Sleight of Hand: Perception of Finger Motion from Reduced Marker Sets

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Intro tl;dr

• Hands are **expressive**, like your **face**!
• Hands **anatomy** and **complexity** is high!
• Capturing hand movements is usually ignored or animated by **hand** (pun intended), like your **face**!
Objectives

• **Reduce** number of markers per hand
• **Use** Inverse Kinematics to fill the unanimated joints
• Keep perceptual fidelity **high**
Method

Golden Standard

Forward Kinematics + 16F-4T\(^{(a)}\)

Various animations:

(a) Opening a bottle
(b) Playing with a tennis ball
(c) Counting

Talking (hand gestures)

(f) Signing
(g) Playing the flute
(h) Grasping
(i) Typing
Experiment 1

$GS_{(a)}$ vs $8F-4T_{(b)}$ vs $4F-2T_{(c)}$ vs Static
Experiment 1 Results
Experiment 2

GS vs 6F-4T\textsubscript{(a)} vs 6F-2T\textsubscript{(b)} vs 4F-4T\textsubscript{(c)}
Experiment 2 Results

- Bar chart: Probability of considering the model to be the same as the gold standard animations
  - 16F-4T Gold Standard

- Line graphs: Probability of considering the model to be the same as the gold standard animations for:
  - Flute
  - Counting
  - Direction
  - Typing
  - Ball

Legend:
- GS 16F-4T
- 6F-4T
- 6F-2T
- 4F-4T
Conclusions

• 6F-2T ROCKS!... In most cases.
• Suggested Guidelines:
  – Majority of the cases: 6F-2T
  – Finger curvature is highly important: GS
  – Independence between fingers: 4F-4T
  – Secondary motion / not really important: Static
Eye Candy

Sleight of Hand:
Perception of finger motion from reduced marker sets.

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