

"Precise Marker-less" Motion Capture System Can Track Patients' Movements to 0.4" Accuracy

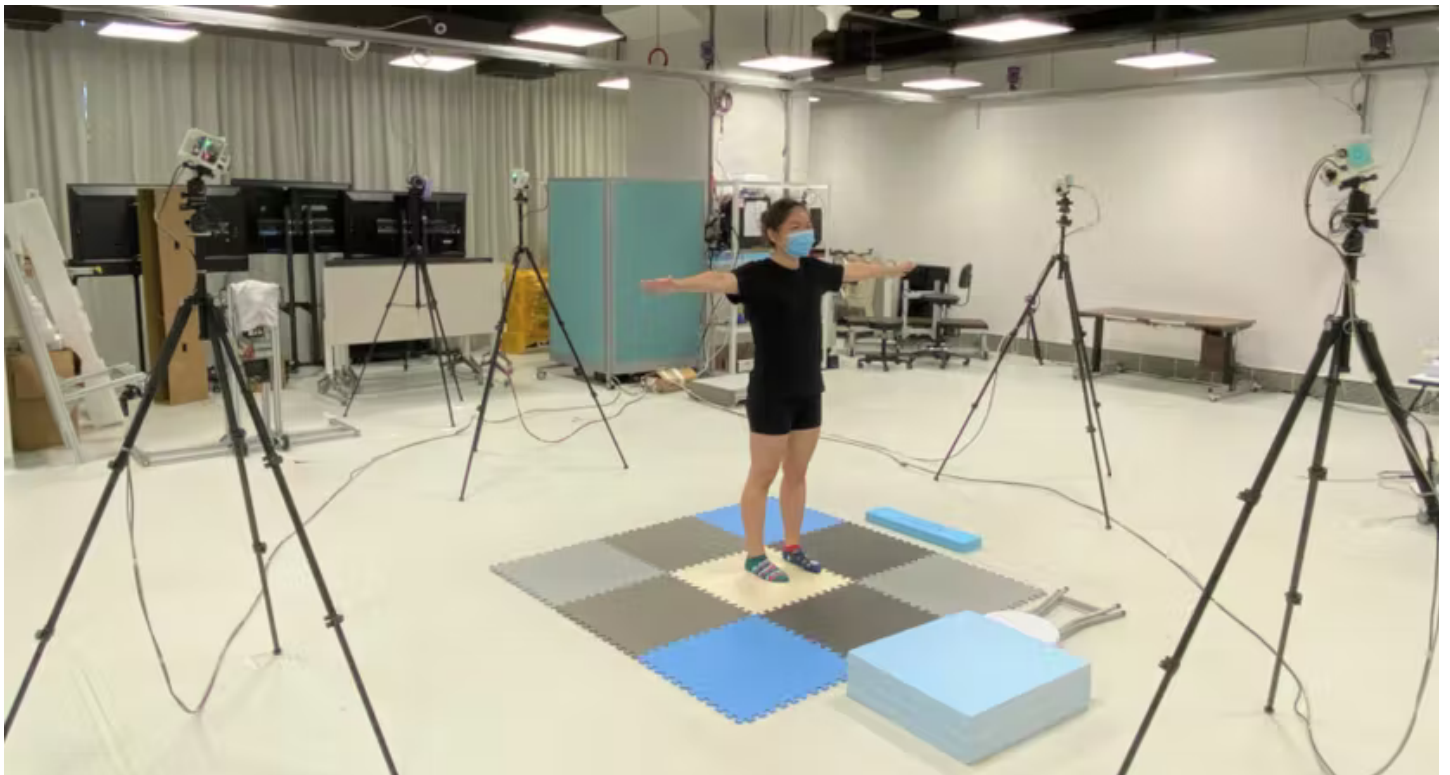
Designed for healthcare, athletic monitoring, animation, and more, this machine learning system offers high-accuracy motion data.



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Researchers at Nanyang Technological University, Singapore (NTU Singapore) have showcased a camera-based motion capture system designed to monitor patients during rehabilitation consultations and more — without the need to apply markers.

"Our tool could be applied by professionals in several fields. For example, doctors and therapists could potentially use it to objectively analyze their patients' movements," explains Prayook Jatesiktat, PhD, research fellow at the Rehabilitation Research Institute of Singapore (RRIS) and lead on the project.

"The technology could also benefit athletes and coaches, as it gives them access to an easy-to-use motion capture system to assess their sports-related actions. Animators could also use our technology to drive their characters' movements."

This marker-free motion capture system, working from two to four cameras, can track joints to 0.4".

(: NTU Singapore)

Dubbed Precise Marker-less, the capture system is able to track bone landmark locations within 10-15mm (around 0.4-0.6"), without needing the application of markers as with most motion capture systems offering similar accuracy. The result, the team claims, is a system that can be used with just minutes of set-up time and which allows for more natural movement to be captured.

The approach uses machine learning, trained on over 16TB of images tracking the movements of a 150-subject cohort, to effectively calculate where the markers would be if the subjects were wearing them. Images are captured using two to four standard cameras linked to a computer, while a calibration kit keeps everything ticking over.



The motion data can be used for healthcare, athletic monitoring, or even animation, the system's creators say. (📷: NTU Singapore)

"To sharpen the precision of such a model, we harnessed the power of machine learning to train a computation model to predict the location of markers on video footage of a moving subject," explains Ang Wei Tech, associate professor and executive director at RRIS.

"The technology developed by our team complements the precision rehabilitation research at RRIS, which harnesses data analytics and computer simulations to enable the translation of such research work to the actual clinical practice."

The team has confirmed that "several Singapore-based companies" have expressed interest in commercializing the technology, while a patent has been applied for.

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