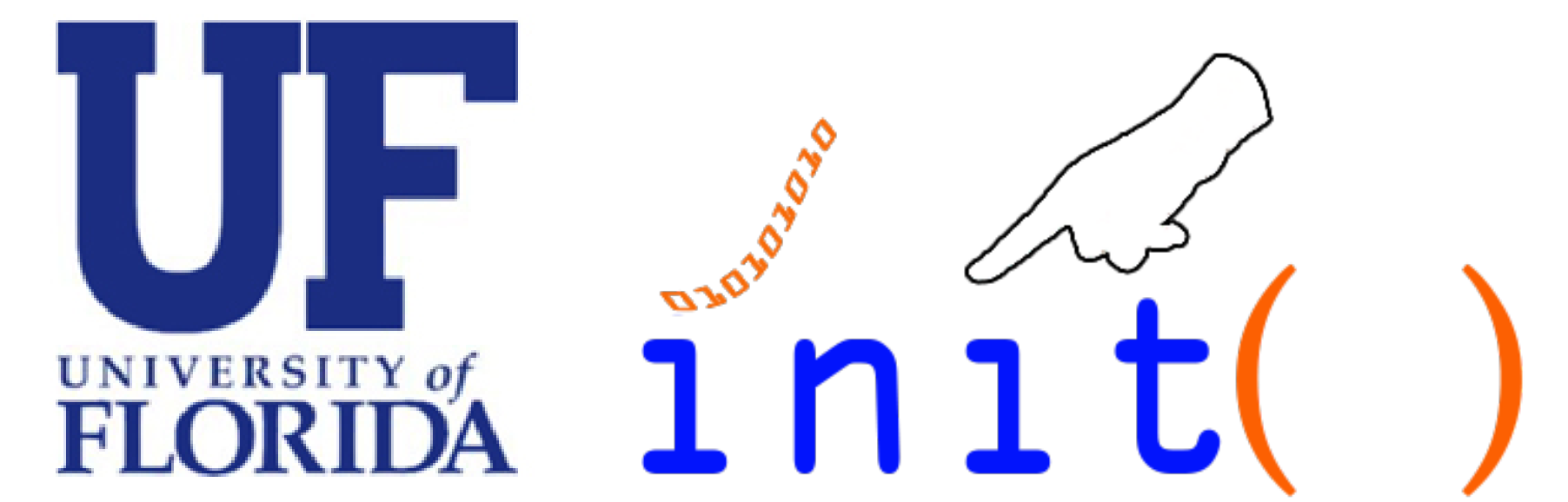# Is the Motion of a Child Perceivably Different from the Motion of an Adult?

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Problem

- **Children's poses, gestures, and movements** are different from adults performing the same action [1].
- Prior research [2,3] on perception of human motion has focused on adult motion.

Solution

- Collect **exploratory corpus of child and adult motion** using the Kinect (Fig. 1).
- Create **point light displays** from the data.
- Run **perceptual study** to discover if naïve viewers can differentiate child and adult motion.

Methodology

- **6 actions** (Jumping Jacks, Fly Like a Bird, Jump High, Run Fast, Walk, Wave) collected from **8 actors** (4 children ages 5 to 10 years old, and 4 adults).
- Gestures are scaled to canonical height and rendered as **point light display videos** (Fig. 2).
- **24 participants** ages 20 to 37 years old saw 48 point light display videos (8 actors x 6 actions) rendered at 30 fps.
- Answered survey with a two-alternative Forced Choice survey question: "**Does this motion belong to a child or an adult?**"
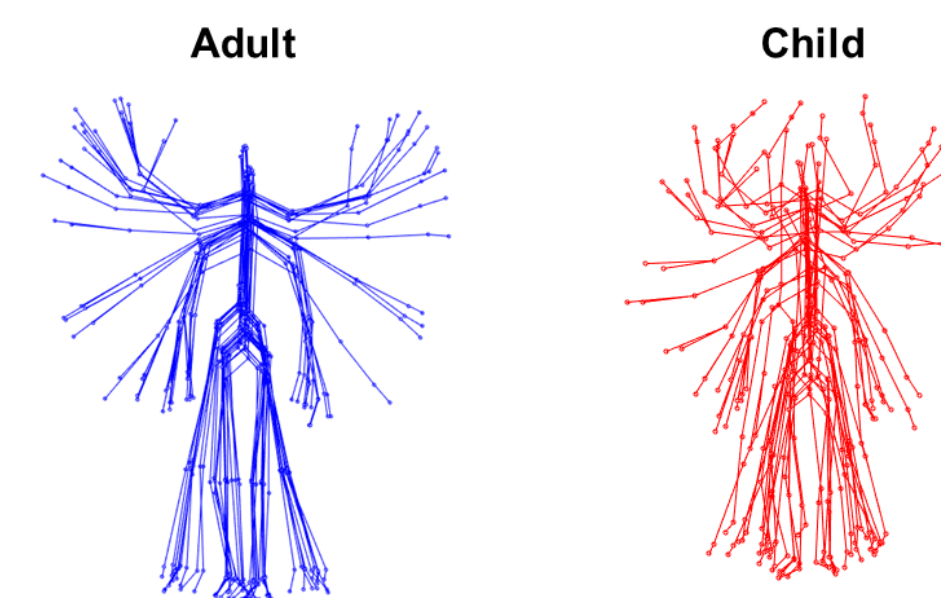

Figure 1. Motion data rendered from the frontal view on every tenth frame for jumping jacks prior to scaling to canonical height. Children bend elbows more and action is less coordinated.
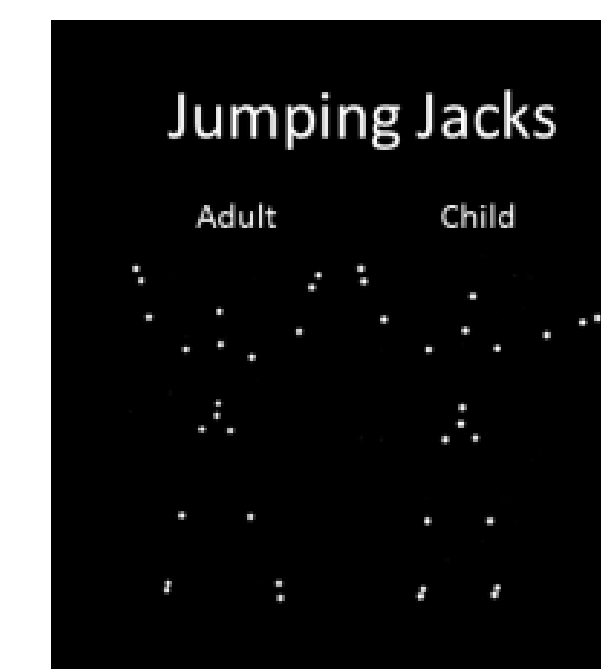

Figure 2. Child and Adult point light displays for Jumping jacks.

Analysis

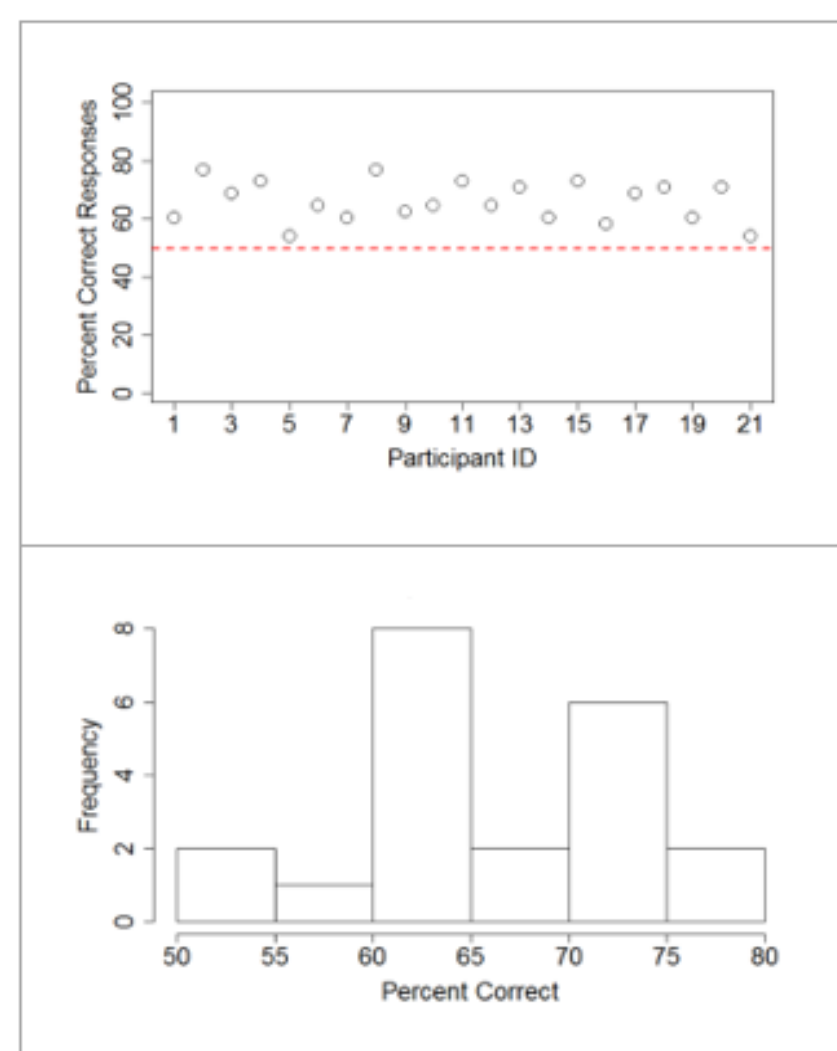### Percentage Correct Responses

Figure 3. (Top) Percentage correct responses denoted by circular markers for all participants. Dotted line shows chance performance level. (Bottom) Distribution of accuracy.

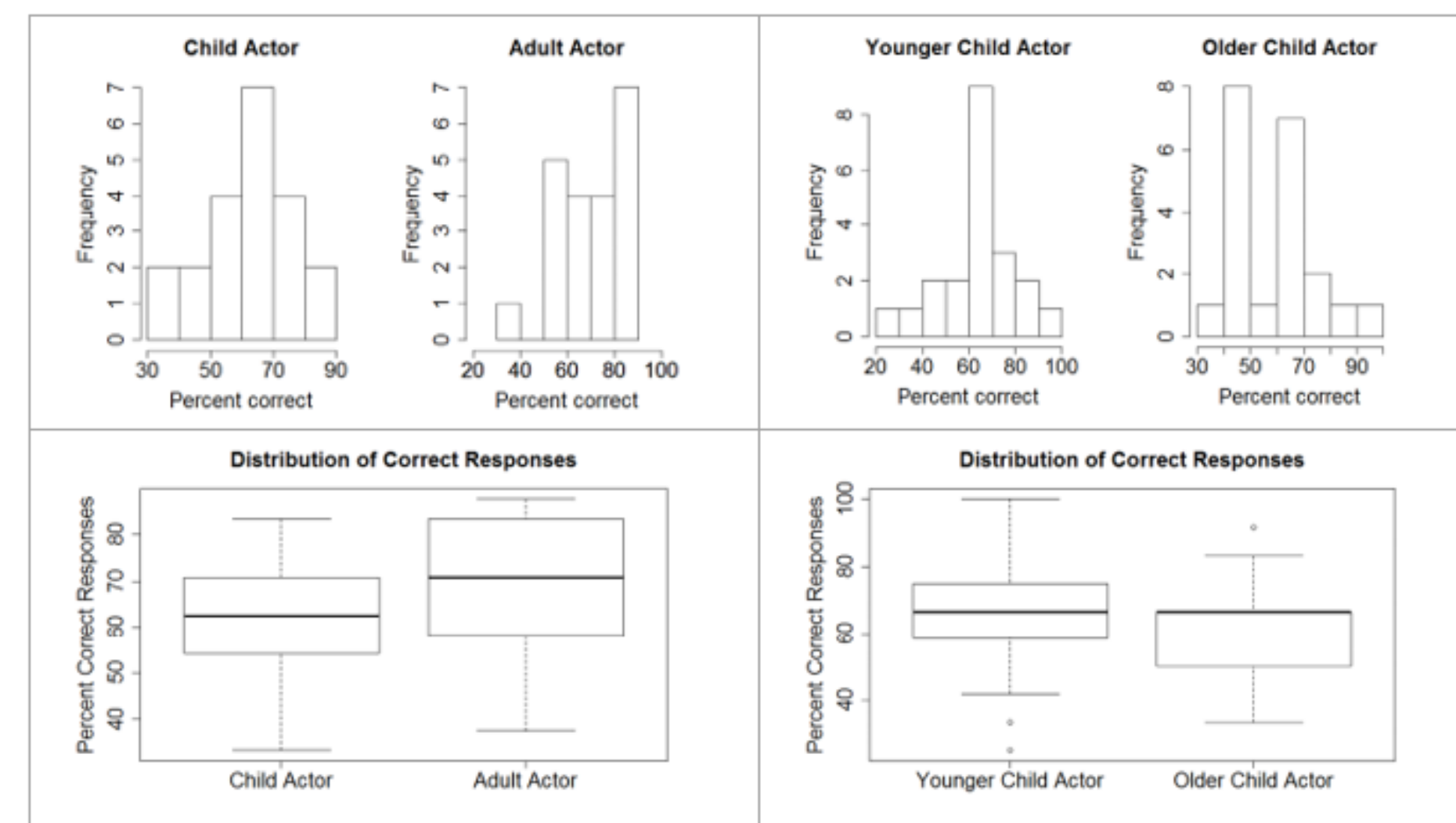### Distribution of Percentage Correct Accuracy

Figure 4. (Top row) Distribution of percent correct accuracy for child vs. adult videos, and younger child (ages 5 to 7 yrs) vs. older child (ages 8 to 10 yrs) videos. (Bottom row) Box plots showing median and interquartile range of accuracy in identifying child vs. adult for both groups of videos.
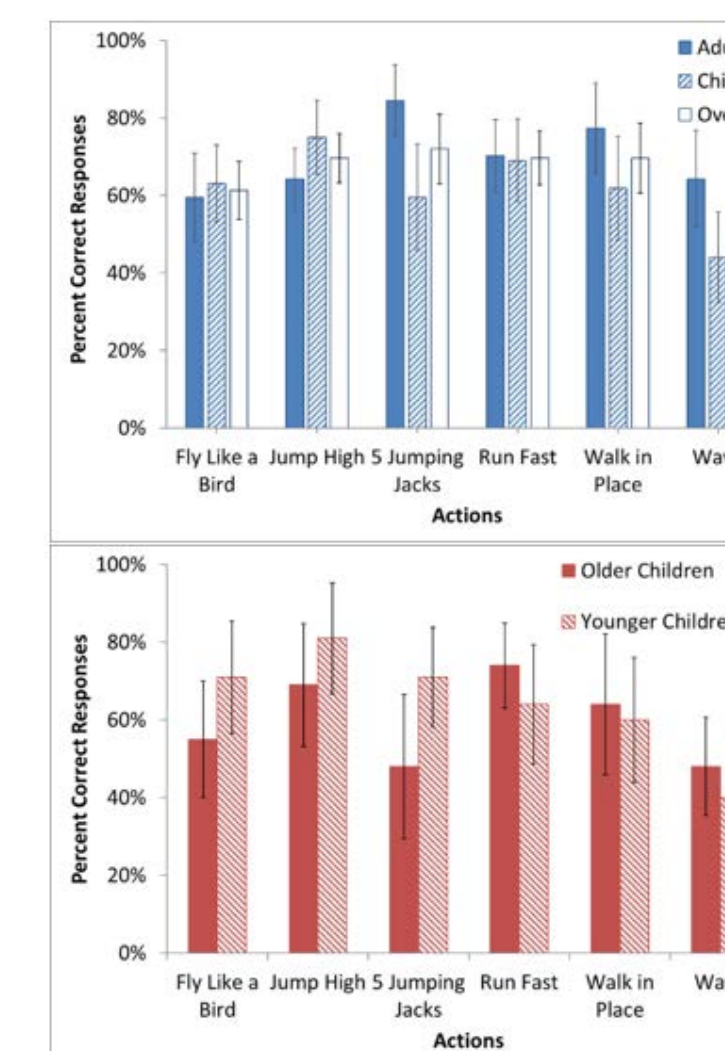
Accuracy by Action Performed

Figure 5. (Top) Avg accuracy over all participants in identifying whether an actor was a child or adult. (Bottom) Avg accuracy on child videos split by younger and older children actors.

Contact Information

If you're interested in this project, we are looking for collaborators! Contact us by email:
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More information on this project:
http://jainlab.cise.ufl.edu/pose-perception.html

Conclusions

- People can **identify** if a motion belongs to a child or an adult **significantly above chance level** (Fig. 3, 4).
- **Younger / older children** equally well identified (Fig. 4).
- The type of action being performed also affects people's perceptions. There is a **higher level of accuracy for dynamic motions** such as walking and running (Fig. 5).
- If a child shows **well-coordinated actions**, they are more likely to be **incorrectly identified as adult motion.**

Future Work

- Extract **quantifiable characteristics** that shows the differences between child and adult motions.
- Create more **engaging and realistic avatars** for games, online social media, and animated media.

References

1. AnimationAddicts. 2013. The Challenge of Animating Underaged Adults. http://www.animation-addicts.com/2013/01/30/animating-kids/. (2013). Accessed: 2016-Feb-25.
2. Anna C. Wellerdiek, Markus Leyrer, Ekaterina Volkova, Dong-Seon Chang, and Betty Mohler. 2013. Recognizing Your Own Motions on Virtual Avatars: Is It Me or Not?. In *Proceedings of the ACM Symposium on Applied Perception (SAP)*. 138–138.
3. Fani Loula, Sapna Prasad, Kent Harber, and Maggie Shiffrar. 2005. Recognizing people from their movement. *Journal of Experimental Psychology: Human Perception and Performance* 31, 1 (2005), 210–220.

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