Deep Support Vector Data Description for Unsupervised and Semi-Supervised Anomaly Detection

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Abstract: In this paper In this paper we have discussed a Deep Support Vector Data Description for Unsupervised and Semi-Supervised Anomaly Detection.

I. INTRODUCTION

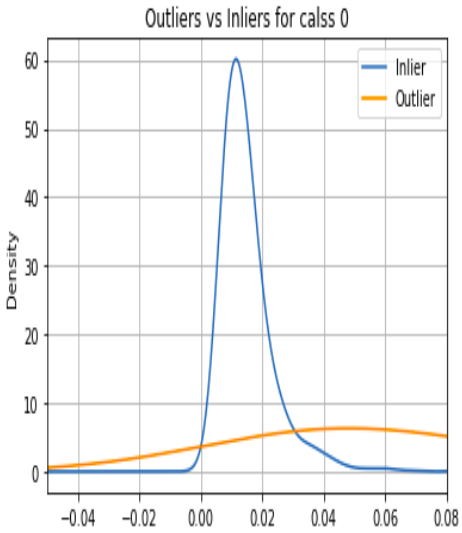
Anomaly detection (AD) is the task of identifying unusual samples in data. This task lacks a supervised learning objective and AD methods typically formulate an unsupervised problem to find a "compact" description of the "normal" class, e.g. finding a set of small measures that contains most of the data as in one-class classification.

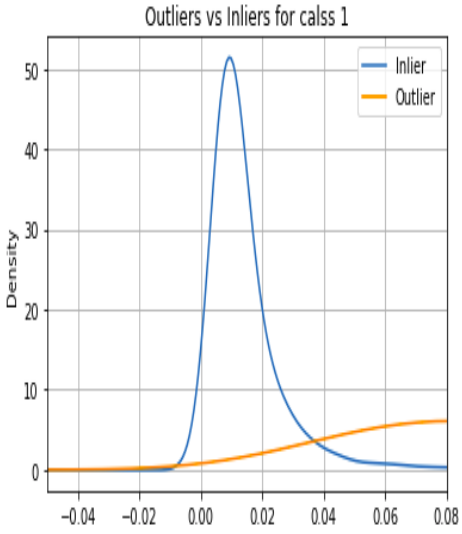
II. RESULTS

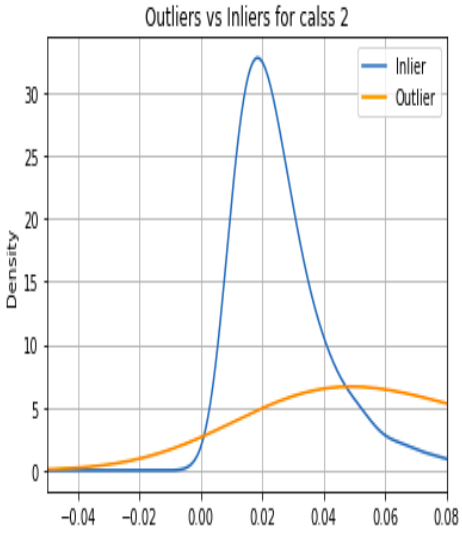
A. MNIST Dataset:

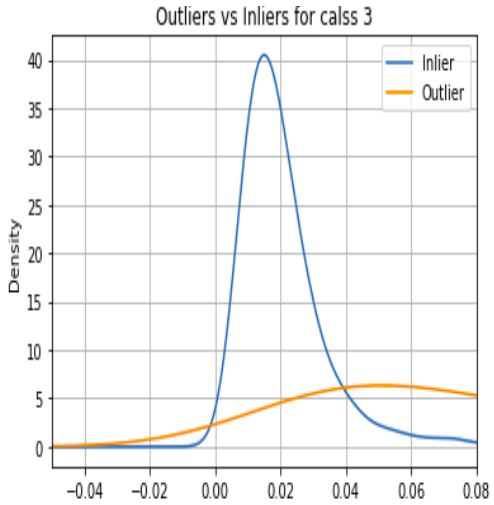
CLASS	ROC SCORE
0	96.31164306077196
1	98.77401353140972
2	88.33588547393316
3	92.80452427890175
4	93.1941841594024

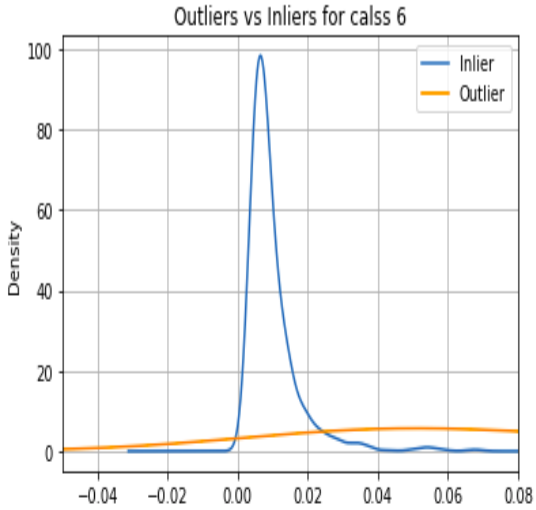
5	78.77104048872425
6	98.29830311711665
7	94.0329056589372
8	88.77153771149828
9	90.04124706139902

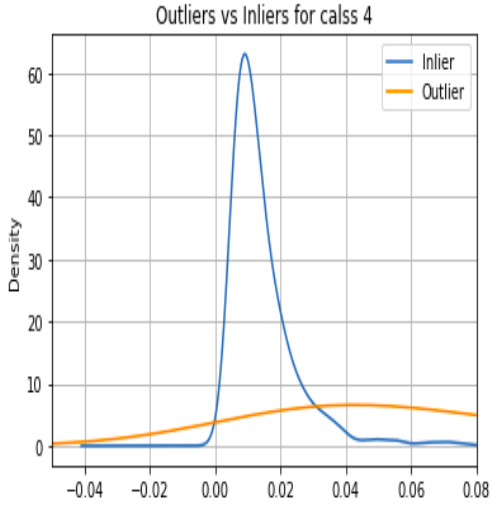


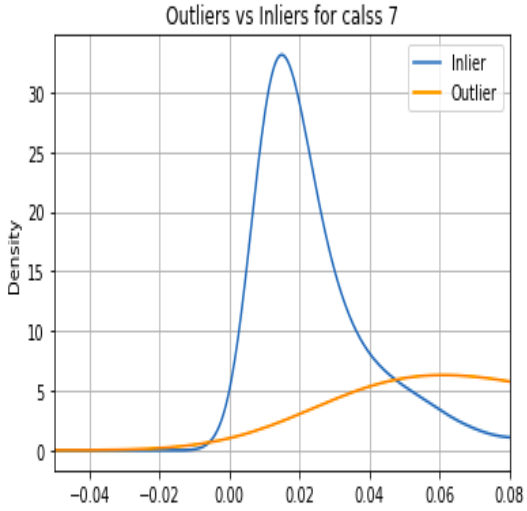


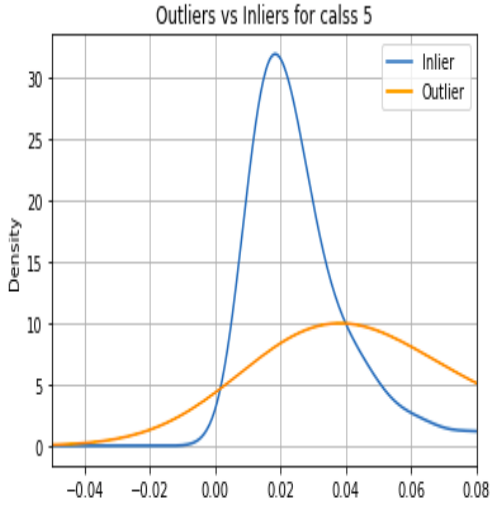


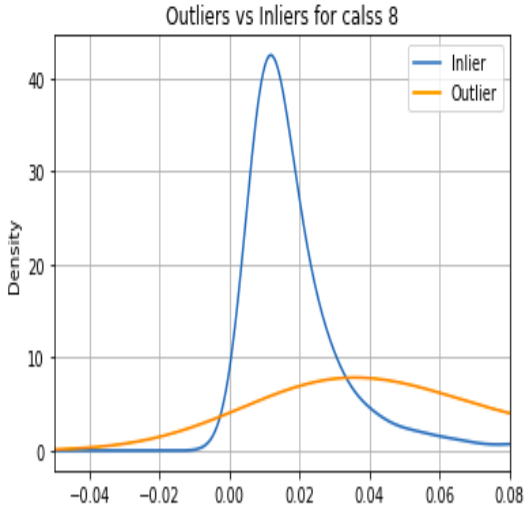

Outliers vs Inliers for calss 3
Inlier
Outlier
Density

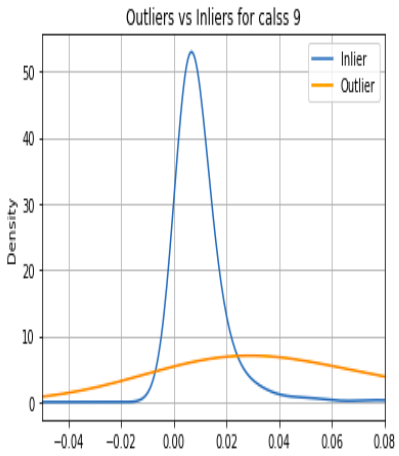

Outliers vs Inliers for calss 6
Inlier
Outlier
Density


Outliers vs Inliers for calss 4
Inlier
Outlier
Density


Outliers vs Inliers for calss 7
Inlier
Outlier
Density


Outliers vs Inliers for calss 5
Inlier
Outlier
Density


Outliers vs Inliers for calss 8
Inlier
Outlier
Density


Outliers vs Inliers for calss 9
Inlier
Outlier
Density
50
40
30
20
10
0
−0.04
−0.02
0.00
0.02
0.04
0.06
0.08