
Photogrammetry

Photogrammetry is the process of measuring or creating 3D objects from photographs

Ideal Objects

The ideal object for photogrammetry capture isn't shiny and has lots of detail.

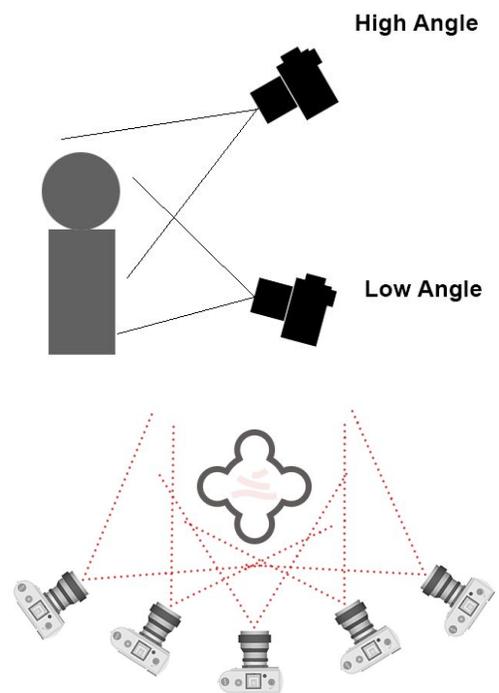
Before you start

Set your camera to JPEG. Shoot in manual mode and set your exposure. On a smartphone lock your exposure. The images need to have an even brightness. Avoid shooting in bright daylight or with lights or a flash that cast strong shadows

Capture Process

Photogrammetry works by comparing pictures of an object to each other.

1. Start by taking a set of photos from a high angle of the object and moving in a ring around it, about one step for each shot.
2. Once you have gone completely around the object, shoot a second set from a low angle or straight on depending on the object.
3. You can trick the software by putting a smaller object on a turntable or lazy susan and putting your camera on a tripod. Then turn the object instead of moving the camera.



Extra Detail

If you have an object with a lot of surface detail, make additional passes around the object capturing just the details. For example if you are capturing a statue, you may want to get additional photographs of the face and head.

Transfer the photos to your computer and save them in a folder with the object's name

Making a 3D model

Each of the Workflow steps takes some time from a few minutes to a half an hour depending on your computer and the size of the object.

Step 1: Open Agisoft Metashape and import your photos by dragging them to Chunk 1 or right clicking Chunk 1 and selecting Add → Add Photos

Step 2: For the best results move your high and low angle passes into separate groups by right clicking Cameras → Add Camera Group. Select the first image of the pass and Shift + Click the last image of the pass then drag them all to the new group. Repeat for each group. (optional)

Step 3: From the top menu select Workflow → Align Cameras. Set Accuracy to High and click OK

Step 4: Select Workflow → Build Dense Point Cloud. Set Quality to High and click OK

Step 5: Select Workflow → Build Mesh. Set Quality and Face Count to Medium and click OK

Step 6: Select Workflow → Build Texture. Leave the settings at default and click OK

Step 7: Select File → Export → Export Model. Select the destination folder for your model and name it then click Save. Check Export texture and select JPEG and click OK

Success!

You now have a 3D model that you can upload to Sketchfab.com or use in a 3D program like Blender. You can even export it as an STL file for 3D printing.

Resources

Agisoft Metashape - cross platform, 30-day trial version

<https://www.agisoft.com/downloads/installer/>

Alice Vision Meshroom - free, only works on Windows with an Nvidia GPU

<https://alicevision.github.io/>

3DF Zephyr Free - free, only works on Windows, limited to 50 images per object

<https://www.3dflow.net/3df-zephyr-free/>

3DF Zephyr Academy - many videos on photogrammetry

<https://www.3dflow.net/technology/documents/3df-zephyr-tutorials/>

Blender.org - open source 3D modelling application

SketchFab.com - online repository of 3D models and photogrammetry scans