

## 3D Periodic Human Motion Reconstruction from 2D Motion Sequences.

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In this paper, we present and evaluate a method of reconstructing three-dimensional (3D) periodic human motion from two-dimensional (2D) motion sequences. Using Fourier decomposition, we construct a compact representation for periodic human motion. A low-dimensional linear motion model is learned from a training set of 3D Fourier representations by means of Principal Components Analysis. Twodimensional test data are projected onto this model with two approaches: least-square minimization and calculation of a maximum a posterior probability using the Bayes' rule. We present two different experiments in which both approaches are applied to 2D data obtained from 3D walking sequences projected onto a plane. In the first experiment, we assume the viewpoint is known. In the second experiment, the horizontal viewpoint is unknown and is recovered from the 2D motion data. The results demonstrate that using the linear model not only can missing motion data be reconstructed, but unknown view angles for 2D test data can also be retrieved.