MOVIN TRACIN': Move Outside The Box

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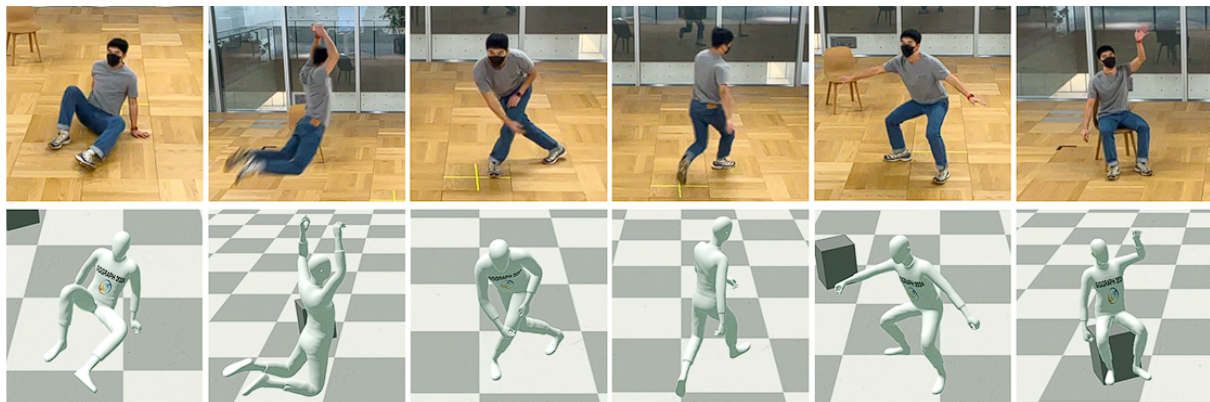MOVIN
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Figure 1: We present MOVIN TRACIN': an AI-driven, single LiDAR sensor system for precise, real-time, full-body tracking without traditional suit markers. Please enjoy our demo featuring two people engaging in a real-time interactive shooting game.

ABSTRACT

We introduce MOVIN TRACIN', an advanced AI-driven motion capture system that leverages a single LiDAR sensor for precise, real-time, full-body tracking. TRACIN' streamlines the user experience by eliminating the need for traditional suit markers or body-mounted sensors, while delivering motion capture accuracy comparable to conventional systems. The system captures full-body

motion at 60 frames per second by upscaling from a 20 fps LiDAR point cloud sequence, making it particularly effective for applications demanding high responsiveness, such as live streaming, metaverse platforms, gaming, and interactive media art.

Unlike traditional motion capture systems that often require multiple sensors or high-quality cameras with extensive calibration, our approach uses a single LiDAR sensor with instant calibration. This significantly reduces setup costs, time, and effort, making the system accessible to general users without the need for expert mocap engineers.

To address the limitations of a single LiDAR setup, such as self-occlusion, we utilize a generative AI model that generates the most plausible output pose from the learned motion distribution, even with sparse or incomplete input point clouds. Our model maintains real-time performance with a fast inference time of around 50 ms, ensuring suitability for real-time applications.

MOVIN TRACIN' also supports an API-SDK for developers, enabling easy integration and streaming to game engines such as Unity and Unreal.

In summary, MOVIN TRACIN' represents a significant advancement in motion capture technology, offering:

- Usability: Effortless setup with a single LiDAR sensor, featuring automated calibration for the capture space and precise skeleton offsets.
- Robustness: Operates without body-worn sensors or markers, maintaining stability and accuracy even during dynamic movements.
- Affordability: Leverages a single consumer-grade LiDAR sensor and operates efficiently on an entry-level gaming laptop.
- Scalability: Provides seamless integration with game engines and content creation pipelines for enhanced versatility.

CCS CONCEPTS

• **Computing methodologies** → **Motion capture**; **Motion processing**; **Neural networks**.

KEYWORDS

Markerless motion capture, Motion synthesis, Point cloud, Deep learning