

Checking Models for 3D Print with Meshlab

Posted by Marco CM - 2013/03/15 15:49

There are currently only three (3) major guidelines to follow when preparing a 3d model for 3d printing.

1. Watertight:

The mesh must be solid, or "watertight". Meaning the mesh cannot have holes, 2-point polygons, or single sided polygon surfaces. You can check meshes for volume within most 3d software packages. I recommend two free options; Netfabb and MeshLab.

2. Minimum Wall Thickness:

Research the limitations of the material you wish to 3d print with and adjust your design accordingly. Typically a minimum wall thickness of 2.5mm or more is required for a durable 3d print.

3. Support Material Removal:

Nearly all 3d printing technologies require some type of secondary support material to be printed along side the primary build material. Research the material you wish to print with and consider how the support material may or may not interfere with your design. For example a hollow Easter Egg 3d printed in Multi-Color Sandstone must have an exit hole for the excess powder support material to be evacuated after 3d printing. Without this hole the egg would be filled with unused 3d print material., Another example; A hollow Easter egg in ABS Plastic would contain support columns made of firm waxy support material and would require some manual removal.

Checking Mesh volume with Meshlab downloaded here: <http://meshlab.sourceforge.net/>

1. File>Import Mesh , click OK to Unify Duplicate Vertices if necessary.
2. Click "Show Layers Dialog" icon (Next to camera icon, looks like layers)
3. Filters>Quality Measures and computations>Compute Geometric Measures
4. You should see a volume for the mesh in the Layers Dialog box to the right if you do not, move onto step 5, 6 and 7.
5. Filters>Cleaning and Repairing>Merge Close Vertices, click apply
6. Filters>Cleaning and Repairing>Remove Duplicate Faces, click apply
7. Filters>Cleaning and Repairing>Remove Duplicated Vertex

Steps 5-7 should automatically repair your mesh. Check the mesh for a volume again by repeating step 3. If you model is still not showing a volume you may have to manually repair it in the original software used to create it.

Another free alternative software to check mesh files for 3d print validity with is Netfabb Basic.

Checking Mesh Volume with Netfabb Basic downloaded here: <http://www.netfabb.com/basic.php>

1. Project>Open> Select your model file.
2. Click the "New analysis" button at the right end of the top row of buttons. Select "Standard analysis". Netfabb will tell you if the mesh is closed and orientable in the dialog box to the lower right. If both fields report a green "YES" then the mesh is ready for 3d print. If you see a hazard symbol in the lower right side, then you must continue with steps 3-5.
3. Click the Red Cross "Repair" button. Wait, Click the "Automatic repair" button at the lower right side. Select Default repair and click "Execute"
4. Click "Apply Repair" at the lower right side and click "Replace model"
5. Right Click on the model file name at the upper right side and select "Export part", choose "STL"

(binary), save the newly repair part.

You may also use Netfabb Basic or MeshLab to perform other simple tasks on models such as measuring and scaling. I encourage you to explore both applications as they are invaluable tools when designing for 3d print. As always post questions in the forums for the quickest response.

-Marco
Community Manager

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Re: Checking Models for 3D Print with Meshlab

Posted by Parrleu - 2013/04/02 16:31

Thanks, Marco,

Nice overview - Meshlab is a great tool - A definite must for anyone using a tool like Blender or Maya, in particular, to do their 3d modeling, I think.

B)
Heather

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Re: Checking Models for 3D Print with Meshlab

Posted by Marco CM - 2013/04/02 17:29

Pixologic's Sculptris is also a great free 3d sculpting tool. Wonderful for creating organic shapes like trees and monsters quickly. Download it for free here: <http://pixologic.com/sculptris/>

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Re: Checking Models for 3D Print with Meshlab

Posted by Parrleu - 2013/04/02 18:37

I've seen this program mentioned b4, but never checked it out - really impressive!

Have you seen <http://www.123dapp.com/sculpt> - not as fully featured, but also free - and I'm finding it a nice tool to bring friends who are more CAD-phobic or Blender-phobic into 3d playtime - some of the most surprising ppl have really creative ideas once you give them the tools to bring them out. : -)

- Heather

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Re: Checking Models for 3D Print with Meshlab

Posted by Marco CM - 2013/04/02 18:43

Yes, you might also be interested in 123d catch. Which uses normal 2d camera photos to make 3d models of real-world objects. It can be rather fun to play with. Also free to use.
<http://www.123dapp.com/catch>

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Re: Checking Models for 3D Print with Meshlab

Posted by Parrleu - 2013/04/02 20:03

I've used it - fun, but does require a lot of images in fairly constant lighting to not need some strong jimmying about when it meshes - definitely a good thing to play with and particularly to show off to people who might be intimidated by starting with a modeling program from scratch but still want that 3d model of their cat doing an lol face - or whathaveyou. ; -)

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