Virtual Draping: User-Friendly Modeling of Draped Cloth

Master thesis proposal

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Left: Various draped cloth structures; Right: manual draping process and virtual (simulated) draped cloth.

Context and objective

Cloth draping, or creation of sophisticated folds and wrinkles, can be used to create a variety of regular and irregular shapes. Draping patterns show on every cloth object around us – clothing, bed linen, drapes, table cloth, napkins, etc... Some of those are meticulously designed while others result from interaction with the environment.

Creating a desired draped look from real cloth requires considerable time and knowledge, and the same is true for draping virtual cloth. While random, irregular draping can be achieved via cloth simulation, designing a particular draped "look" remains an effectively manual process. Even with specialized interfaces [Igarashi'10] virtual draping requires the user to specify every local folding operation similar to the manual process shown above.

In this project we aim to provide a more intuitive and faster way to design regular or irregular cloth draping patterns. Specifically we expect the user to first provide the general shape of the draped surface and sketch on it some characteristic lines indicating fold draping directions. Given this input we aim for the method to generate a draping pattern that fits those using geometric knowledge about fabric behaviour. We aim for the user to be able to interactively edit the created pattern to create the desired look, by changing draping directions, as well as fold magnitude and shape as desired.

Main steps

Specifically from an algorithmic point of view we aim to take advantage of several modeling techniques: first to propagate the sketched patterns we plan to define a smooth vector filed on the input surface consistent with the user sketched directions. We then intend to use a constrained parameterization of the surface to define fold directions consistent with actual fabric behaviour, using the observation that in parameter domain, or on the planar cloth pattern, folds should follow roughly straight lines. This

observation will be used to control fold magnitude necessary for creating believable folds consistent with real-life fold behaviour. Lastly an implicit modeling mechanism [Rohmer'10] will be used to create the actual folds. Time permitting, the implicit setting will be edited to allow for complex fold profiles.

Références

[Igarashi'10] Takeo Igarashi, Jun Mitani, Apparent Layer Operations for the Manipulation of Deformable Objects, ACM Transactions on Graphics, 29, 4, (Jul. 2010), 1-7. SIGGRAPH 2010

[Rohmer'10] Animation Wrinkling: Augmenting Coarse Cloth Simulations with Realistic-Looking Wrinkles, Damien Rohmer, Tiberiu Popa, Marie-Paule Cani, Stefanie Hahmann, Alla Sheffer. ACM Transactions on Graphics (TOG). Proceedings of ACM SIGGRAPH Asia.