3D Scans for Low Poly Statues

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https://learn.adafruit.com/low-poly-3d-scans-for-3d-printing

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Overview

In this project, we are scanning statues to 3d print low poly miniatures!

You can 3D scan statues from museums, art galleries or historic sites to make custom keepsakes.

Use them as a base for custom models like planters or book ends. This is also great for accessibility!

With an Adafruit Qt Py and a NeoPixel Stick (), you can make them glow to make a custom lamp ().

To diffuse the LEDs, you can 3D print them with zero infill to make them hollow.
Using photogrammetry, we can generate detailed 3d scans and use a low polygon generator to make artistic renditions.

We had a lot of fun printing these and think it's a great way to experience works of art when you aren't physically able to travel. It's also great for archiving!

Being able to touch and feel objects that are protected from the public is a great use of this technique!

Parts

1 x Polycam
Polycam photogrammetry Mobile App (App Store, Google Play, Web)  
https://poly.cam/

1 x 3D Low Poly Generator
3D Low Poly Generator by Andrew Sink (web app)  
https://www.lowpoly3d.xyz

1 x Blender
Open source 3D computer graphics software  
https://www.blender.org
NinjaFlex - 1.75mm Diameter - Semitranslucent White - 0.50 Kg
Looking beyond ABS? Tired of PLA? Open a world of possibilities, limited only by your imagination. NinjaFlex, a cutting-edge filament for 3D printers, is a specially formulated...
https://www.adafruit.com/product/2445

Adafruit QT Py RP2040
What a cutie pie! Or is it... a QT Py? This diminutive dev board comes with one of our new favorite chip, the RP2040. It's been made famous in the new
https://www.adafruit.com/product/4900

Adafruit Lilon or LiPoly Charger BFF Add-On for QT Py
Is your QT Py all alone, lacking a friend to travel the wide world with? When you were a kid you may have learned...
https://www.adafruit.com/product/5397

NeoPixel Stick - 8 x 5050 RGB LED with Integrated Drivers
Make your own little LED strip arrangement with this stick of NeoPixel LEDs. We crammed 8 of the tiny 5050 (5mm x 5mm) smart RGB LEDs onto a PCB with mounting holes and a chainable...
https://www.adafruit.com/product/1426
Lithium Ion Polymer Battery - 3.7v 500mAh

Lithium-ion polymer (also known as 'lipo' or 'lipoly') batteries are thin, light, and powerful. The output ranges from 4.2V when completely charged to 3.7V. This...

https://www.adafruit.com/product/1578
3D Scan

You can import pictures or use the camera on your mobile to create the face geometry.

Use the Polycam app in photo mode to automatically snap pictures of all angles of your face or upload pictures taken from your library.

Take at least 50 pictures of all sides of the statue. Include the tops and underneath the statue to ensure geometry is created for the whole object.

Even with differences in lighting, distance and people walking in front of the statue, you can get a pretty decent scan.

After polycam processes the pictures, you can export an obj file to clean and modify.
Clean 3D Scan

To isolate the statue, you'll want to clean up the model for 3D printing.

We imported the file into Blender and removed the unwanted geometry.

We'll start by adding a box around the part we'd like to remove.

Next, we'll add a boolean modifier and use the box to isolate the statue.

Switch to Edit mode to select any left over faces and delete.
Delete Left over faces

Switch to Edit mode to select any left over faces and delete.

Enter object mode, select the object and frame selected to verify all the extra faces are deleted.

From here the model is ready to print or it can made into a low polygon version.

Create Low Polygon Model

To generate a low polygon model we used Andrew Sinks Low Poly Generator that you can find on lowpoly3d.xyz.

Here you can easily disseminate the model to get a cool looking low-res statue!

Next will export our model and then reimport into Blender to fix any overlapping faces or overhangs.
Fixing geometry

Inside Blender, we can delete extra faces and fill in any holes generated during the low poly process. Then, use the fill face command to rebuild the geometry.

Fixing overhangs

To fix any extreme overhangs, we can pull faces by going into the sculpt mode. We used the Elastic Deform tool to help pull faces so they are at a 45 degrees angle. This will help cut down on the amount of support material.
3D Printing

Setting up model

Orient STL files for 3D printing for FDM style machines. Parts are designed to 3D print with support material. You can also split models into pieces and glue together.

To diffuse the LEDs, you can 3D print them with zero infill to make them hollow.

Slicing Parts
Slice with setting for PLA material.

The parts were sliced using CURA using the slice settings below.

PLA filament 220c extruder
0.1 layer height
10% gyroid infill
60mm/s print speed
60c heated bed