

# 6DAPose Dataset

6DAPose presents two synthetic image datasets for 6D object assembly pose estimation in robotic assembling tasks. The dataset contains 431 RGB and depth images, ground-truth object and camera pose for each assembly step and model information in BOP format. The datasets are generated by a hemisphere view sampling technique using mesh files in gazebo simulation environment. The code and instructions in GitHub : <https://github.com/KulunuoS/6DAPose>.

## Dataset






Mesh model					
Mesh name	Bottom casing	Left gear	Right gear	Top casing	Complete assembly
Diameter [cm]	3.81	2.78	2.78	3.82	

Figure 1: Fidget gear assembly <https://www.thingiverse.com/thing:3936460>

Mesh model						
Mesh name	Nema17 Motor	Sun gear	Housing	Carrier	Cover	Complete assembly
Diameter [cm]	7.67	2.70	6.17	3.56	5.38	

Figure 2: Nema17 reducer assembly <https://www.thingiverse.com/thing:8460>

## Method

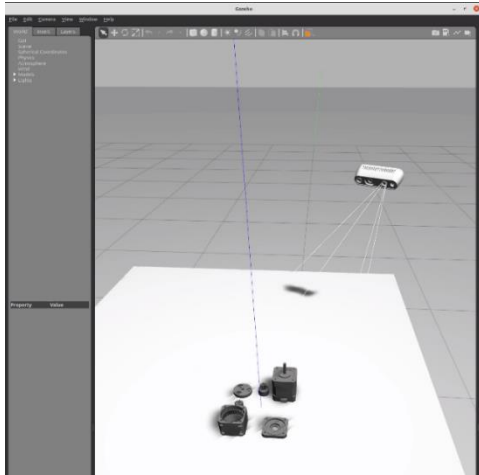


Figure 3: Gazebo simulation

### Algorithm : Assembly dataset generation

#### Parameters:

- $\phi$ : yaw angle of the camera
- $\theta$ : pitch angle of the camera
- $s$ : scale of the camera

**Input** : CAD models of object assembly

**Output** :  $I_{RGB}, I_D$ : color and depth images  
 $I_{SEG}$ : segmentation maps,  
 $P_{obj}$ : ground truth object poses,  
 $P_{cam}$ : ground truth camera pose,  
 $K_{cam}$ : ground truth camera parameters

Define and record assembly constrains

```

foreach Assembly step do
  foreach  $\phi, \theta, s$  do
    | Record  $\{I_{RGB}, I_D, I_s, P_{obj}, P_{cam}, K_{cam}\}$ 
  end
end
  
```

Figure 4: Hemisphere sampling algorithm

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