

How does 3D street painting work?

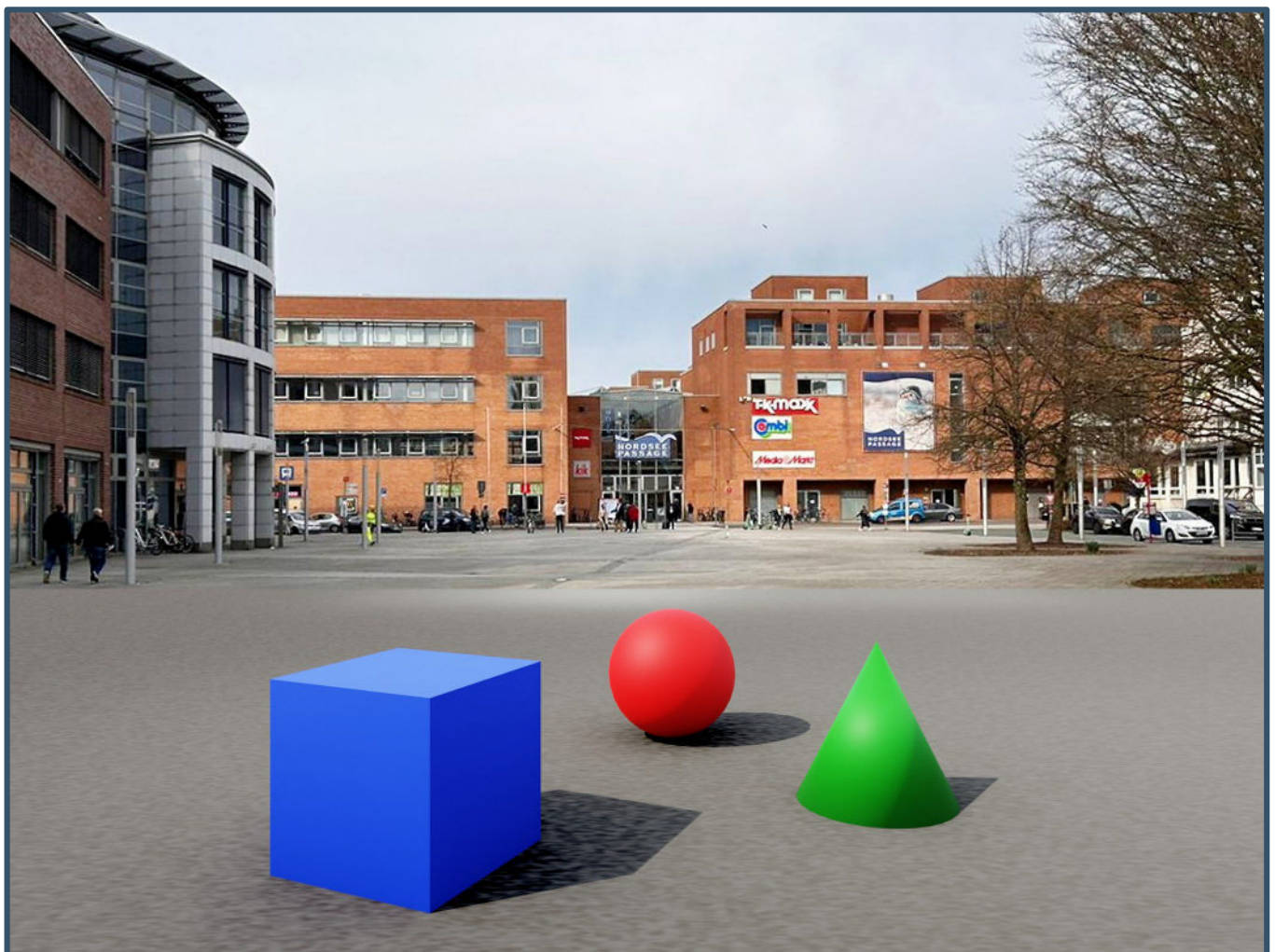
Instructions Part I

Do you have a template, a motif that you would like to paint on the floor in 3D? How does it work? How can I transfer an image to the floor in 3D?

This is the first part of my instructions, where I first go into the camera or the smartphone and its position. Later, our image should look three-dimensional on a photo. This will only work if you understand right from the start why the correct position of the camera is so important.

The position and tilt of the camera is always important!

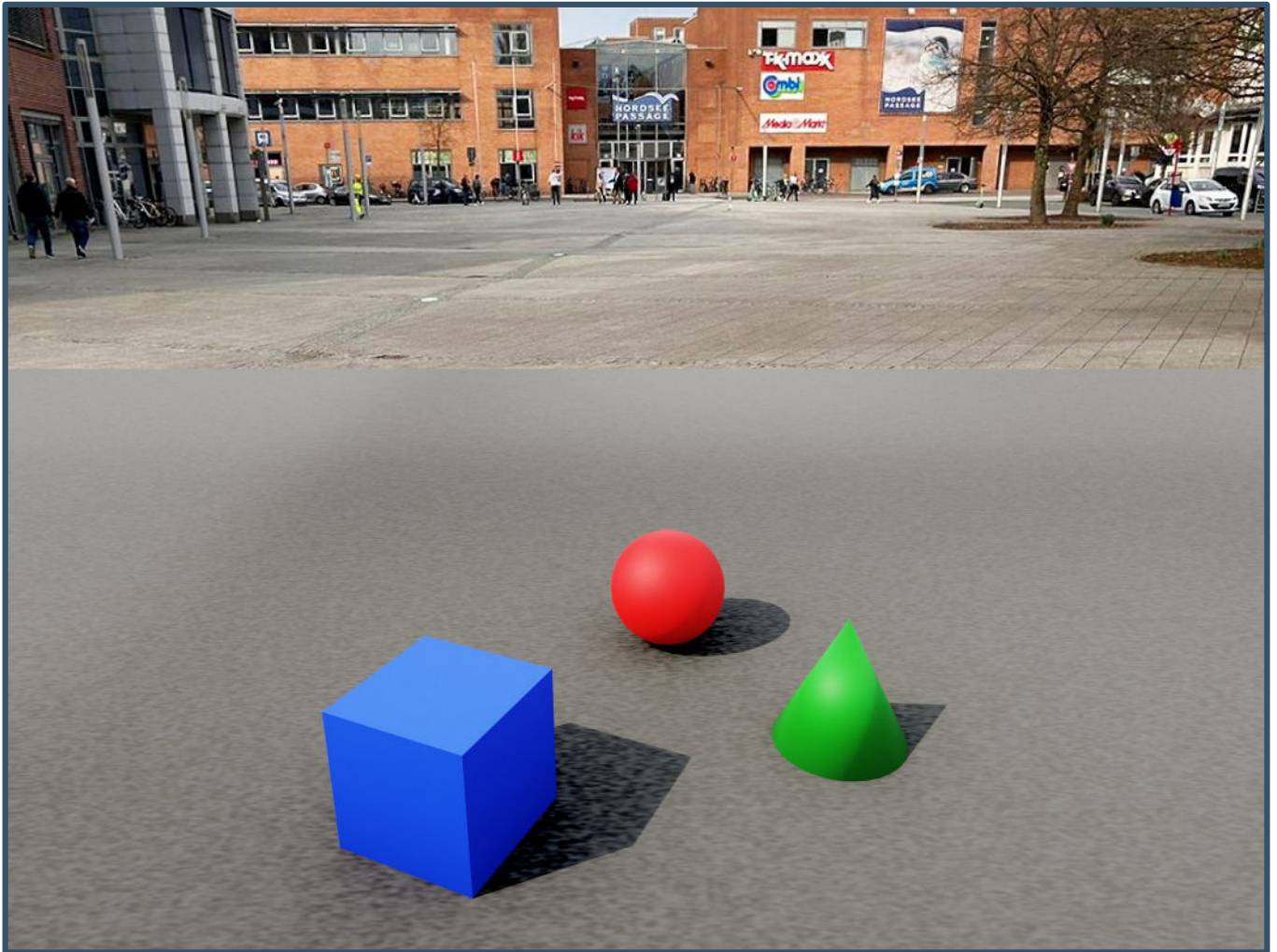
This is the first important point that you need to notice and understand. If you want to draw a cube, a sphere or a cone like in this example, you want the objects to look like they are standing on the ground. So like in real life. Here are the three objects as they appear from a camera's point of view when the camera is held three feet off the ground and very straight. The distance from the camera to the image is two meters, which is a good distance for almost all 3D street images.



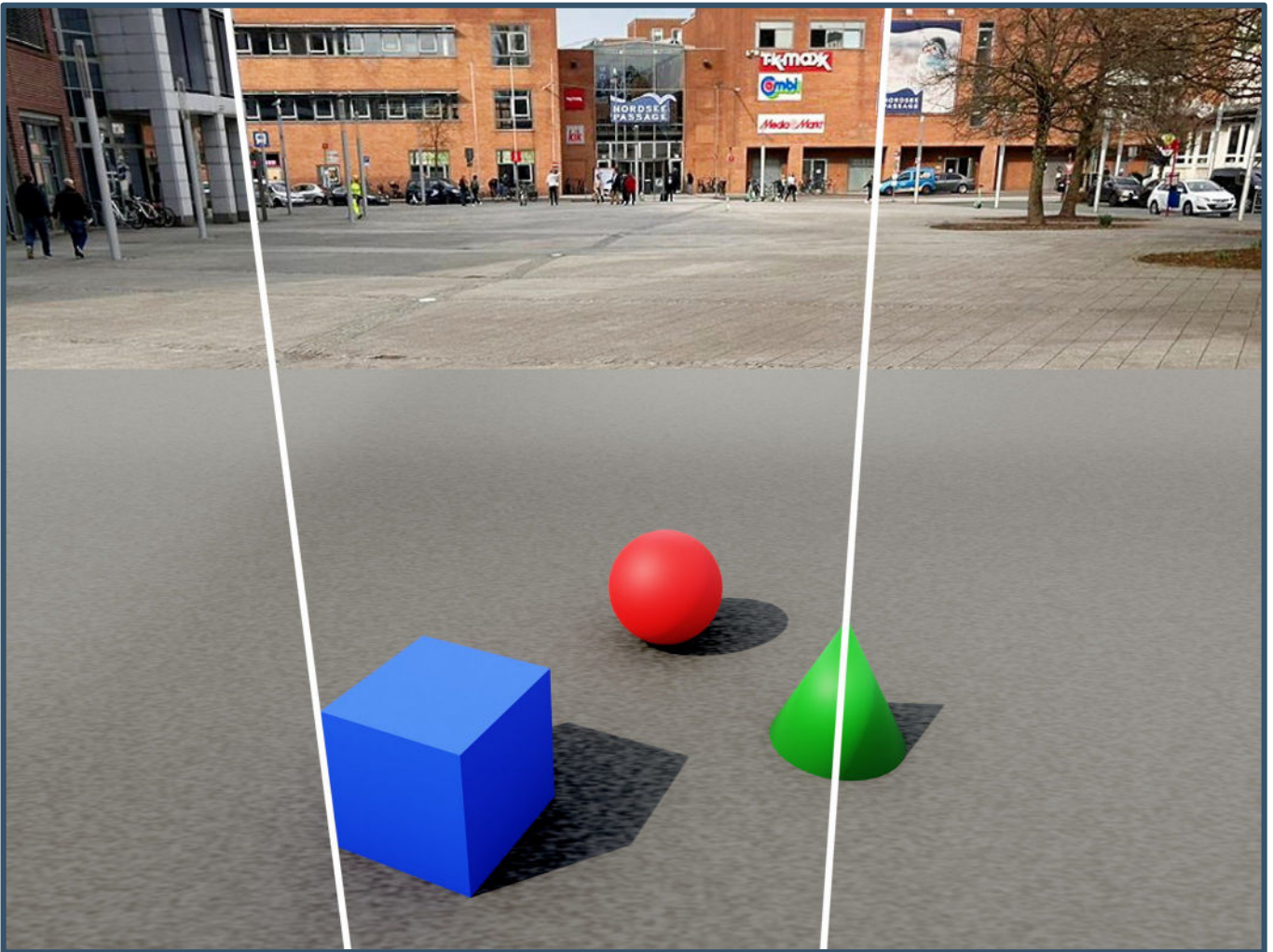
You can see here very clearly, especially with the cube, that the objects are not distorted or tilted. The vertical edges of the cube are also vertical, or straight. That's because we're holding the camera at ninety degrees relative to the ground, which is level. Even the edges of the houses are straight.

You can easily check this by taking photos of buildings with your smartphone. If you hold the camera very straight, the edges of the houses will also be straight. If you tilt the camera forward a little, you can see in the photo how the edges of the houses diverge more and more upwards, or converge more and more downwards, the further you tilt the camera forward. Try this. Then you have already understood a very important point of the laws of perspective.

In the image below you can clearly see what happens when the camera is tilted. The edges of the houses are not straight. Our three test objects are not straight either, or you can see with the cube that the edges that are actually vertical do not run vertically downwards. You can see this by comparing the edges to the border of the image.



On the next picture I have drawn two auxiliary lines that show what I mean by "tilting". This applies to all verticals in the image. The street lights in the top right of the picture or the billboard on the right building are also distorted. That's the crucial difference between a camera that you hold completely vertically and one that is tilted.



If you want to photograph something to later paint it on the ground in 3D, pay attention to the angle of the camera. This must be the same as later when photographing. A good standard is 80 degrees to the ground, ie tilted 10 degrees forward.

Why it's best to use a tripod

If you're holding your phone straight up, you're at ninety degrees from the ground, or zero degrees in camera tilt. In order to be able to determine exactly what the tilt angle of your camera is, you have to be able to measure it somehow. Estimating is also possible, but only with a little experience and practice. So you should use a tripod to mount your camera or smartphone on.

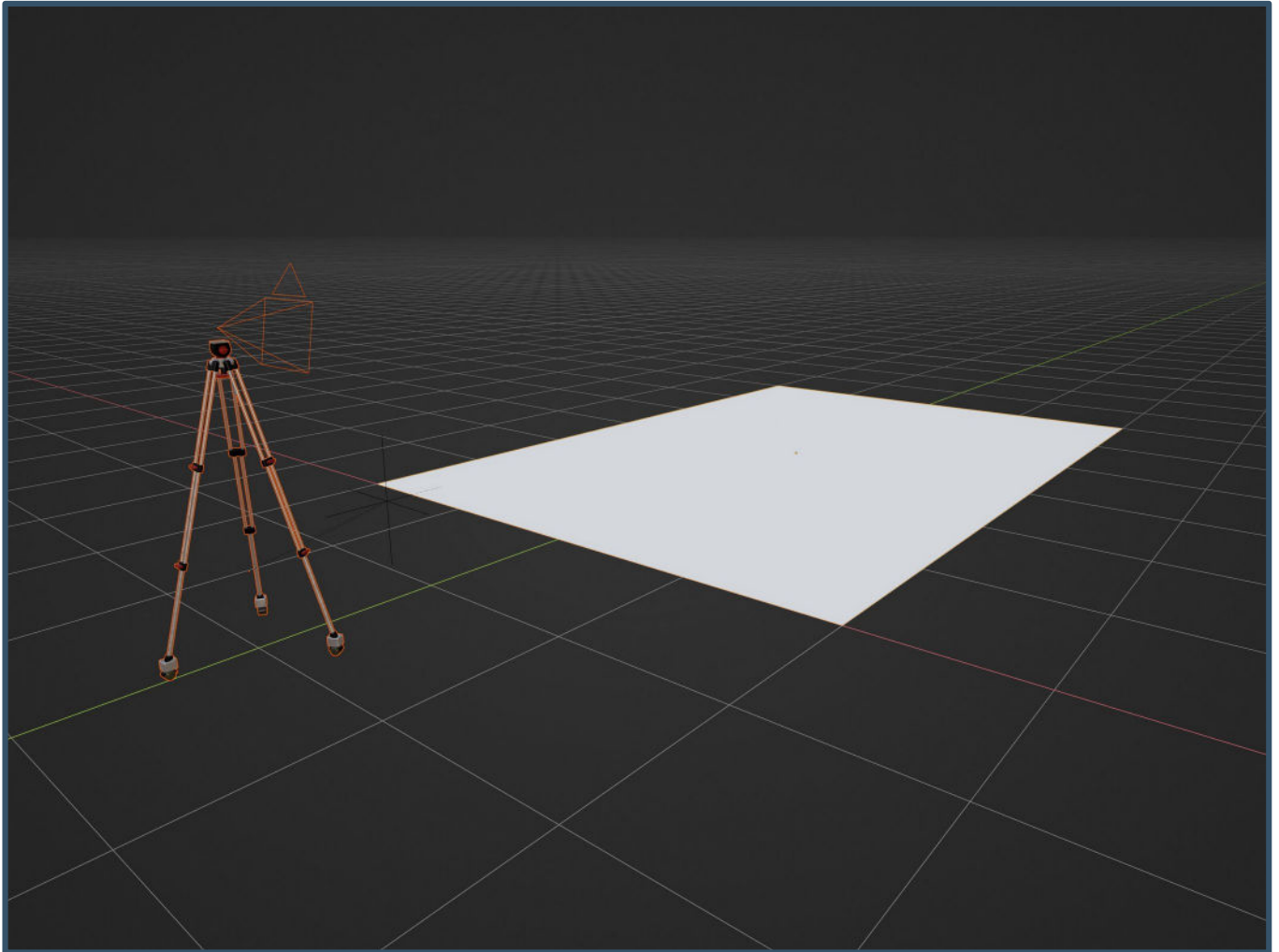
There are tripods with a tilt head where you can read the angle. If you only have a normal tripod where you cannot tilt the tripod head, you have to tilt the tripod yourself. You can then measure the angle on your smartphone using a corresponding app. With my iPhone this works well with a clinometer. You need to search an app with the keyword "inclinometer".

You can also attach a simple smartphone holder to the tripod and use it to adjust the angle. You can also measure the angle with a set square from the stationery department.

It is important that the camera or smartphone is mounted exactly in the middle of the tripod. This is automatically the case with a DSLR with a standard mount. If you use a cell phone holder, you should align it so that the cell phone sits exactly over the center of the tripod.



I generally recommend using a tripod. It is better if the camera is in a fixed point while painting. This way you can quickly check on a photo whether you are doing everything correctly.



We have already taken an important step in the right direction. The tripod stands at a fixed point, at a height of 1.3 meters and at a distance of 2 meters in the middle of the picture or the area where the picture is to be painted. Above you can see this area in white. The grid on the floor is divided into 1x1 meter squares. As you can see, the measurements are correct.

In the next part of the 3D street painting guide, you will learn how to transfer an image onto the ground so that it appears in 3D from the camera's point of view. At the moment there is only a white area. We will change that soon.

What methods are there to create a 3D image from a template?

The easiest method is to use a [beamer or projector](#). However, if you want to learn how the technique of 3D street painting works, I advise you to use [the raster method](#) at least in the beginning. This will give you a better understanding of the perspective laws of linear anamorphosis, which is what the technique is actually called.

There are now projectors that are small and even run on batteries. However, a projector must always be used in the dark, otherwise you cannot see the projected image on the floor. The daylight outshines the light from the projector. This is a decisive disadvantage compared to the grid method. This works anytime and anywhere because it does not require electricity or technical aids.

In addition, if you have some experience with the grid method, you can later very easily transfer individual parts of the picture to the floor. It is often not necessary to rasterize the entire motif. Much can also be predicted in this way. At some point, after a long practice, you will have a grid in your head and you can do without it.