

Predict object's unseen part using one view image

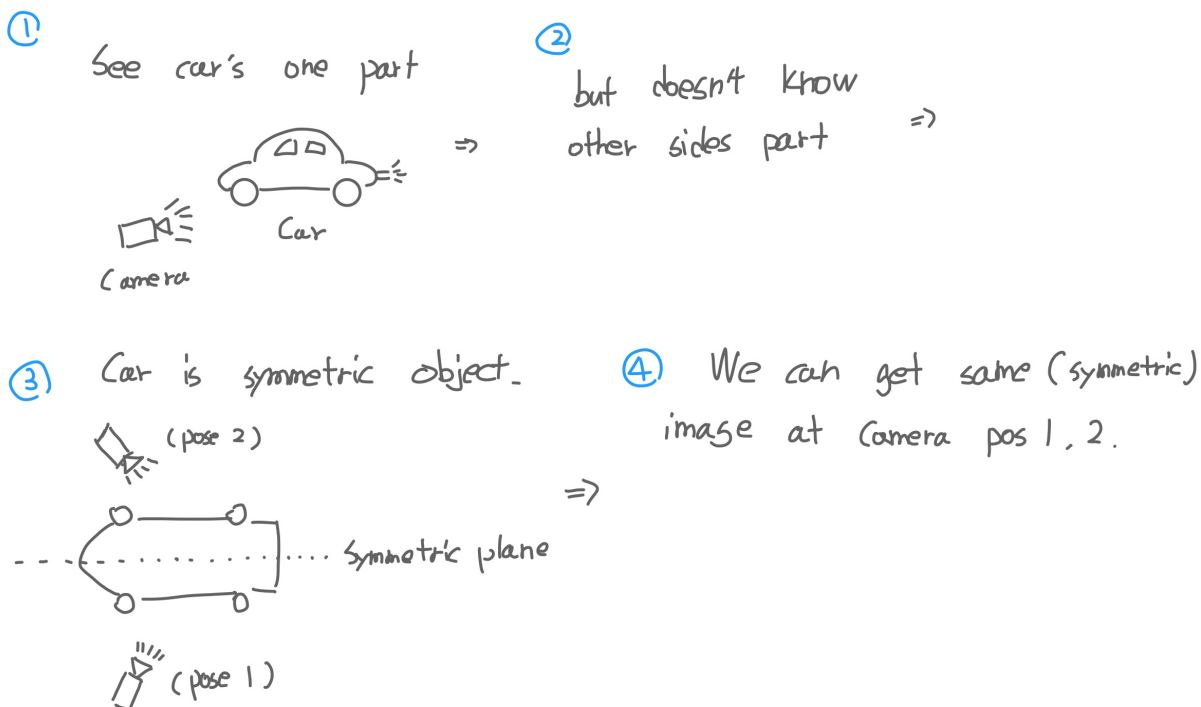
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Background

Technologies such as Nerf, which predict three-dimensional space with input images, perform poorly in unseen areas when input images are limited. For example, it is difficult to predict a back or the teapot shape when we have only in front of teapot image. In situations that has limited information about an object, we plan to find out the symmetrical plane of objects to obtain unseen part. If we know the symmetrical plane of the object and the camera position, then we can symmetrical the camera position with respect to the symmetrical plane. We can think of images before and after symmetricalizing the position of the camera are also symmetrical. Through this method, we can obtain information about the object's unseen part.

- In order to guarantee the unseen part obtained by this method, we assume that the object is symmetrical, so we will first test on a simple object like teapot, car, chair, desk.
- Knowing the symmetrical plane of the object and the camera position, an image in a view symmetrical to the camera position can be obtained.



Goals

The purpose of this project is to find the best symmetric plane when an object (or image) given. Using symmetric plane and camera position, obtaining information on the invisible part of the object.

Approach & Test

1. Approach : First, given the information on a 3D object, a method of finding the optimal symmetric plane using the ransac method will be used. (We will also try other methods too.) (If possible, we plan to try to find a symmetric plane using Deep Learning. We think we will use pytorch framework.)
2. Test : Compare with how similar the image obtained by finding symmetric plane then symmetrical the position of the camera and actual ground truth. we will find how compare ground truth and getted image. (Binary cross entropy, and so on)

Environment

- Python
- OpenGL