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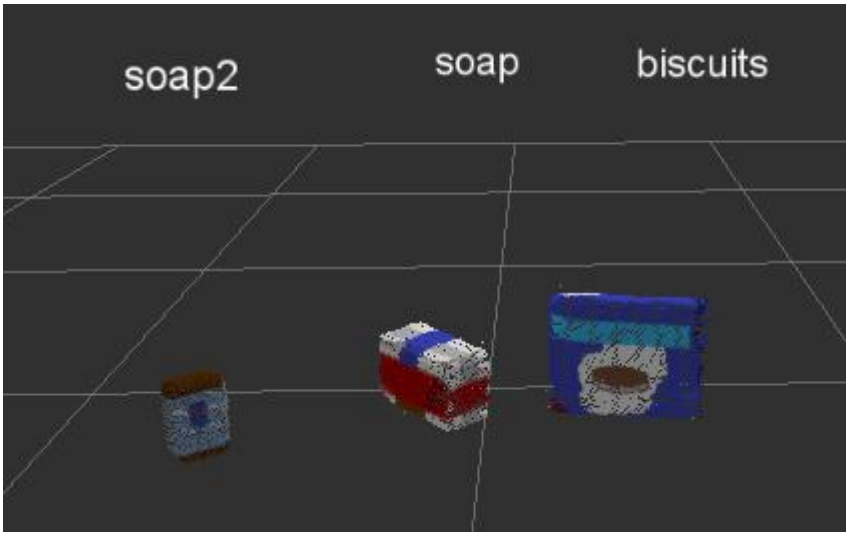
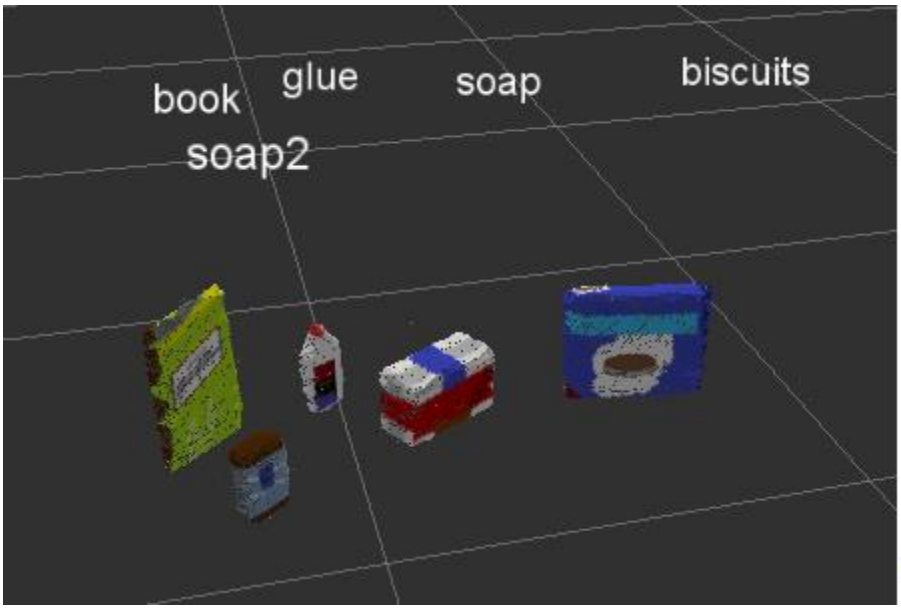
Perception Pipeline for Object Detection

The perception pipline was created by first applying several filters to obtain an accurate point cloud. The filters that were applied were statistical outlier filtering, voxel grid downsampling, passthrough filtering, and RANSAC plane segmenting. RANSAC plane segmenting is used to detect inliers and outliers in the point cloud and separate the objects from the table. After the filters has been adjusted to properly capture the scene, the objects were segmented into separate clusters.





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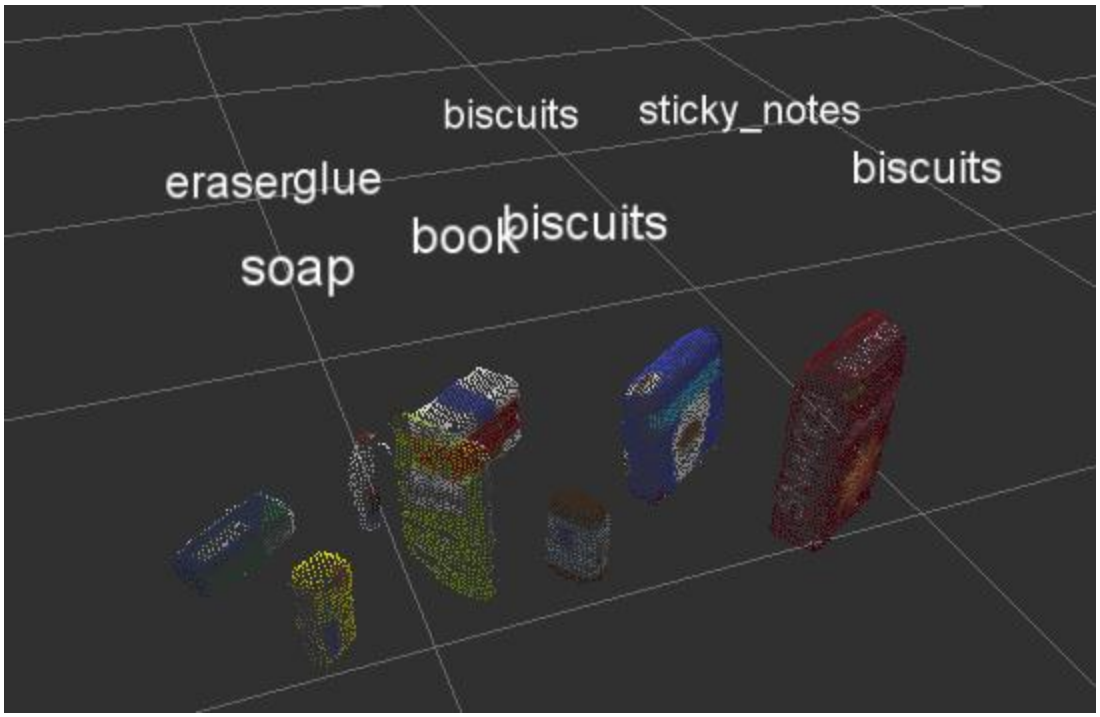

These screenshots show the object after all the filters has been applied. The object recognition was then created by capturing histogram features of the filtered objects. The object detection system got 100% on worlds one and two. The third world got 6/8 correct. Capturing more features during sensor_stick training helped better detect objects.

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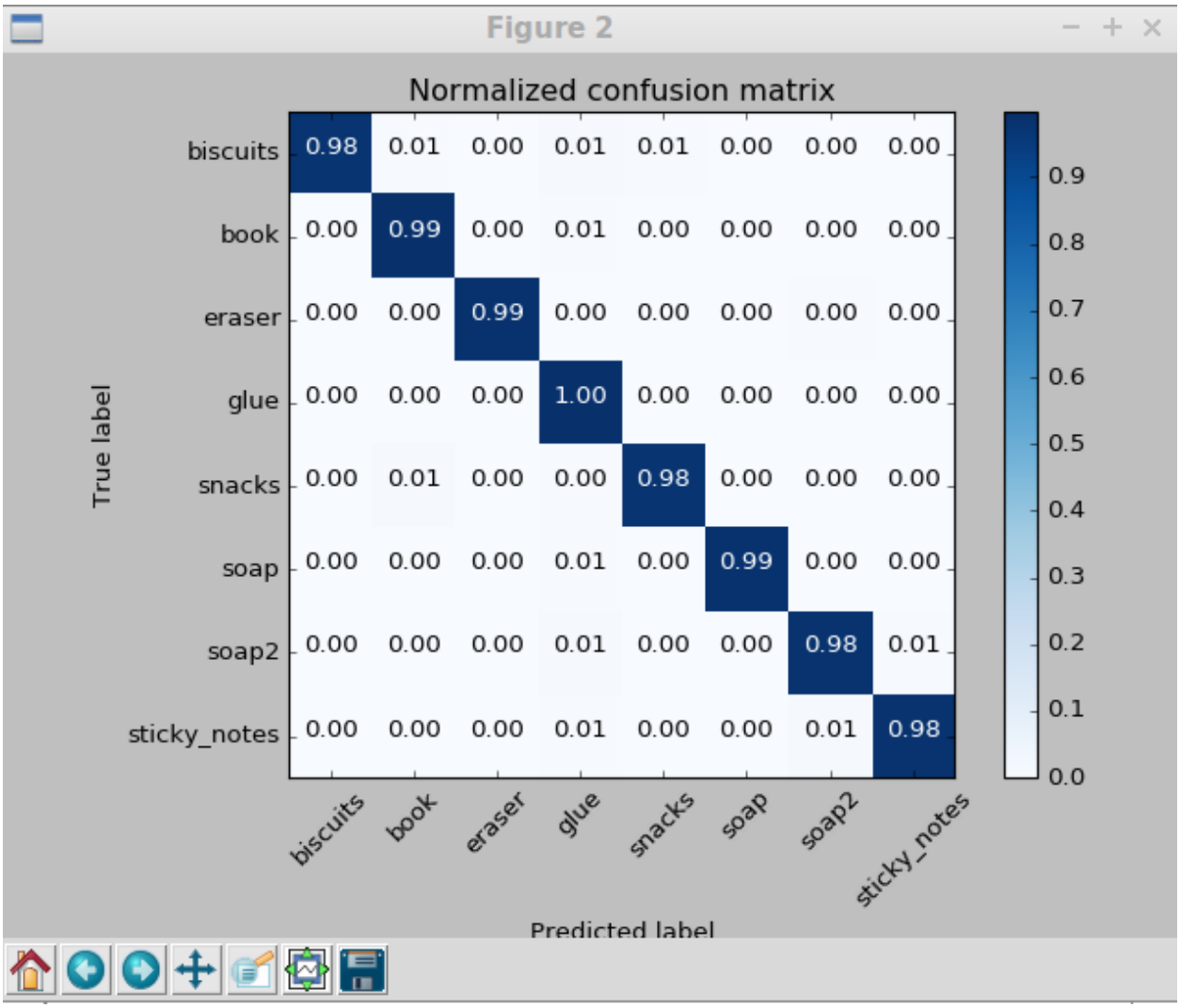

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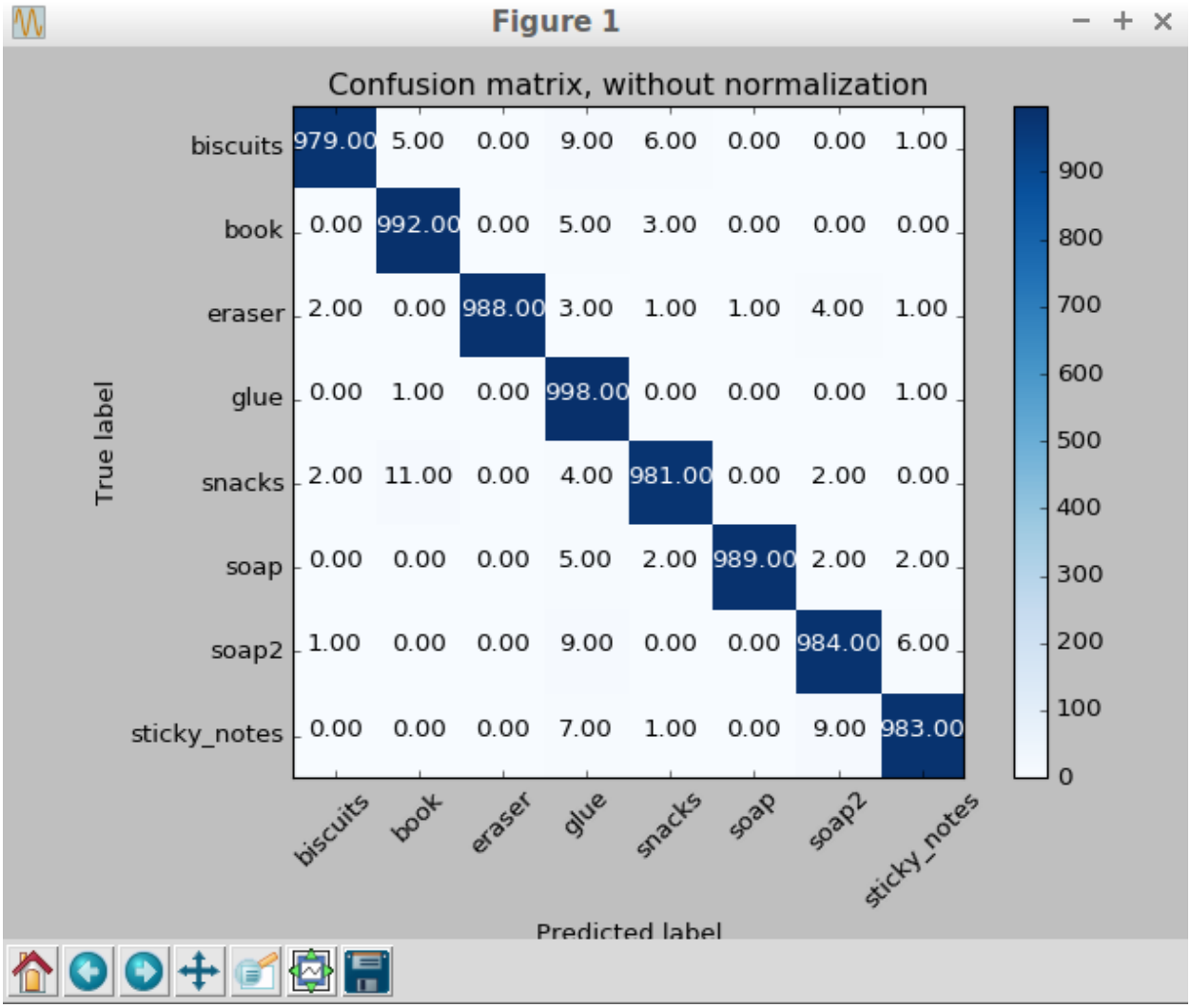

The training data captured 1000 features for each object. The train_svm settings were set to ‘rbf’. Slight improvements to accuracy were achieved by using this classifier method than ‘linear’ setting.

Future work can be done to increase the accuracy of the object detection with multiple objects. Adding extra features such as texture, shape, size of objects can help improve the accuracy of the object detection.