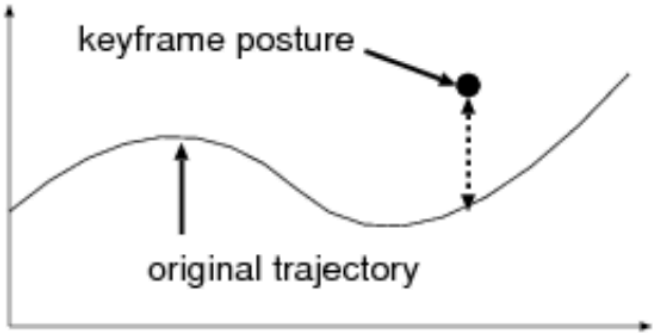
Working with motion clips

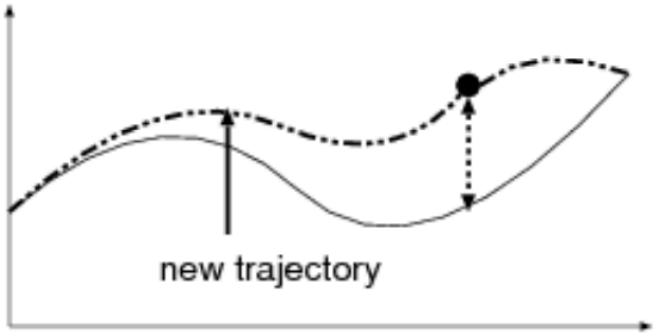
Editing Motion Capture Clips (offline or online)

- motion retargeting
- motion warping
- footskate cleanup
- time warping
- motion signal processing, i.e., exaggeration filter

Common idea for: Motion Warping, Retargeting, and Footskate Cleanup

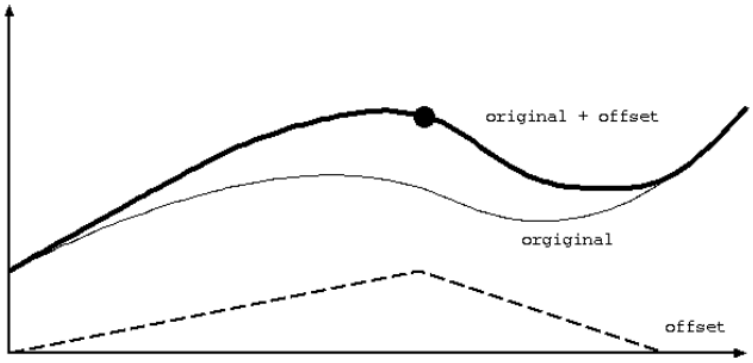
- Adding offset to the data so the constraint is satisfied





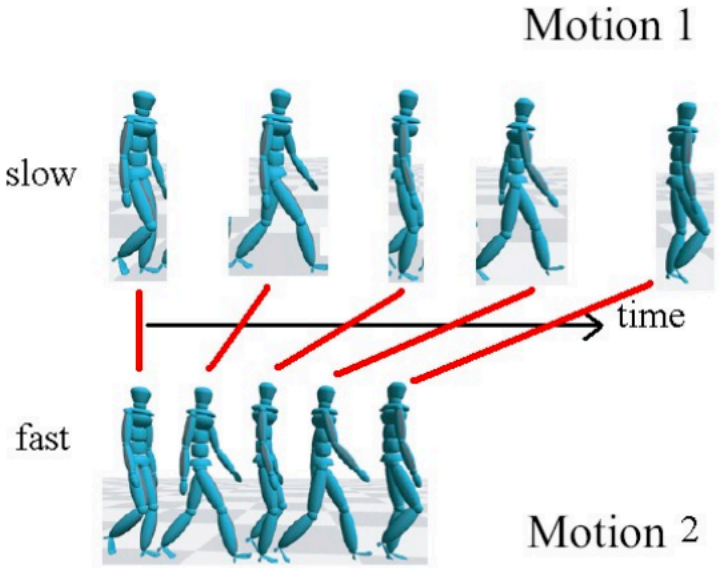
Warped Motion = original motion + offset

Offset can be a simple 1D motion

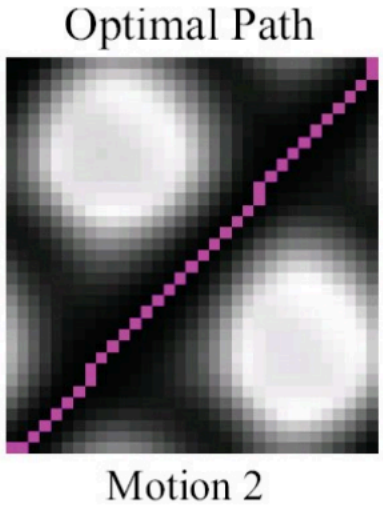


[slide from Taku Komura]

Time Warping



http://www.youtube.com/watch?v=EL7ARaH5jHU



[slide from Taku Komura]

Motion Signal Processing for exaggeration (and other effects)

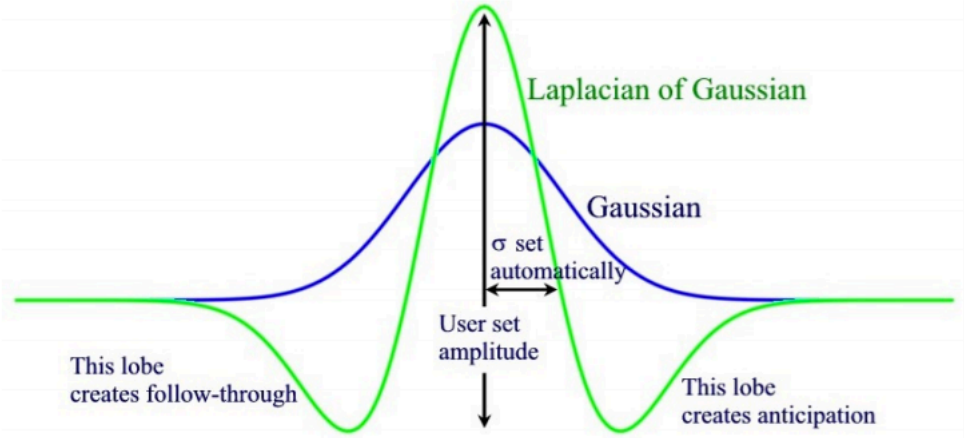


Figure 2: The cartoon animation filter.

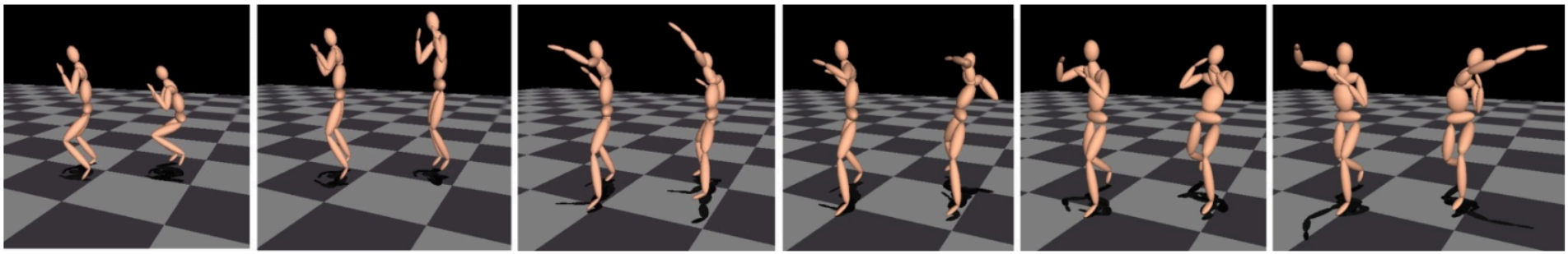


Figure 1: A punch. Left: before filtering. Right: after filtering.

["The Cartoon Animation Filter, SIGGRAPH 2006]

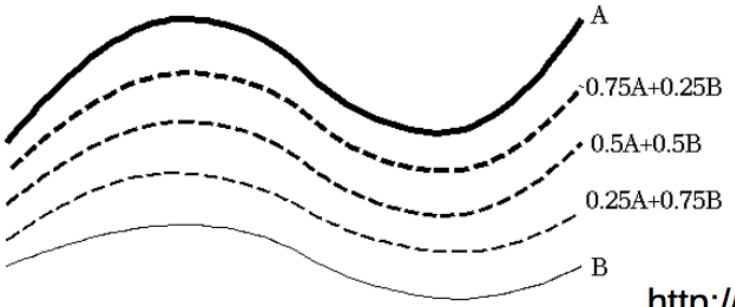
Integration of Multiple Motion Clips

- Motion Transitions
- Motion Blending
- Motion Graphs
  - manual construction
  - automated construction

Motion Blending

- Given two different motions A and B

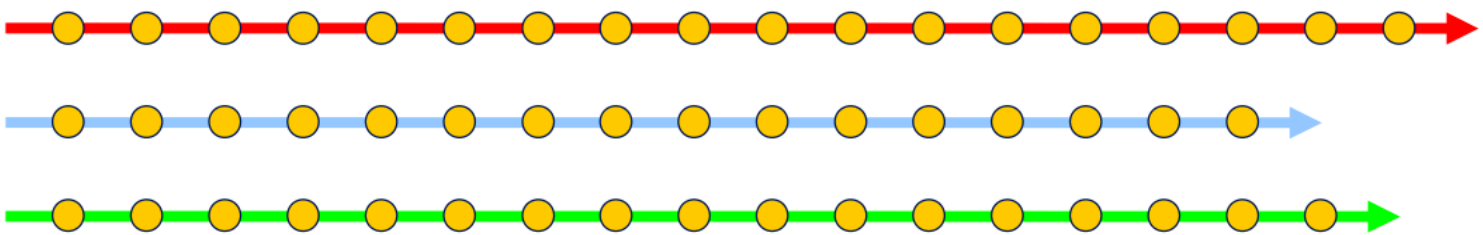
  Blended Motion = A * (1-s) + B *s (0<s<1)
- How can we use this?
  - Generate a motion inbetween
  - Exaggerating the motions by extrapolation (s>1, s<0)
  - Gradually shift from motion A to motion B
  - Concatenating two motions – blending the two ends by gradually shifting s from 0 to 1

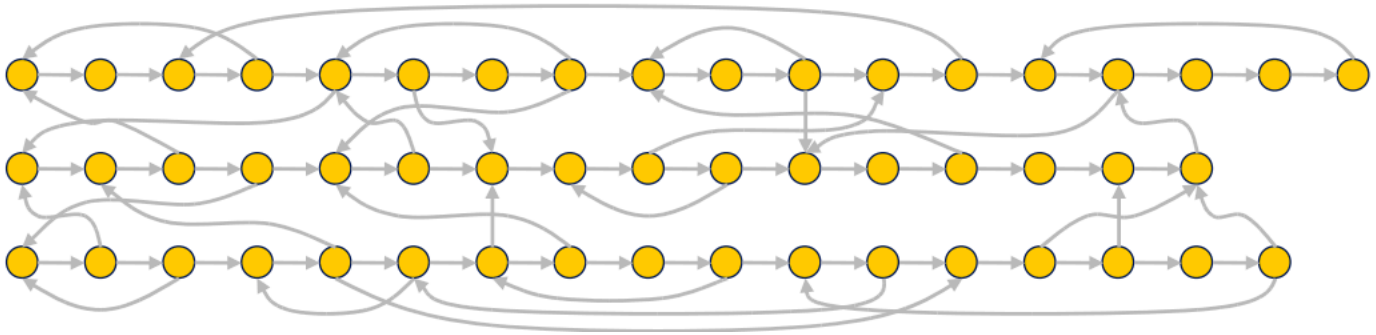


http://www.youtube.com/watch?v=Uha81cm5fRw

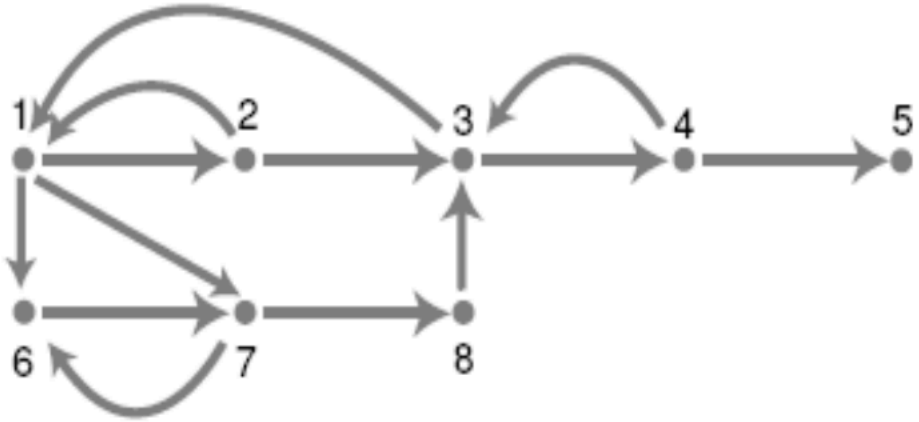
[slide from Taku Komura]

Motion Graphs





Pruning the motion graph

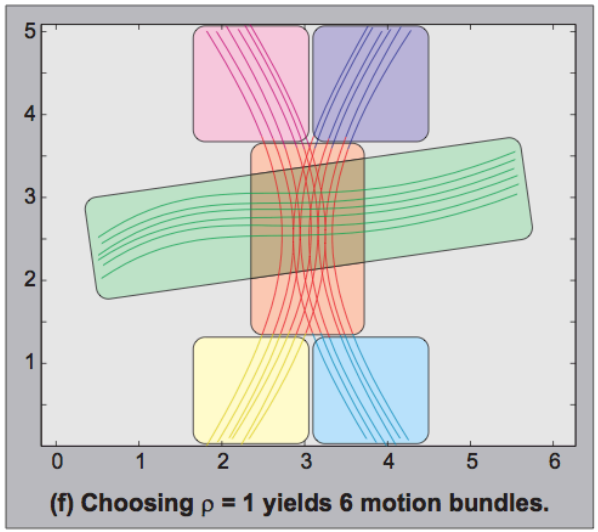


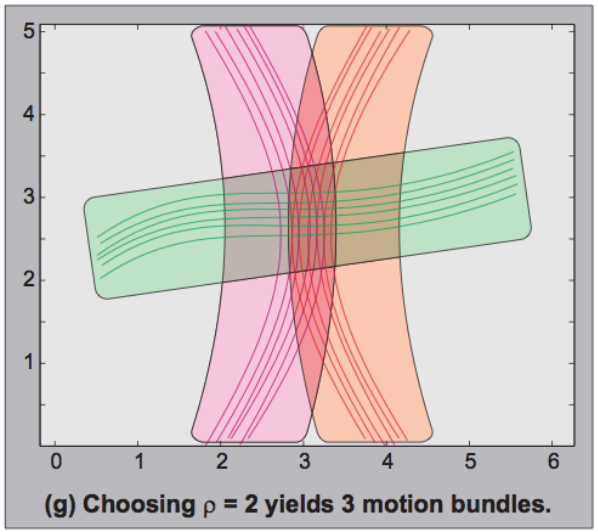
- Some parts of the graph may contain dead-ends
- Some parts of the graph might be isolated from the rest of the graph
  - Connectivity is important
  - We can remove nodes which have low connectivity

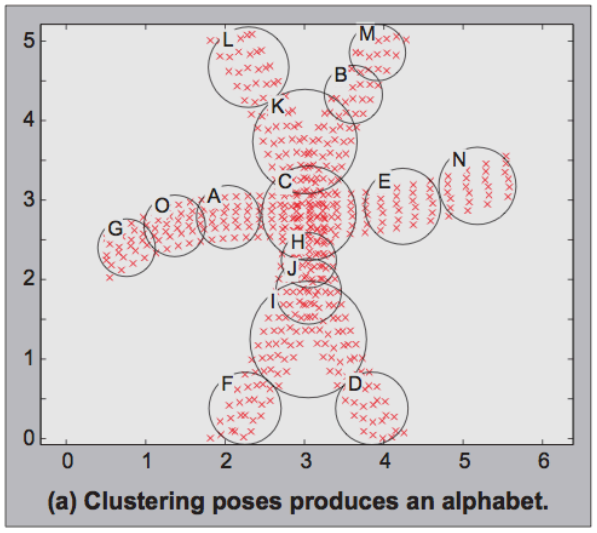
[slide from Taku Komura]

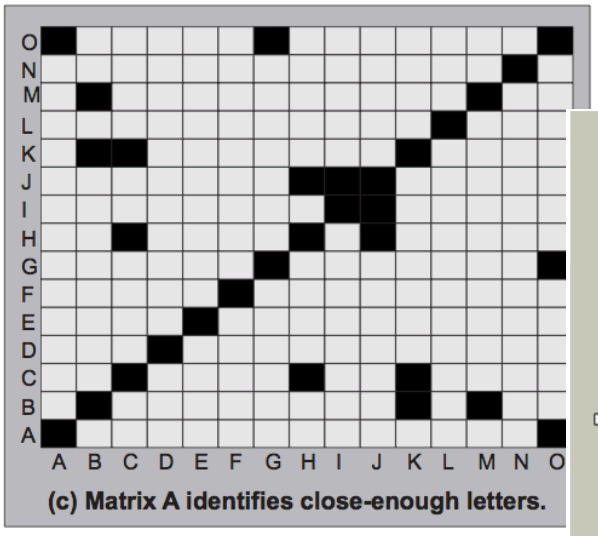
Automatic construction of parameterized motion graphs

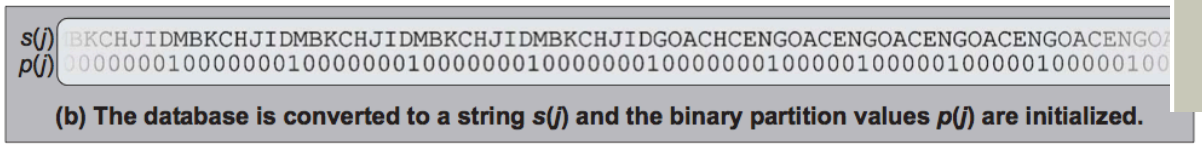
["Motion Motif Graphs", SCA 2008]

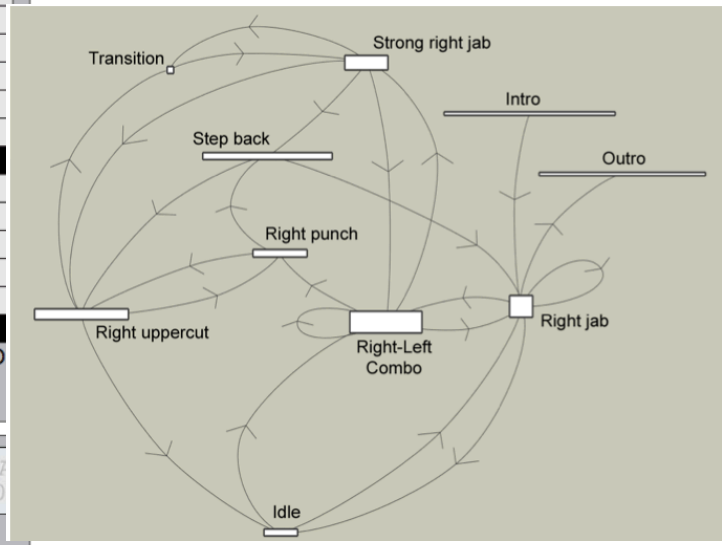












Game Engines

- hierarchical finite state machines
  - "move tree", "blend tree", "animation tree"
  - multi-way, body-part-specific blends
  - online procedural edits via IK, blending, …
  - mix of visual programming language & scripting
- Unity engine
- Unreal Engine
- Assassins Creed procedural animation