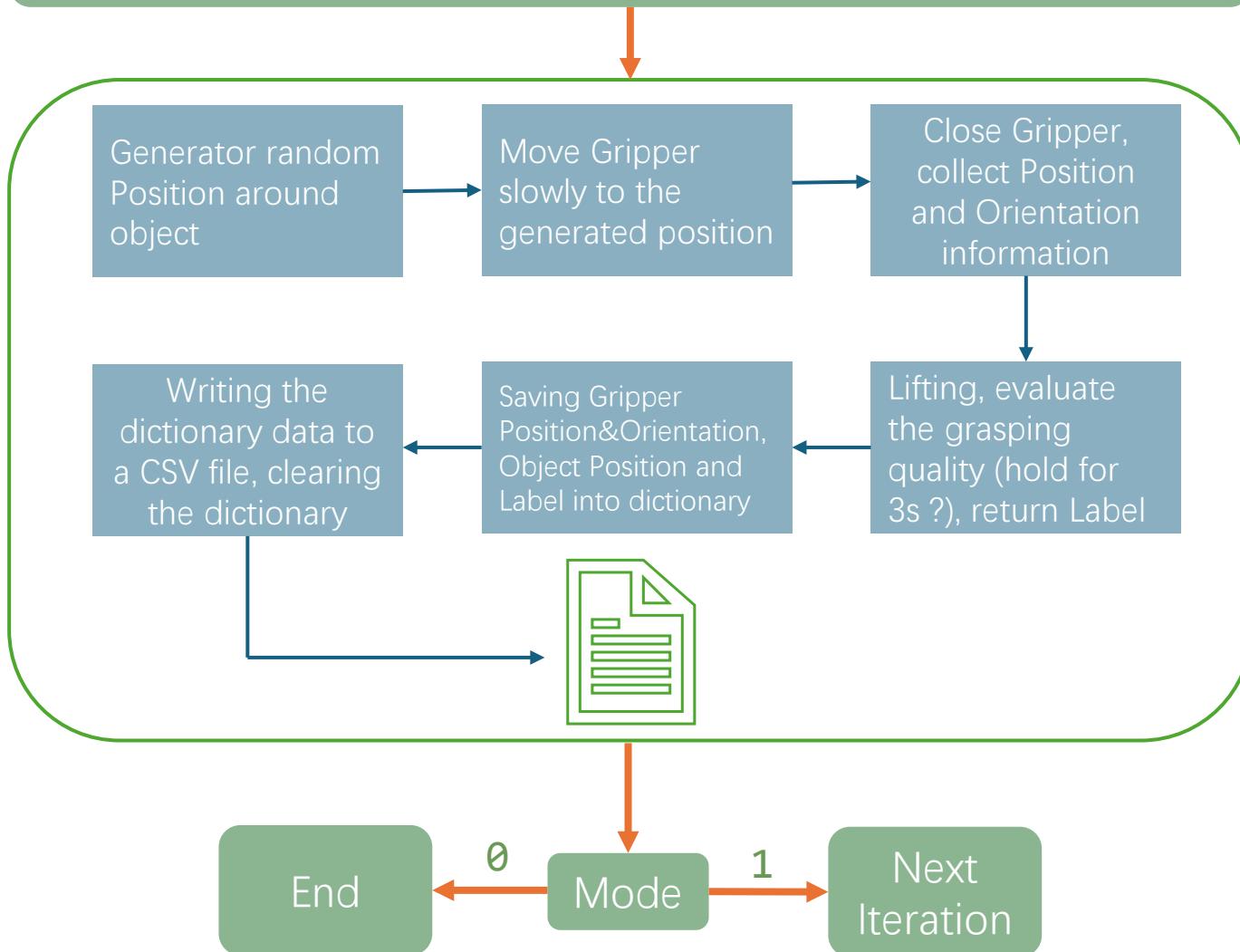


Input Parameters:
GripperType OrientationToGrasp Object DataBatchSize Mode



Parameter Options↓

GripperType(str): PR2, F3

OrientationToGrasp(int): 0 ~ 4

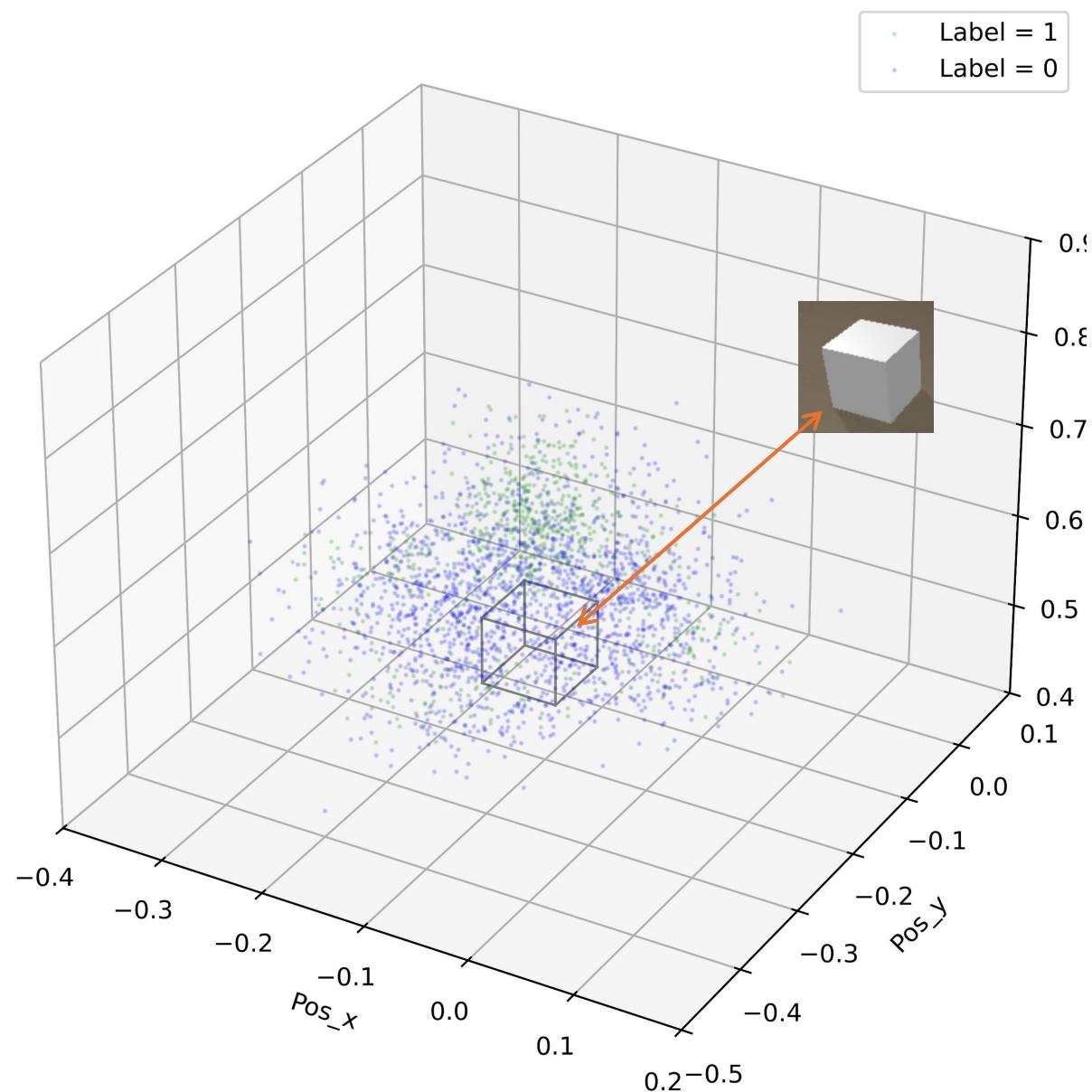
Object(str): cube, dog, duck, mug

DataBatchSize(int):
Number of data samples to collect

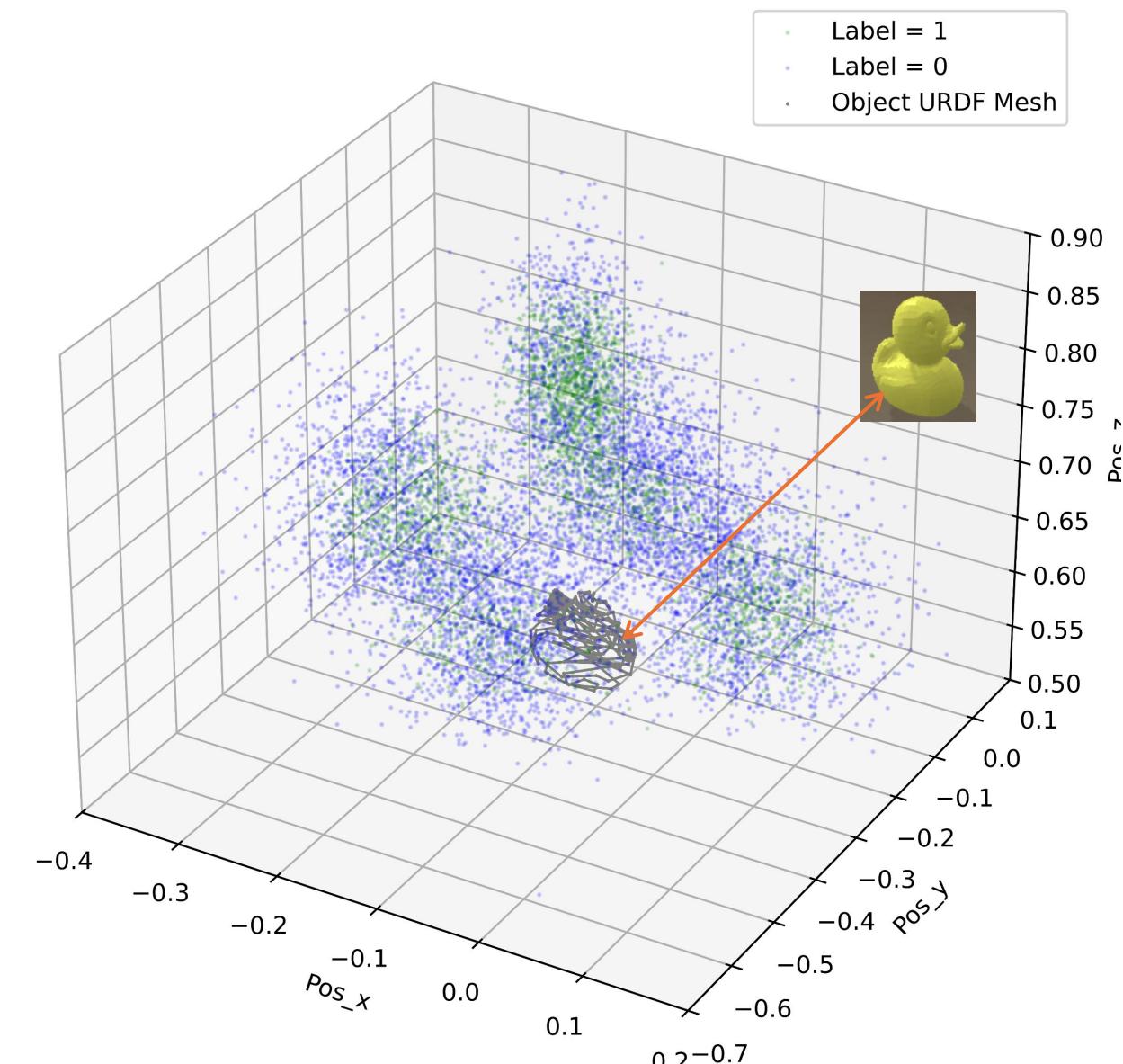
Mode(int):
0 → Demo, Debugging
1 → Data Collection

F3 gripper Position Visualization

F3 gripper position 3D Visualization

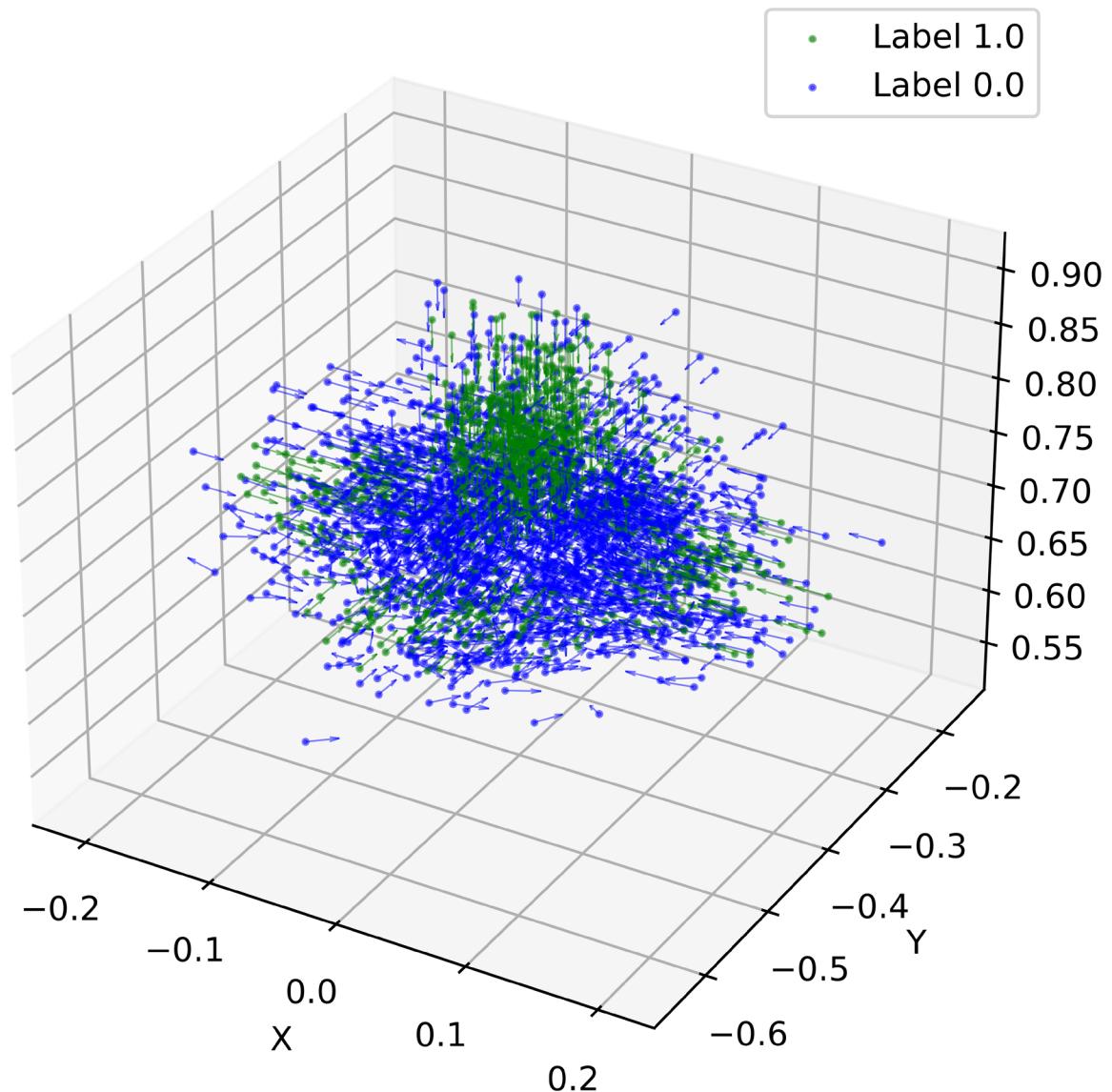


F3 gripper position 3D Visualization

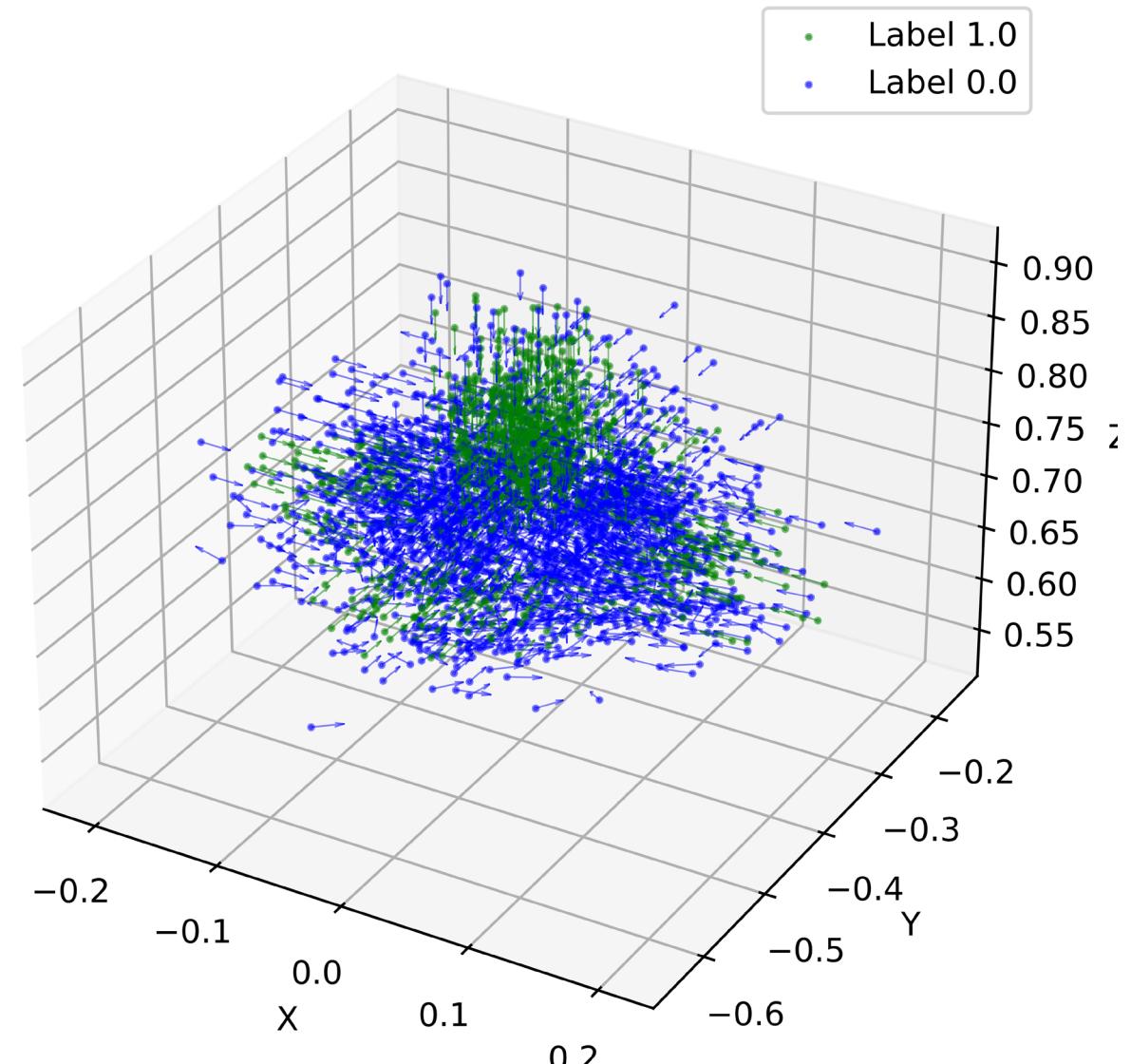


F3 gripper Orientation Visualization

F3 gripper orientation:cube

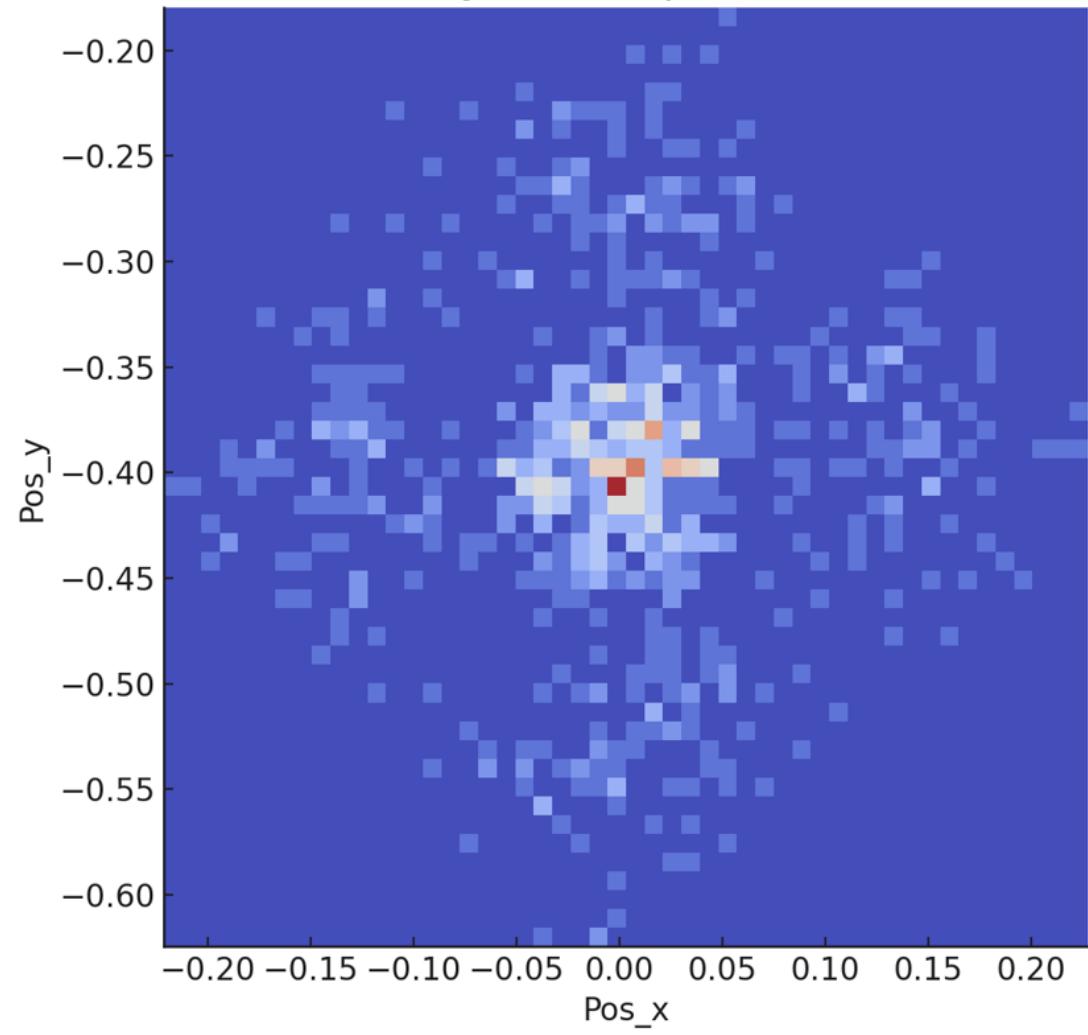


F3 gripper orientation:cube

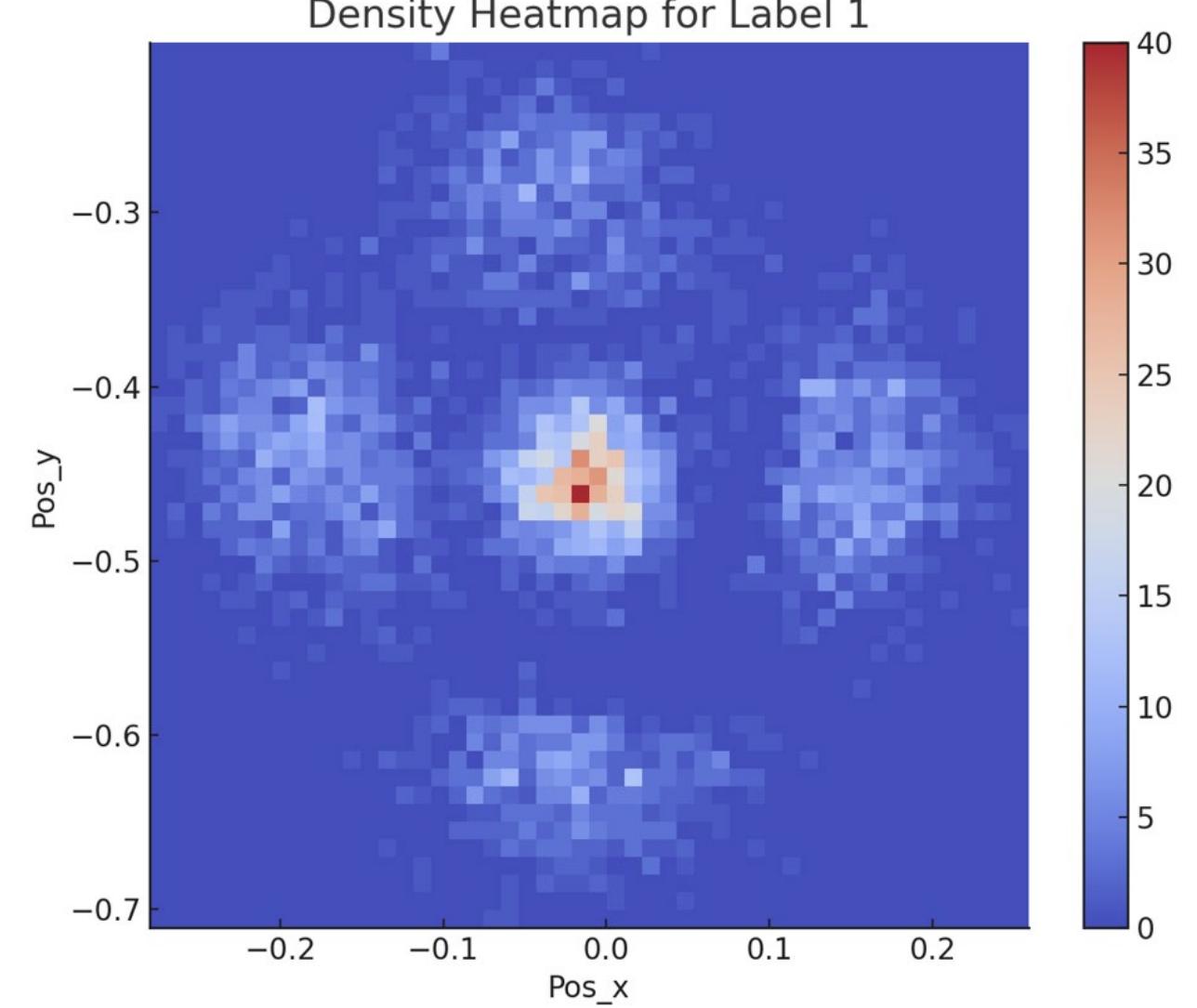


F3 Thermal density Visualization

Density Heatmap for Label 1

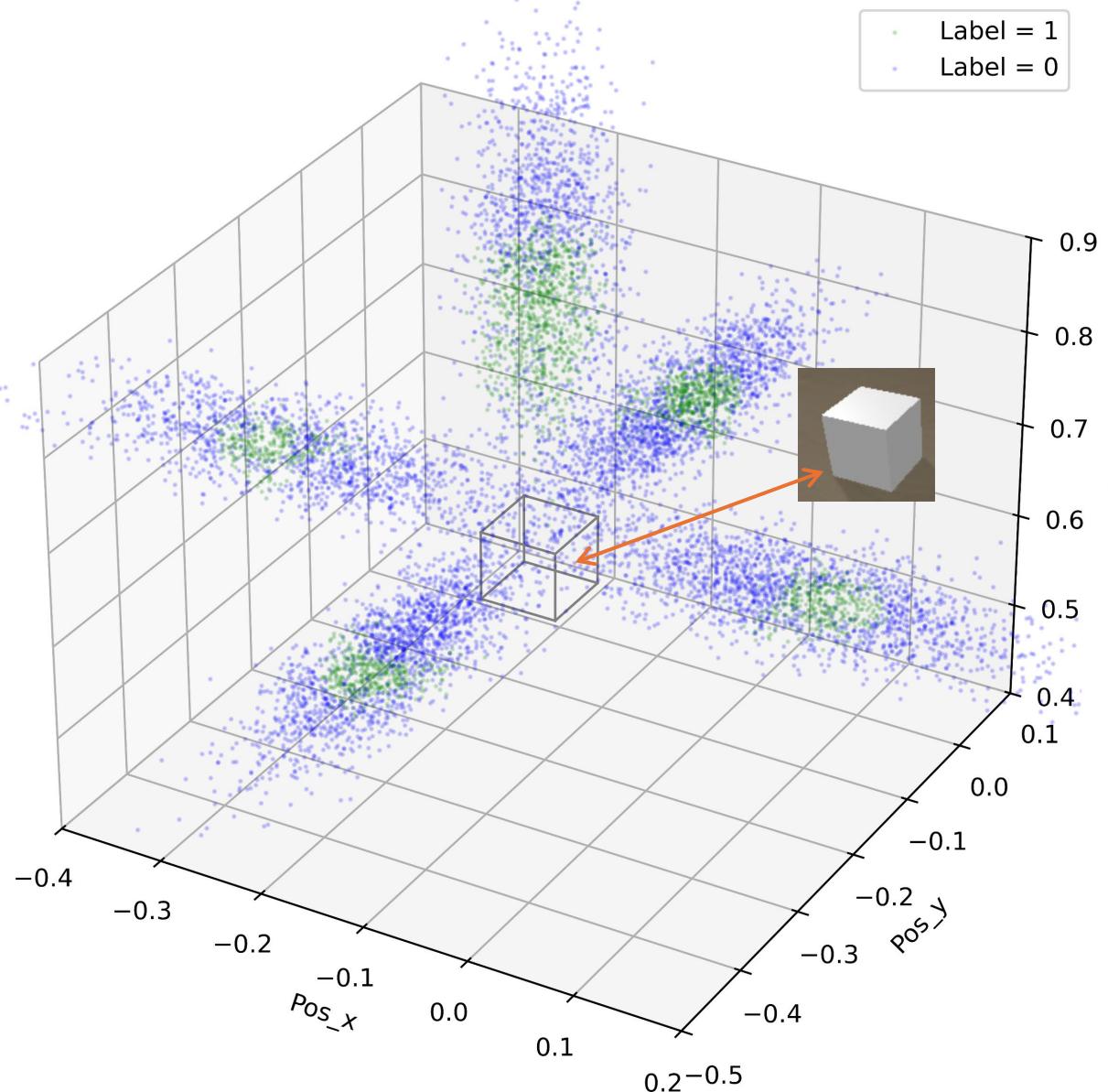


Density Heatmap for Label 1

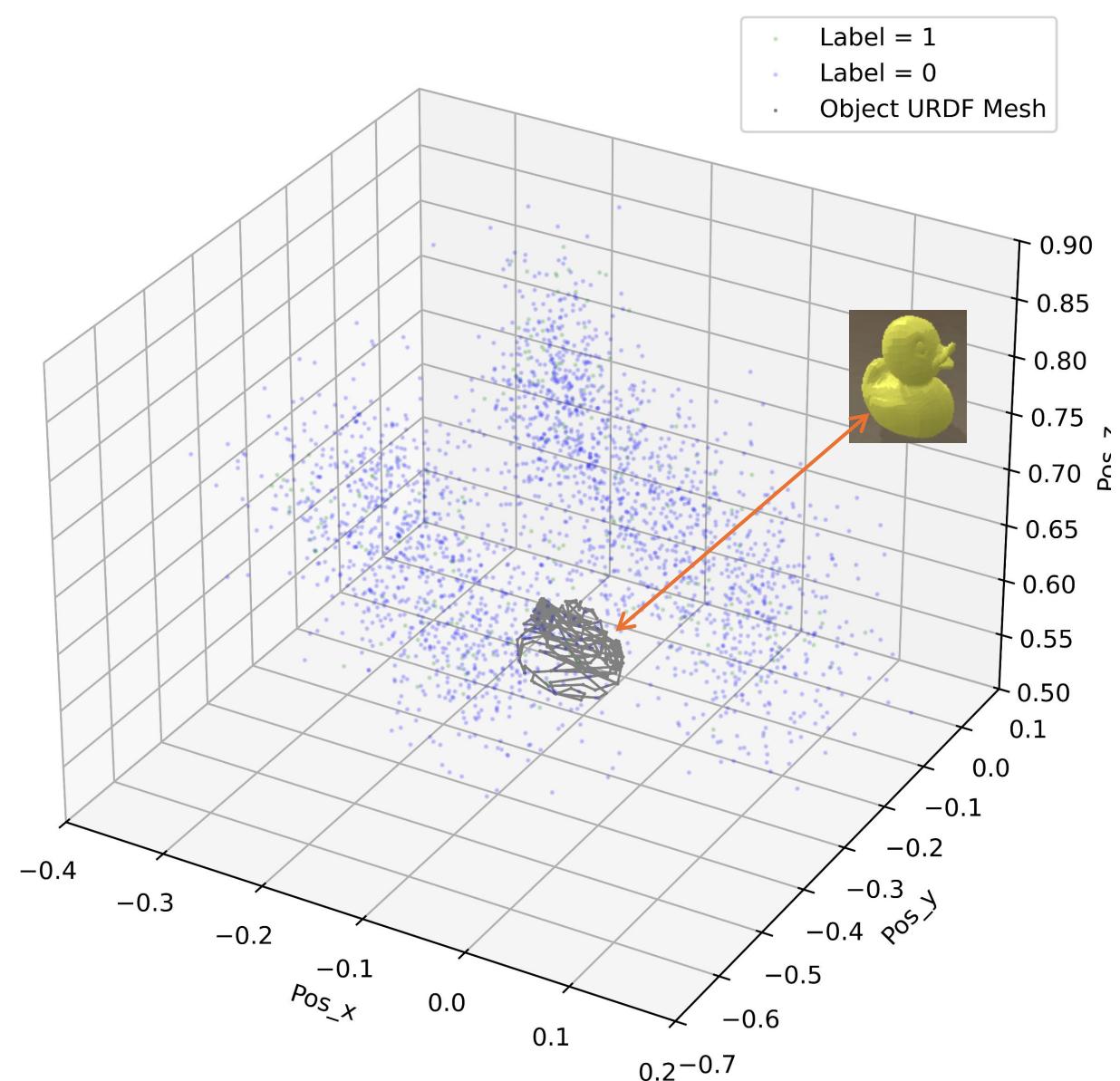


PR2 gripper Position Visualization

PR2 gripper position 3D Visualization

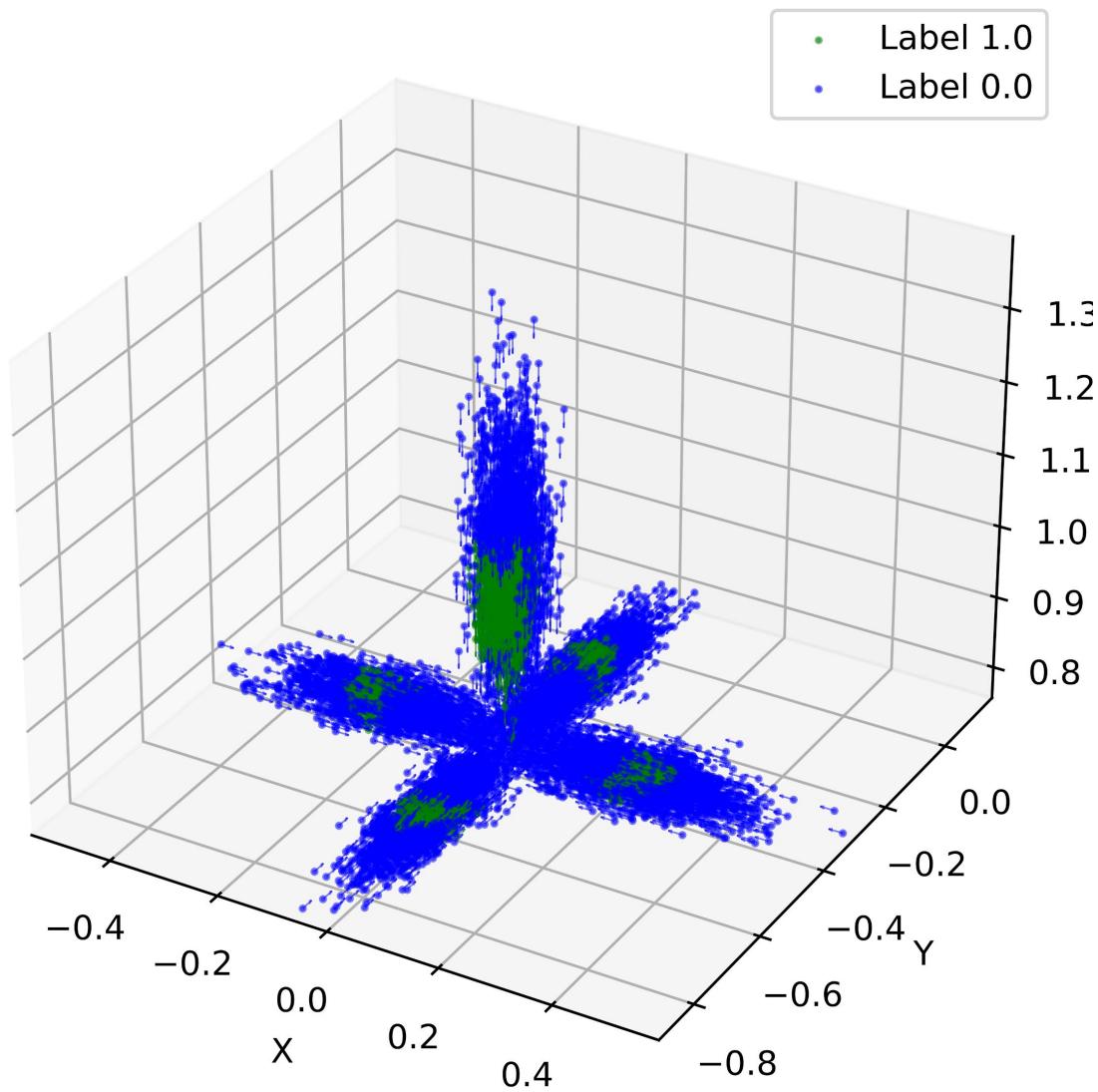


PR2 gripper position 3D Visualization

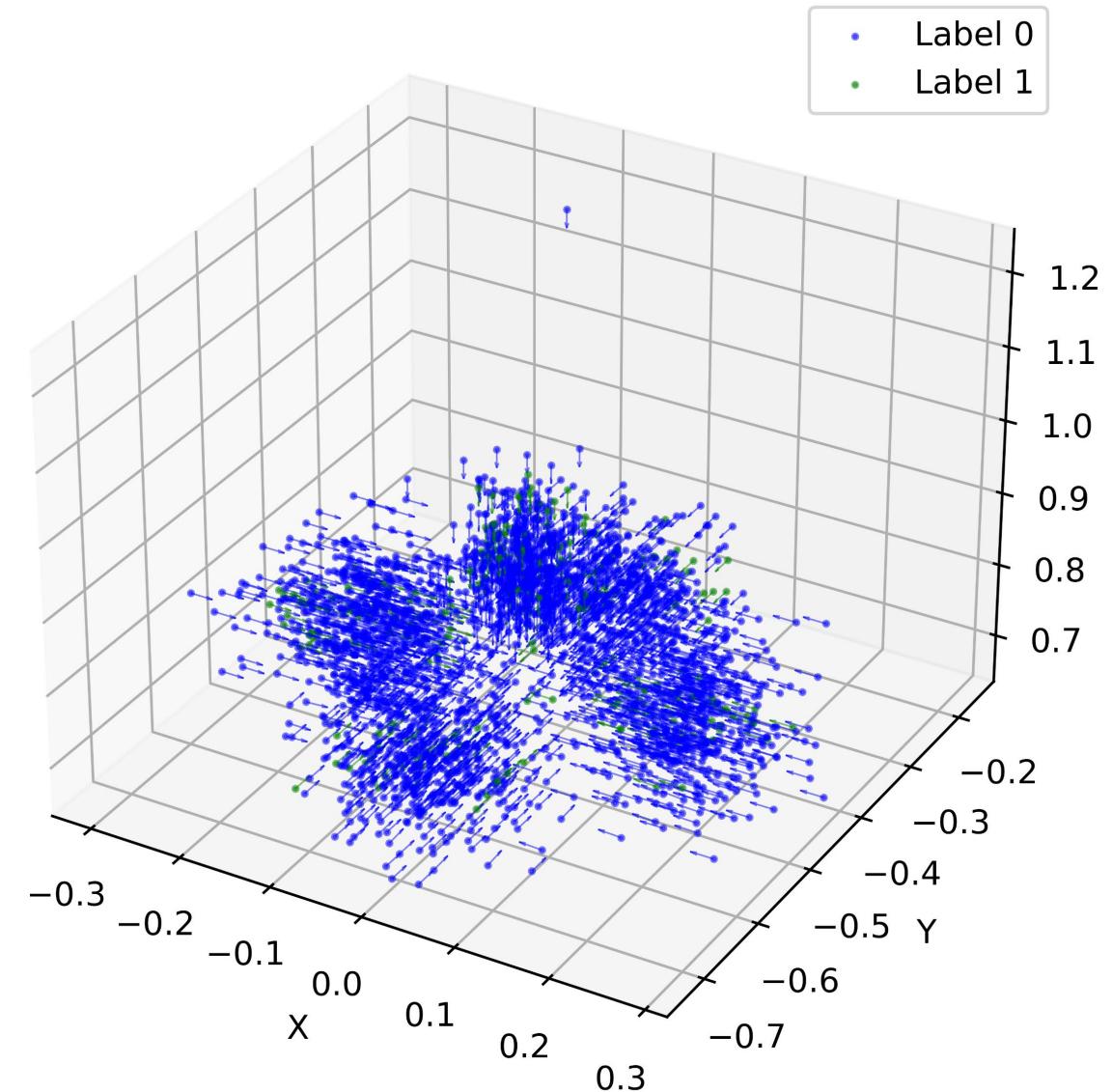


PR2 gripper Orientation Visualization

PR2 gripper Orientation:Cube

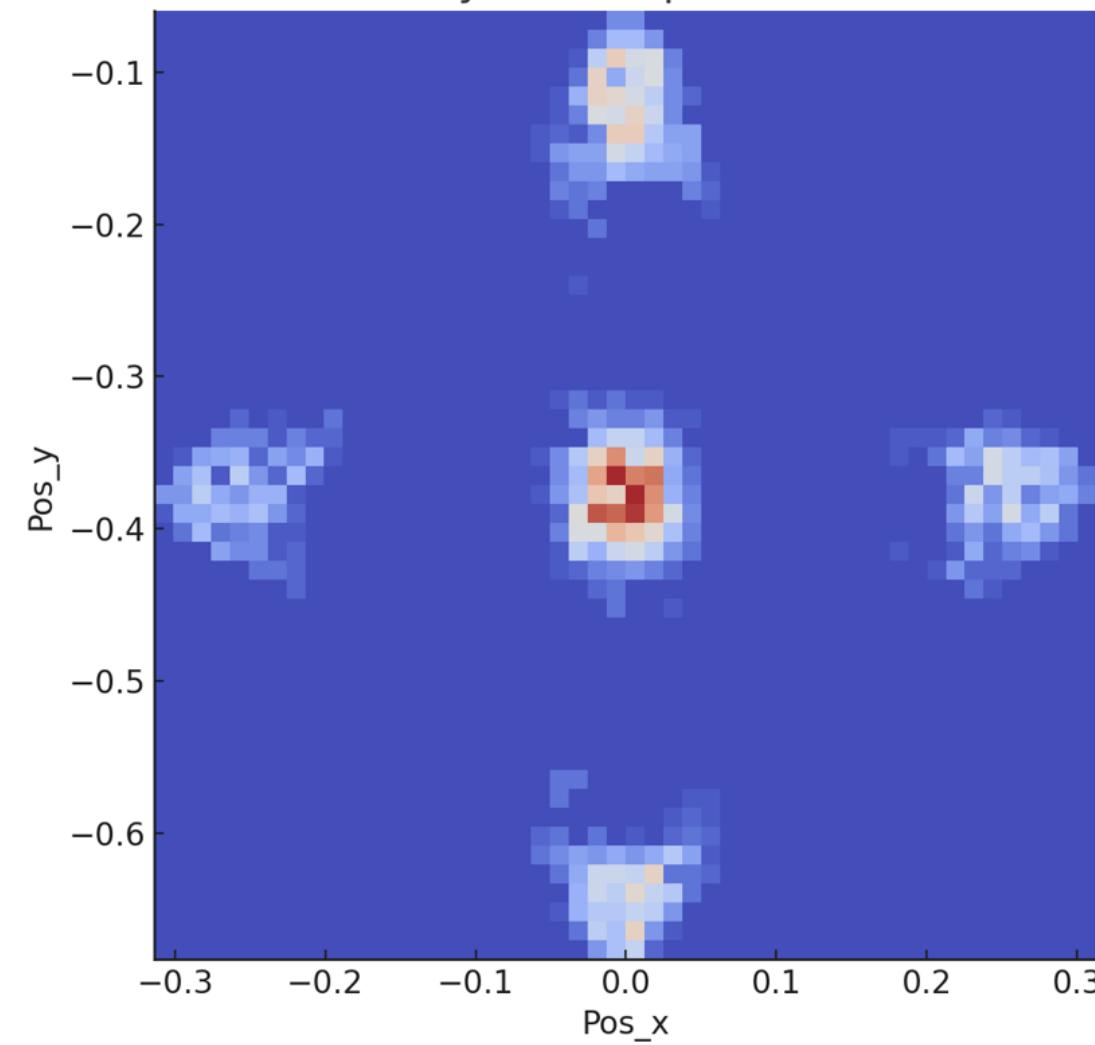


PR2 gripper Orientation:Duck

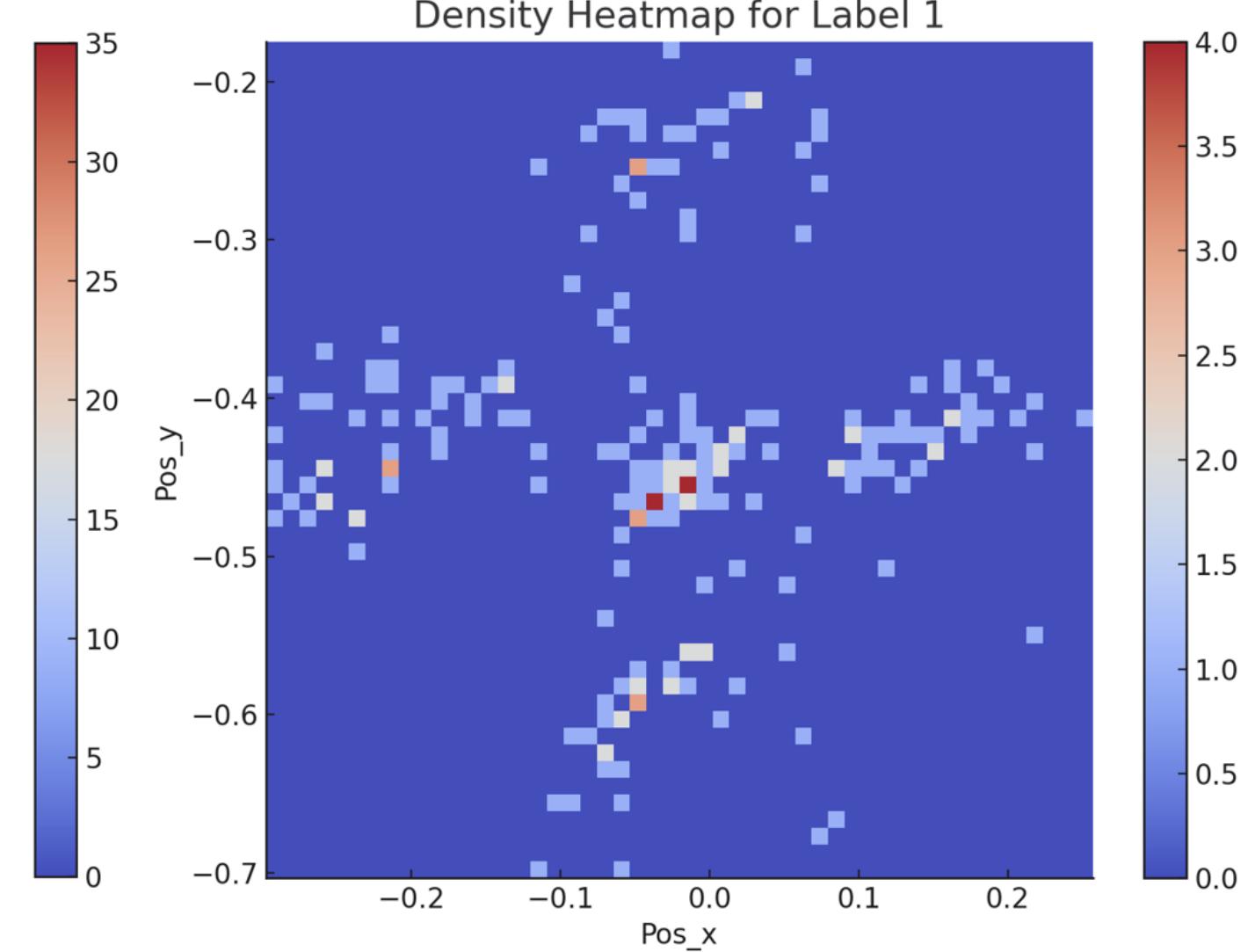


PR2 Thermal density Visualization

Density Heatmap for Label 1



Density Heatmap for Label 1



NN vs. XGBoost: Performance on F3 Gripper for Cube and Duck

Cube	Train Accuracy	Test Accuracy	Test Precision	Test Recall	F1-Score
NN	0.8381	0.8825	0.9011	0.6833	0.7773
XGBoost	0.9262	0.9250	0.8689	0.8833	0.8760

Duck	Train Accuracy	Test Accuracy	Test Precision	Test Recall	F1-Score
NN	0.7746	0.7775	0.5798	0.6389	0.6079
XGBoost	0.8180	0.8125	0.6410	0.6944	0.6667

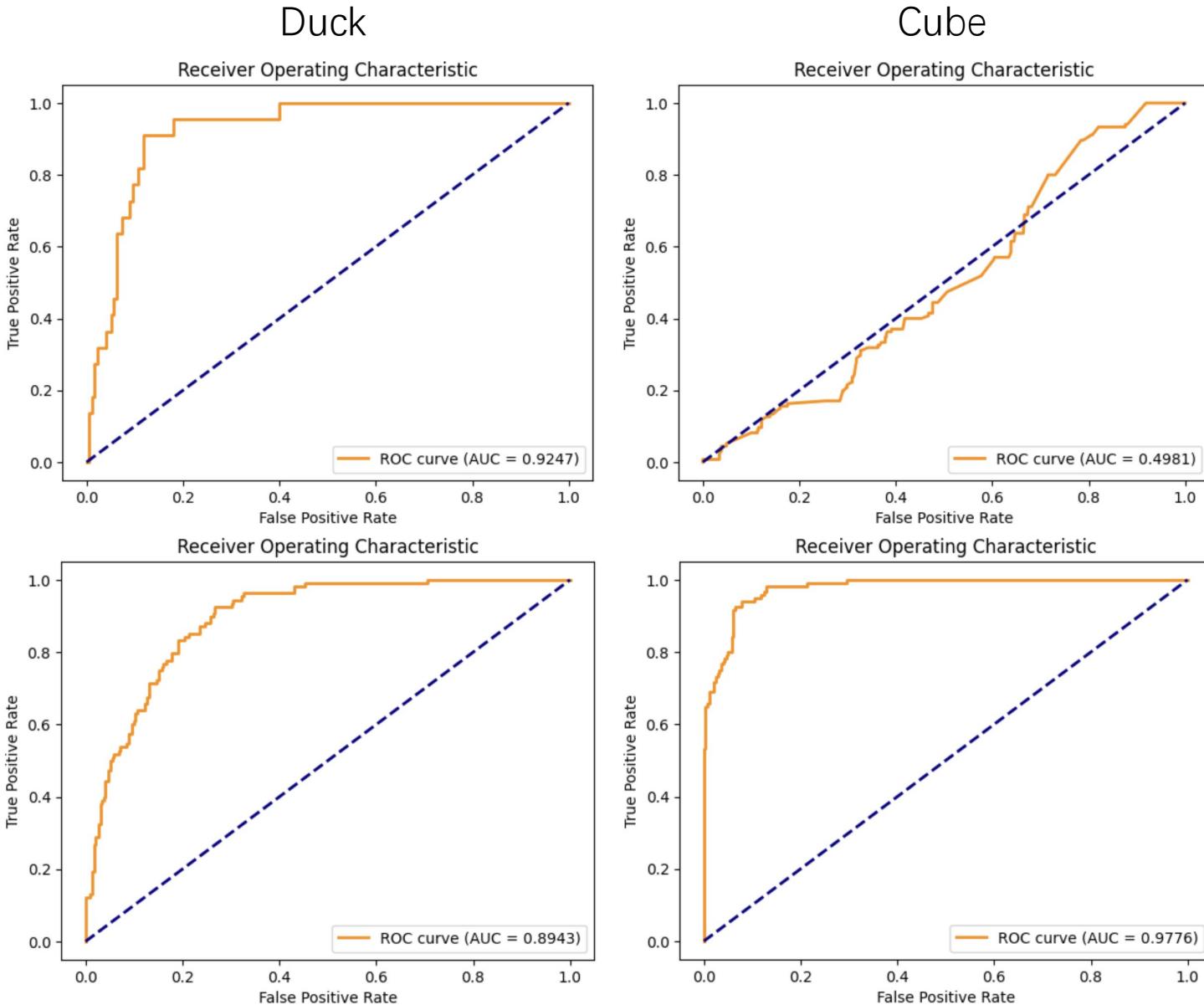
NN vs. XGBoost: Performance on PR2 Gripper for Cube and Duck

Cube	Train Accuracy	Test Accuracy	Test Precision	Test Recall	F1-Score
NN	0.9028	0.8524	0.6055	0.9778	0.7479
XGBoost	0.9322	0.8839	0.6738	0.9333	0.7826

Duck	Train Accuracy	Test Accuracy	Test Precision	Test Recall	F1-Score
NN	0.9298	0.8900	0.0000	0.0000	0.0000
XGBoost	0.9447	0.8850	0.4000	0.0909	0.1481

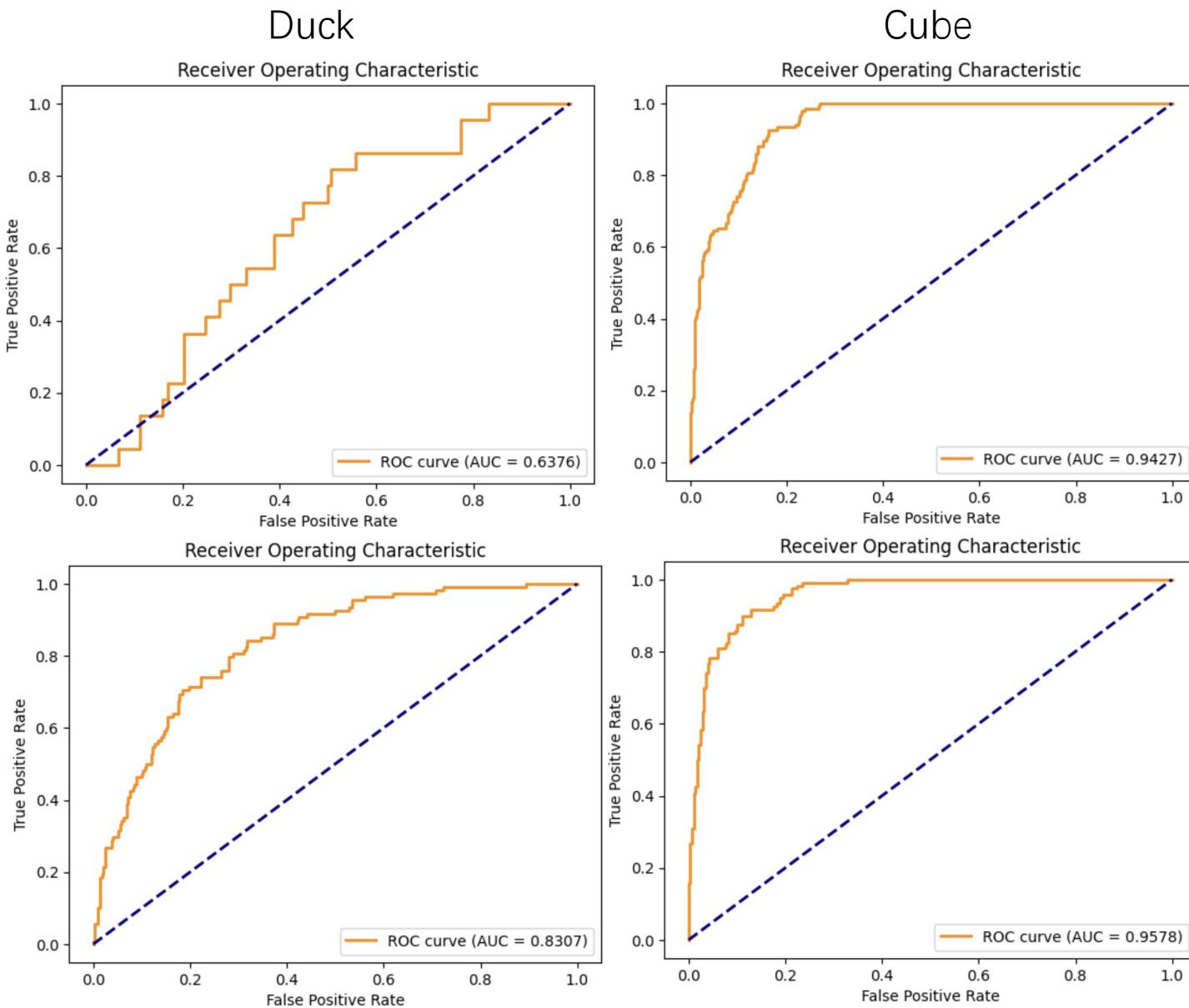
XGBoost

PR2



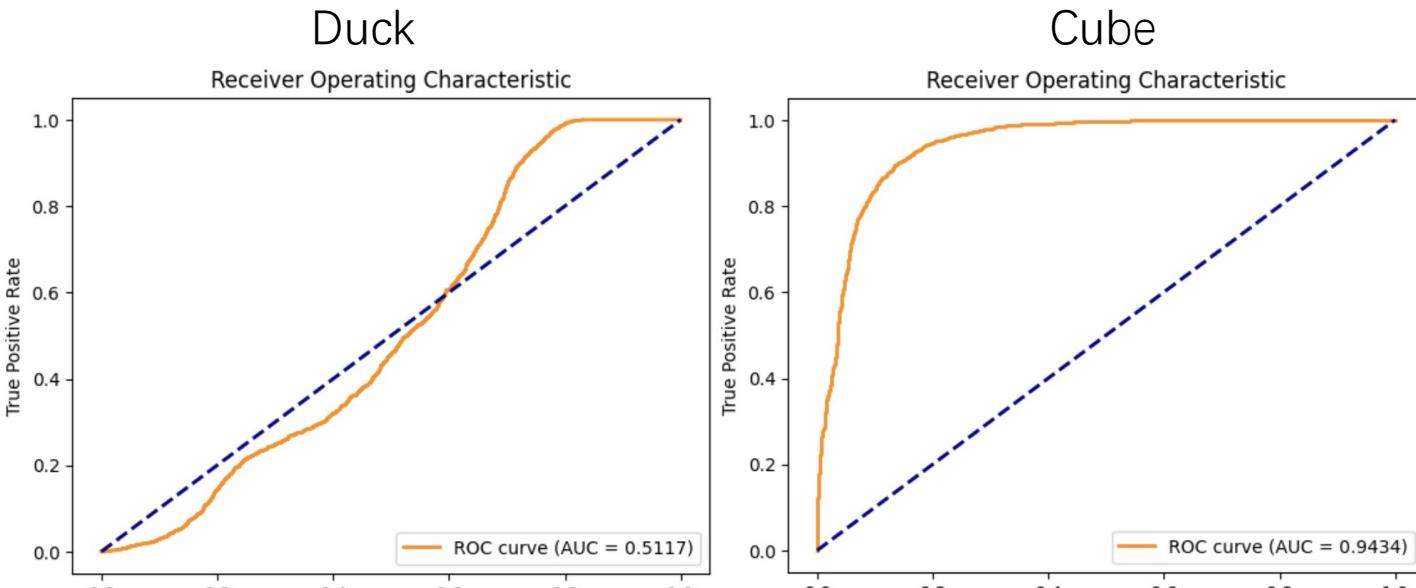
NN

PR2

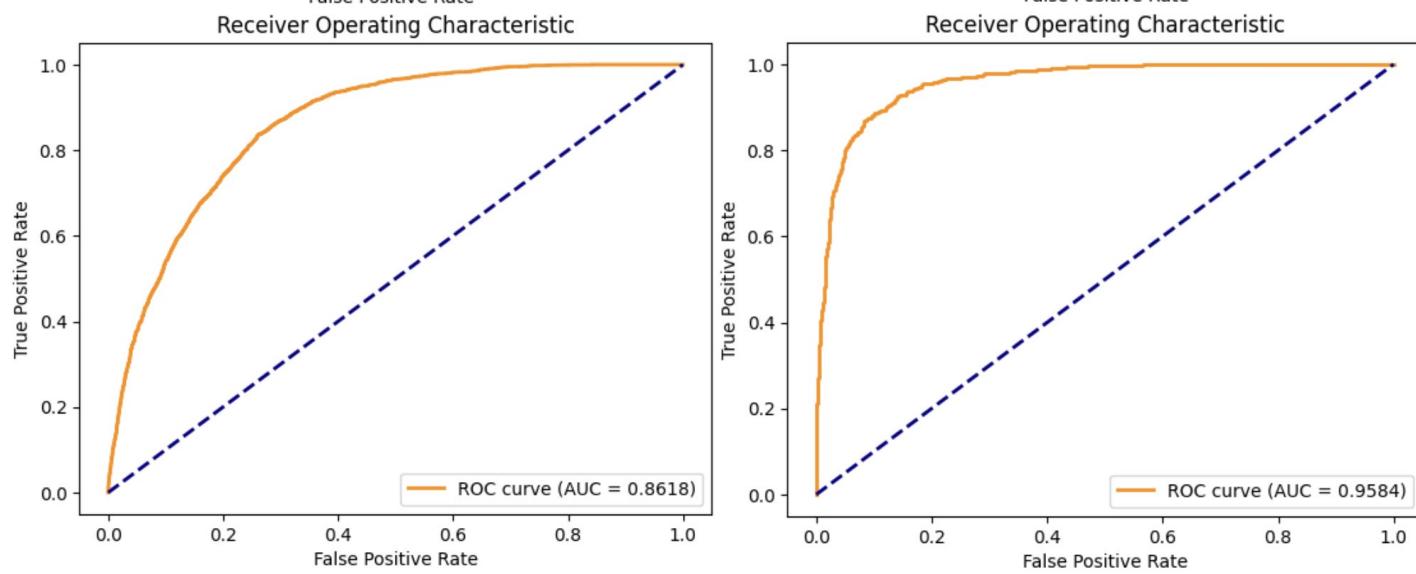


NN: K

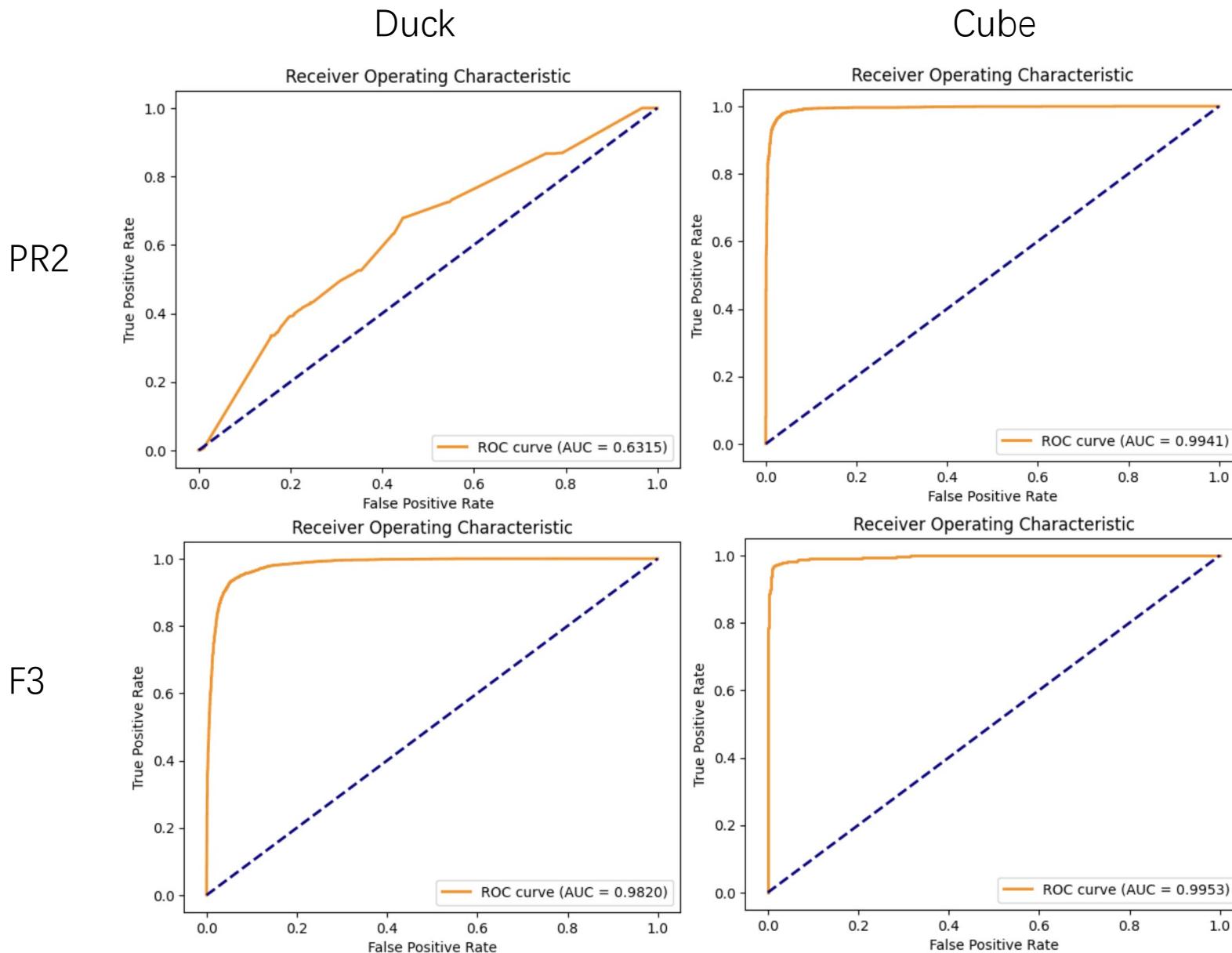
PR2



F3



XGB:K



NN vs. XGBoost: Performance on PR2 Gripper for Cube and Duck

Cube	Test Accuracy	Test Precision	Test Recall	F1-Score
NN	0.8474	0.6126	0.8667	0.7178
XGBoost	0.8939	0.6940	0.9407	0.7987

Duck	Test Accuracy	Test Precision	Test Recall	F1-Score
NN	0.8900	0.0000	0.0000	0.0000
XGBoost	0.8800	0.3333	0.9090	0.1429

NN vs. XGBoost: Performance on F3 Gripper for Cube and Duck

Cube	Test Accuracy	Test Precision	Test Recall	F1-Score
NN	0.9100	0.8559	0.8417	0.8487
XGBoost	0.9300	0.8710	0.9000	0.8852

Duck	Test Accuracy	Test Precision	Test Recall	F1-Score
NN	0.7700	0.5741	0.5741	0.5741
XGBoost	0.8100	0.6311	0.7130	0.6696

NN vs. XGBoost: Performance on PR2 Gripper for Cube and Duck

Cube	Test Accuracy	Test Precision	Test Recall	F1-Score
NN	0.8474	0.6126	0.8667	0.7178
XGBoost	0.8939	0.6940	0.9407	0.7987
Duck	Test Accuracy	Test Precision	Test Recall	F1-Score
NN	0.8900	0.0000	0.0000	0.0000
XGBoost	0.8800	0.3333	0.9090	0.1429

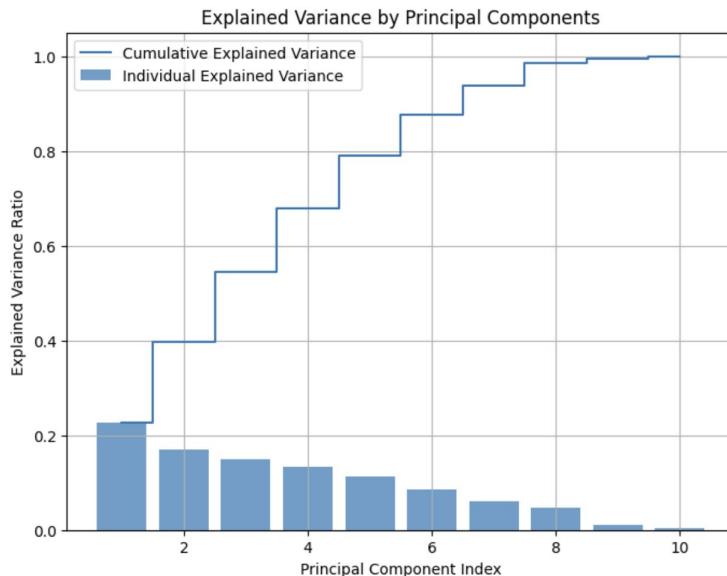
NN vs. XGBoost: Performance on F3 Gripper for Cube and Duck

Cube	Test Accuracy	Test Precision	Test Recall	F1-Score
NN	0.9100	0.8559	0.8417	0.8487
XGBoost	0.9300	0.8710	0.9000	0.8852
Duck	Test Accuracy	Test Precision	Test Recall	F1-Score
NN	0.7700	0.5741	0.5741	0.5741
XGBoost	0.8100	0.6311	0.7130	0.6696

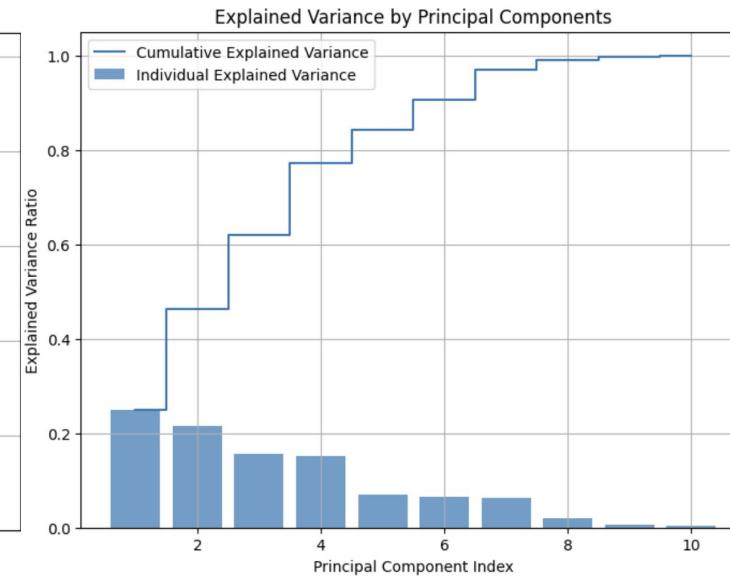
XGB:K

PR2

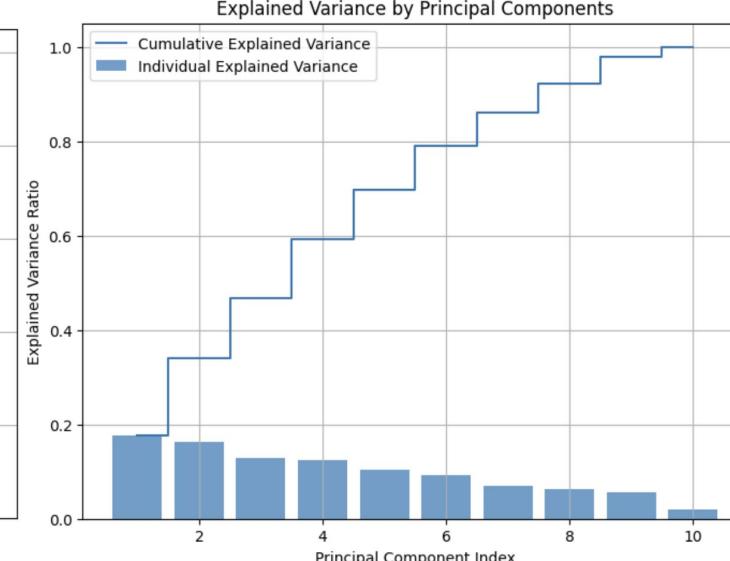
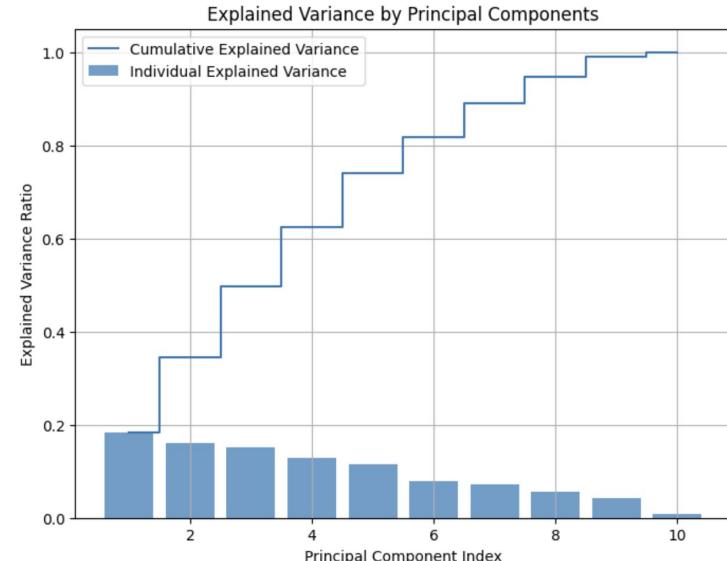
Duck



Cube



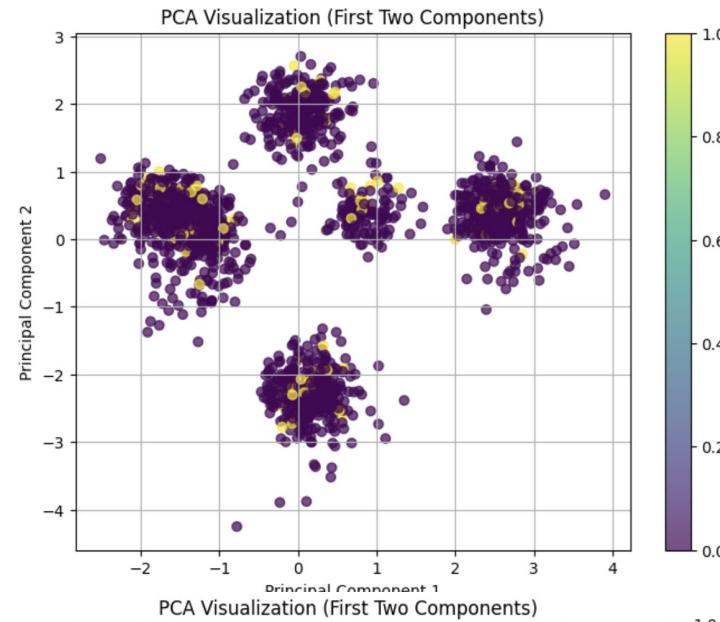
F3



XGB:K

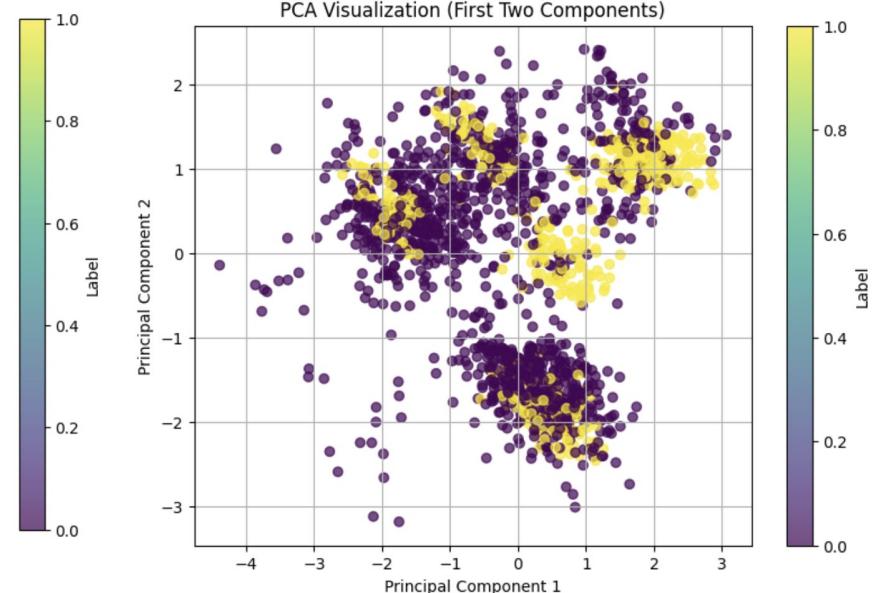
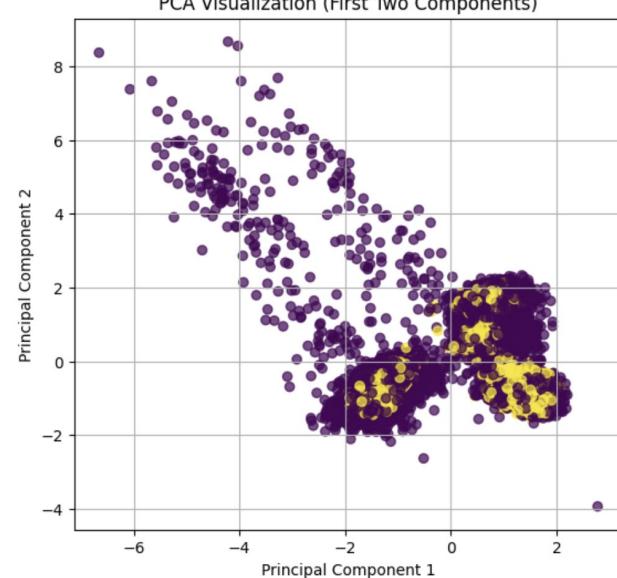
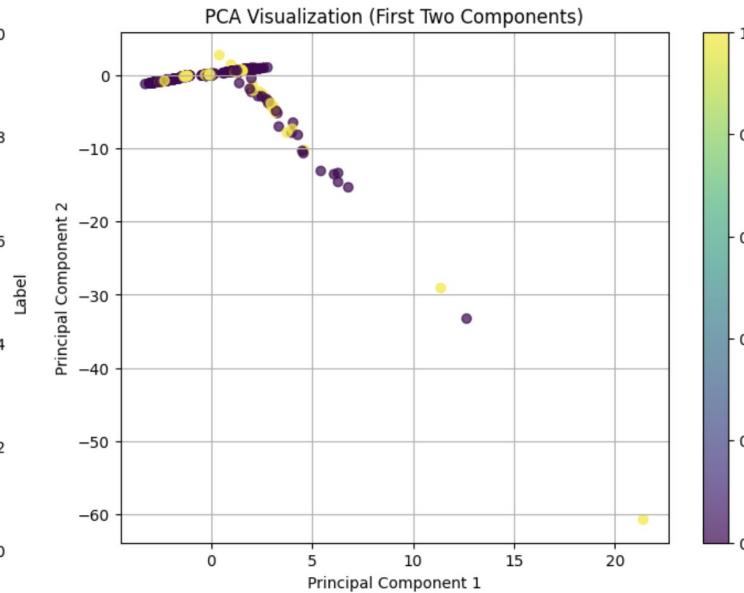
PR2

Duck



F3

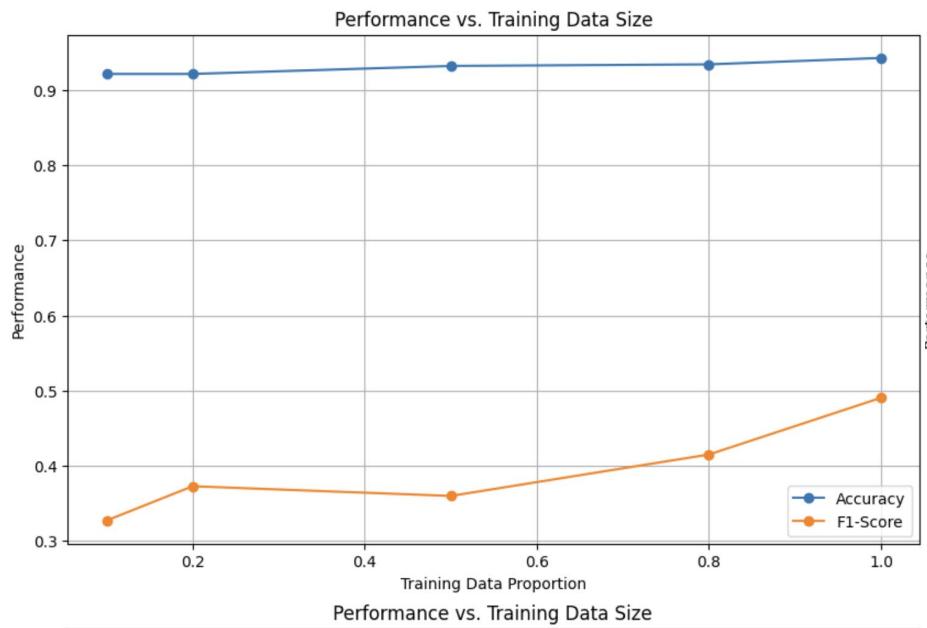
Cube



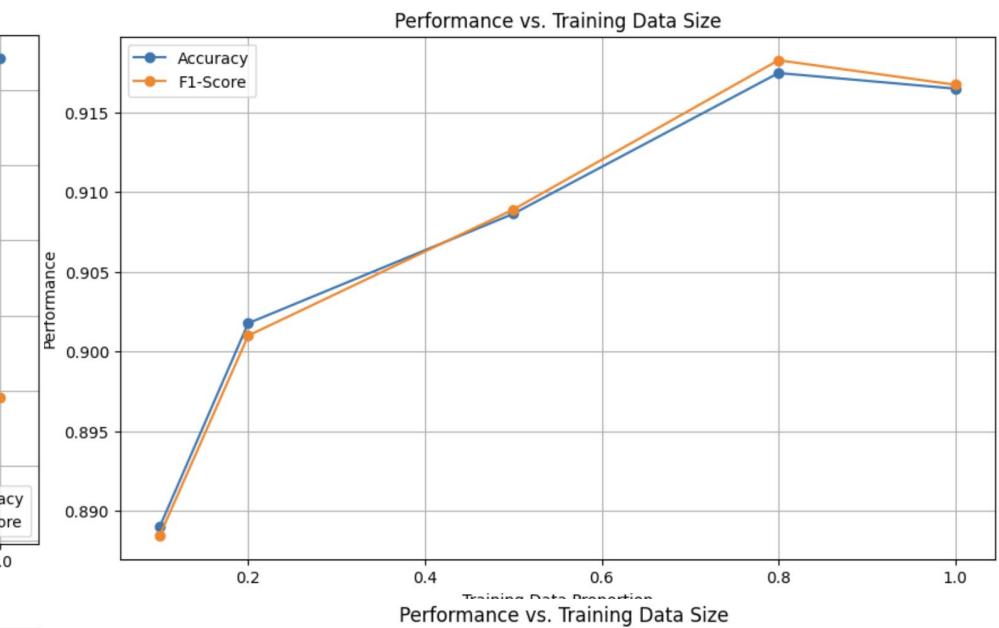
XGB

PR2

Duck

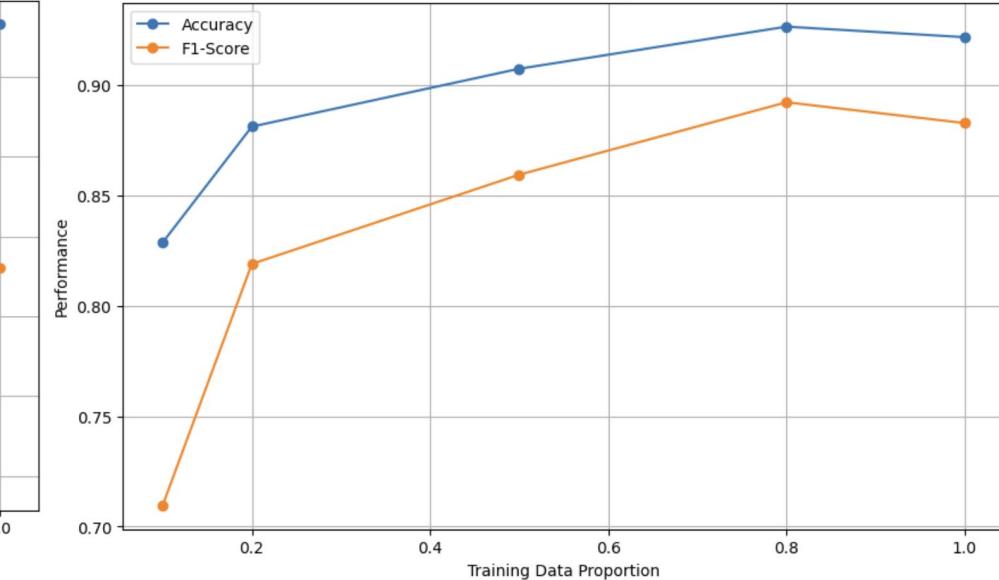
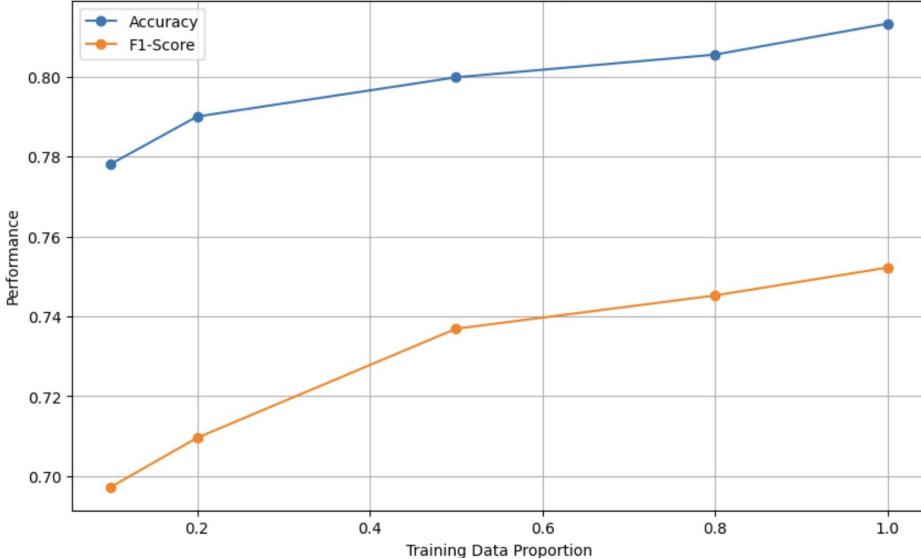


Cube



F3

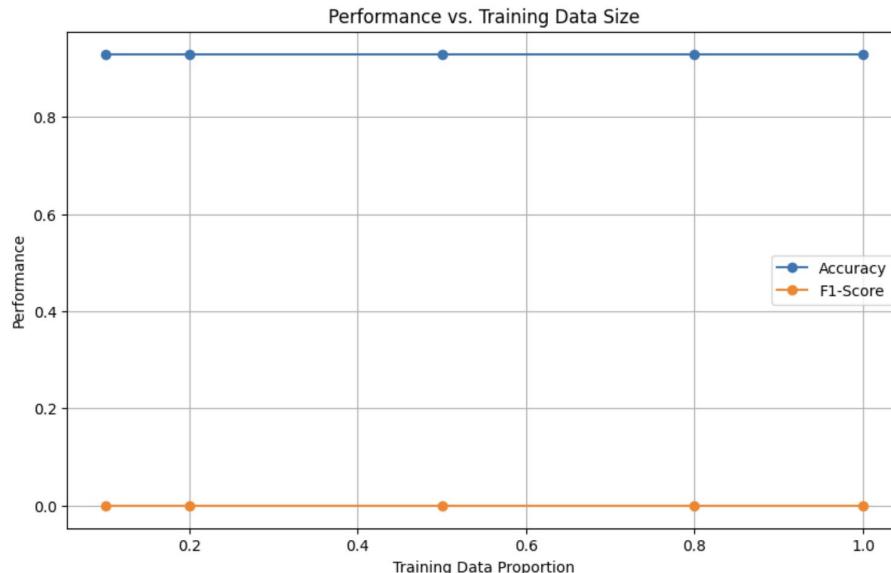
Performance vs. Training Data Size



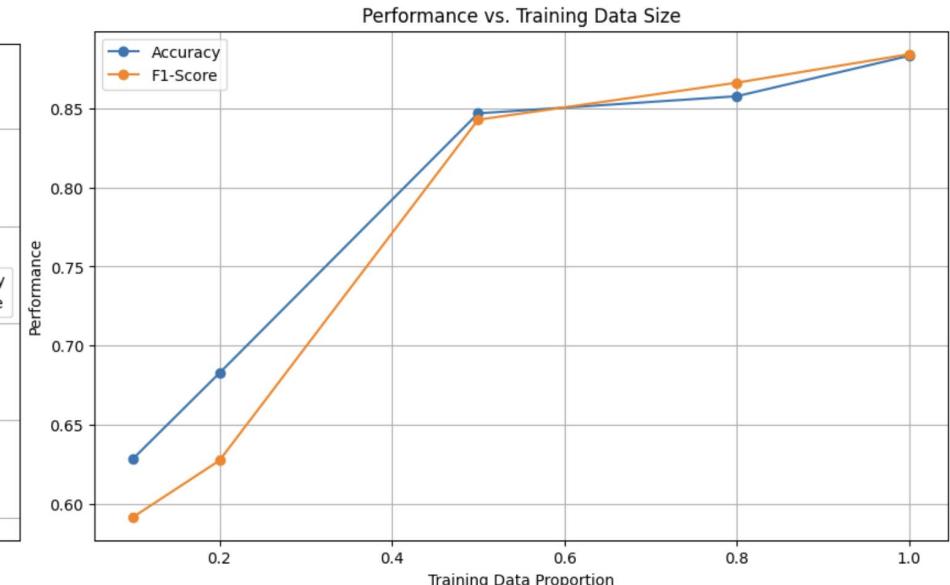
NN

PR2

Duck



Cube



F3

