

Style Translation to Create Child-like Motion

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Introduction

- There are increasing numbers of child characters in games, movies, educational content etc.
- Viewers could identify if a motion came from a child actor or an adult actor [Jain et al. 2016] (Fig 1).
- Child motion capture data is less available than adult mocap data [Dong et al. 2017].
- We implemented style translation [Hsu et al. 2005] to transform adult motion to appear more child-like.



Fig 1: A child bending to the lowest point during a jumping action (left) and an adult bending to the lowest point during a jumping action (right).

Method

- Iterative motion warping is performed to find correspondences between child and adult motion.
- Dynamic time warping followed by space warping were iterated until the cost function comes to convergence.
- We estimated a state space model where the model order was set to 40 and the state vector is set to zero (Fig 2).
- The new input adult motion was time warped to the training child motion and translated to child motion (Fig 3).

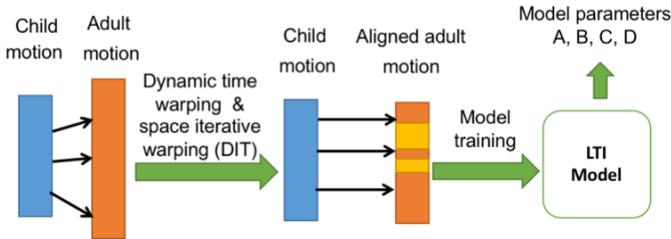


Fig 2: Pipeline for training the state space model.

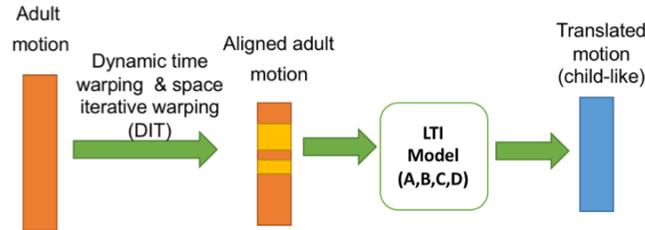


Fig 3: Pipeline for translating a new adult motion.

References

Jain, E., Anthony, L., Aloba, A., Castonguay, A., Cuba, I., Shaw, A., and Woodward, J. 2016. Is the motion of a child perceivably different from the motion of an adult? *ACM Transactions on Applied Perception (TAP)* 13, 4, 22.
Dong, Y., Aloba, A., Paryani, S., Anthony, L., Rana, N., and Jain, E. 2017. Adult2child: dynamic scaling laws to create child-like motion. In *Proceedings of the Tenth International Conference on Motion in Games*, ACM, 13.
Hsu, E., Pulli, K., and Popovic, J. 2005. Style translation for human motion. In *ACM Transactions on Graphics (TOG)*, vol. 24, ACM, 1082–1089.

Results

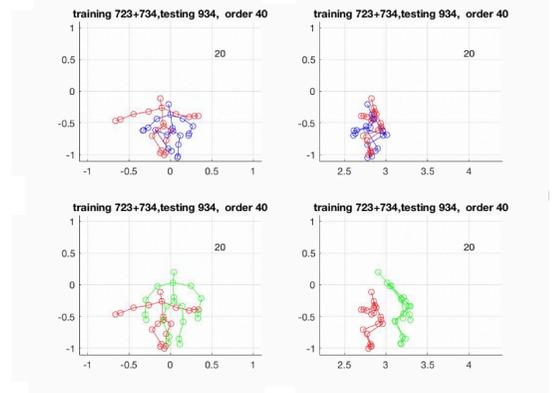


Fig 4: “Jump High” is shown above. Both adult (green) and child (blue) are bending to the lowest point in the landing phase of the jump.

Compared to adult, the result of the algorithm in red and the child both bend lower (Fig 4,5).

Conclusion

- We algorithmically transformed adult motion capture data to appeared child-like.
- We aim to apply this algorithm to more actions and actors and evaluate the result is by conducting a perception study.

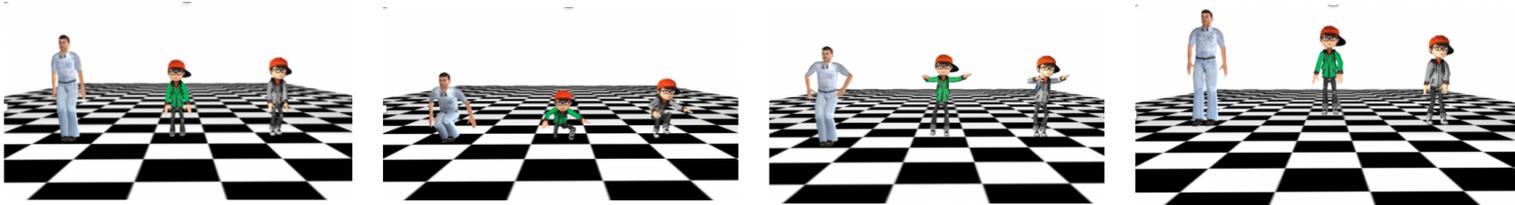


Fig 5: A sequence of jumping action The arm of child (grey jacket) and our result (green jacket) swing to a larger extent compared to adult. The gesture and the timing of the translated motion is very similar to child motion.