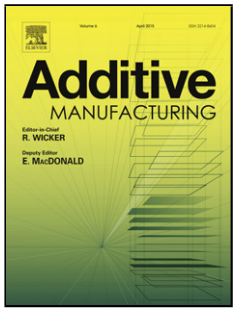

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Near-Convex Decomposition and Layering for Efficient 3D Printing

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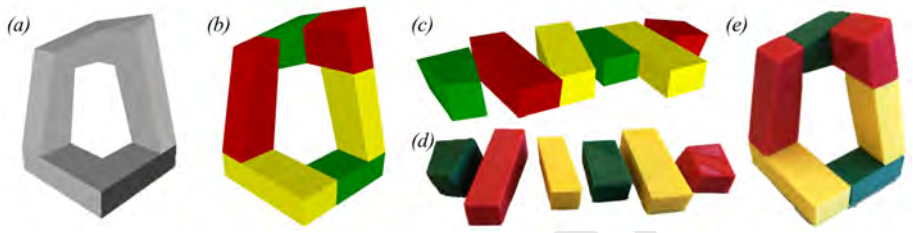

Figure 1: **Decomposition for 3D printing:** Input model (a), our automatic near-convex decomposition (b), configuration that will be printed (c), individual printed components (d), and the final printed and assembled object (e).

Abstract

We introduce a novel divide-and-conquer approach for 3D printing, which provides automatic decomposition and configuration of an input object into print-ready components. Our method improves 3D printing by reducing material consumption, decreasing printing time, and improving fidelity of printed models. An input object is decomposed into a set of components obtained by a near-convex segmentation that minimizes an energy function. Then the configuration phase provides a robust algorithm to pack the components for an efficient print job. Our approach has been tested on both simulated models and real-world printed objects. Our results show that the framework can reduce print time by up to 65% (fused deposition modeling, or FDM) and 36% (stere-

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