

Um Sistema de Animação Baseado em Movimento Capturado

(A Motion Capture Based Animation System)

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Motion Capture

- Sampling over time of joints
- Motion Capture hardware
- Uses
 - analysis.
 - reproduction.



Applications of Motion Capture

- Movies and television
 - Terminator 2, Titanic, Star Wars and others.
- Medicine
 - study of motion deaf people's movement.
- Sports
 - improvement of motions with high complexity (baseball, tennis and others).

Motion Capture and Animation

- Computer animation
 - synthesis of parameters using computational processes.
- Motion Capture animation
 - motion curves generated by sampling.

Motivation

- Captured data are different from those obtained from traditional methods
 - a specific approach is required.
- Traditional animation systems
 - treat Motion Capture as a secondary tool.
 - incorrect description of the Motion Capture problem.
 - not suitable for captured data processing.

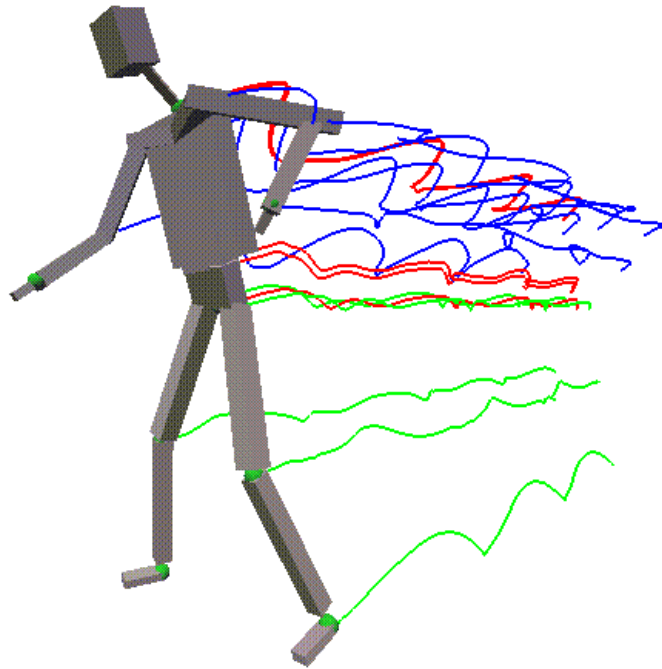
*There is a need for specialized Motion
Capture animation systems*

A Motion Capture Based Animation System

- MoCap: main animation tool
- Internal architecture
 - data structures suitable for captured data processing.
- Graphic interface specialized on MoCap
 - dynamic sharing of information between system's modules.

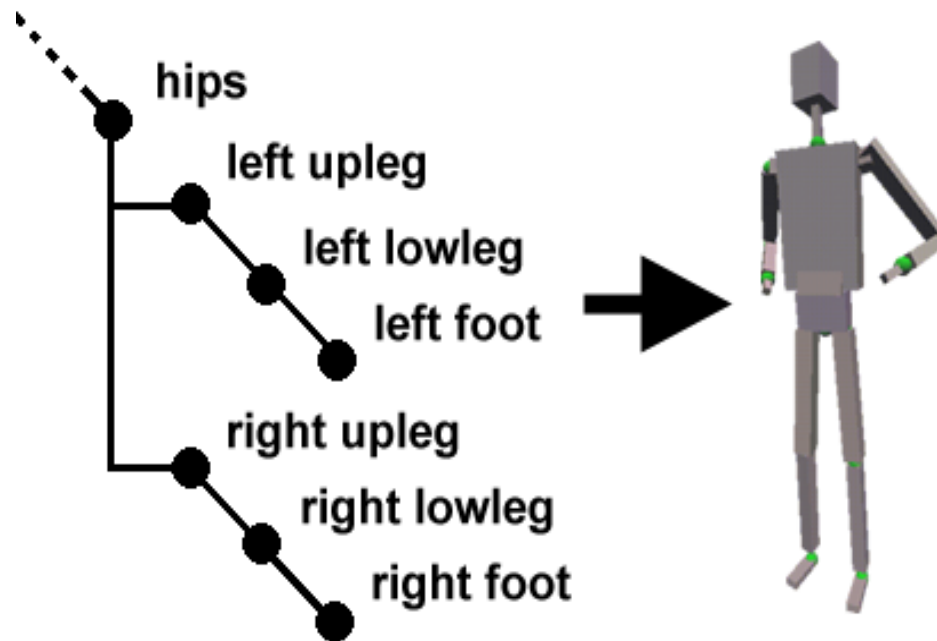
Data Structures

- Basic entities
 - virtual actor: skeletal structure.
 - motions: sampled data.



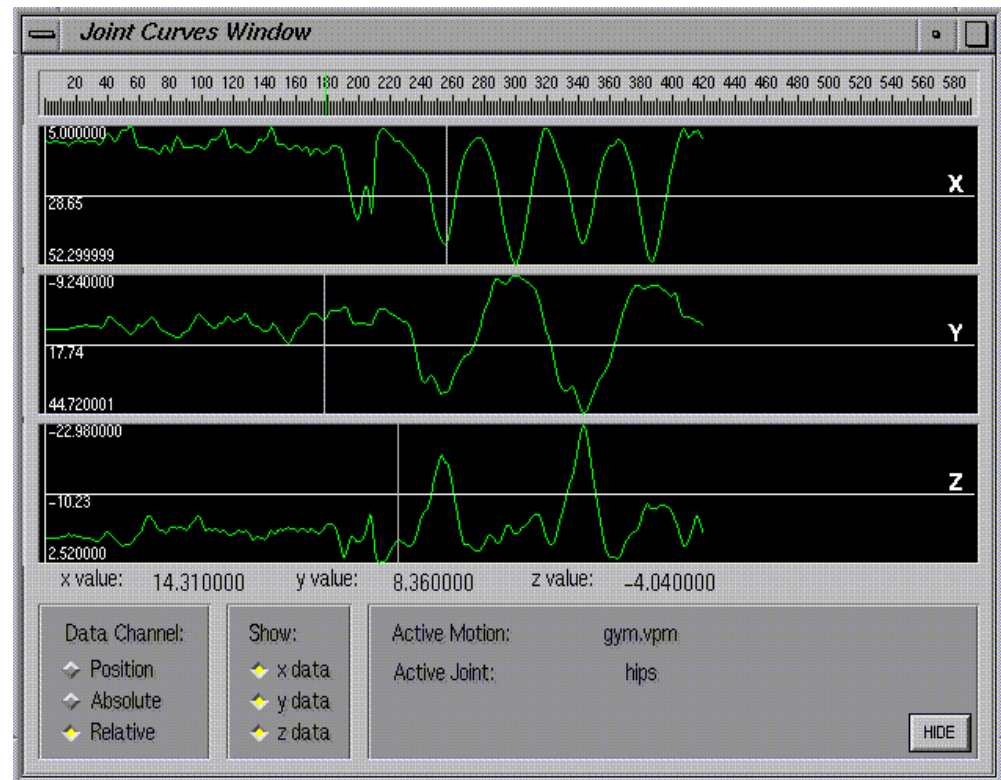
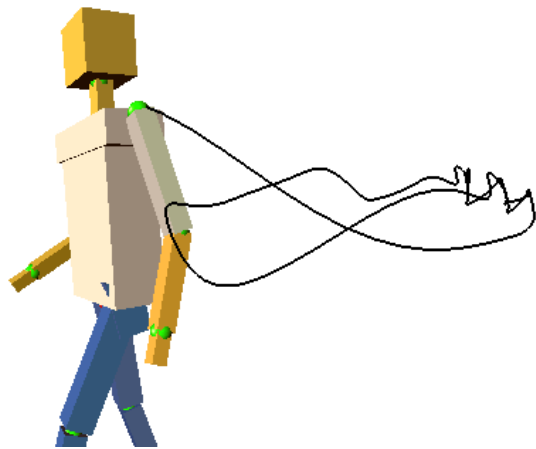
Virtual Actor

- Topology + Geometry



Motions

- Sampled data (motion curves)



Motion Processing

- Goal

- editing and reuse of captured data.

- Operations

- filtering.

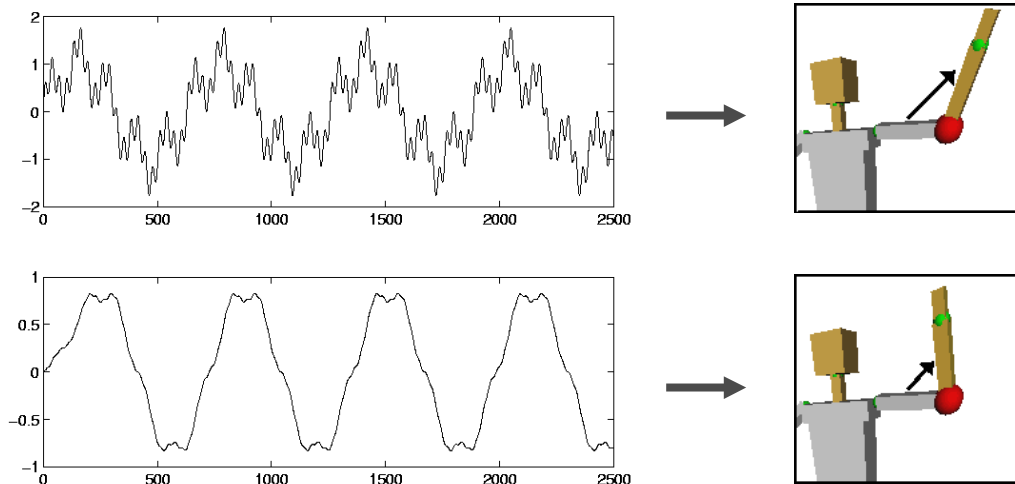
- warping.

- concatenation.

- blending.

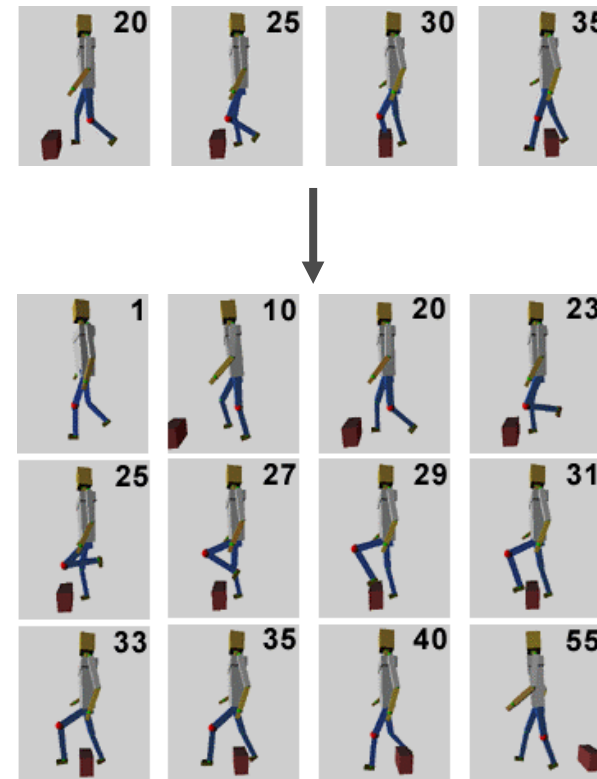
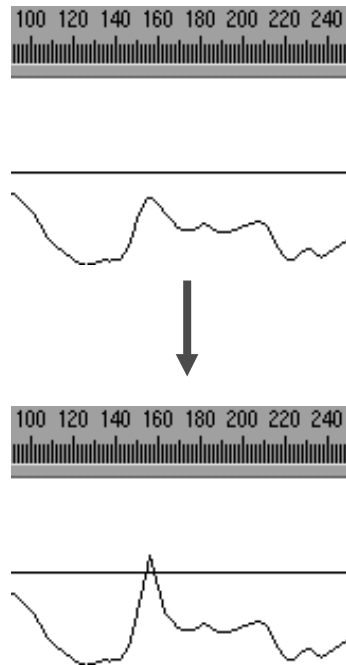
Filtering

- Global transformation of motion capture curves
- Applications: smoothing of oscillations and temporal reparametrization of motion



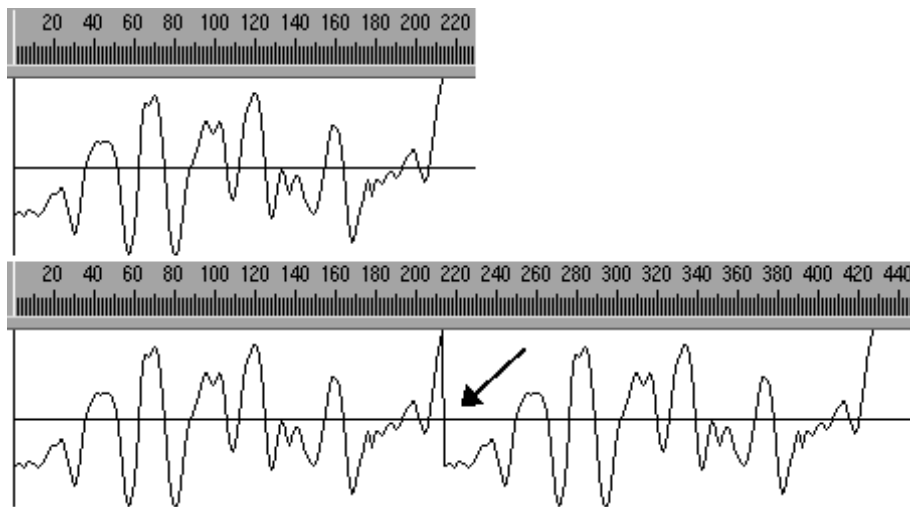
Warping

- Local transformation of a motion curve
- Application: adjusting of the configuration of one or more joints



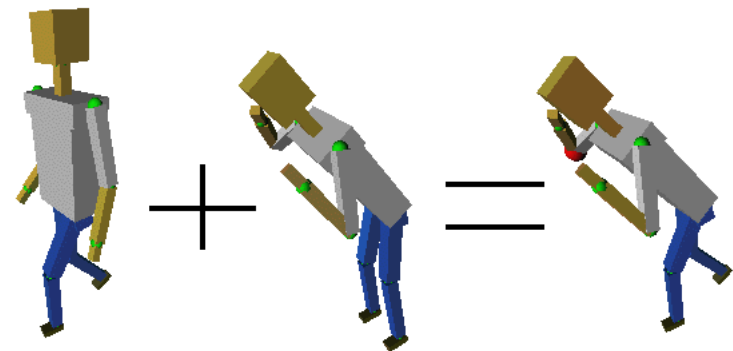
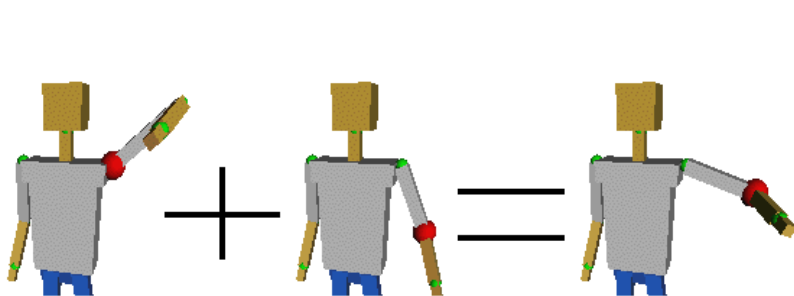
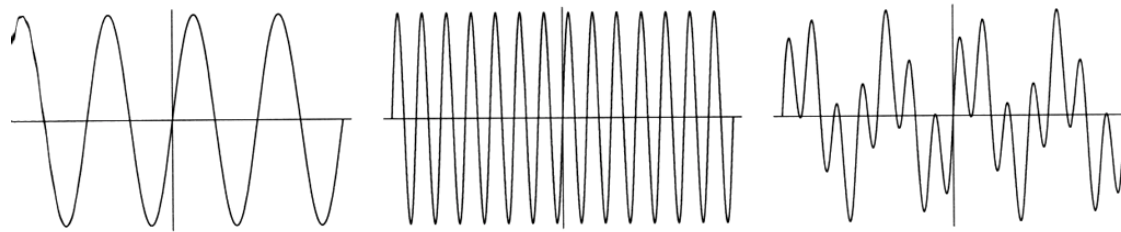
Concatenation

- Sequential junction of several motion curves
- Application: cyclification and transition between different motions in computer games



Blending

- Fusion of two or more motion curves
- Application: combination of specific characteristics of two or more motions

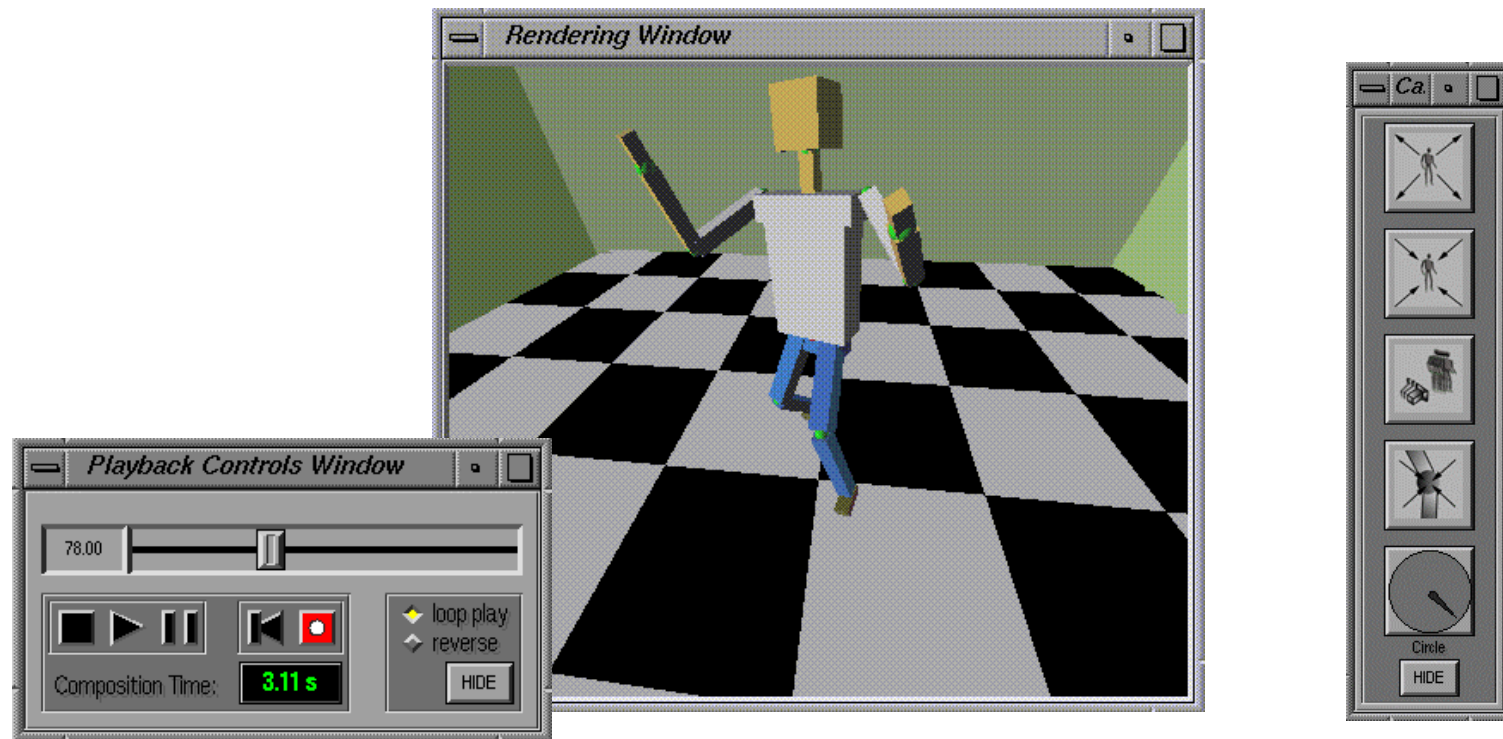


User Interface

- Graphic objects
 - designed to correctly represent the main MoCap abstractions and entities.
- Used paradigm: digital video editing
 - motions are independent segments, placed in horizontal rails.
 - compositions are generated by combining the motion segments.
 - possibility of local change, by edition of the motion curves.

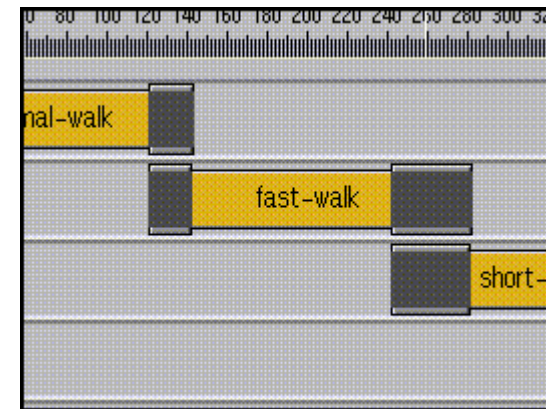
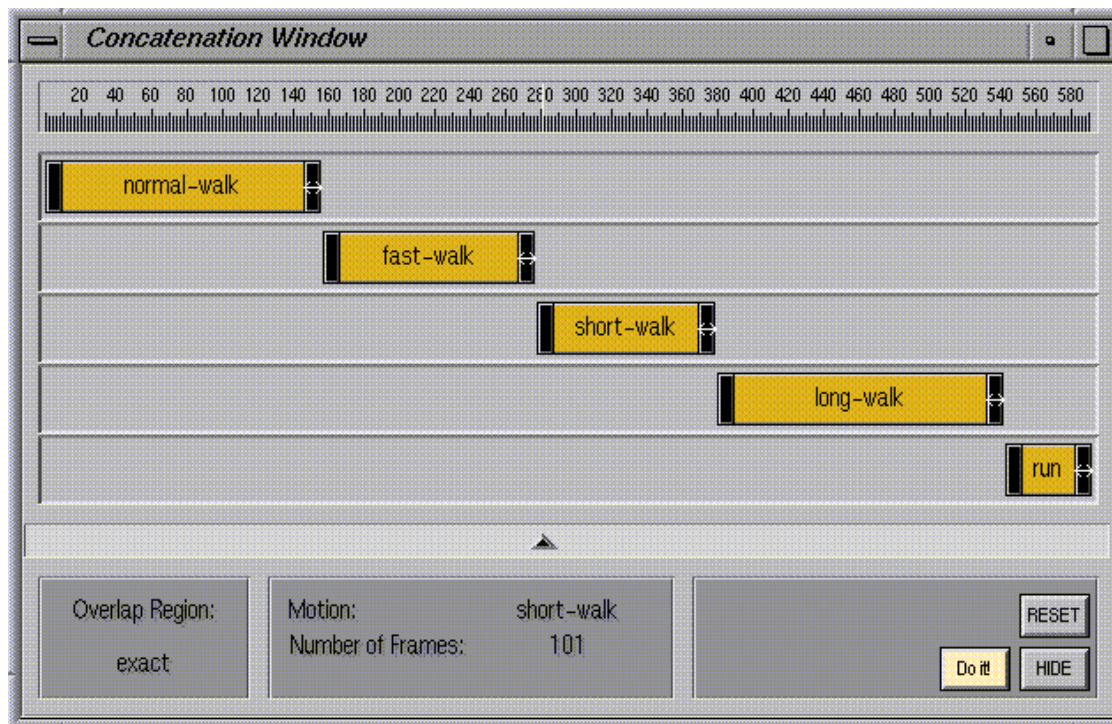
User Interface

- Motion visualization
 - playback control similar to VCRs.
 - camera control focused on the Virtual Actor.



User Interface

- Motion processing
 - specific windows for each type of operation.
 - interactive segment control and positioning.



Implementation Issues

- C language + UNIX
- Rendering: OpenGL
- Standard GUI facilities: XForms
- Real-time animation preview
- Tested on SGI, RS6000 and Linux

Conclusions

- A Motion Capture Based Animation System
 - new architecture and interface paradigms.
 - tools for motion processing.
 - important applications: special effects and research.

Future Work

- New techniques for motion processing
 - signal processing theory.
- MoCap and traditional techniques
 - combination with procedural animation and dynamic simulation.
 - better motion analysis tools.

Results

- Video presenting an overview of MC Animator