Interactive sketch-based method for generating realistic cloth graphics from 3D model

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1. Research Target

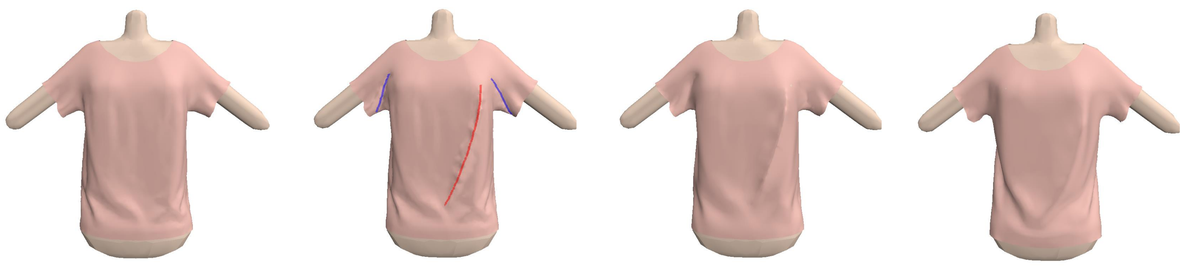
We propose a interactive sketch-based method that allow the user to generate realistic cloth graphics with good sense of reality by directly painting on the surface of cloth 3D model to build folded surfaces.

The user who has little or no relevant knowledge of the cloth can also easily obtain a one-shot image of the 2.5D cloth fold simulation results through our method.

2. Procedure Flow

An overview procedure flow of our method.

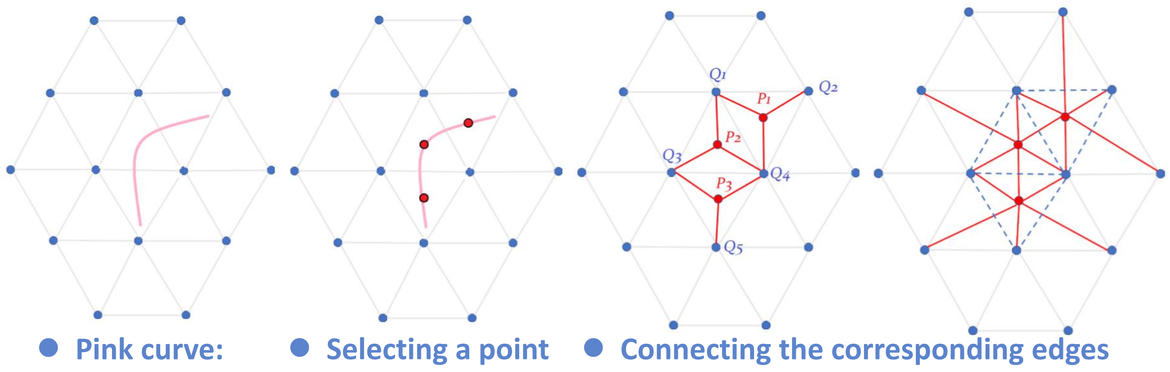
1. Original cloth model and body model
2. Applying remeshing method[2] and build improved mass-spring mode based on Provot's method[3]
3. Applying physical simulation and adding yellow sewing lines



4. Applying physical simulation again after adding sewing lines
5. Draw curves on the cloth model to make the folded surface
6. Applying constraint Taubin smoothing[1] on the new added folded surface
7. Final result after physical simulation and remeshing

3. Processing User Input

◆ Reconstructing the mesh structure of the cloth model based on user input curves.



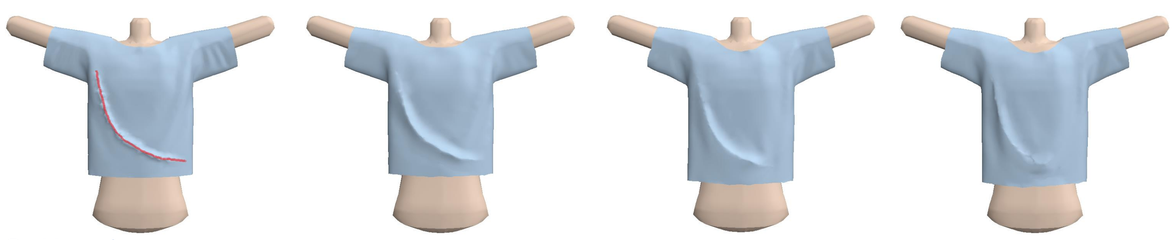
- Pink curve: user input curve
- Selecting a point in each triangle
- Connecting the corresponding edges and deleting the dotted edges

◆ Lifting or sinking the surface

- The height is not changed when the user is drawing the sewing lines.
- When the user input device supports pressure input, the height will be based on the size of the pressure.
- When the user input device doesn't support pressure, the height will be based on the position of input curves.

◆ Constraints Taubin smoothing and parameter updating

- We use the new points based on the user input line as the non-moving control points for Taubin constraint smoothing.
- The parameters related to springs at the new folds are changed in to improve efficiency and prevent overstretching after physical simulation.

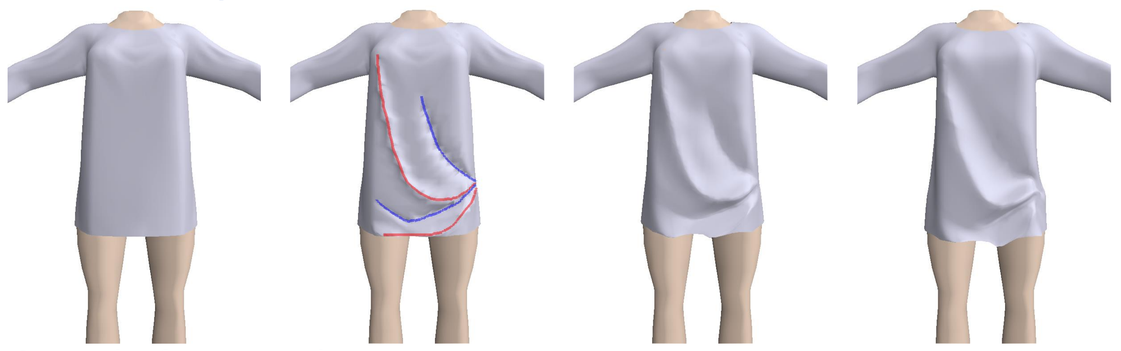


- User input curve
- Constraints Taubing smoothing result
- Physical simulation result with/without parameter updating

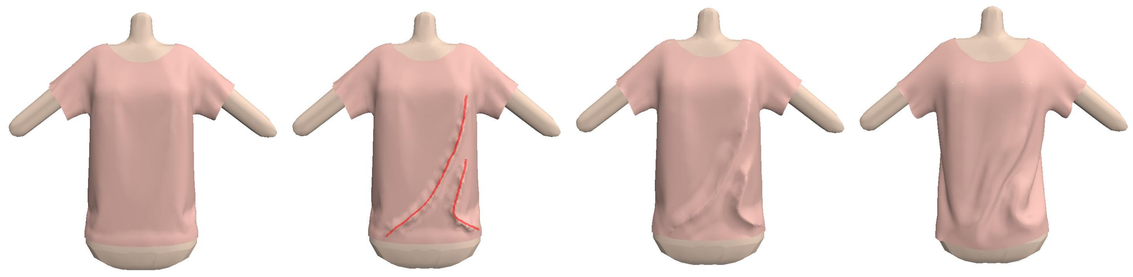
4. Our Results

We provide users with a fully functional, simple and friendly user interface.

- Sub-tool windows, including physical simulation tools, model editing tools and scene controller
- Display window, the user can modify the rotation and position of the models, and interactively draw curves on the cloth model to make folds
- Main tool window, the user can load the models and choose to open sub-tool windows



- Result of a women dress



- Result of a women shirt

0 m/s 5 m/s 18 m/s

- The physical simulation results of the wind system.

5. Conclusion and Future work

Our method easy to use and fast to calculate, which is helpful for the user to make some pictures of 2.5D cloth models with good sense of reality. Compared to our work we have demonstrated previously, we have updated many tools for customization and optimized the stability of the physical simulation system.

The most important things in our future work is that we need to develop a reasonable evaluation system to judge our folding results. In addition, we also want to enhance the stability and usability of the existing system, and add more customization options to improve user experience.

Reference

[1] Gabriel Taubin. A signal processing approach to fair surface design. In Proceedings of the 22Nd Annual Conference on Computer Graphics and Interactive Techniques, SIGGRAPH ' 95, pages 351–358, New York, NY, USA, 1995. ACM.

[2] Botsch M, Kobbelt L, Pauly M, et al. Polygon mesh processing[M]. CRC press 2010.

[3] Xavier Provot. Deformation constraints in a mass-spring model to describe rigid cloth behaviour. In Proceedings of Graphics Interface '95, pages 147–154, 1995.