

ILR02

10/23/15

TEAM F: ADD_IN
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Individual Progress

Since the previous ILR (10/15/15) my primary focus has been commanding Slic3r from the command line and MATLAB. To do this I installed Slic3r from source, requiring me to set up Perl on my computer. While doing this, I familiarized myself with both the syntax and development basics of Perl. Specifically, I learned to use the CPAN (Comprehensive Perl Archive Network), an archive and development resource used to easily find and install Perl modules. Once the main Slic3r package and its dependencies were installed, I was able to invoke it to slice a given *.stl* file from the command line.

MATLAB provides an easy method for invoking the command line functions through the `system()` call. Using this command, I was able to write a MATLAB script that allowed a user to select a part, slice it, and produce G-Code file. At the same time, MATLAB would prompt the user to select a Z height to use as an insertion layer (Figure 1). After the G-Code file is produced, MATLAB combs the G-Code file produced and, using regular expressions, identifies all of the layer heights, and inserts instructions to pause the printer and move to the insertion configuration at the first layer that is above the specified height.

In addition to developing the layer insertion script, I have been researching ways to display a model of the part and selected insertion layer in MATLAB. While not absolutely essential, this would provide a nice user feedback when selecting the insertion layer and would be useful in debugging the software. I have found some MATLAB file exchange programs that produces 3D plots of *.stl* files. The next step will be to integrate them into the insertion layer script and find a way to display a plane at the selected height.

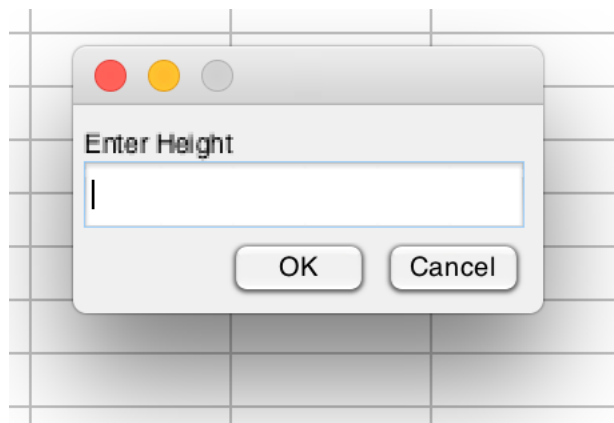


Figure 1: Layer Height Selection Prompt.

Challenges

The most difficult challenge this week has been attempting to install the GUI module of Slic3r from source. After installing the correct modules, the installation of the main Slic3r module was fairly painless. The GUI module however, continues to crash during installation due to a failure related to the 'Wx' module.

```
==> Found dependencies: Alien::wxWidgets
--> Working on Alien::wxWidgets
Fetching http://www.cpan.org/authors/id/M/MD/MDOOTSON/Alien-wxWidgets-0.67.tar.gz ... OK
Configuring Alien-wxWidgets-0.67 ... OK
Building Alien-wxWidgets-0.67 ... FAIL
! Installing Alien::wxWidgets failed. See
/Users/Dan/.cpanm/work/1445485167.50301/build.log for details. Retry with
--force to force install it.
! Installing the dependencies failed: Module 'Alien::wxWidgets' is not
installed
! Bailing out the installation for Wx-0.9927.
! Installing the dependencies failed: Module 'Wx::build::MakeMaker' is not
installed
! Bailing out the installation for Wx-GLCanvas-0.09.
Don't worry, this module is optional.
The following prerequisites failed to install: Wx
```

Figure 2: Bash output during failure of Wx module installation

Wx is a GUI toolkit that was used to develop the Slic3r GUI. In various attempts to solve the problem I have installed Wx (and associated packages: WxWidgets, AlienWx) using both CPAN and direct downloads from the perlWx website. In each case the installer will check my installation and confirm that it is installed and listed in the Perl @INC directory. Because of this I suspect that the issue has to do with a dependency file or library directory error, rather than the actual module missing.

Currently, I have postponed further investigation into this problem since the immediate next steps (developing the insertion layer selector) do not require the Slic3r GUI. However, over the next week I hope to continue investigating this problem and see if we encounter the same problem when installing the GUI on Astha's computer (she is also having issues installing the GUI, although it is not yet clear if it is due to the same issue). Although the GUI is not immediately needed, I would like to have it working so that I can begin to familiarize myself with the source code, and hopefully eventually migrate our MATLAB layer selection algorithm into the Slic3r program itself.

Teamwork

Over the last week each team member has worked on the following tasks:

Nikhil Baheti – Nikhil has been working closely with Ihsane Debbache on designing and iterating on a 3D printed adapter to mount the MakerGear’s original extruder nozzle at a 45-degree angle, and to allow it to be manually rotated. This will be used for testing of:

- a) Print quality (including affects of orientation) when printing from a nozzle that is not orthogonal to the print surface
- b) Rotary joint requirements to avoid twisting and kinking of the filament.
Specifically, is it possible to continually rotate the nozzle and avoid kinking the filament without some sort of specialized slip ring/interface.

Ihsane Debbache – Ihsane has been working closely with Nikhil on the nozzle mount adapter described above. While Nikhil has been primarily focused on design, Ihsane has responsible for manufacturing and testing the adapters. In addition, Ihsane has been researching rotary stages and working on a calculation to determine the minimum rotational speed required.

Astha Prasad – Astha has been working closely with me on the insertion layer selection algorithm. While I have focused on how to cut the part and locate the line in the G-CODE file where we need to insert commands for ‘pause and move to insertion configuration’, Astha has been working with the actual printer to determine how to send a pause command and to move the bed to the insertion configuration.

Future Plans

The following goals have been set for this coming week:

Software

1. Continue development on insertion layer script. Make it more robust (tolerant to incorrect insertion layer entries, invalid .stl files, and invalid slicer settings)
2. Enable the insertion layer script to load slicer settings from a locally stored .ini file. The documentation for Slic3r says that this feature is implemented, but attempts thus far have failed. More investigation is needed to determine if this is a software bug or we are incorrectly executing the load command.
3. Investigate the failure to install Slic3r’s GUI module. (Note: 2 and 3 may require contacting Slicer’s developer, Alessandro Ranellucci, who is active on many 3D printing forums.

Hardware

1. Continue design of extruder nozzle in SolidWorks (specifically the heat break) based on results of test this week.
2. Begin design and selection of rotary mechanism for nozzle rotation