Observable Subspaces for 3D Human Motion Recovery

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Task

3D Human Body Tracking from Monocular Sequences

Standard Approaches

The articulated body models used to represent human motion typically have many degrees of freedom, usually expressed as joint angles that are highly correlated. The true range of motion can therefore be represented by latent variables that span a low-dimensional space.

Standard approaches that adopt this idea have typically 2 main drawbacks:
- Initialization both of the latent variables and of the pose is not straightforward.
- The used variables usually do not have an intuitive meaning.
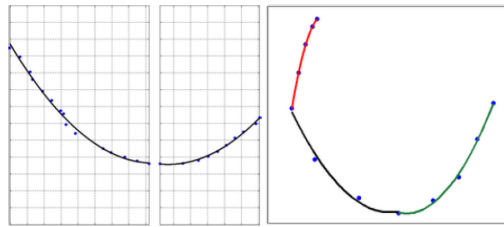
Contribution

We propose to make use of directly observable image quantities as latent variables to overcome both issues
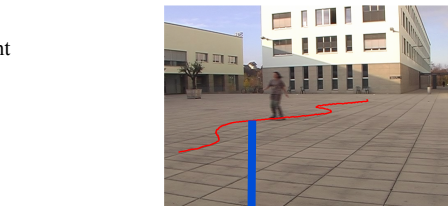
Training

PCA Training

GP Training
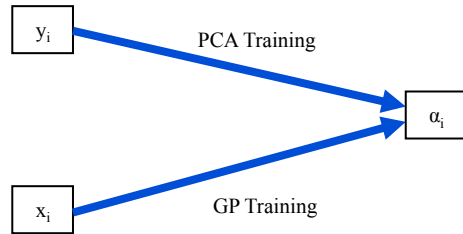
y_i Pose Sequence defined by Joint Angles

α_i PCA Representation of the Pose Sequence

x_i Observable Variables corresponding to the Pose Sequence

Observable Variables: Examples

Skating & Skiing (Feet' Trajectory)   Golf (Hands' Trajectory)

Run-Time

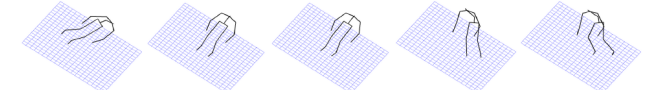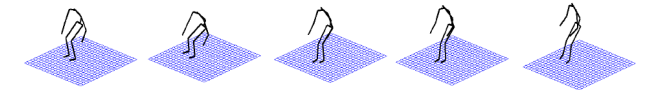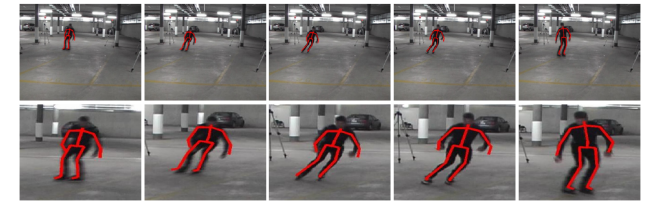Observable Variables x_i

GP Mapping

α_i

PCA Linear Mapping + Image Based Refinement

y_i

Results