**Challenges:**

* Achieving Flat shading in matplotlib is not challenging, but the gouraud and phong shading technique has not been included in matplotlib.
* To achieve the Gouraud shading python is difficult.
* Although doing the shading and rendering is more easy and convenient in Matlab
* Although most MATLAB features are already in matplotlib, the surface shading with Phong and Gouraud is not one of them.
* To achieve this, I have learned we can incorporate 3d plotting and rendering using pythreejs,vtk, and mayavi.
* The vtk and pythreejs work more with images, so I tried doing it with mayavi
* I opted to do the assignment in mayavi since it has MATLAB, vtk. It can work with pySide pyQT GUI
* Installing Mayavi was one of the conundrum tasks.
* After so many tries, another challenge was to superimpose the plots because of the naming convention difference.

**Resources and References Link:**

* <https://www.youtube.com/watch?v=PMgjVJogIbc&t=139s&ab_channel=GuerrillaCG>
* <https://www.youtube.com/watch?v=PMgjVJogIbc&t=139s&ab_channel=GuerrillaCG>
* <https://www.youtube.com/watch?v=s-g3E3aAgEo&ab_channel=EuroSciPy>
* <https://www.youtube.com/watch?v=r6OD07Qq2mw&t=1133s&ab_channel=Enthought>
* <http://physicalmodelingwithpython.blogspot.com/2015/08/illuminating-surface-plots.html>
* <https://docs.enthought.com/mayavi/mayavi/auto/mlab_helper_functions.html>
* <http://docs.enthought.com/mayavi/mayavi/index.html>
* <https://docs.enthought.com/mayavi/mayavi/installation.html>
* <https://www.mathworks.com/matlabcentral/fileexchange/35240-matlab-plot-gallery-change-lighting-to-gouraud>
* <https://matplotlib.org/3.1.1/gallery/mplot3d/wire3d.html>
* Pypi.org
* <https://builtin.com/expert-contributors-software-engineering-perspectives/3d-rendering-using-threejs>
* <https://stackoverflow.com/questions/28232879/phong-shading-for-shiny-python-3d-surface-plots/31754643>
* <https://github.com/kuixu/kitti_object_vis/issues/22>
* https://github.com/enthought/mayavi/issues/952