Py3D Engine Documentation

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Getting started

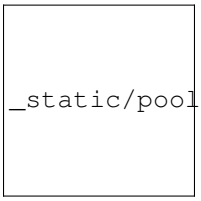
The application was developed to design 3D scenes for the the Python 3D Engine.

This application toguether with the Python 3D Engine can be used to help computer vision algorithms extract 3D information from 2D video.

CHAPTER 1

Functionalities

- Add and manipulate cameras properties in a 3D scene.
- Add 3D solids to a scene.
- Trace pixels rays from cameras and detect collisions with objects in the scene.
- View a 3D scene from a virtual camera prespective.
- Export the scene to a OBJ format file and open it in a external software.



CHAPTER 2

Developer

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2.1 Install & run

- Download & install Anaconda or Miniconda.
- Download and uncompress the py3dsceneeditor repository.
- Open the terminal and go to the previous uncompressed directory.
- Execute in the terminal the next command to install the Anaconda/Miniconda environment.

```
conda env create -f environment-ubuntu17.yml
```

- Activate the environment by executing the command:

```
source activate py3dengine-environment
```

- Execute in the terminal the next command to update the code:

```
python install.py
```

2.2 My first 3D scene

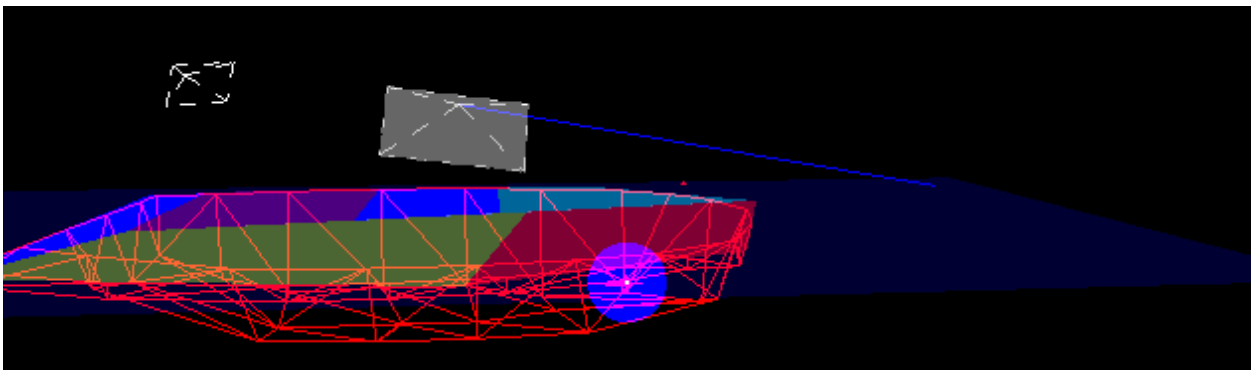
Download the example: material file, object file

```
from py3dengine.utils.WavefrontOBJFormat.WavefrontOBJReader import WavefrontOBJReader
from py3dengine.scenes.GLScene import GLScene
from py3dengine.bin.RunScene import RunScene


w = WavefrontOBJReader('DolphinScene.obj')

scene = GLScene()
scene.objects = w.objects
scene.cameras = w.cameras

camera = scene.getCamera('Camera1')

ray     = camera.addRay( 100, 100 )
collision = ray.collidePlanZ(0);

print('Point of collision with the Z plain', collision)

floor   = scene.getObject('Floor')
collision = ray.collide([floor])

print('Point of collision with object Foor,', collision)

run = RunScene(scene)
run.startScene()
```

Stdout output

```
Collision with the Z plain (-15.97673643616865, -18.90785099921925, 0.0)
Collision with object Foor, (29.07119617403152, (-15.97673643616865, -18.
↪90785099921925, 0.0), <py3dengine.objects.RectangleObject.RectangleObject object at␣
↪0x7f1198e7cac8>)
```

Output scene window



2.3 py3dengine.bin

2.3.1 RunScene

2.3.2 RunSceneFile

2.4 py3dengine.cameras

2.4.1 BaseCamera

2.4.2 Camera

2.4.3 ClientCamera

2.4.4 PhysicsFromCamera

2.4.5 Ray

2.4.6 VirtualCamera

2.4.7 WavefrontOBJCamera

2.5 py3dengine.objects

2.5.1 SceneObject

2.5.2 WavefrontObject

2.5.3 CubeObject

2.5.4 CylinderObject

2.5.5 EllipseObject

2.5.6 EllipsoidObject

2.5.7 PlaneObject

2.5.8 PointObject

2.5.9 RectangleObject

2.5.10 TriangleObject

2.6 py3dengine.scenes

2.6.1 Scene

2.6.2 GLScene

2.6.3 SceneClient