Subject: Oversmoothed model previews?
Posted by crisrose on Wed, 06 Aug 2008 14:43:27 GMT
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Hi there,

So i've been working for a long time to get the perfect level of detail vs filesize, but have had some problems with flipped normals and the like.

Anyways, i have seemingly fixed them, as my 50k faces models now upload and i'm happy to order them.

However, the model preview now seems to be seriously oversmoothed?!

The new scaling options on upload are great, and the fact that it zooms right into the model in the preview is also excellent, well done chaps!

But the model in Accutrans now is very dissimilar to the previews of the uploaded models.

Can you confirm that the preview is no longer an accurate representation of the actual printed model? I don't want to get it printed and get what's been shown in the preview!

Attached is an example.

Cheers

File Attachments

1) Oversmoothedbody.jpg, downloaded 520 times

Subject: Re: Oversmoothed model previews?
Posted by crisrose on Wed, 06 Aug 2008 14:44:27 GMT
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Here's another example to demonstrate that it isn't an issue with the model.

File Attachments

1) Oversmoothedleg.jpg, downloaded 452 times

Subject: Re: Oversmoothed model previews?
Posted by Dalhimar on Wed, 06 Aug 2008 16:36:43 GMT
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It is possible that this is being caused by the format you are using to upload. Some formats will convert the models from a "Mesh" type to a Nurbs/spline type. When this happens it tends to remove sharp edges and some detail in place of not having to store as much information regarding the placement of each individual vertex. Try uploading as another of the supported formats.

Subject: Re: Oversmoothed model previews?
Posted by crisrose on Wed, 06 Aug 2008 16:43:14 GMT
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Thanks for the input!

But i think you missed the crux of my point:

The format hasn't changed, the model hasn't changed, it's the preview system that has changed and it's now no longer visually accurate.

I am uploading in STL format, the only format that Solidworks Outputs that is compatible with Shapeways systems and the industry standar for rapid prototyping.

It was uploading perfectly before.

So changing the upload format is neither practical, nor required

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Subject: Re: Oversmoothed model previews?
Posted by svenpb on Wed, 06 Aug 2008 16:48:41 GMT
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Looks like the java applet uses smooth shading instead of flat. In Rhino, depending on quality (weld etc.) of the STL, this also happens.

Where did you find this the scale button?

Subject: Re: Oversmoothed model previews?
Posted by crisrose on Wed, 06 Aug 2008 16:51:30 GMT
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when you upload, assuming that you haven't rescaled the STL file with Accutrans, select the Radio Button that says "Millimeters" rather than the default "Meters"

It should upload then

It's not a custom ratio/scaling tool, but it does mean you don't have to go through a 2nd program to upload standard STL files now! YAY!

Subject: Re: Oversmoothed model previews?
Posted by svenpb on Wed, 06 Aug 2008 16:57:35 GMT
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aaaah...! that's a welcome utility too! I though you meant applet zoom

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Subject: Re: Oversmoothed model previews?
Posted by crisrose on Wed, 06 Aug 2008 16:59:38 GMT
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No, sadly there's no zoom on the preview yet, but the upload scale choice is a HUGE addition that will make many many lives much easier! Oh, and mine. lol

---

Subject: Re: Oversmoothed model previews?
Posted by Dalhimar on Wed, 06 Aug 2008 20:21:37 GMT
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I do agree, the smoothing effect is a little misleading in that the printer dose not apply the smoothing at all, it takes the mesh at face value, quite literally using only the faces you have on the object.
As such, i think it would be a good idea to try and give the viewer an option of "Estimated Printed

Appearence" or something along those lines that shows it exactly how it will look when printed instead of with the smoothing.

Subject: Re: Oversmoothed model previews?
Posted by crisrose on Wed, 06 Aug 2008 23:31:28 GMT
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i think the smoothing needs to be dropped entirely as it's misleading.

it didn't have any smoothing on the preview before, and like you said, none will be applied, so i'm a little confused as to why it's been added.

Any staff around to address the issue? I've emailed about it too about 12 hours ago just in case that's the response

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Subject: Re: Oversmoothed model previews?
Posted by WetMorgoth on Thu, 07 Aug 2008 08:27:28 GMT
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o/

The smoothing issue is an interesting issue to deal with. When we turn it off, everyone complains their models look blocky, when we turn it on, everyone complains that it rounds the edges off. We can't win either way!

Knowing when to smooth or not can be entirely dependent on the model format. Both X3D and Collada give us a crease angle parameter, which we can use to make that determination. STL does not, so we automatically smooth everything. That said, right now the pipeline ignores the crease angle and smooths everything. This is a known problem and related to the things taht we need to do on the backend during the model processing that require everything to be smoothed out. There are plans to be fixing it in a future version of the site, but can't give you a specific date yet other than that we're aware of it and have been for several months now. Other things have just had much higher priority.

Subject: Re: Oversmoothed model previews?
Posted by crisrose on Thu, 07 Aug 2008 08:36:55 GMT
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Okay, so 2 questions:

1. If the preview is not going to change back, i should just totally ignore previews and hope that it comes out like the STL model? If this is the case, does Shapeways take responsibility if the representation that's printed is inaccurate? After all, if i have no accurate preview to check, i can only trust that your system correctly analyzed it.

2. is there any chance at all that you could just please everyone and take 2 preview snapshots that can be switched between? A "raw" capture, and a "smoothed" version? You can keep the smoothed version default if you like, and leave the raw version for power-users? I know that may seem like a fudge, but you have to understand that for people like myself that require the dimentional accuracy and are using the model as the first stage of a moulding process, it's pretty important.

i totally understand that this isn't the most important thing for the site as a whole, but for anally retentive people such as myself, that really need to check and double check everything at every stage so time and money isn't wasted, i would rather that there was no preview at all, than a preview that bares little resemblance to what i'm having made

Check the files i attached in my first 2 posts if you haven't already, and you'll see that it's not really suitable for the level of smoothing applied to it

Thanks for reading and addressing this minor issue!

Subject: Re: Oversmoothed model previews?
Posted by WetMorgoth on Thu, 07 Aug 2008 09:26:00 GMT
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We're definitely not doing anything to the model under the covers. The triangles you give us are the triangles that get sent to the printer (unless you give us a file format that has primitives like spheres and boxes and we generate those triangles for you) in It is purely a visual artifact of the rendering infrastructure.

Subject: Re: Oversmoothed model previews?
Posted by svenpb on Thu, 07 Aug 2008 09:57:04 GMT
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I think smooth shading is useless as a preview. I can create STL files that become unrecognizeable when smooth shaded.

File Attachments

1) ----------Image2.png, downloaded 342 times

Subject: Re: Oversmoothed model previews?
Posted by andre.bois on Fri, 08 Aug 2008 01:24:46 GMT
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I also find that that the smoothed preview (both screenshot and 3D mode) is not a good idea.

The preview should give a realistic idea on how the model will look when printed. It will not be printed smoothed, so it is very misleading.

For pretty renders, one can always upload a picture...

Oh an by the way, can you change the webserver so that middle-clicking these extra shots just show the image in the browser, instead of downloading it ? It would be much more convenient. Merely serving mime-type "image/jpeg" instead of the current wrong "application/octet-stream" should be enough.

Subject: Re: Oversmoothed model previews?
Posted by Wildsketch on Fri, 08 Aug 2008 08:09:43 GMT
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I agree that displaying faceted models makes more sense than displaying smoothed normals.

Subject: Re: Oversmoothed model previews?
Posted by wormwood on Sat, 09 Aug 2008 16:36:36 GMT
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I think it is very important that the model screenshot and 3D view are NOT smoothed in any way.

This service is all about how models are built and their 3D reality when printed. Rendering the models with smoothing is of no practical use at all.

The previews need to act as a proof in the same way that proofs are used in 2D commercial printing, so that there is no confusion over what the customer will actually receive when ordering a printed model. The previews also need to serve as a way of checking that a model has been processed correctly by the Shapeways system before placing an order.

This also raises the issue of resolution. Would it be possible to have the upload system calculate a number for the average resolution of a printed model? It would be similar in use to the number that 2D images have for their resolution in DPI (dots per inch). I'm no mathematician but I guess the equation would be something like...

F (total number of faces) divided by A (total surface area) equals VPC (vertices per centimeter)

The VPC number could be a useful guide for how faceted/smooth a model will turn out when printed.

Subject: Re: Oversmoothed model previews?
Posted by crisrose on Sat, 09 Aug 2008 18:14:06 GMT
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Many thanks to everyone that's replied to this issue. I'm glad it wasn't just me.

It's good to see so many people realise that the snapshot generated from an uploaded model needs to be a "proof", even if that is merely to confirm to the person about to spend a hundred dollars getting this printed, that he's not going to get something turned inside out by an uploading glitch!

I can totally understand the situation Shapeways is in, some say smoothed, some say unsmoothed. You can't please everyone.

But i would argue that anyone that wishes to see a smoothed preview, needs to be educated properly about Rapid Prototyping, and gently informed of the reality of what their printout will look like.

If they are unhappy with the faceted reality, perhaps this isn't the method of production for them? Perhaps it will just encourage them to increase the mesh density and face count.

I would hate for anyone to feel mislead by the Preview images, and disappointed with their order.

Wormwood - with relation to your suggestion of a "VPC" - i'm really not sure that sort of information would be that useful. If i take a flowing, curved model, and print it at 1cm with 50,000 faces, it will appear very smooth. If i then scale exactly the same model to 10cm, it will not seem as smooth. So the system you're suggesting appears to work in this situation.

However, if i then design something that is extremely flat sided, with only 1 curved surface, then increases in mesh density become much less related to it's "overall quality".

The information would be interesting to have, but with no way to predict how curved or flat faced users models are meant to be, Shapeways cannot offer a guide number to aim for. Without a guide, the numbers don't really help.

It's great that with print - you can be told "300dpi for print quality". However a cube mesh with only 6 faces may look "higher quality" than a 25,000 face "monster head", even though the "VPC" is telling the user the exact opposite should be true. It doesn't matter if i scale it to 1cm or 100m, a cube requires no additional vertices to retain it's "quality".

I think this is why no one has come up with a 3D version of DPI, apart from a face-count.

Subject: Re: Oversmoothed model previews?
Posted by wormwood on Sun, 10 Aug 2008 15:06:03 GMT
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Crisrose, regarding VPC, obviously you are not wrong, but maybe we need to think outside the box.
(pun intended ;)

Even in 2D printing it is NOT enough to know just the DPI resolution of an image. You also need to know the type of image. Curves will look smooth when printed at 300 dpi as part of a CMYK image but if printed in just black on white they would need to be 1200 dpi to look smooth. And just like your 3D cube quality example, a 2D image of just coloured squares could in theory be printed at 1 dpi and still look hi res.

My VPC equation was clearly way too simplistic. But maybe an SV (smoothness value) could be calculated by software that analyzed the model in more detail. The SV could possibly be calculated by analyzing the angle change of adjacent normals over their real world distance. The

SV could be expressed as a percentage or a figure between 1 and 10 to a varying number of decimal places, or just rounded up to a whole number.

For a cube, or any model where all the surfaces are flat, the SV could be expressed as either 100% or 0 or N/A.

For models with a combination flat and curved surfaces, the flat surfaces would need to have more than 1 face so that the software could recognize them as intentionally flat. So then if 2 or more adjacent faces that shared a normal were followed by 2 or more faces at a different angle, but they also shared a normal, then the analyzing software would recognize that the angle change is not intended to be smooth and would ignore it when calculating the SV.

At school I was crap at maths, so there's a very good chance I'm talking nonsense. And, as you mention, someone would probably have already come up with a 3D DPI or SV if it was possible.

And I don't suppose any figure could be given by Shapeways to guarantee smoothness. It will probably always come down to the individual to decide if their model had enough faces. Much like when choosing the DPI for 2D printing.

Subject: Re: Oversmoothed model previews?
Posted by crisrose on Sun, 10 Aug 2008 15:23:23 GMT
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sounds like the sort of algorithm, that were you able to perfect it, would make you a rich man wormwood lol

in the meantime, i think a much larger, unsmoothed preview would go a long way to helping people visually determine whether or not the result is good enough

---

Subject: Re: Oversmoothed model previews?
Posted by WetMorgoth on Tue, 12 Aug 2008 14:47:37 GMT
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We do have some measure of "smoothness" in some fileformats. As I stated above - both Collada and X3D provide a crease angle value. If the angle between two faces is greater than that angle, you render a sharp edge. If it is less than that, render a smoothed surface between those two faces.

We are having our launch here today on the floor in SIGGRAPH in about an hour. I'll chat with the

rest of the shapeways guys about this hopefully just before the crowds invade the floor and make sure they've seen this thread. For us in the renderer, it is relatively easy to turn smooth shading off, but the corporate overlords have to say "make it so" for me to do that

---

Subject: Re: Oversmoothed model previews?
Posted by Wildsketch on Fri, 22 Aug 2008 20:49:04 GMT
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I have to say that I am impressed with the way Wormwood has thought this out. He's right. The display ought not to mislead people about the surfaces their prints are going to have and in the short run that probably means simply turning smoothing off. In the long run it might mean something like displaying a simulation of the surface with print grain.

Other ideas expressed here are very interesting and I'll have to think about them.

Subject: Re: Oversmoothed model previews?
Posted by Wildsketch on Fri, 22 Aug 2008 21:09:34 GMT
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Ok, somewhere between what crisrose, Wormwood and WetMorgoth were saying an idea for optimizing uploads came to me. This may be off topic, if so, please feel free to move this to some place where we can discuss this better.

WetMorgoth said:
Quote:We do have some measure of "smoothness" in some fileformats. As I stated above - both Collada and X3D provide a crease angle value. If the angle between two faces is greater than that angle, you render a sharp edge. If it is less than that, render a smoothed surface between those two faces.

And elsewhere on the forum today I remember seeing a discussion of the upload limit being based on back end optimization and downloading bandwidth and this idea occurred to me that might help with all of those problems:

Why not set up your own software to do the NURMS subdivision meshsmooth, and let us upload a base mesh with crease angles defined?

That way we could save on bandwith both uploading and downloading, (if your viewer software would also meshsmooth the object.) And we could still get very high poly prints.

The mesh smoothing algorithm gives very similar results from software package to software package these days. In my experience you can export a base mesh from Wings 3D or 3DS Max to Maya, and the smoothed result will look just the same as it did in whatever package you originally used to model it.

You shouldn't even need to depend on interpreting each software's file type. Just support the format we already use to move meshes between these programs, the .obj format.

You create an offline tool, or enable basic object editing on the website. Let us import an .obj, and in addition to checking if it is manifold, let us define he hard and soft edges, or smoothing groups and smoothing angles, give us an estimate of how smooth it will be printed at various sizes, and let us see how a mesh-smoothed version of the model would look printed out. Then we upload the base mesh and you have fewer polygons to store or to download to viewers.

Subject: Re: Oversmoothed model previews?
Posted by madox on Fri, 09 Jan 2009 12:23:15 GMT
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Lets revive a dead thread...can there be an option to turn smoothing off in model previews?

(For STL files?)

Subject: Re: Oversmoothed model previews?
Posted by robert on Fri, 09 Jan 2009 16:32:30 GMT
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madox wrote on Fri, 09 January 2009 07:23Lets revive a dead thread...can there be an option to turn smoothing off in model previews?

(For STL files?)

It is planned. Just cannot make any promises yet when it will be available.

Cheers!

Robert