Booklization: Design and Optimization of Building by Books

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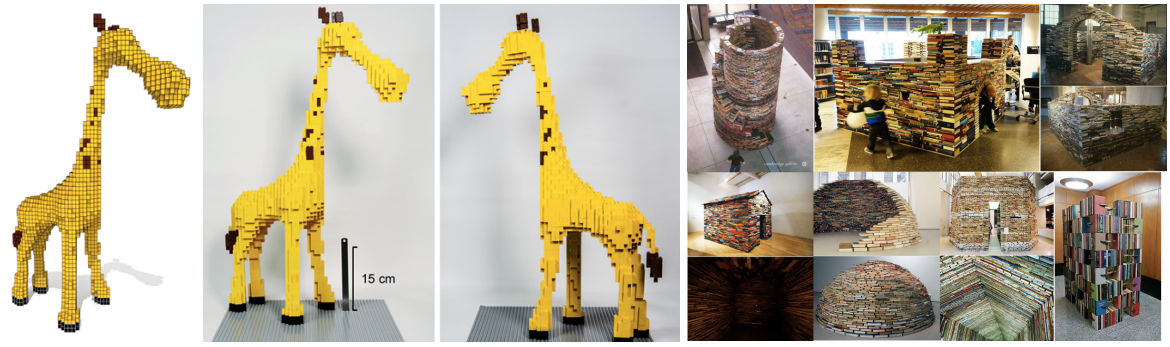

(Left: Voxelization based Legolization [1]; Right: Shape fabricated by books http://www.playingbythebook.net/2015/03/06/top-tips-on-building-with-books-and-a-big-thankyou/)

Introduction

The student involved in this project is expected to develop new method to automatically convert an input 3D model into a sequence of placing books for fabricating the shape similar to the input model. In this project, the shape optimization technique will be adopted to deform the input model into a shape that is easier to be fabricated by books. The methodology in fabricating models by lego blocks [1] and the methodology for building masonry [2] will be studied to generate a new design method for the fabrication by books.

Context

The major challenge in this project is to investigate the new methodology of fabricating a shape by books. The collapse of blocks caused by gravity will be considered and incorporated into the constraints of shape optimization. This project is part of research taken in the *advanced manufacturing* group in DE department.

Your Assignment

To study the new methodology and realize the fabrication process on some prototypes. For detail information, please contact Rob Scharff or Charlie Wang directly.

References

[1] Sheng-Jie Luo, Yonghao Yue, Chun-Kai Huang, Yu-Huan Chung, Sei Imai, Tomoyuki Nishita, and Bing-Yu Chen. “Legolization: Optimizing LEGO Designs”. *ACM Transactions on Graphics (TOG)*, Vol. 34, No. 6, p.222:1 - p.222:12, 2015.
[2] Emily Whiting, Hijung Shin, Robert Wang, John Ochsendorf, and Frédo Durand. 2012. “Structural optimization of 3D masonry buildings”. *ACM Trans. Graph.* 31, 6, Article 159 (November 2012), 11 pages.