SKETCH TO 3D
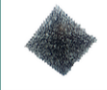## Indraprastha Institute of Information Technology, Delhi

3D Models

INTRODUCTION

Various systems have explored the idea of inferring 3D models from sketched 2D outlines. In all of these systems the underlying modelling methodology limits the complexity of models that can be created interactively.

We present a sketching interface for quickly and easily designing freeform models. The user draws 2D freeform strokes interactively on the screen and the system automatically constructs 3D polygonal surfaces. Sketch to 3D, our prototype system, is implemented as a C++ program with OpenGL and CGAL, and the mesh construction is done in real-time on the computer.

METHOD

The user first draws a 2D freehand curve in the program window.

We used Delaunay Triangulation to initially construct a 2D mesh for the freehand sketch that the user draws.

Then, we find the circumcircle for each triangle in the mesh and with it's circumradius, we run a function to create points in the plane perpendicular to the one of the freehand sketch(a substitute to create a "convolution surface"). We then use those points to create the 3D model.

This completes the basic method involved in creating a 3D object from a 2D sketch.

RESULT

Our current implementation is written in C++ using CGAL and OpenGL. We are able to provide a very stable(30+ FPS) framerate as well.

Furthermore, we have learned that Sketch to 3D indeed supports the skill transfer from traditional 2D sketching to 3D modeling; while the system does require some practice, the amount is reasonable and acceptable and creating separate models first and then merging, as well as animation tools would be very useful.

The current implementation of the system has slightly inefficient 2D freehand sketching(visible on slightly outdated systems), owing to the large number of sample points being taken to ensure the mesh and it's corresponding 3D image are as accurate and precise as possible. The meshing and 3D inflation on the other hand have been heavily optimized and do not run into any hiccups.

2D Freehand Sketch

3D Object from 2D Drawing

CONCLUSIONS

To quote a tester of the system: "A great thing about this is that one can start doodling without having a specific goal in mind, just like on paper.

2D Sketch to 3D has great potential and possibilities for artists. The program, along with new functions will be revolutionary.

REFERENCES

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