Robot Autonomy Homework 1

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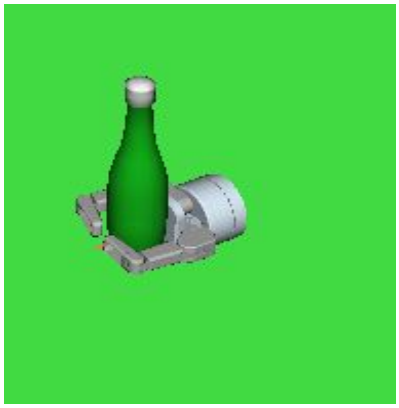
1) Top rated OpenRave grasp:



No, we do not think it will work in practice. The image does not look very reliable since there is some space between the robotic arm and the bottle. The bottle could easily slip out or potentially break if there is to much pressure. There is no information about what the object is made of, so the grasp could be miscalculated without this data being taken into account.

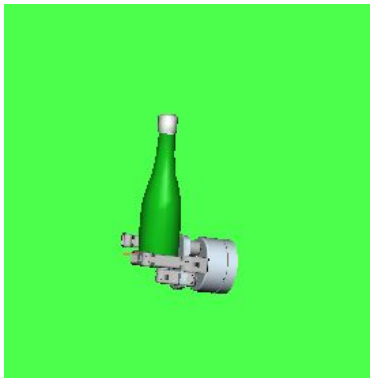
2) Our evaluation function for testing grasps involved getting the quality measures in two different ways and combining them into one quality measure. We used the minimum singular value of G and the volume of ellipsoid in wrench space in our function. We know that G cannot resist wrench as it gets closer to singular and therefore initially computed the minimum singular value of G and then the volume of the ellipsoid resulting from mapping an ellipsoid into the wrench space. We added these two values to get our quality measure. The larger the quality measure the more highly rated the grasps were. Images showing these are their noisy counterparts are shown below.

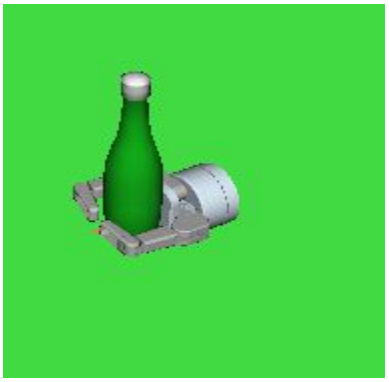
3) Code has implementation - we used gaussian noise and changed both the position and the orientation.

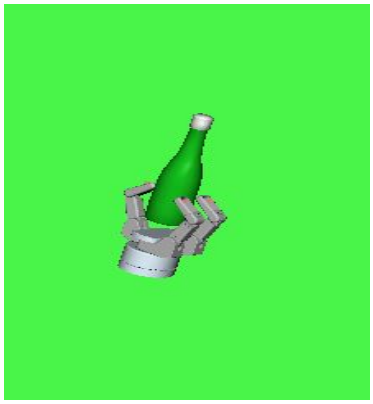
4) Adding the noise seemed to help on some objects more than others. The champagne model images with and without noise show a transition to much better grasp options. Both the wine glass and the mug don't seem as they will work very well in practice with their approach. It's possible our evaluation function is more well suited for the champagne bottle.

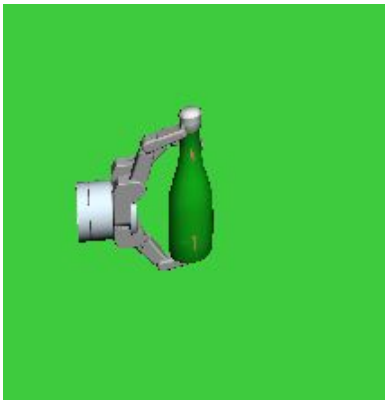
5) 10 hours

Images without noise - Champagne bottle (top 4)

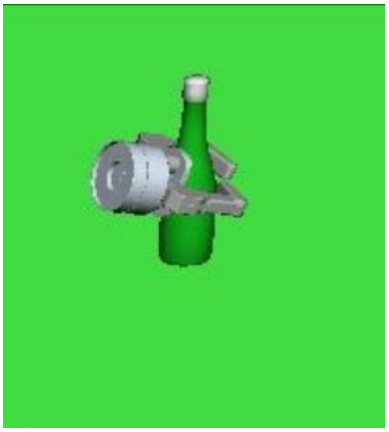


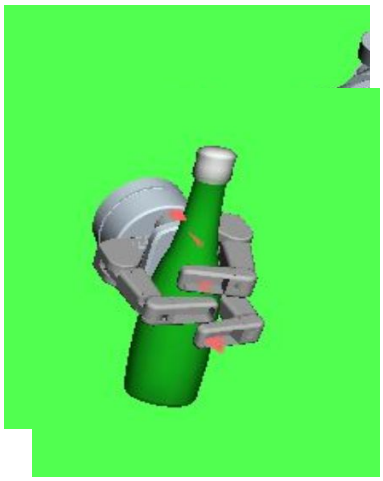


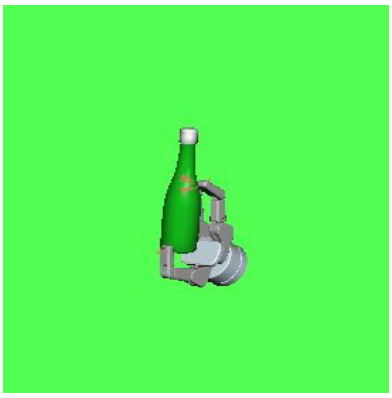




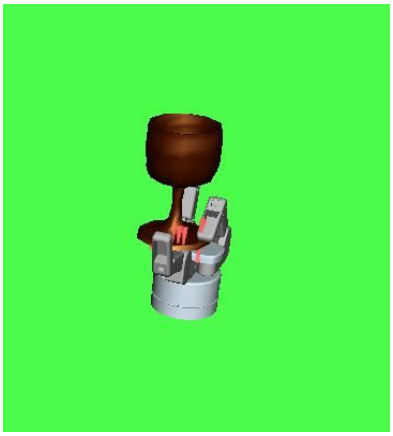
Images with noise (Top 4)

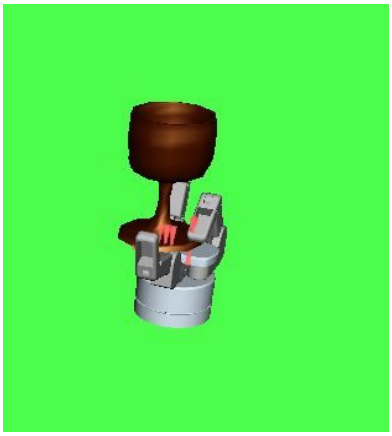


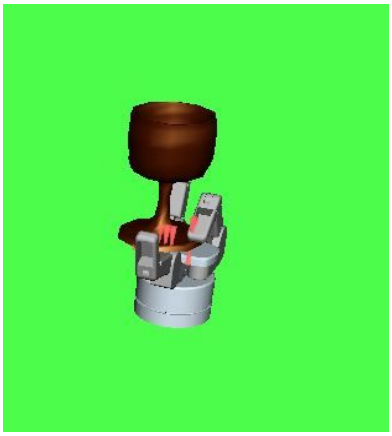


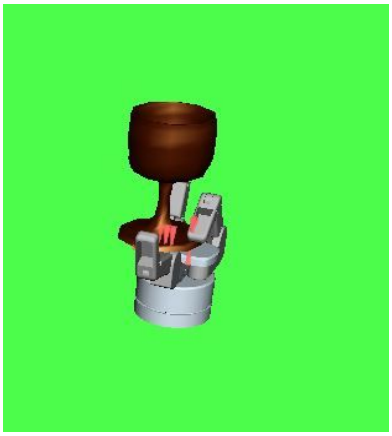


Images without noise - Wine Glass (top 4)

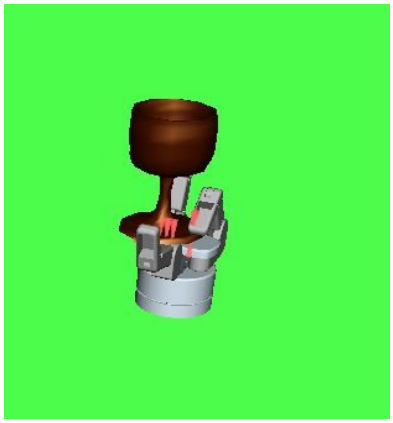


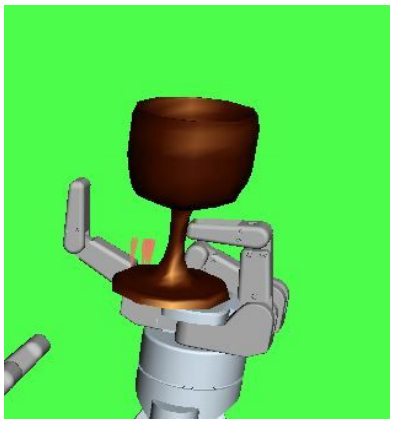


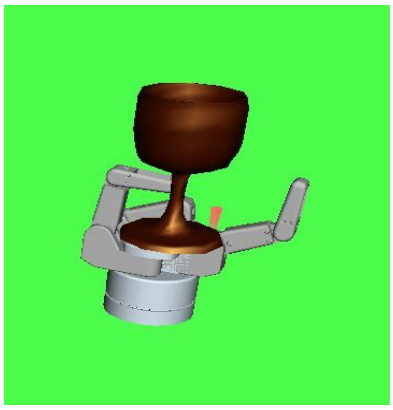


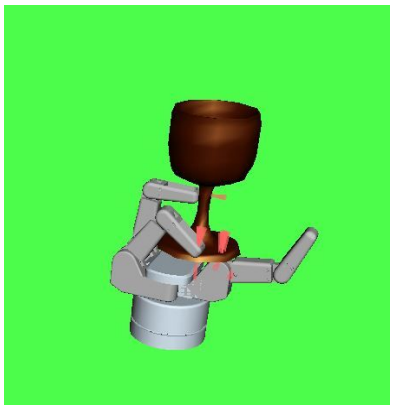


Images with noise - Wine Glass (top 4)

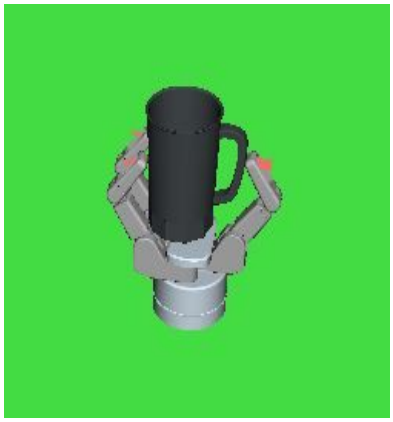


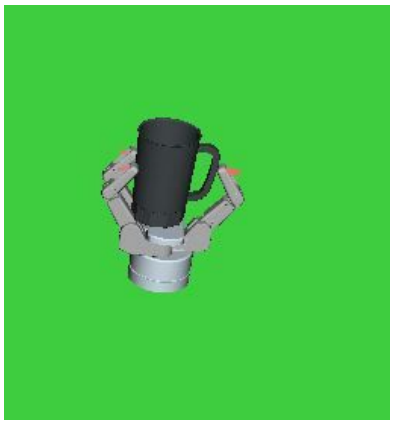


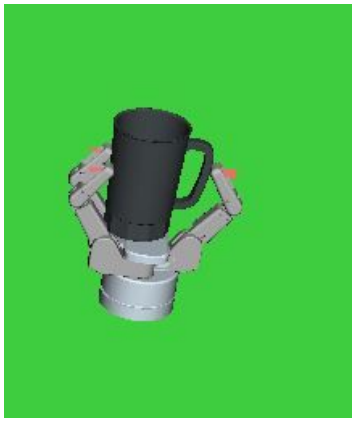


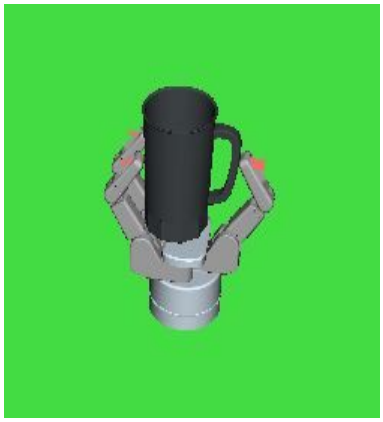


Images without noise - Mug (top 4)









Images with noise (mug)