Human Computer Interaction
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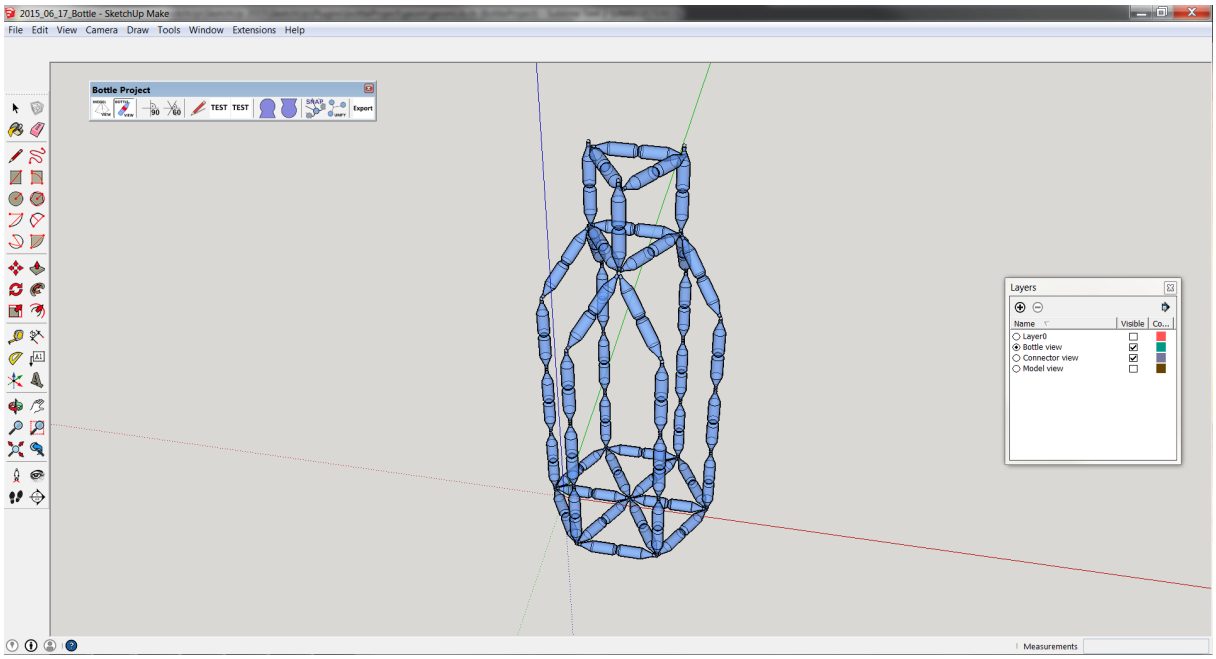
Masterprojekt Sommersemester 2013

HCI: Software for making large sculptures from plastic bottles + 3D print: compute structural engineering

The project

How to scale 3D printing to person/building scale? The key idea behind this project is to create large sculptures by combining 3D print with recycled plastic bottles, i.e., to 3D print only the connectors between bottles, while most of the volume and structural strength of the sculpture stems from the bottles. We have a first version implemented as a sketch-up extension. The system allows users to sketch objects based on bottles and generated the respective 3D-printed connectors.



Screenshot of the Sketch-up extension of the current version of our system. It allows users to draw large objects from bottles: here a large sculpture of… a bottle. The software then generates custom connectors that connect the bottles, allowing users to assemble the sculpture.

Software you will write & required skills

Your objective is to **extend the software to allow engineering for human weight,** such as stages, tents, or bridges**.** (1) Write software that allows users to create steps and board and covers that allow users to walk on or climb your structures. (2) Write software that computes the forces in the system & proposes modifications to the design to carry the load.

You should have **experience in 3D modeling and computer graphics.** You will learn about different tessellation algorithms. We have a codebase written for sketch-up in ruby that should possibly be used for the project.

Your software should allow users to make functional bridges etc. from water bottles combined with 3D-printed connectors. One of key challenge here is to create software that computes the involved forces and makes sure the result is structurally sound.

References to get you started

- Find the article "Zometool Shape Approximation" using Google Scholar and read it
- Google for the open source software tool “MeshLab” and play with it
- Check out Google’s Sketch-up Extension Warehouse https://extensions.sketchup.com
- Come talk to us

Contact

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