COS 702

Bonus Assignment

Loading 3D Points from STL Files

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Introduction:

In this paper, I will be demonstrating how to obtain and load 3D points from STL files. For loading STL files, I obtained a file from the MathWorks file exchange. This file reads STL files and loads in the faces used to create the 3D object, the normal vectors of those faces, and the vertices of the object. In this paper, I will show how to load these points, some examples of STL files with points plotted, and how to find more STL models to use. Also, I will provide .mat files for the four examples shown at the end of the paper.

Loading STL Files:

Loading the STL vertices uses the file 'stlread.m'. It is a simple Matlab function call as follows.

```
[faces, vertices, face_normals] = stlread('filename.stl');
```

The variable 'vertices' now contains all the 3D points contained in the object. These points can be shown easily using the 'scatter3' function.

Obtaining STL Files:

3D printing is becoming more popular everyday. There are many online communities that contain many 3D printing files in STL format. One of the more popular is www.thingverse.com which claims to have over 500,000 files. Many of these files are of objects that would be good data sets for various surfacing techniques.
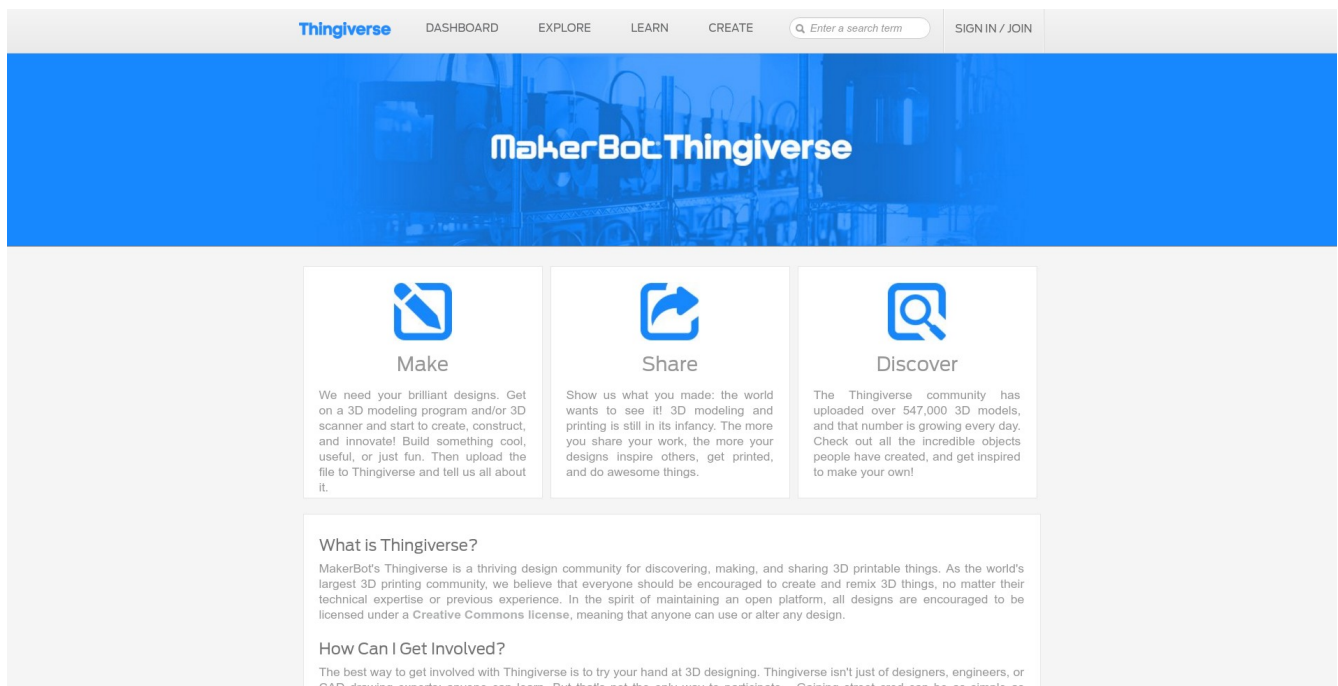
To obtain the data sets, you can simply go to the Thingverse website and search for various items. It contains many items that aren't suitable for use, but you have to search through them to find the good ones. Below are some examples of the newest submitted animal models.
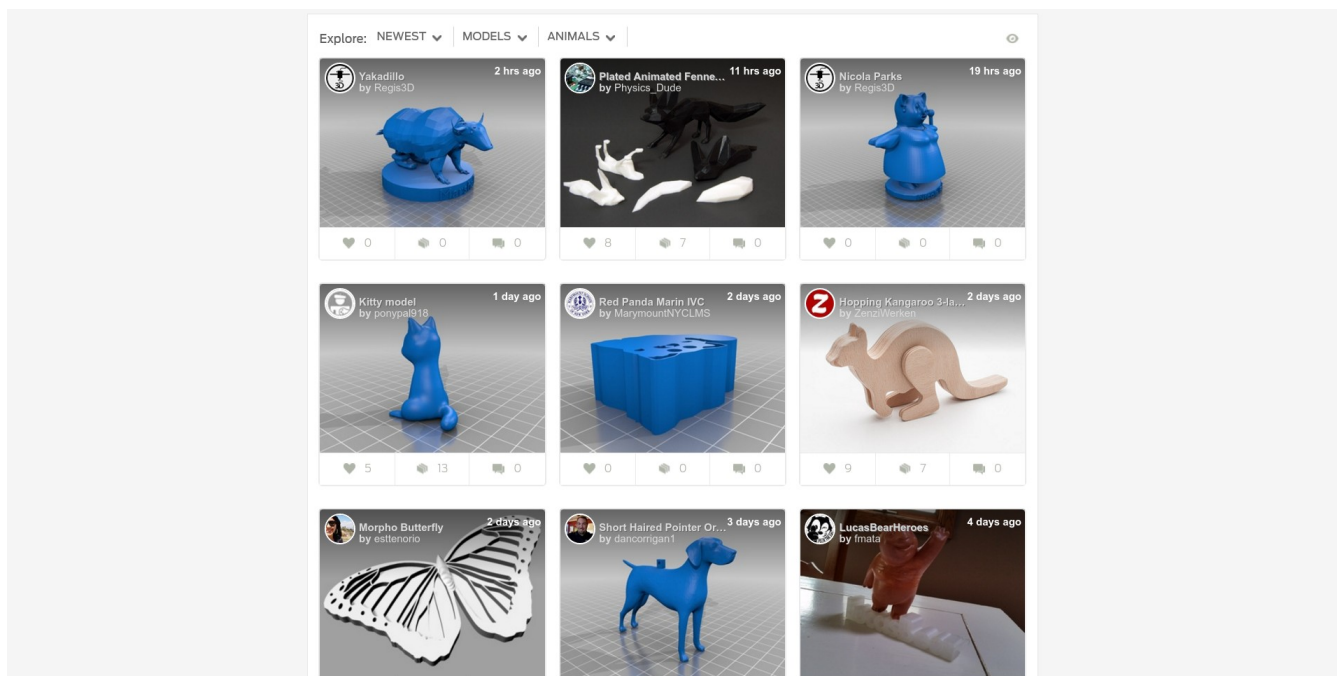
Once you have found a file you like, you simply click on it, and it will take you to a page that tells more about the item. On this page, you can download it.
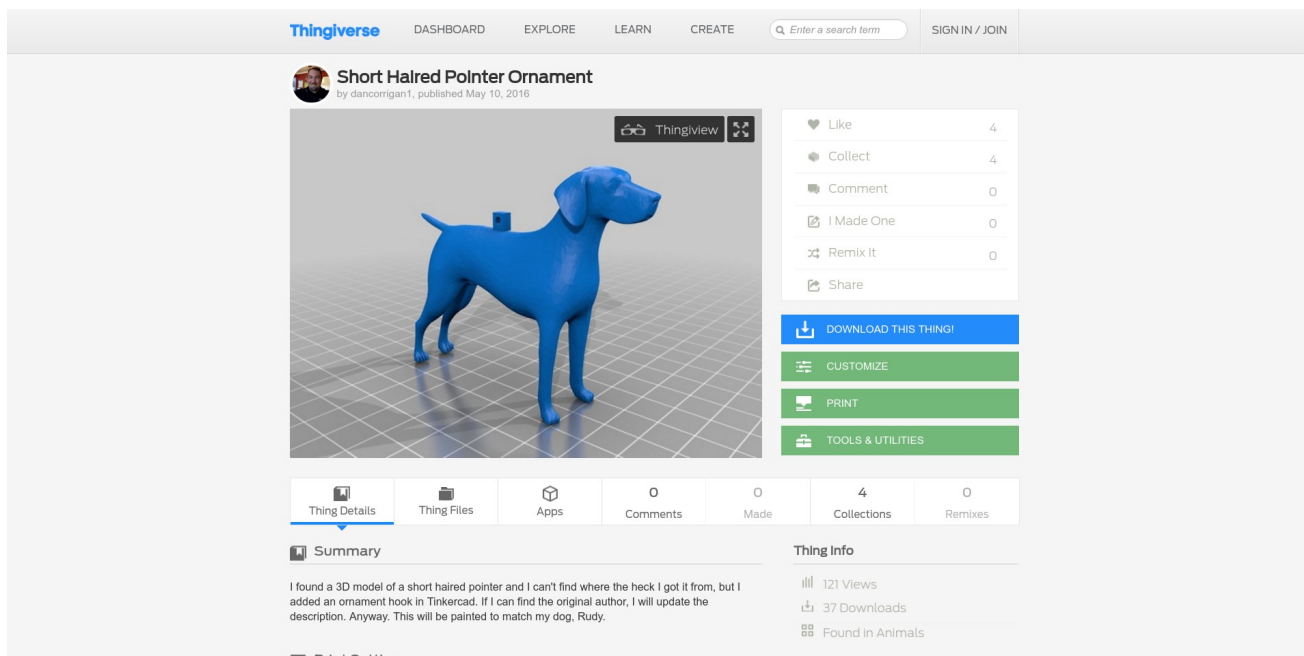
Then, you would simply put the STL file in your Matlab project directory, and load it using the 'stlread' function.

Most of the files that I tested from this website worked. However, I did find a couple that Matlab said was too large, or they had some sort of error while loading. You just have to try them to see if they will load.

Examples of Models to Points: