

3D MODEL FROM PHOTOS TUTORIAL

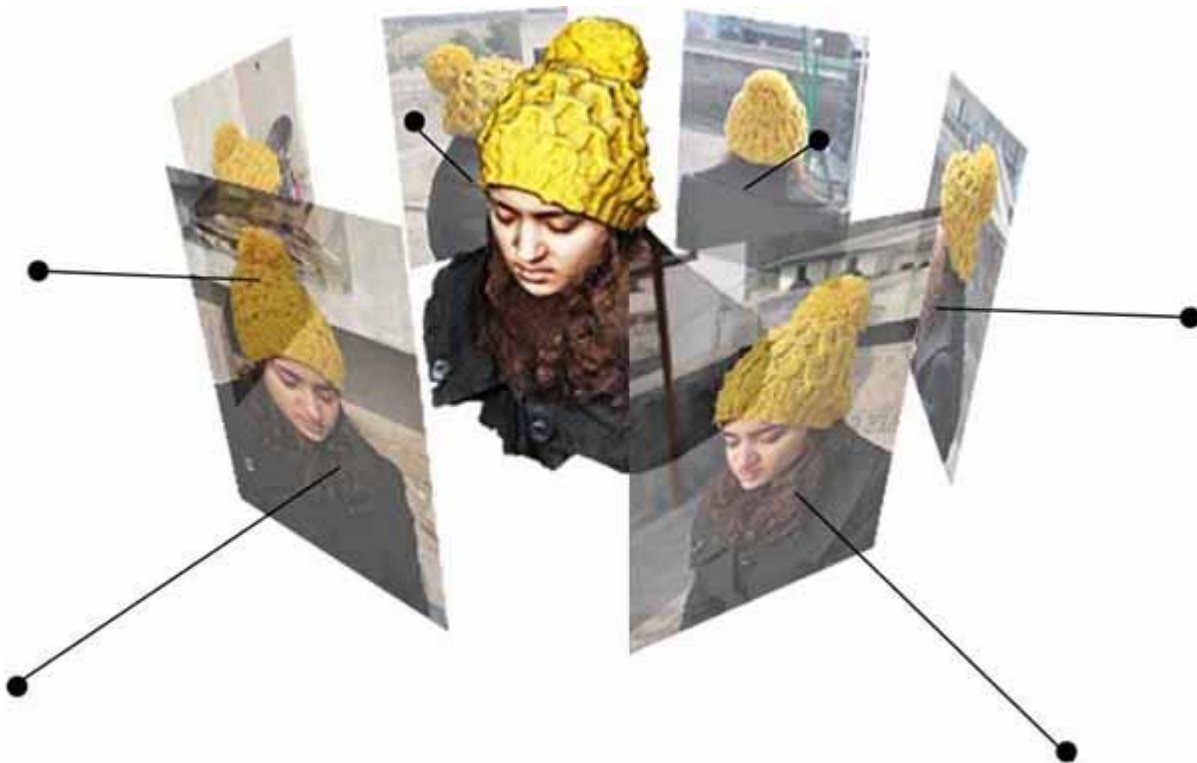
Photogrammetry is process of turning a series of images into a 3D model.

A 3D model is a model with three dimensions. You can walk around and see it from all sides, it is allowing you to see the item entirely.

Photogrammetry works by looking at photos of an object taken from two or more places. Uses different perspectives from these images, to calculate the coordinates of points on the subject.

The more photos of your subject taken from different locations, the more accurate the calculation (triangulation) process will be. The result is the coordinates of points plotted in 3D space, which is exactly what you need to create a 3D model.

The input to photogrammetry is photographs, and the output can be a map, a drawing, a measurement, or a 3D model of some real-world object or scene.



1. Equipment

- You can use any camera for this, a smartphone camera will work just fine

2. Location

- First scout the locations. Exit with the camera. Find the object and take a few reference shots.
- Find out :
 - o Can you expose the subject easily?
 - o Are there objects in-between you and your subject?
 - o Can you walk around the subject 360°?

3. Object

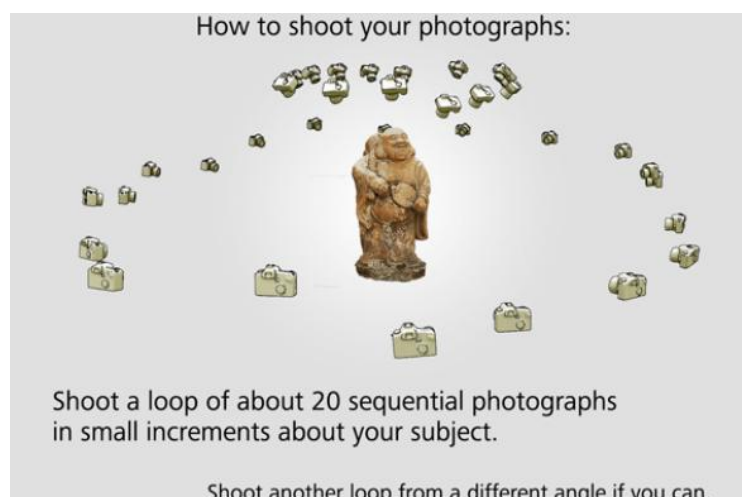
- **Statues are perfect for photogrammetry.** Their surface is rough, unable to cast any reflections. There are lots of details and features to be tracked by the software, , just grab your camera and start taking pictures.

4. Capturing the object

- The first step is to capture your object by taking pictures of it. These images will serve as the foundation for the rest of your project and will later become a 3D model.
- You can do this step either with a digital camera or your mobile phone.
- You'll want to capture **at least 20 pictures**. It is often necessary to take 50-80 pictures in order to record every detail.
- Keep in mind, that some pictures might get discarded if the program doesn't find enough similarities with other pictures.

5. Photographing

- In order to make a 3D print based on photos, you first need to get the right images.
- Move around the target object in circles.
- Do not move the object or its surroundings between pictures.



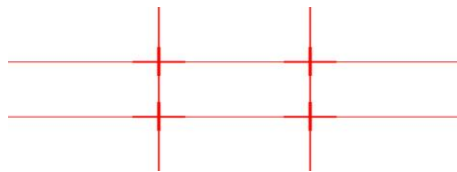


6. Overlap

- we need an overlap of around 80%. Each new image we shoot needs to show 20% more of the scene than the last image.
- **This is why we are going to shoot IN PORTRAIT ORIENTATION.**
- This allows us to get the height of the subject in its entirety.

7. Composition

- The object should make a significant portion of each image.
- **The rule of thirds** is dividing your frame into nine equal rectangles.



- You can do this by creating two vertical and two horizontal lines. The four lines will **intersect at four points**.
- **These are the points where your point of interests should be.** *You can do this mentally or you can also change the setting on your camera. Most digital cameras have an option to add the rule of thirds grid onto the screen.*

8. Composition

- You should **always have a reference point on the object** to orient your shots. This shows the benefit of choosing the right subjects (statues) for shooting.
- While photographing a statue of a human, the head of the statue can be used as a good reference point.

9. Shooting

- **Start directly in front of the statue.** The reason for this is to ensure the square base provide you with a flat reference point.
- You should **always have a reference point** on the object to orient your shots.
- Again, this shows the benefit of choosing the statue for shooting.
- The head of the statue should be kept above the upper line of the bars, as a rule of the third, in all three pictures.
- Keep your position constant and record the same reference point each time the camera is moved.
- **The distance from the object should be the same at all times.**
- For each new shot, you should move about one meter (one average step).



- **The camera should be in the same position during recording**
- If you can't see the whole object in one shot (because you're too close), first make a whole circle around the object by photographing it. Then raise the camera to a higher height and repeat the shooting process in a circle. It would also be good to take a few shots around the top of the object.

10. Avoid:

- **Shadow**
 - If possible, wait for a cloud to block the sun, so that there are no hard shadows.
 - When it came to the shoot, you need an overcast day. This ensures that the light is not harsh, and falls evenly on the subject.
 - Also, chose the statue as you wanted to stay clear of reflective or shiny surfaces.
 - If you do have to shoot on a bright day, go for the morning or evening. This will mean the sun isn't directly above the subject.
- **Moving targets**
 - Try to avoid having moving targets in your picture (e.g. pets, unless they are sleeping).
 - If there are people walking by, let them pass and in the meantime take pictures from the directions where people are not visible.
- **Glossy targets**
 - the glossy surface changes in appearance and reflects surrounding light sources. This results in barely any points being reconstructed on this surface. This will ultimately lead to **incorrect mesh shape**.
 - **Glass – transparent surfaces**

11. Do not forget:

- **record a trip** to your object (walk around, bus, train), research and site selection
- **note the location** of the object
- **make a selfie** with the shooting object
- **make a short video** about your colleagues while taking photos
- **share recorded material** with other colleagues in your group via WhatsApp or Viber group or other



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12.Reconstructing

- We suggest creating a folder that will hold all the files for a single reconstruction.
- Inside that folder create another folder called “Photos” and place all your pictures here.
- Quickly go through the photos and delete any blurry ones.

Let’s create a 3d model from photos!

- Upload your images:
- Croatia: <https://bit.ly/3b04hPh>
- Cyprus: <https://bit.ly/2SoaoXI>
-
- Greese: <https://bit.ly/2PlxHKj>
-
- Poland: <https://bit.ly/3xQUSDJ>
-
- Portugal: <https://bit.ly/33a4qeF>
-
- Spain: <https://bit.ly/3vE3ZWo>