Sketched Based Realistic Folded Cloth

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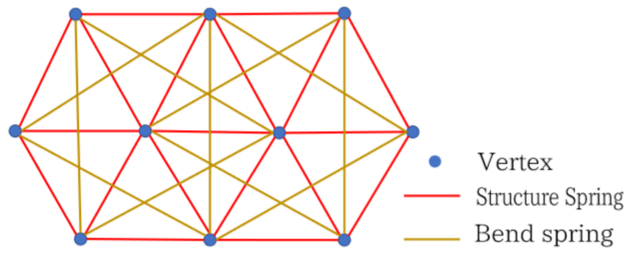
1. Research Target

We propose a method that allow the user to build folded surfaces with good sense of reality by directly painting on the surface of cloth 3D model.

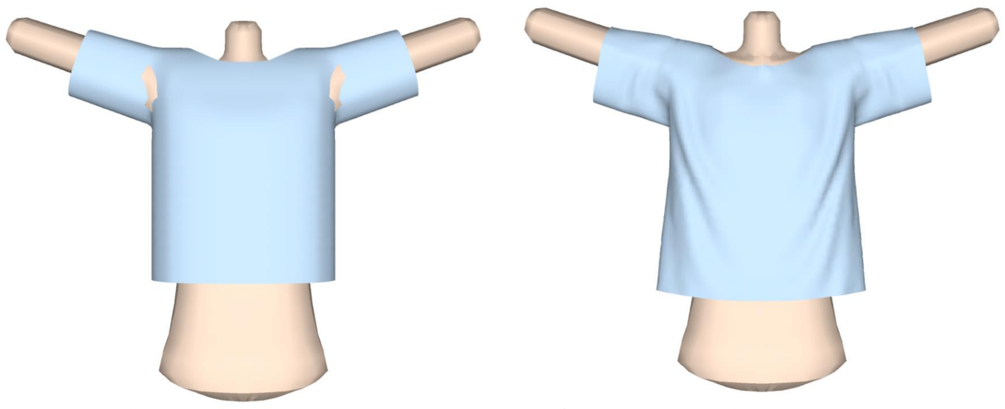
The user who has little or no relevant knowledge of the cloth can also easily obtain a one-shot image of the 2.5D cloth fold simulation results through our method.

2. Preprocessing Method

- Using Taubin smoothing[1] and remeshing[2] method to optimize the grid structure.
- Building mass-spring model[3] of the cloth model based on the triangular mesh grid.



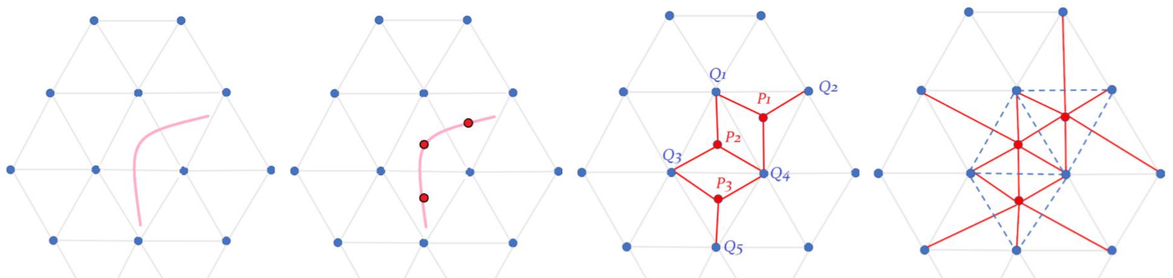
- Applying preliminary physical simulation.



Original Cloth Model After physical simulation

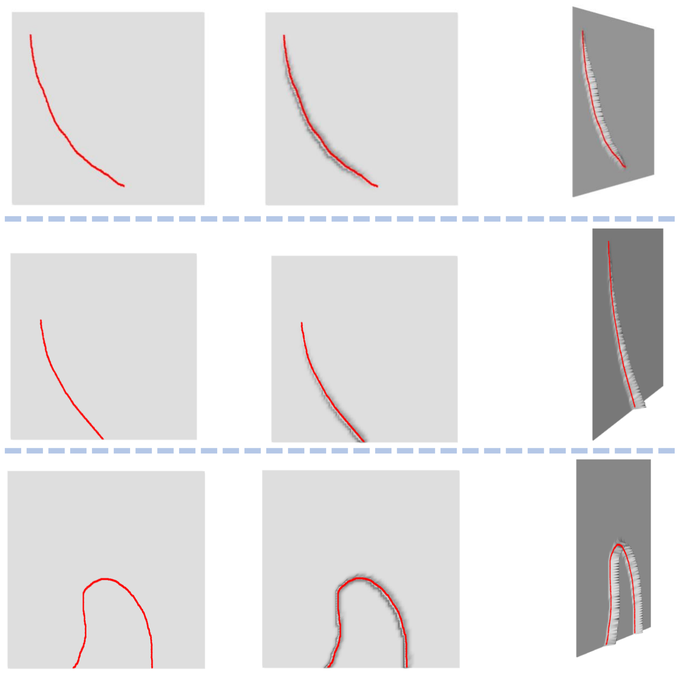
3. Processing User Input

- 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 according to the position of user input curves.



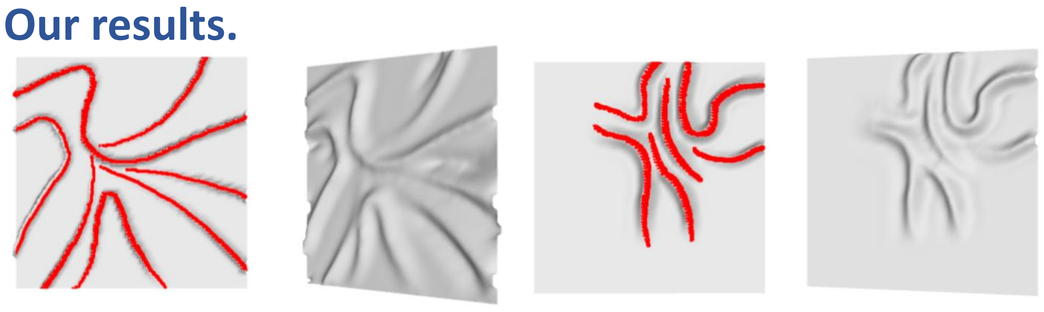
- The curve that doesn't intersect the boundary of the cloth model.
- The curve that intersects the boundary of the cloth model at its end.
- The curve that intersects the boundary of the cloth at both its end and its beginning.

4. Refinement and Result

- Applying smoothing and remeshing method on folded surface. If it is necessary, the user can apply physical simulation method again.

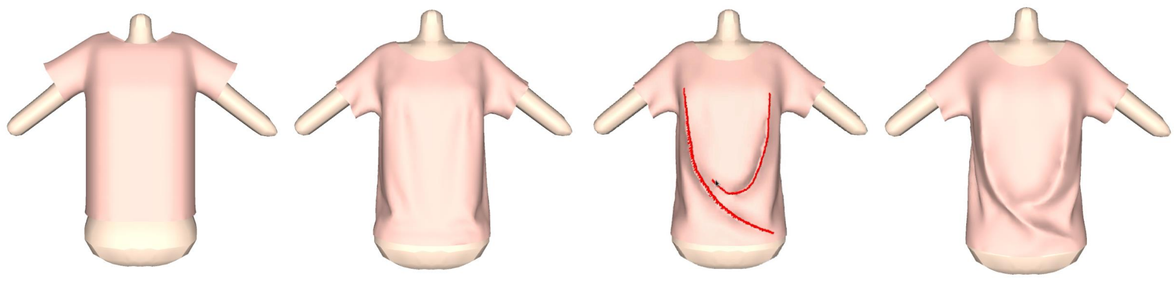
- User input curve
- Original folded surface based on the input curve
- Result after constraints Taubin smoothing[1] and remeshing[2]

- Our results.



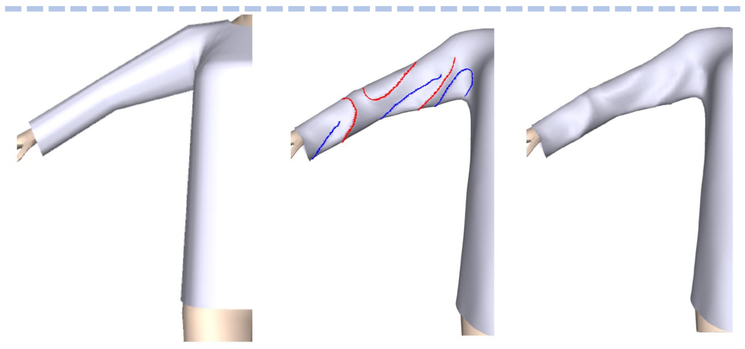
- Directly drawing on a square cloth without physical simulation.

- Result of a t-shirt with a man lifting his arms after smoothing and physical simulation. The input blue curves mean to build the concave folded surface



- Result of a women shirt. Input red curves mean to build the convex folded surface.

- Result of the sleeve on a women dress. Using both red curves and blue curves to draw the shape of the folded surface, with the refinement using smoothing method.



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 with some existing methods, our method is more concise and has less restrictive.

Currently, we can only build the soft folded surface with a fixed height, so we will introduce more methods for different surfaces and enhance the 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.