WEB-BASED MODEL SLICING FOR 3D PRINTERS

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B.S., UNIVERSITY OF MASSACHUSETTS LOWELL (2015)

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF MASTER OF SCIENCE
DEPARTMENT OF COMPUTER SCIENCE
UNIVERSITY OF MASSACHUSETTS LOWELL

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December 1, 2010

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Abstract of a thesis submitted to the faculty of the
Department of Computer Science
in partial fulfillment of the requirements
for the degree of
Master of Science
University of Massachusetts Lowell
2016

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Abstract

3D printing currently has a large gap between software and hardware. A hobbyist machine can now be purchased for less than $500 but having good software to drive it is hard to find. Currently the only competent and free slicing software available is Cura and Repetier Host. Currently, Cura has varied support on all platforms, and Repetier Host is intended only for Windows. Neither software have any web support nor will they be likely to have any support in the future as the slicing process requires a computer with a considerable amount of both graphical and computational power. The purpose of this research is to construct a web based slicing software and make it simple for users without any prior knowledge of 3D printing to take full advantage of their printer and as a result will make 3D printing much more approachable for users who are not computer savvy. Additionally, this opens up opportunities for educators in STEM programs to teach students about 3D printing in a simple and practical way.

Acknowledgments

Contents

List of Figures

List of Tables

Chapter 1

Introduction

3D printing, over the past few years, has become immensely popular in the home hobbyist space because of its new found availability. A hobbyist can now go and buy a do-it-yourself 3D printer kit for less than $500. Even though the hardware to build a 3D printer is easily available, the software support leaves much to be desired. Most of the big name companies that used to hold all of the patents for 3D printers have retained the software patents but not the hardware patents. This creates a gap in knowledge between building the printer and actually running it. This proposed research is to find out what software already exists in the open source world and then try to expose this on the web in a simple and easy to use manner. This effectively will democratize the world of 3D printing, much in the same way that Google has democratized the way that we search the web. D'Aveni, R.s (2015) article theorizes that this rise in the popularity of 3D printing will spur an industrial revolution as manufacturing becomes more personalized and decentralized.

To print something simple on a 3D printer, there is a multi step process that can be daunting to many first time users. The first step in the process is to either create or download a model. Creating a model can be done with any standard 3D CAD software, such as AutoCAD or SolidWorks. Downloading pre-existing models from an online repository can be done from websites such as Thingiverse or YouMagine. Once a model file is obtained, it is time to slice the model. Slicing is the act of taking this model file and splitting it up into many thin layers that the 3D printer can understand.

This process can only be done by a dedicated slicing software which can often be complicated to use and difficult to install. Once the file has been sliced, the resulting file is a G-code file which is simply a set of movement instructions that the printer head must follow. This file is then loaded to an SD card or sent via a print server similar to the way that a normal 2D printer is networked. Once the G-code file has been loaded all that is left is to hit print either manually using the printers interface for the SD card or by hitting print on the network interface for the file that was uploaded.

1.1 Research Focus

1.2 The RepRap Idea

1.3 Sudden Growth Of 3D Printing

1.4 Purpose of This Research

1.5 Research Objectives

1.6 Existing Technology

1.7 Thesis Map

Chapter 2

Libraries and Existing Code

2.1 OctoPrint

2.2 G-Code Viewer

2.3 CuraEngine

2.4 Bootstrap AngularJS

2.5 JavaEE

Chapter 3

Methodology

3.1 Research Design

3.2 Key Challenges

3.3 Working Procedure

3.4 Web Interface

3.5 Slicing Engine

Chapter 4

Client Side

4.1 Basic Run-down

4.2 AngularJS

4.3 OctoPrint Integration

4.4 2D Model Viewer Integration

4.5 Other Planned Integrations

4.6 Issues Known Bugs

Chapter 5

Server Side

5.1 JavaEE 7

5.2 ProcessBuilder

5.3 CuraEngine Integration

5.4 REST API

5.5 Issues Known Bugs

Chapter 6

Discussion

6.1 Usability Testing

6.2 Data Gathering

6.3 Design Updates Improvements

6.4 Future Work

References