Variable Density Cubic Infill for Fused Filament Fabrication

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Fused Filament Fabrication (FFF) is a type of 3d printing used in a variety of applications, from small scale manufacturing to rapid prototyping. Printed pieces are typically filled with a sparse uniform pattern known as infill to conserve material and time. This project implemented a dynamic infill with increased density near the skin of the print to further conserve material and print time. The infill is in the form of recursively subdivided cubes that are oriented with their space diagonal normal to the print surface. Cubes are further subdivided near the skin of the print, leading to a higher density. The infill was developed as a modification to CuraEngine, an open source slicing application. This modification was officially incorporated into the CuraEngine 2.4 release, allowing thousands of people to make use of it. Strength testing for identical mass parts was performed, which showed that the developed infill was stronger than cubic infill.

Awards Won:

Third Award of $1,000

Association for Computing Machinery: Fourth Award of $200