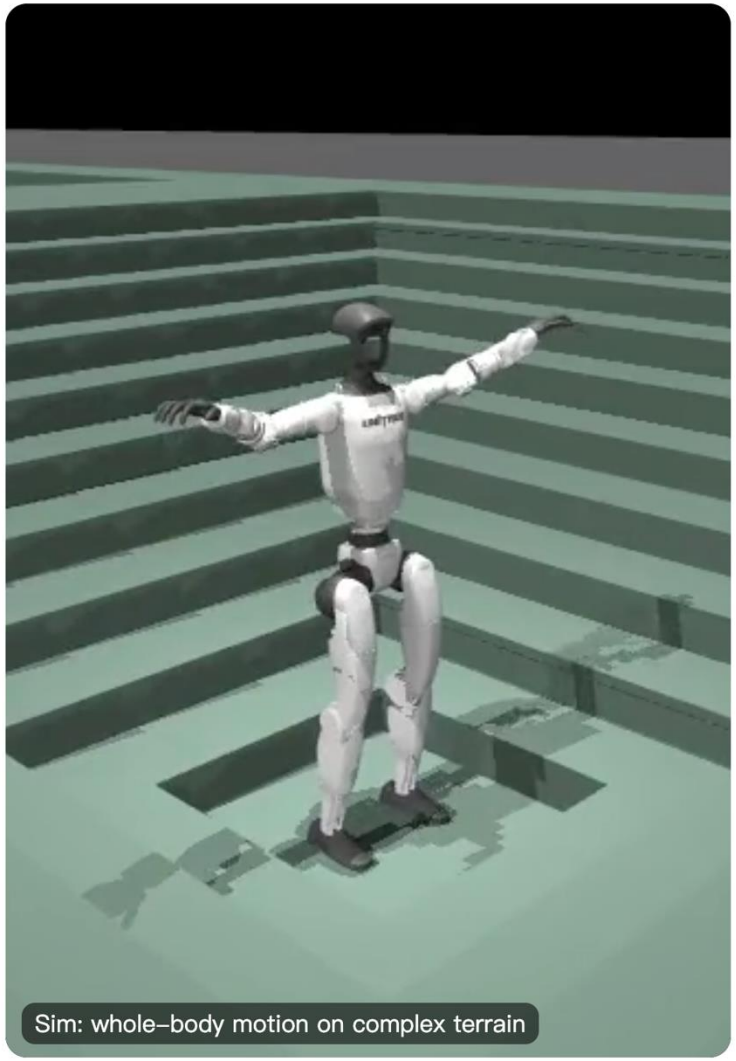
P–BFM: Perceptive Behavioral Foundation Models for Humanoid Control via Unsupervised RL

Exploring **terrain interaction** with FB unsupervised learning.

ICLR sub Lead · Xue Wang







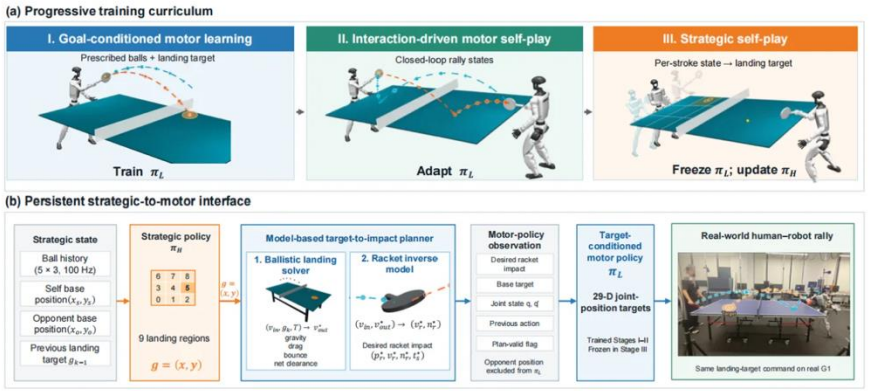
I–BFM · Objects | P–BFM · Terrain | **Table Tennis** | Ball Sports | Parkour

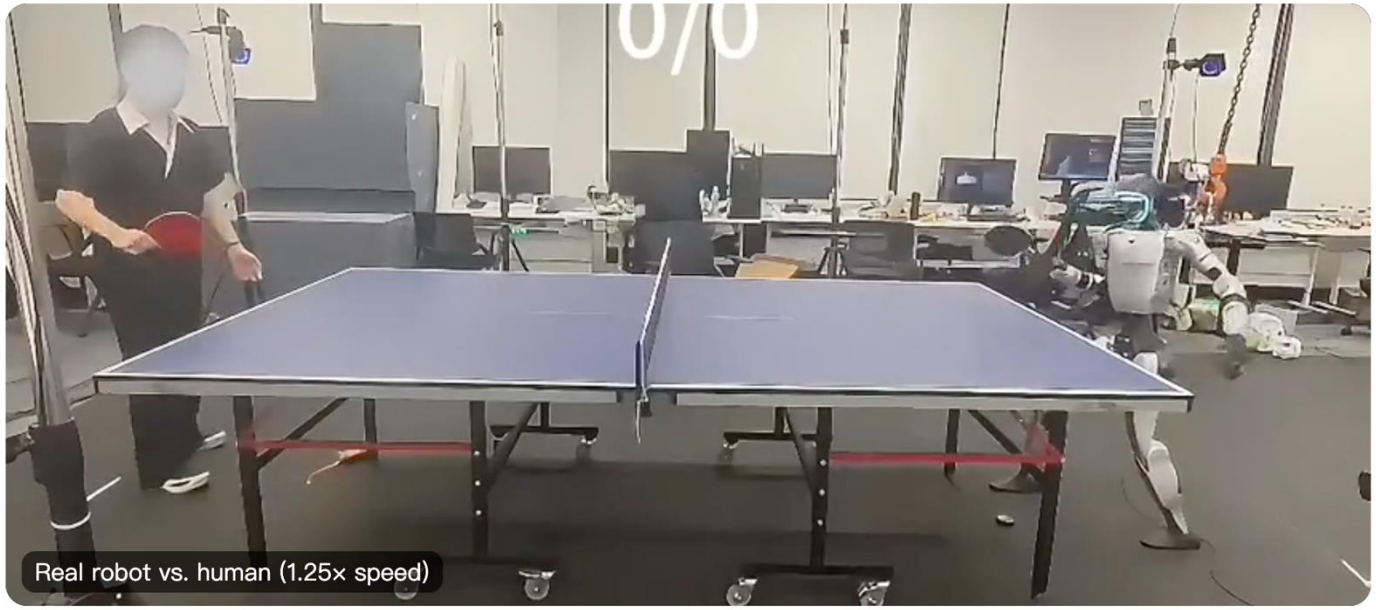
Built on FB unsupervised learning

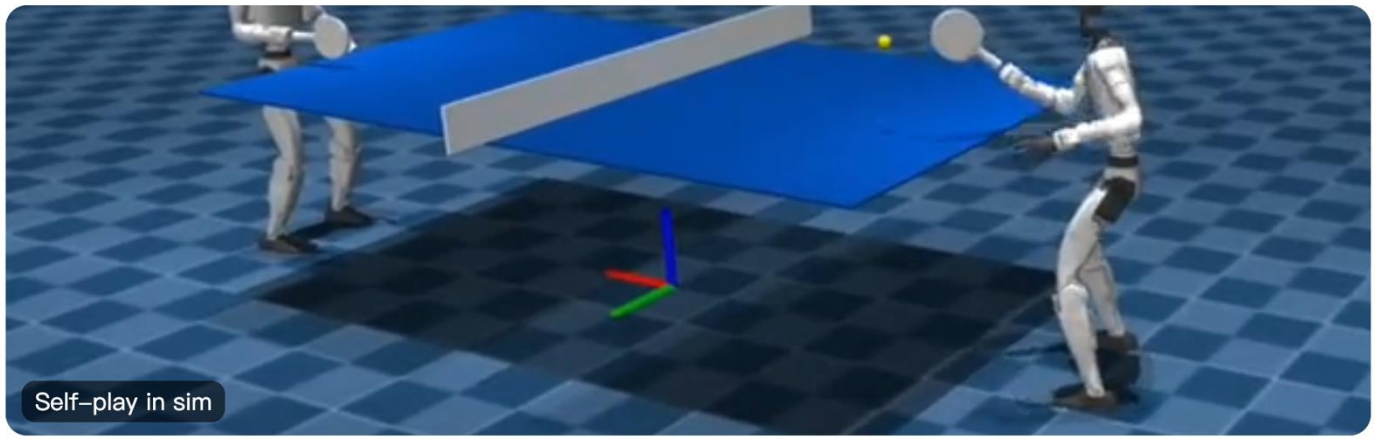
From Hitter to Player: Separating Motor Execution and Strategy in Competitive Humanoid Table Tennis

1. A training framework for dynamic ball interaction
2. Self–play training for competitive rallies

ICRA sub Lead · Fanrong Dong







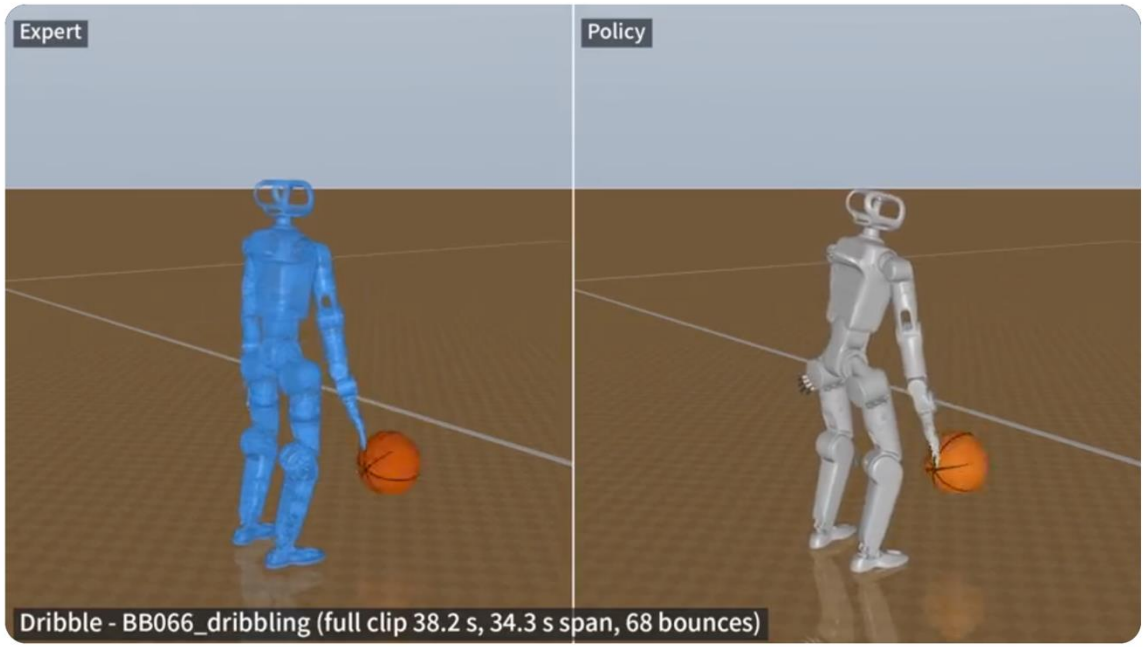
I–BFM · Objects | P–BFM · Terrain | Table Tennis | **Ball Sports** | Parkour

Built on FB unsupervised learning

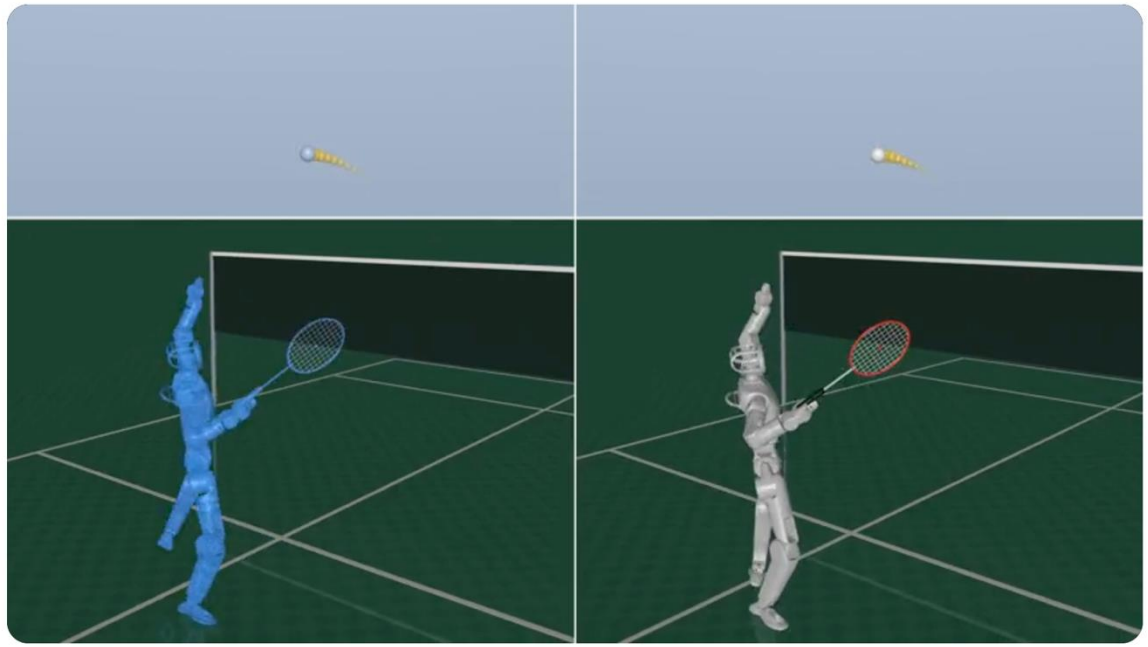
Ball Sports: RP1 basketball & badminton

Beyond table tennis: in simulation, the policy (right) reproduces the expert motion (left) while handling the ball.

Basketball · dribbling (sim)



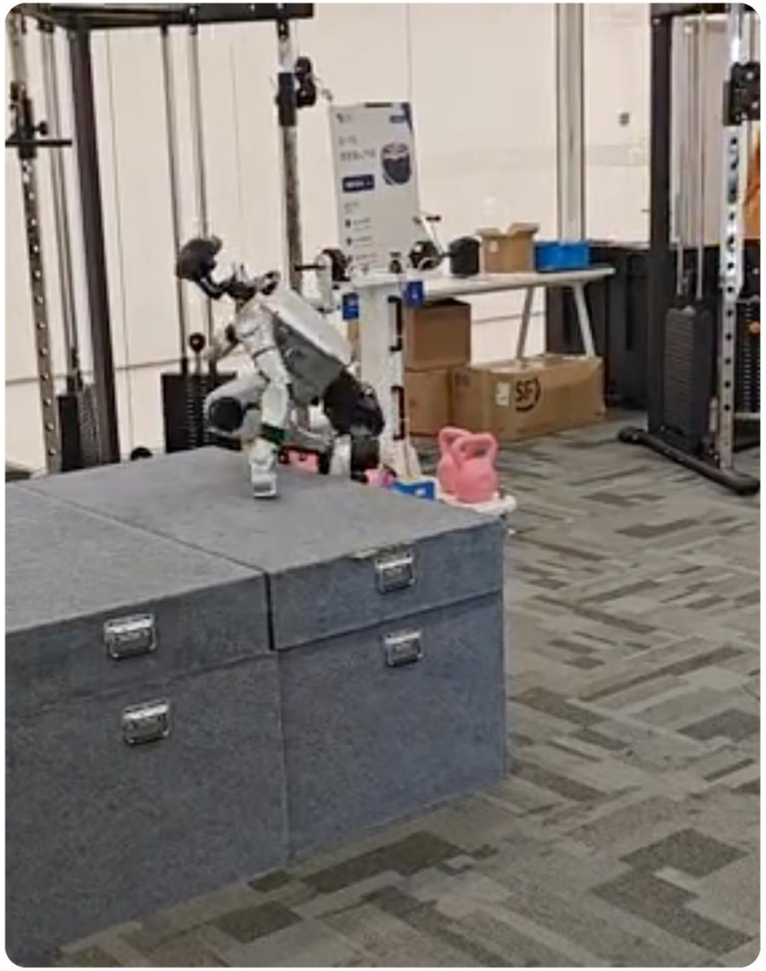
Badminton (sim)

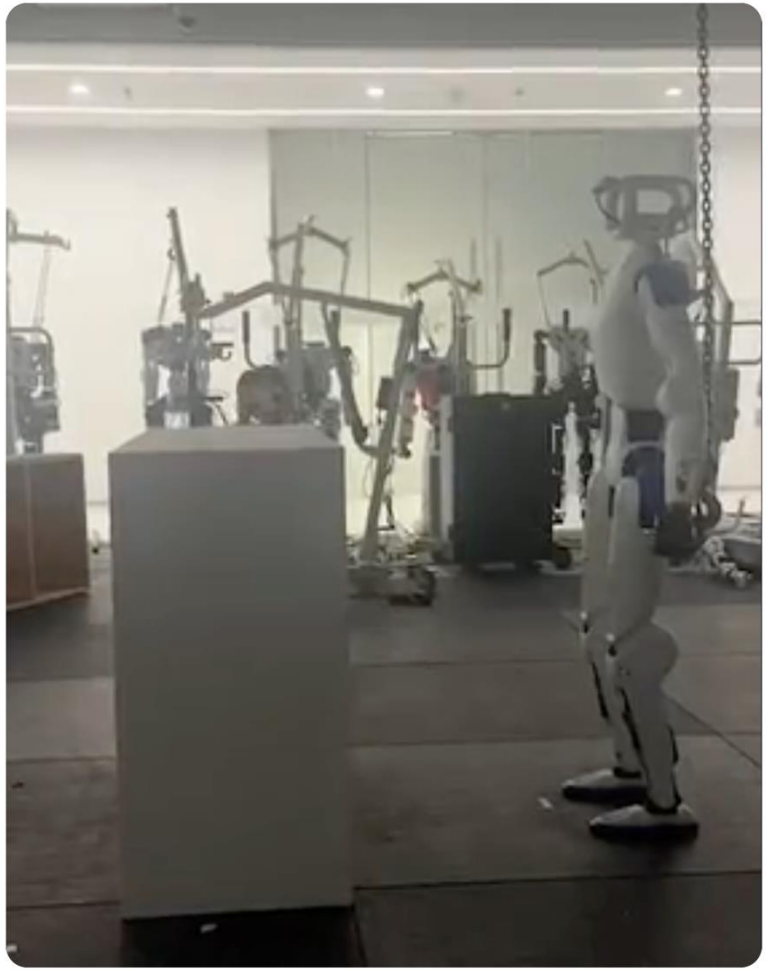


I–BFM · Objects | P–BFM · Terrain | Table Tennis | Ball Sports | **Parkour**

Built on FB unsupervised learning

Humanoid Parkour: perception + high–dynamic whole–body motion







INTACT | Real2Sim2Real

INTACT: a lightweight zero-shot sim2real deployment framework

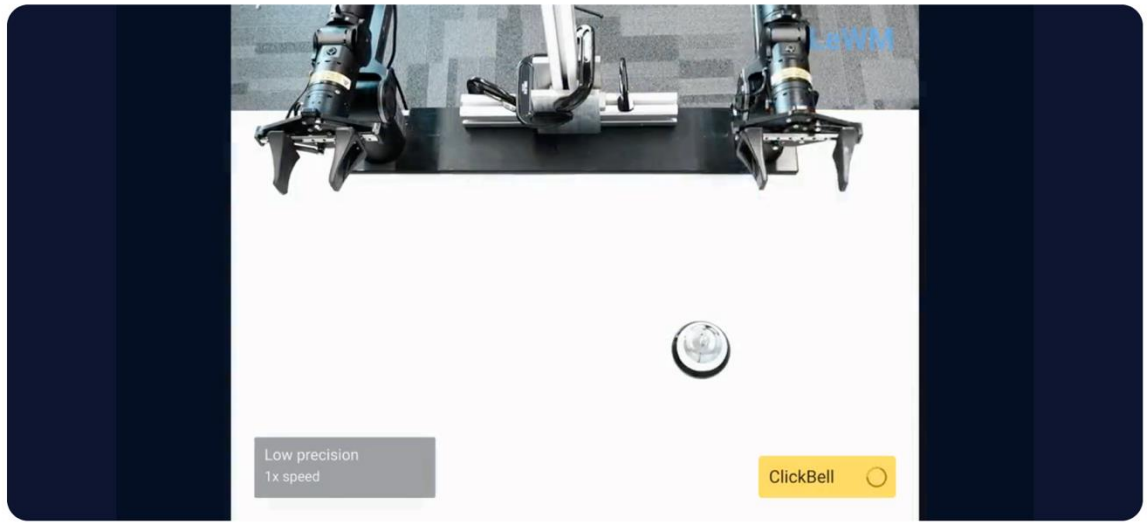
1 GPU
Trains on a single 4090

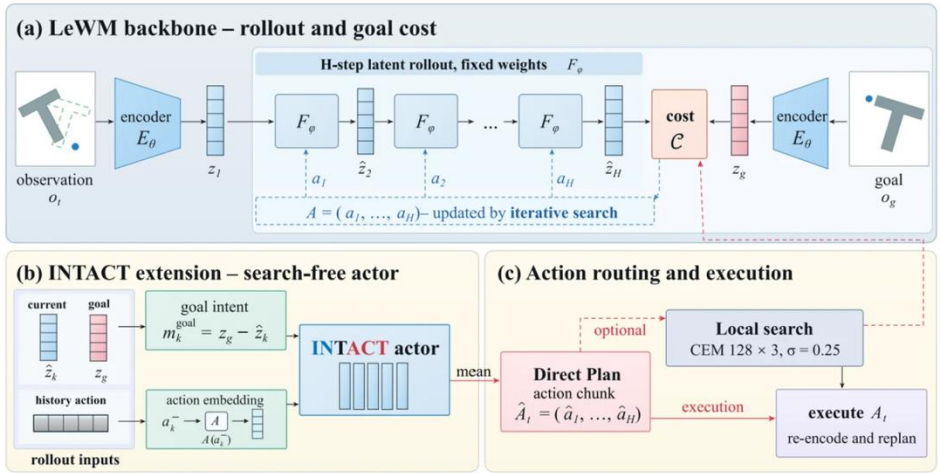
99%
Single-task success rate

ms-level
Inference latency

1. Turn imitation into **intent**
2. Remove inference-time CEM by amortizing it into training
3. Unified representation upstream and downstream
4. Efficient, lightweight deployment

● ★ 196 Stars · 10 Forks | ICLR sub · Open Source | Lead · Junhan Sun





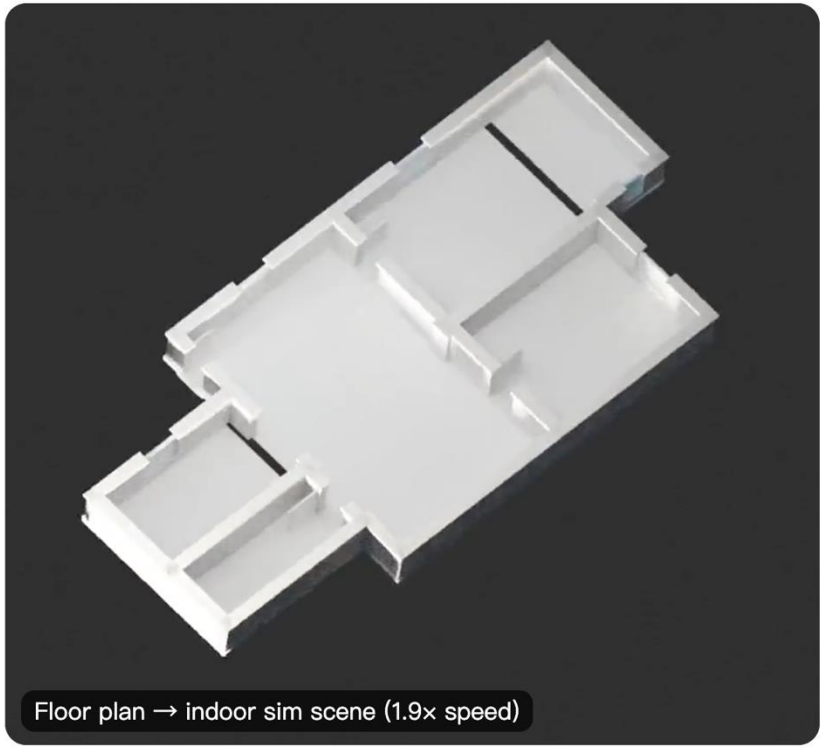
③ Manipulation Infra

SOTA Algorithms

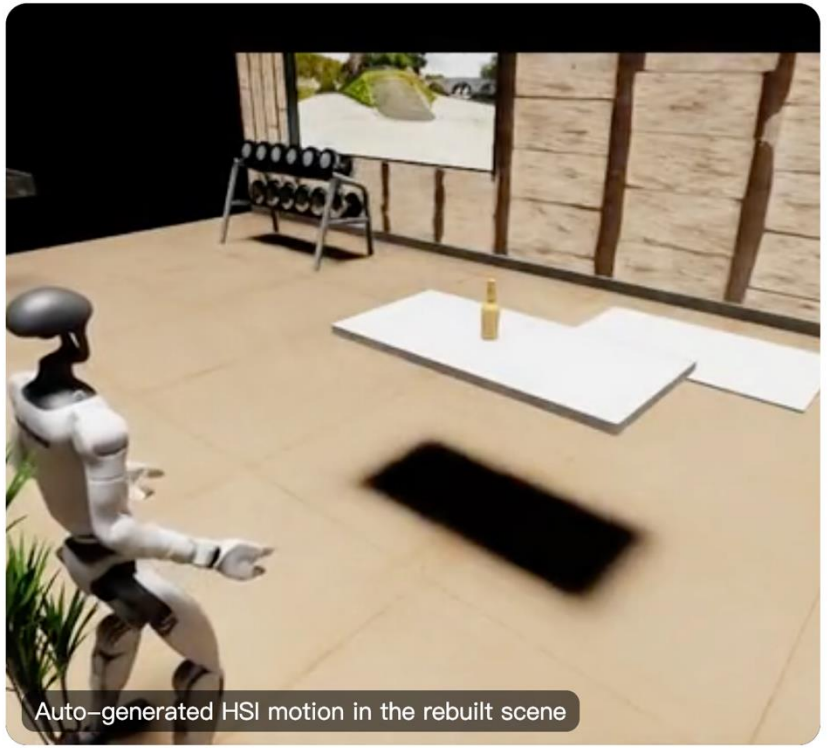
INTACT | **Real2Sim2Real**

Real2Sim2Real: rebuild → generate HSI motion → train in sim → feed data back

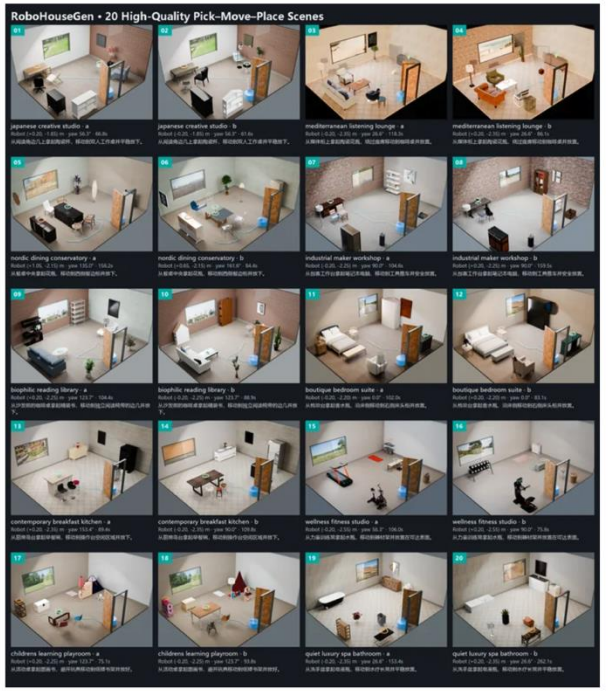
Open-sourcing soon



Floor plan → indoor sim scene (1.9× speed)



Auto-generated HSI motion in the rebuilt scene



Scene rebuild / gen
Real room → sim assets

→

Task / motion gen
HSI motion · Pick-Move-Place

→

Sim training
Massively parallel

→

Evaluation
Embodied AI benchmark

→

Data feedback
Real data → next round

PartyDojo | VIStream

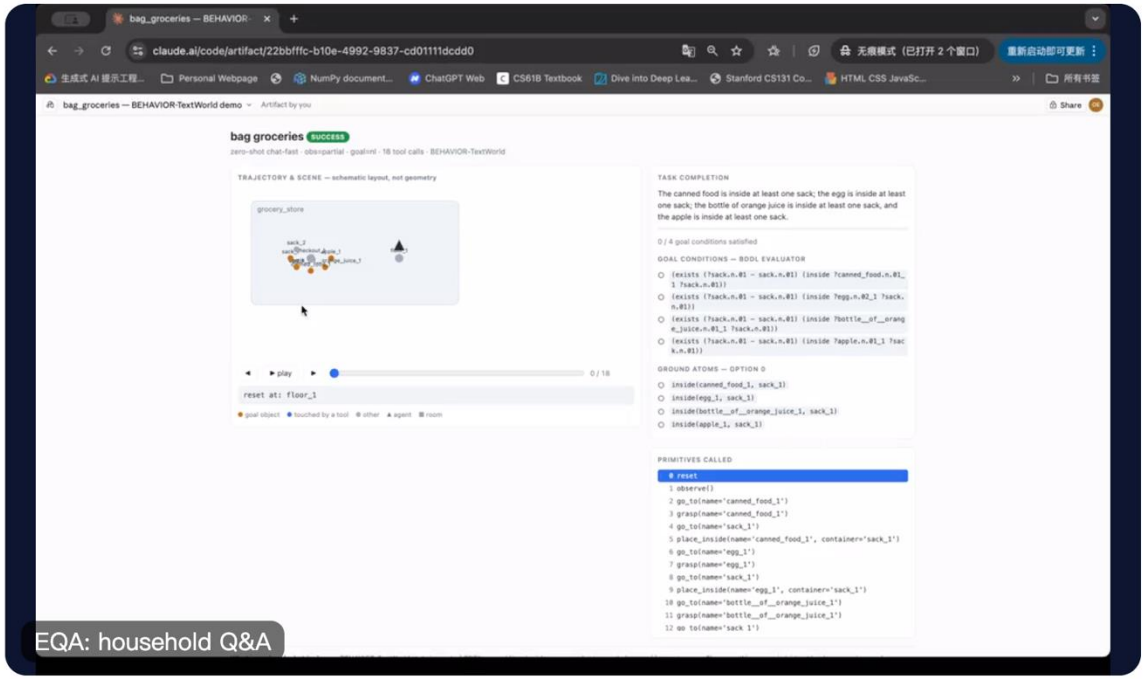
PartyDojo: a GPT-6 enhanced harness for robots

Embodied Question Answering (EQA)

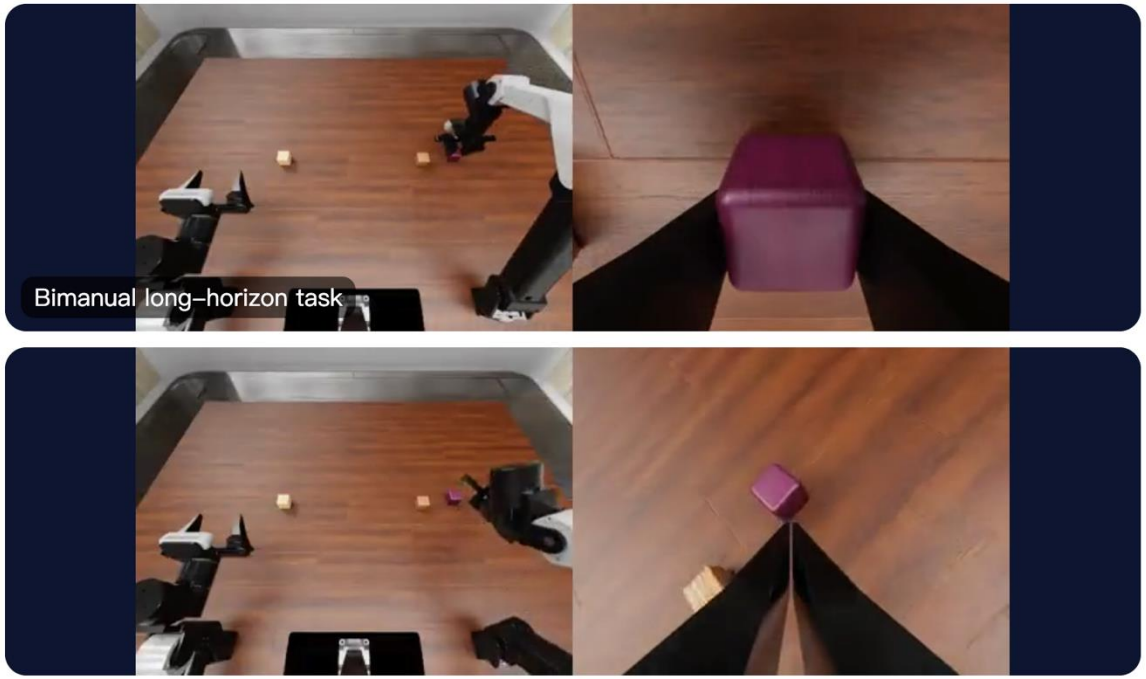
1. Structured scene perception
2. Specialist primitive policies

Long-horizon tabletop manipulation

1. Visual + proprioceptive feedback
2. Geometrical controllers · Integrated memory / planners



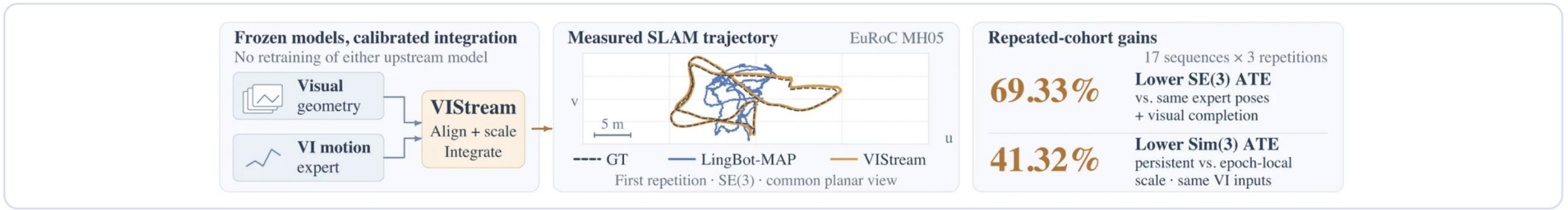
EQA: household Q&A



Bimanual long-horizon task

PartyDojo | VIStream

VIStream: Bringing Inertial Sensing to Streaming Geometric Foundation Models

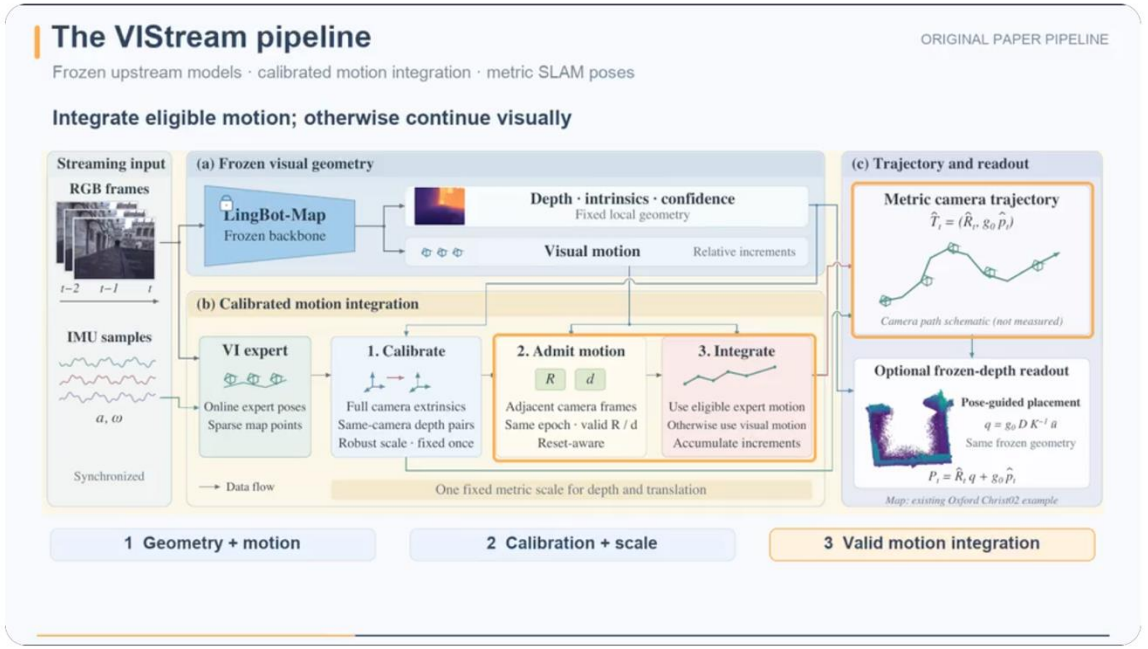


1. No changes to the foundation model (DUSt3R / VGGT / LingBot–Map)
2. Persistent scale
3. Component–wise fusion: rotation and translation VIO increments are judged and selected independently

69.33% lower SE(3) ATE

41.32% lower Sim(3) ATE

ICRA sub Lead · Mingzhe Liu



ROBO PARTY | LAB

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SOTA Ecosystem

4
open-source projects · **870+** GitHub Stars

7
papers under review: ICRA × 4 · ICLR × 3

50K words
Humanoid control Know-How

1
automated Real2Sim2Real loop, open-sourcing soon

Open hardware
Joints · robots · SDK

Open algorithms
4 projects · 870+ ★

Open knowledge
50K-word Know-How

Open talent
Full-time + frontier interns

HHtools	Human → robot retargeting tool	Open ★221	
MimicLite	SONIC-level BFM in 4 h on 8× 4090	Open ★183	
UFO	Unsupervised BFM training + deployment	Open ★270	
INTACT	Intent-to-action, lightweight deployment	Open ★196	ICLR
PREDACTOR	On-device State-Action Diffusion		ICRA
MimicAll	Cross-embodiment whole-body tracking		ICLR
I-BFM / P-BFM	Unsupervised BFMs for object / terrain	ICRA	ICLR
Hitter → Player	Humanoid table-tennis self-play		ICRA
VIStream	Inertial sensing + streaming geometric FMs		ICRA

Star counts as of preparing this deck; "under review" means submitted, decision pending.



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Agenda