Subject: Re: Mudbox terrain sculpting
Posted by Mad Ivan on Fri, 26 Apr 2013 01:34:50 GMT
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I haven't been active around here at all and now that this pops up I think I might have something to contribute

I am currently working on a university project with a sound guy (short story: audio-heavy "game" for blind people proof-of-concept) and keeping in mind that I am a coder and my audio guy doesn't know anything about game art (well, apart from sound) there were some tools that helped me a lot.

Disclaimer: I am not an artist, so please refrain from judging the artistic quality of the following. The project's main focus is audio and will be shown to people, so I've just put stuff together to make it look somewhat descent.

Sculptris is a sculpting tool, developed by Pixologic.
It's much simpler, compared to ZBRush/Mudbox (up to 2k textures, brush textures can't zoom in/out if you don't zoom in/out on the model itself, can't switch from texturing mode back to sculpting, texture paint acts weird on some topologies, is in alpha stage), but does support obj import/export, normal map and bump map import/export (paint normals as well) and has a nice games-friendly polygon reduce brush *and* is free (including commercial projects!). Link: http://pixologic.com/sculptris/

Structure Synth is a really cool tool for creating 3d structures, using design grammars (technically, you "code" your models).
For an example, the following grammar:
Toggle Spoiler[code] set maxdepth 300

```
10 * { y -0.5 sat 1 color #ccc} box

4 * { ry 90 sat 1 } spiral

rule spiral w 100 md 300 > spiral2 {
{ color #ccc } box

{ y 0.5 ry 1 rz 1 rx 1.5 s 0.993 } spiral
}

rule spiral2 md 50 > flower {
{ color #ccc } box
{ y 0.5 rx 2.5 s 0.993 } spiral2
}

rule spiral w 1 {
spiral
{ ry 180 z 0.5 rx 45 rz 0 } spiral
}
```

```
rule flower {
1 * { y 0.75 s 4 } 8 * { ry 45 } petal
ball
}

rule petal {
{ x 0.55 rz 25 s 1 0.05 0.35 color #f09 } box
}

rule ball {
{ s 1.75 y 0.5 sat 1 color #f60 } sphere
}[/pre][/align]
```

Generates one of these models.

If you look at the script, you'll see that each model is made out of many cubes and some spheres. The bottom left one is 7756 cubes = 7756x6 faces = 7756x6x2 triangles, which obviously isn't very game friendly (for a tree).

As Aircraftkiller pointed out, you can use MeshLab to optimize:
Toggle Spoiler
0/ Import your model into MeshLab* (Structure Synth can export obj and ML can import them)
1/ View->Show Layer Dialog to see the layers
2/ Filters->Point Set->Surface Reconstruction: Poisson. These settings worked quite well for me, but they will vary for different models. For an example: using the default will yield an ugly approximation. The result looks something like this.
3/ You can turn off a layer by clicking on the green eye icon next to its name in the layers window on the right. If you turn off your original model's layer, you should see that it didn't do very well with approximating the new model.
3a/ Right-click on the Poisson Mesh layer and delete it and start over with trying different settings OR
3b/ Filters->Cleaning and Repairing->Remove Isolated pieces (with Diameter). It pretty much does what the title says, but the dialog box explains it better . The default settings worked ok with that model (except for the circled bit), but for the purpose of this post it will have to do.
4/ With your Poisson Layer selected Filters->Remeshing, Simplification and Reconstruction->Quadric Edge Collapse Decimation. See Aircraftkiller's post about this.
Don't go nuts with the Target Number of Faces. If you dig around other filters, you can lower the amount of faces to 500 or lower without getting too much ugliness (look up Iso Parametrization + Watertight mesh + How to make a mesh watertight), but generally 10000 didn't crash ML for that model so I just stuck with it.
5/ In some cases you might get a pretty "fat" mesh from the Poisson filter. Filters->Sampling->Vertex Attribute Transfer should take care of that. Tick Geometry and normal. Quality has gotten me some weird results from time to time, so it's up to you. Source mesh should be the original mesh layer, and Target Mesh should be you Poisson mesh layer.

With enough experimentation you can lower the polycount enough to have a bunch of those in your game without your PC having a heart attack over crazy polycounts.

*MeshLab can generate structure synth objects as well. Filters->Create New Mesh Layer->Structure Synth Mesh Creation and just paste your script in the grammar box.
Link: http://structuresynth.sourceforge.net/

Structure Synth's 2D Version: http://www.contextfreeart.org/

And on the topic of terrain, you can try the Filters->Create new Mesh layer->Fractal Terrain filter on for size
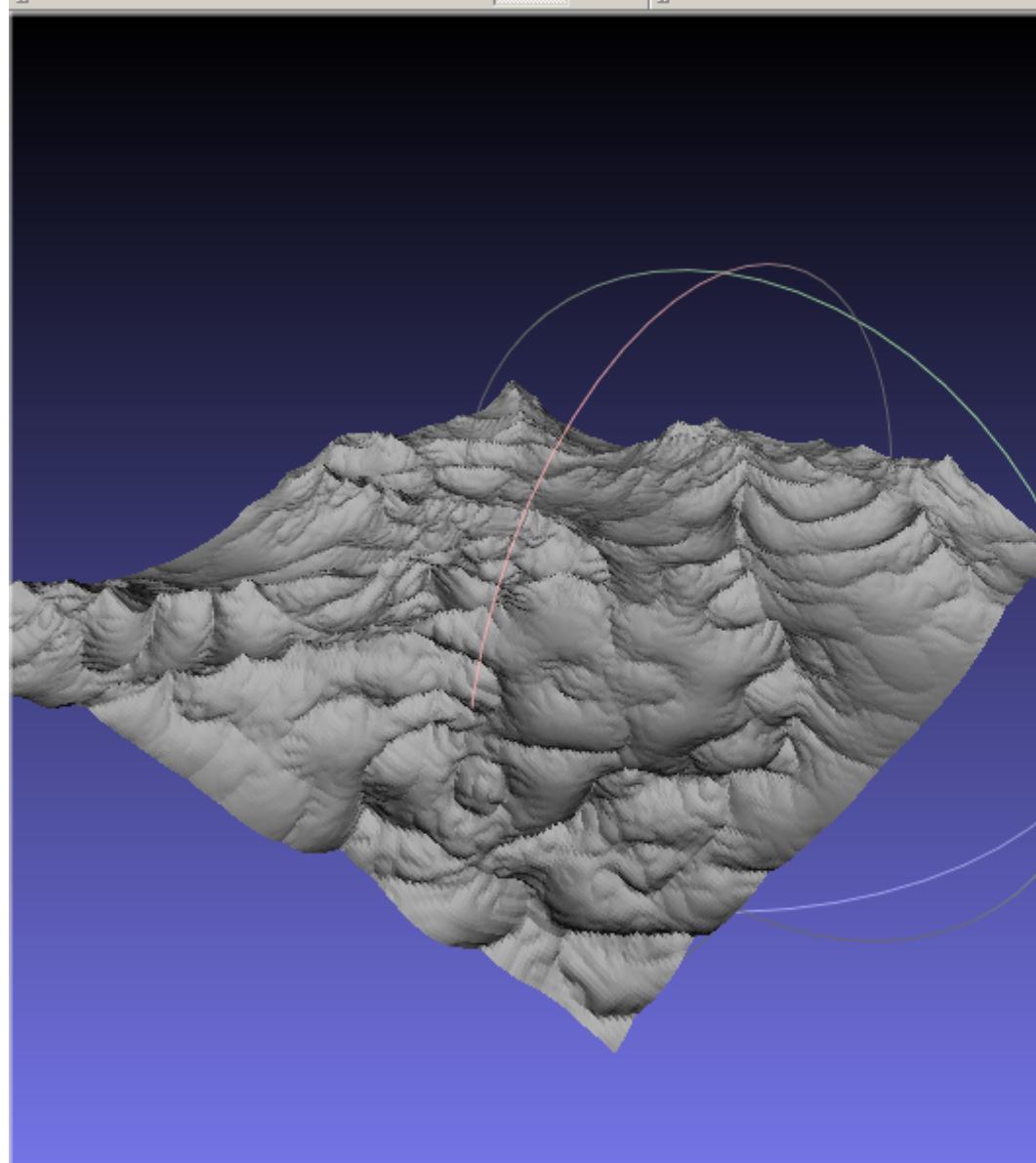
## File Attachments

1) fbm.png, downloaded 457 times

**MeshLab v1.3.2 - [Project_1]**

File   Edit   Filters   Render   View   Windows   Tools   Help

**Fractal Terrain**

Generates a fractal terrain perturbat...
Some good parameter values to star...

| - | Seed | Octave |
|---|------|--------|
| fBM | 1 | 10 |
| Standard multifractal | 1 | 8 |
| Heterogeneous multifractal | 1 | 8 |
| Hybrid multifractal | 1 | 8 |
| Ridged multifractal | 2 | 8 |

Detailed algorithms descriptions can
Ebert, D.S., Musgrave, F.K., Peachey,
**Texturing and Modeling: A Proce**
Morgan Kaufmann Publishers Inc., Sa

| | |
|---|---|
| Subdivision steps: | 8 |
| Max height: | |
| Scale factor: | |
| Seed: | 2 |
| Algorithm | Ridged multifra |
| Octaves: | |
| Lacunarity: | 4 |
| Fractal increment: | 0.5 |
| Offset: | 0.9 |
| Gain: | 2.5 |

☐ Save as vertex quality

Default

Close

FOV: 60
FPS:  119.0

Current Mesh: Fractal Terrain(
Vertices: 66049 (462343)
Faces: 131072 (917504)