Lecture

**Information Retrieval for Music and Motion**

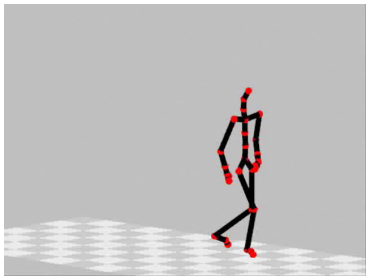
Meinard Müller and Andreas Baak

Summer Term 2008

# Motion Representations

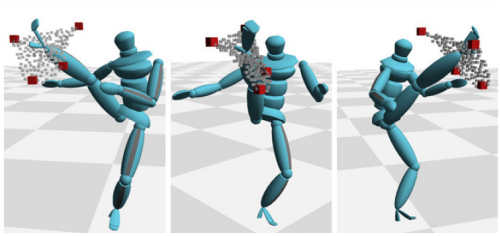
## Motion Capture Data

- Digital 3D representations of motions
- Computer animation
- Sports
- Gait analysis





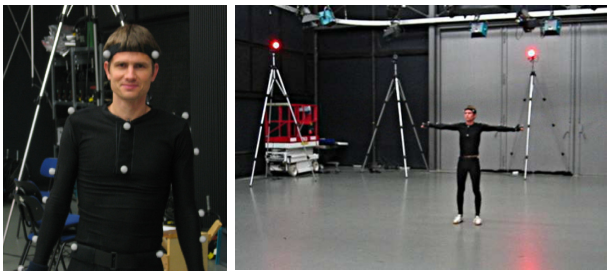
## Motion Morphing



From Kovar/Gleicher (SIGGRAPH 2004)



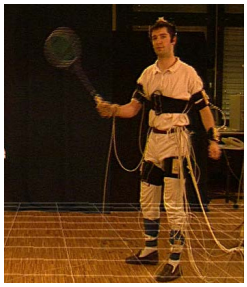
## Optical Motion Capture





## Mechanical and Magnetic Motion Capture

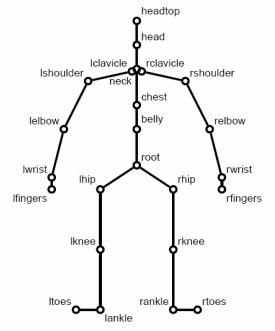
http://www.metamotion.com/gypsy/gypsy-motion-capture-system.htm



http://vrlab.epfl.ch/research/MC_motion_capture.html

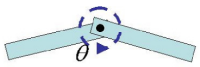


## Skeletal Kinematic Chain

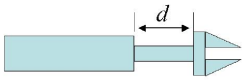


## Joint Types

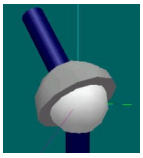
- Rotation joint




- Prismatic joint

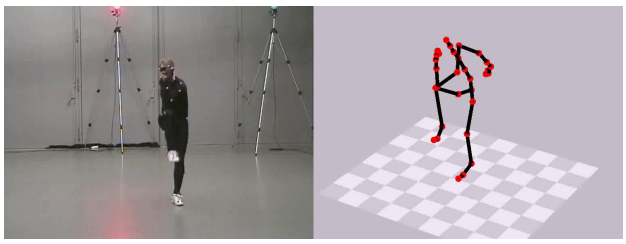



- Spherical joint



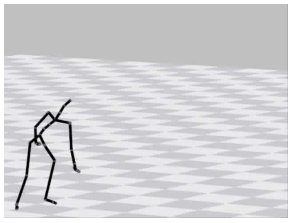


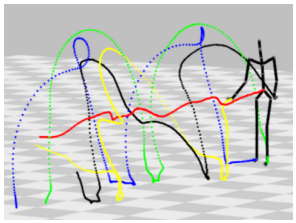
## Conversion: Marker → Skeleton





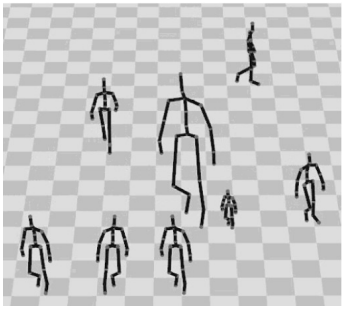
## Motion Capture Data





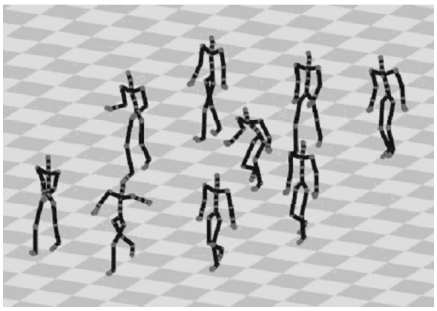


## Similarity: Global Transforms



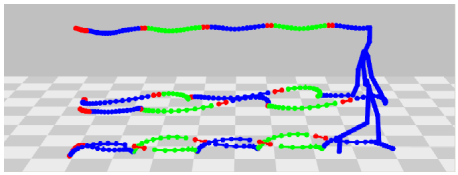


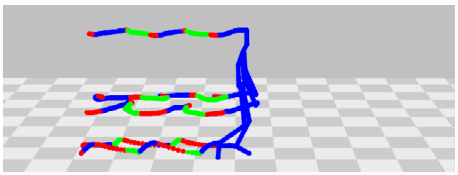
## Similarity: Various Motion Styles



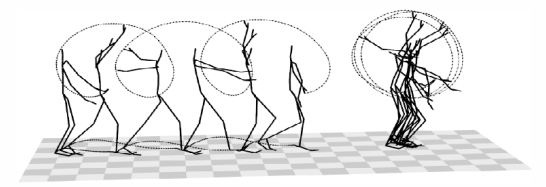


## Similarity: Motion Speed



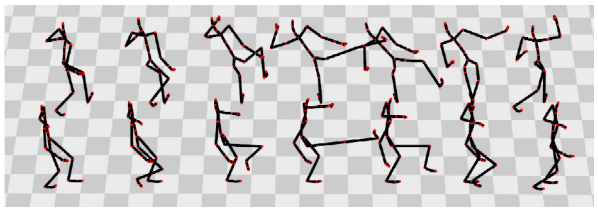


## Partial Similarity





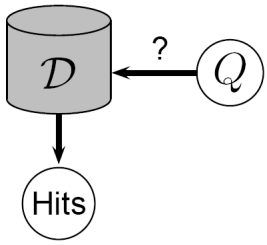
## Partial Similarity





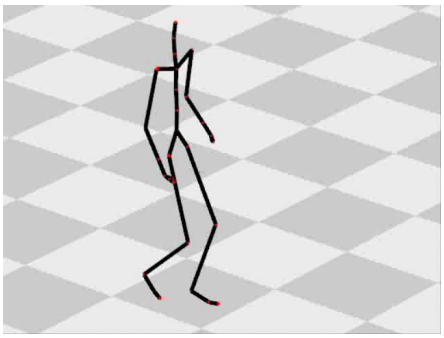
## Motion Retrieval

- $\mathcal{D}$ = MoCap database
- $Q$ = query motion clip
- Goal: find all motion clips in $\mathcal{D}$ similar to $Q$






## Motion Retrieval





## Notion of Similarity

- Numerical similarity vs. logical similarity
- Logically related motions may exhibit significant spatio-temporal variations