3-7-02

Skeletal Conversion I

Problem:

GIVEN: CLEAN MARKER DATA

FIND: SKELETAL PARAMETERS (offsets, lengths)
ANIMATION DATA

① What markers -

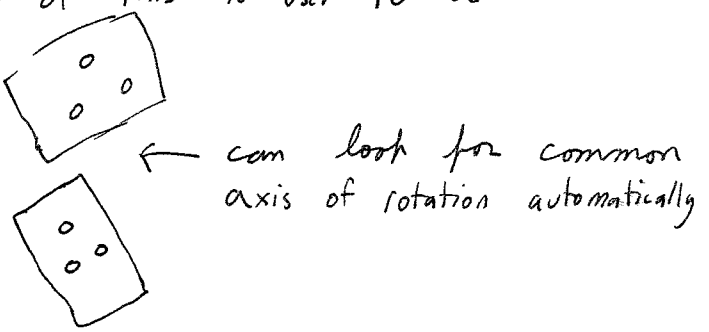
ease of processing vs. ease of capture
art of motion capture marker placement

EXAMPLE:

3 MARKERS PER BONE
RIGID PLACEMENT

3PTS → RIGID BONE

Figure out how to make rigid bones connect
↑ can give a lot of this to user to do



find skeletal parameters over all frames

ROBUST STATISTICS 1

3-7-03

A note on statistics ≡
is taking the average a good idea ?

what do outliers do ?
↳ really throw things off

ROBUST STATISTICS

Average = minimize L^2 norm
what happens if you change the norm ?

if L^N is lower ≡ outliers matter little
is bigger ≡ outliers matter a lot L^∞ = biggest difference

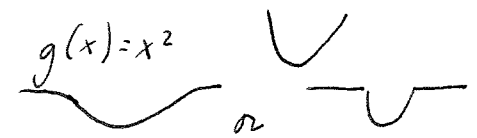
Strategies :
1. use norms $< L^2$
2. reject outliers ≡
   1. compute statistics
   2. use to predict outliers (STD deviation)
   remove outliers

M-estimators ≡ fancy name for blends of these approaches
↑ generalize

$$\min \sum_i g\left(\frac{f^* - f_i}{\sigma_i}\right)$$

σ_i ← standard deviation

↳ could be $g(x) = x^2$

could be  or

Iteratively Re-Weighted Least Squares

Robust Statistics II

3-7-03

Other Robust Estimators ≡

Rank Statistics (Median)

└ Order Statistics

R- estimators ≡ linear combination of order statistics

Skeletal Conversion II

Optimization

① define connection between ~~optics~~ observations

Minimize error

Good Points:

Flexible / General

Can define good "measurements" (what kind of sliding)

Uses all information ← deals with missing info

"weight" importance of different errors

Downsides:

Big, Nasty Optimization Problem

GLOBAL (errors on one side ⇒ problems on other)

need initial points