

TPA 6: Modeling of soft object deformation

Soft object modeling deals with visually realistic physical simulations of the motion and properties of deformable objects (or soft bodies). Several methods are used for modeling the deformation. In spring model, the body or the structure of the deformable object is composed of a number of nodes and their weights a spring attachment between two nodes, forming mesh structure. Applying Newton's second law to the point masses including the forces applied by the springs and any external forces (due to contact, gravity, air resistance, wind, ans so on) gives a system of different equations for the motion of the nodes, which is solved by standard numerical processes.

Demo – **skin on face or hand; Football when kicked, slippers, top surface of sofa, stiff paper, magazine etc.**

References:

1. Soft Object Deformation Monitoring and Learning for Model-Based Robotic Hand Manipulation; Ana-Maria Cretu, Pierre Payeur, and Emil M. Petriu; IEEE TRANSACTIONS ON SYSTEMS, MAN, AND CYBERNETICS PART B: CYBERNETICS, VOL. 42, NO. 3, JUNE 2012.
2. Dynamic Simulation of Soft Heterogeneous Objects; Jonathan Hille and Hod Lipson, 2012, <http://arxiv.org/abs/1212.2845>
3. Interactive haptic deformation of dynamic soft objects; Chen Hui , Sun Hanqiu, Jin Xiaogang Proceeding VRCIA '06 Proceedings of the 2006 ACM international conference on Virtual reality continuum and its applications, Pages 255 – 261
4. Wang, B., Wu, L., Yin, K., Ascher, U., Liu, L., & Huang, H. (2015). Deformation capture and modeling of soft objects. ACM Transactions on Graphics (TOG), 34(4), 94.