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Title: Hair simulation

Key reference:

1. Kelly Ward, Florence Bertails, Tae-Yong Kim, Stephen R. Marschner, Marie-Paule Cani, and Ming C. Lin, 2007, *A Survey on Hair Modeling: Styling, Simulation, and Rendering*, IEEE TRANSACTIONS ON VISUALIZATION AND COMPUTER GRAPHICS, VOL. 13, NO. 2

This paper divides the field of hair simulation into three parts: hairstyling, hair simulation and hair rendering helping me find the way to do research about simulation hair. It presents a literature review on hair simulation and lists a lot of basic algorithms in each topic. This article summarizes the techniques involving in hair simulation and shows the unsolved problems and challenges facing each area. It provides clear thinking for me to do researches from hair modeling to hair rendering and helps me to understand the history of the algorithms for hair simulation.

2. Tiantian Liu, Adam W. Bargteil, James F. O'Brien, Ladislav Kavan, 2013, *Fast Simulation of Mass-Spring Systems*, ACM Transactions on Graphics, Vol. 32, No. 6, Article 209

This paper introduces one method in hair dynamic simulation field. It describes the mass-spring system in detail which is the most important algorithm when we animate hair and some deformable object. The background and notation of mass-spring system is expressed. What's more, it explains the drawbacks of mass-spring system and find the way to innovate this method which can obtain higher accuracy. This paper helps me to understand the basic equations and concepts about mass-spring system and shows me the unsolved problems during simulating the hair.

3. Menglei Chai, Tianjia Shao, Yanlin Weng, 2016, *AutoHair: Fully Automatic Hair*

This paper introduces an automatic method for 3D hair modeling from a single portrait image. It efficiently generates complete and high-quality hair geometries which doesn't require user interaction. I learnt a totally new pipeline for hair reconstruction which uses image as input, produces the hair segmentation along with a direction map, then combine with precomputed 3D hair model exemplars and finally generate the final strand-level hair model. This method represents the new and innovative algorithm to model hair which is different from the old algorithms presented by the first paper.