

15-464/15-664 Reference List for April 10, 2023

Today we talked about some history of character simulation / control.

We began by talking about state machine based control, beginning with papers from the 90's from Marc Raibert and Jessica Hodgins and her students:

Raibert, Marc H., and Jessica K. Hodgins. "Animation of dynamic legged locomotion." In *ACM SIGGRAPH Computer Graphics*, vol. 25, no. 4, pp. 349-358. ACM, 1991.

<http://dl.acm.org/citation.cfm?id=122755&dl=ACM&coll=DL&CFID=657285216&CFTOKEN=27654732>

The video I showed can be found here: <http://www.ai.mit.edu/projects/leglab/simulations/otr/otr.html>

Jessica K. Hodgins, Wayne L. Wooten, David C. Brogan, and James F. O'Brien. 1995. Animating human athletics. In *Proceedings of the 22nd annual conference on Computer graphics and interactive techniques (SIGGRAPH '95)*, Susan G. Mair and Robert Cook (Eds.). ACM, New York, NY, USA, 71-78.

DOI=10.1145/218380.218414 <http://doi.acm.org/10.1145/218380.218414>

The video can be found here: <http://graphics.cs.cmu.edu/?p=689>

We then reviewed the SIMBICON paper and some follow-on work related to that paper.

Yin, KangKang, Kevin Loken, and Michiel van de Panne. "Simbicon: Simple biped locomotion control." In *ACM Transactions on Graphics (TOG)*, vol. 26, no. 3, p. 105. ACM, 2007.

<http://www.cs.ubc.ca/~van/papers/Simbicon.htm>

Coros, Stelian, Philippe Beaudoin, and Michiel van de Panne. "Generalized biped walking control." *ACM Transactions on Graphics (TOG)*. Vol. 29. No. 4. ACM, 2010.

<http://www.cs.ubc.ca/~van/papers/2010-TOG-gbwc/>

<https://www.youtube.com/watch?v=IOxeyooDmw>

<https://www.youtube.com/watch?v=MHj8RDfyqP0>

We then turned to some sampling-based papers:

Hämäläinen, Perttu, Sebastian Eriksson, Esa Tanskanen, Ville Kyrki, and Jaakko Lehtinen. "Online motion synthesis using sequential monte carlo." *ACM Transactions on Graphics (TOG)* 33, no. 4 (2014): 1-12.

<https://mediatech.aalto.fi/publications/graphics/OnlineSMC/>

Hämäläinen, Perttu, Joose Rajamäki, and C. Karen Liu. "Online control of simulated humanoids using particle belief propagation." *ACM Transactions on Graphics (TOG)* 34, no. 4 (2015): 1-13.

<https://mediatech.aalto.fi/publications/graphics/C-PBP/>

We also saw a bit of the talk associated with this paper and codebase:

Howell, Taylor, Nimrod Gileadi, Saran Tunyasuvunakool, Kevin Zakka, Tom Erez, and Yuval Tassa. "Predictive Sampling: Real-time Behaviour Synthesis with MuJoCo." *arXiv preprint arXiv:2212.00541* (2022). <https://arxiv.org/abs/2212.00541>
https://github.com/deepmind/mujoco_mpc

The sampling based paper that generates simulated results that track motion capture data that I couldn't find during class was this one:

Liu, Libin, KangKang Yin, Michiel Van de Panne, Tianjia Shao, and Weiwei Xu. "Sampling-based contact-rich motion control." In *ACM SIGGRAPH 2010 papers*, pp. 1-10. 2010.
<https://www.cs.ubc.ca/~van/papers/2010-TOG-sampControl/index.html>

We then turned to optimization, beginning with this muscle-based optimization research:

Geijtenbeek, Thomas, Michiel Van De Panne, and A. Frank Van Der Stappen. "Flexible muscle-based locomotion for bipedal creatures." *ACM Transactions on Graphics (TOG)* 32, no. 6 (2013): 1-11.
<https://www.goatstream.com/research/papers/SA2013/index.html>

The paper of my own that I showed to set context for the general technique was this one:

Fang, Anthony C., and Nancy S. Pollard. "Efficient synthesis of physically valid human motion." *Acm transactions on graphics (tog)* 22, no. 3 (2003): 417-426.
<https://dl.acm.org/doi/abs/10.1145/882262.882286>

We concluded with a look at this recent paper which aims to improve on the general approach by better incorporating artist input:

Kim, Nam Hee, Hung Yu Ling, Zhaoming Xie, and Michiel van de Panne. "Flexible motion optimization with modulated assistive forces." *Proceedings of the ACM on Computer Graphics and Interactive Techniques* 4, no. 3 (2021): 1-25. <https://www.cs.ubc.ca/~van/papers/2021-SCA-modassist/index.html>
