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A tangible surface for digital sculpting in virtual environments

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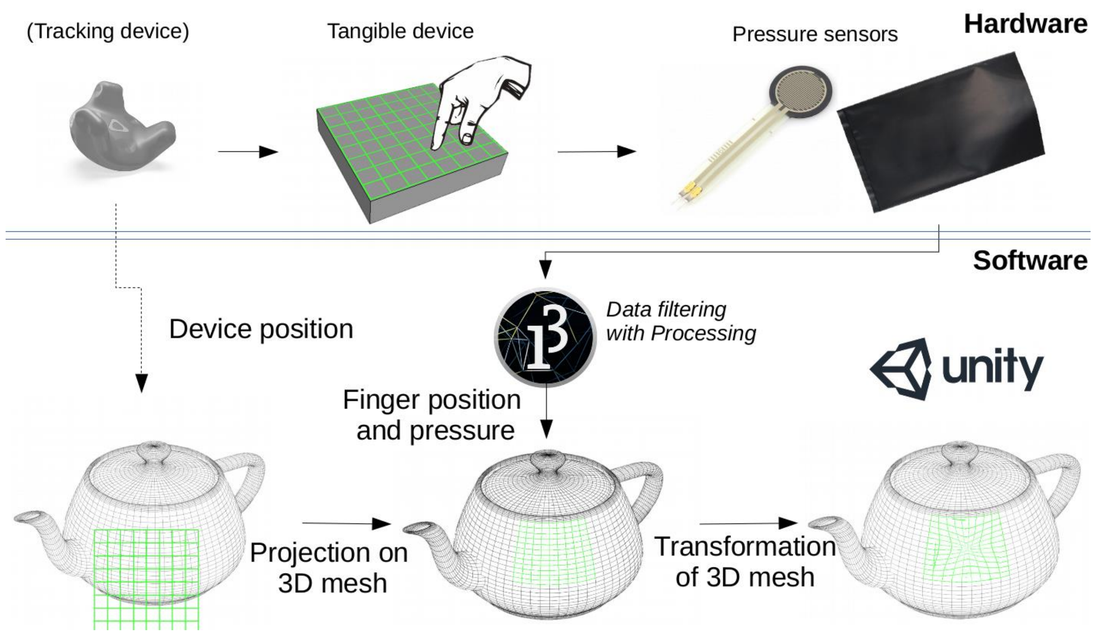
With the growth of virtual reality setups, digital sculpting tools become more and more immersive. However, current devices do not allow to touch virtual material as a sculptor would do. To tackle this issue we investigate the use of a tangible surface.



We designed a low-cost prototype composed of two layers of sensors in order to measure a wide range of pressure. We also propose two mapping techniques to fit our device to a virtual 3D mesh to be sculpted.

Tangible Surface for 3D Sculpting

Top layer: light pressure and position sensing

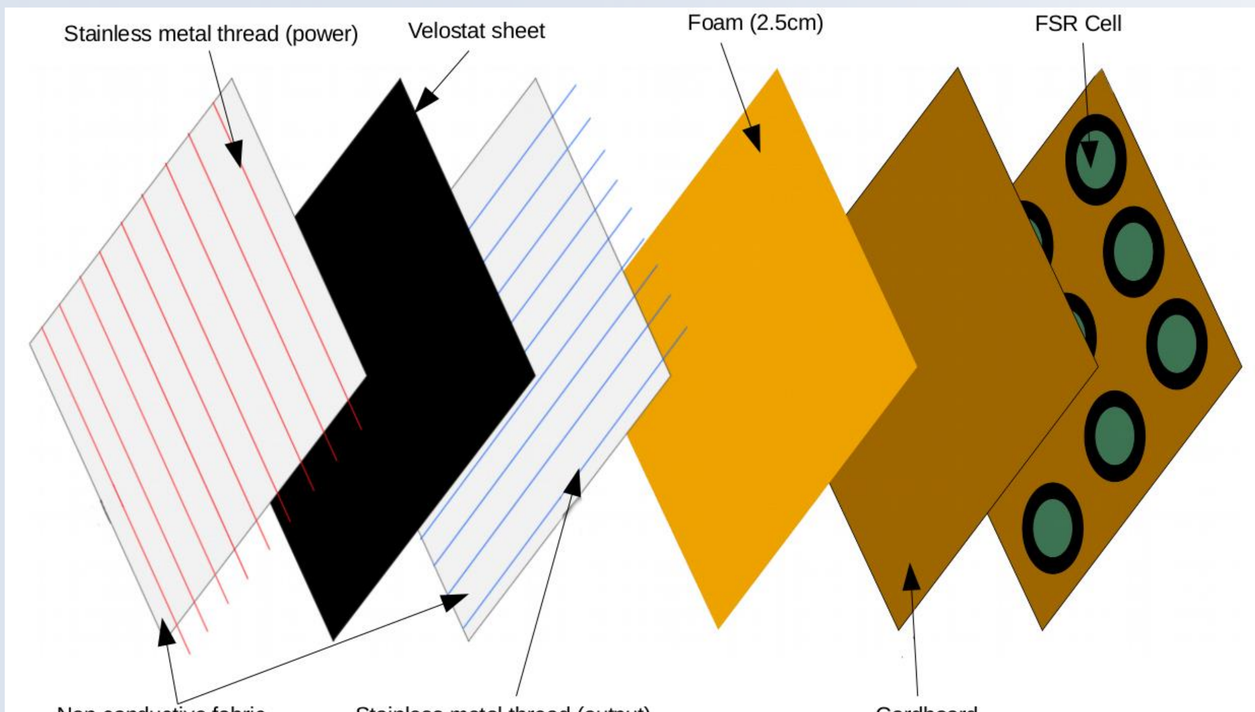
- Velostat sheet + grid stainless wires

Bottom layer: intense pressure sensing

- Interlink 402 FSRs matrix

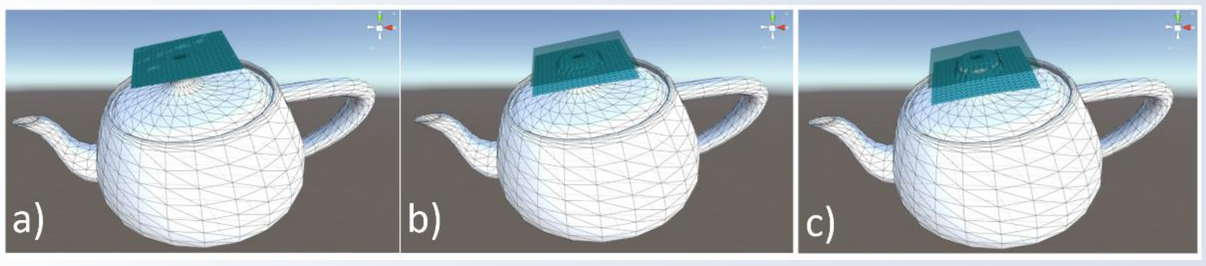
Foam: passive haptic feedback

Cardboard: pressure distribution

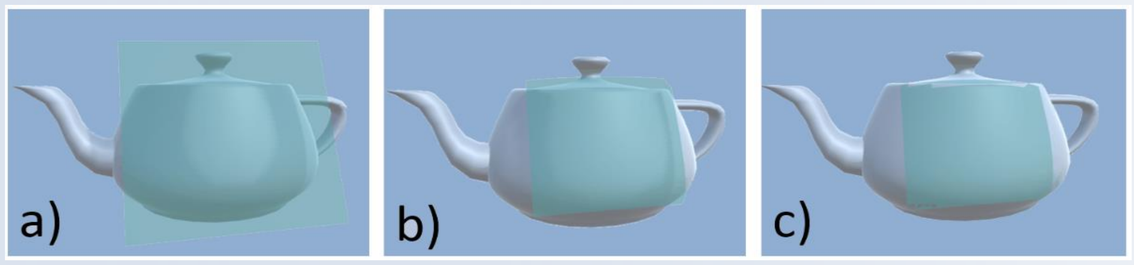


Mapping Techniques

Projection mapping:
vertices projected onto target mesh

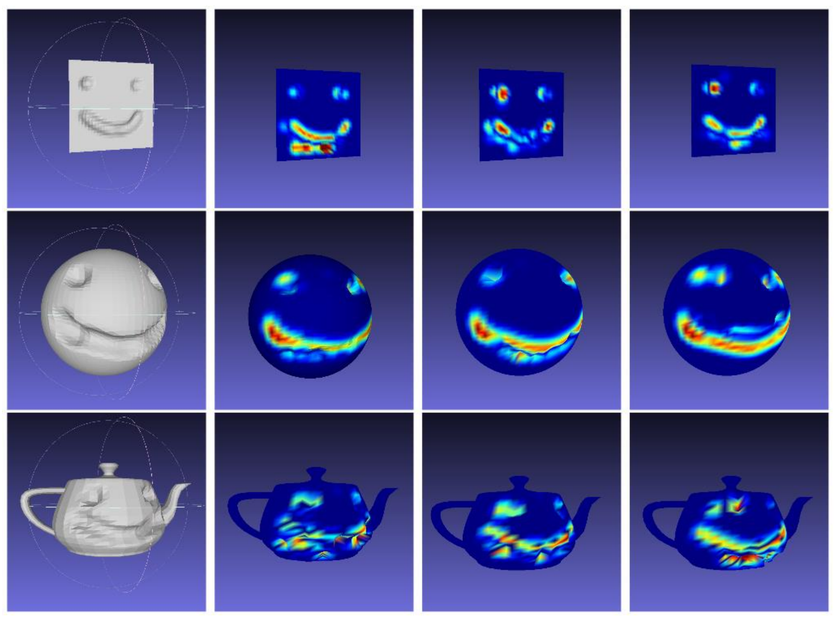


Wrapping mapping:
move vertices in direction of target mesh normals



Pilot Study

- Task: deform object according to reference
- Conditions: 3 mapping (projections, wrapping, none)
- Results: Task successfully completed. No method outperform another



Discussion & Conclusion

- Interaction is intuitive and simple
- Deeper user studies required: mapping methods and complex objects
- Other shape for the device to be investigated (half-sphere)

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