Exploring Deep Learning Approaches for Real-Time Interactive Character Animation

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***Abstract*— Xxx**

Index Terms

Character Animation, Deep Learning, Neural Networks, Interactive, Real-time

1. Literature Review

1.1. Domain 1

1.2. Domain 2

1.3. Domain 3

1.4. Similar system

2. Methodology

2.1. Target user

2.2. Sampling method

2.3. Data collection method

3. Conclusion

Real-time interactive character animation contributes largely into the immersion of interactive applications such as games. Constructing such system that can react realistically and naturally to dynamic environments is extremely challenging without incorporating machine learning components. Thanks to the adoption of neural networks and the abundance of accelerated computing of GPUs in recent years, the animation industry has been able to benefit from it by harnessing the enormous learning capability of neural networks to revolutionize the interactive application industry.

4. References

Büttner, M., & Clavet, S. (2015). Motion matching-the road to next gen animation. *Proc. Of Nucl. Ai*, *2015*, 2.

Clavet, S. (2016). Motion matching and the road to next-gen animation. *Proc. Of GDC*, *4*, 9.

Harvey, F. G., Yurick, M., Nowrouzezahrai, D., & Pal, C. (2020). Robust motion in-betweening. *ACM Transactions on Graphics (TOG)*, *4*, 60–1.

Holden, D., Kanoun, O., Perepichka, M., & Popa, T. (2020). Learned motion matching. *ACM Transactions on Graphics (TOG)*, *4*, 53–1.

Menolotto, M., Komaris, D.-S., Tedesco, S., O'Flynn, B., & Walsh, M. (2020). Motion capture technology in industrial applications: A systematic review. *Sensors*, *19*, 5687.

Peng, X. B., Abbeel, P., Levine, S., & Panne, M. Van de. (2018). Deepmimic: Example-guided deep reinforcement learning of physics-based character skills. *ACM Transactions on Graphics (TOG)*, *4*, 1–14.

Peng, X. B., Guo, Y., Halper, L., Levine, S., & Fidler, S. (2022). Ase: Large-scale reusable adversarial skill embeddings for physically simulated characters. *ACM Transactions on Graphics (TOG)*, *4*, 1–17.

Rose III, C. F., Sloan, P.-P. J., & Cohen, M. F. (2001). Artist-directed inverse-kinematics using radial basis function interpolation. *Computer Graphics Forum*, *3*, 239–250.

Rumman, N. A., & Fratarcangeli, M. (2016). State of the art in skinning techniques for articulated deformable characters. *International Conference on Computer Graphics Theory and Applications*, 200–212.

Starke, S., Mason, I., & Komura, T. (2022). DeepPhase: Periodic autoencoders for learning motion phase manifolds. *ACM Transactions on Graphics (TOG)*, *4*, 1–13.

Starke, S., Zhao, Y., Komura, T., & Zaman, K. (2020). Local motion phases for learning multi-contact character movements. *ACM Transactions on Graphics (TOG)*, *4*, 54–1.

Vaswani, A., Shazeer, N., Parmar, N., Uszkoreit, J., Jones, L., Gomez, A. N., Kaiser, Ł., & Polosukhin, I. (2017). Attention is all you need. *Advances in Neural Information Processing Systems*.