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Combining Motion Matching and Orientation Prediction to Animate Avatars for Consumer-Grade VR Devices

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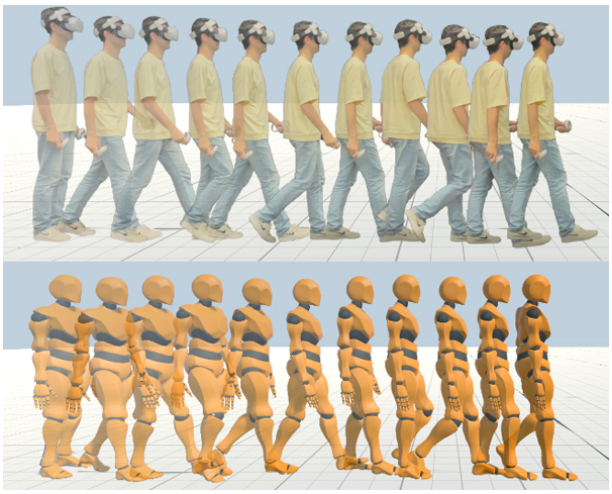

The animation of user avatars plays a crucial role in conveying their pose, gestures, and relative distances to virtual objects or other users. Consumer-grade VR devices typically include three trackers: the Head Mounted Display (HMD) and two handheld VR controllers. Since the problem of reconstructing the user pose from such sparse data is ill-defined, especially for the lower body, the approach adopted by most VR games consists of assuming the body orientation matches that of the HMD, and applying animation blending and time-warping from a reduced set of animations. Unfortunately, this approach produces noticeable mismatches between user and avatar movements. In this work we present a new approach to animate user avatars for current mainstream VR devices. First, we use a neural network to estimate the userï¿½ï¿½s body orientation based on the tracking information from the HMD and the hand controllers. Then we use this orientation together with the velocity and rotation of the HMD to build a feature vector that feeds a Motion Matching algorithm. We built a MoCap database with animations of VR users wearing a HMD and used it to test our approach on both self-avatars and other usersï¿½ï¿½ï¿½ avatars. Our results show that our system can provide a large variety of lower body animations while correctly matching the user orientation, which in turn allows us to represent not only forward movements but also stepping in any direction.

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