



Technion-Israel Institute of Technology
Computer Science Department
Center for Graphics and Geometric Computing



CGGC Seminar – M.Sc. Talk

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Nozzle Modification for Efficient FDM 3D Printing

3D printing is based on layered manufacturing, where the layers are printed consecutively in increasing height order. In Fused Depositing Modeling (FDM), the printing head may travel without extruding material between separated “islands” of the sliced layers. These travel movements increase the printing time and reduce the quality of the 3D printed part. We present an extended nozzle modification, which can be applied to off-the-shelf FDM printers, and a corresponding toolpath generation algorithm. Together, these dramatically reduce the amount of travel movement, thus improving the printing time and quality of the results. The extended nozzle allows us to print the sliced layers out of order, where part of a lower layer might be printed after a higher layer was already printed. Our toolpath generation algorithm takes advantage of this capability and generates a toolpath which maximizes the number of consecutive layers printed within the same “island” without requiring any travel movement. In addition, the algorithm optimizes the order of the printed islands, and guarantees that the generated toolpath will not cause collisions between the extended nozzle and the model. We demonstrate our approach on a collection of varied models, and show that we considerably reduce the required travel, and improve the printing time and quality compared to standard layer-by-layer printing.

The lecture will be held on Wednesday, 08.06.2022, at 10:00, Taub 401

הזמנה זו מהווה אישור כניסה עם רכב לטכניון