

Out-of-Distribution Detection for Contrastive Models using Angular Distance Measures

(Supplementary document)

1 A sample ID/OOD report

The report from our proposed framework depicted in Figure 1 shows the nearest neighbors of a given test image and its ID/OOD detection results. The nearest neighbors are from the ID training dataset (ImageNet). It is also shown that the image is in the distribution of the ImageNet dataset (reported ID score S_{ID} is 0.6646). The ID score S_{ID} can provide a stronger explanation and trust in the contrastive AI model. It should be noted that the ID score could correctly identify the data in-distribution even if the class is predicted incorrectly. A close-set model may sometimes give a very confident prediction outside the model’s knowledge limits. This proposed framework ensures that a potential user would be aware of such a situation.

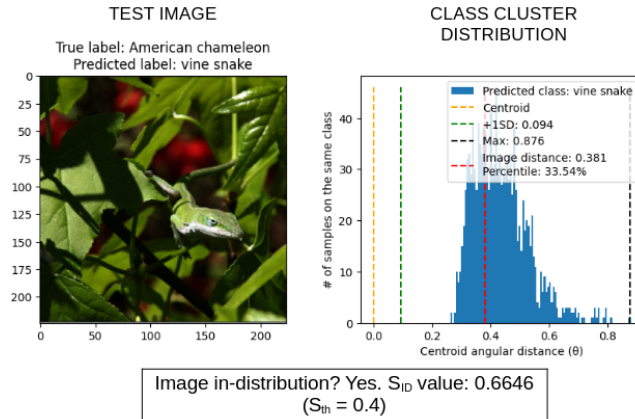


Figure 1: A sample report showing the given test image, class cluster distribution, nearest exemplars in the training set, and OOD reports showing the result with the proposed framework.

2 Data distribution for OOD detection for different datasets and methods

Table 1: OOD detection score for in-distribution and out-of-distribution data for KNN+, SSD+, and proposed methods.

	In-distribution		Out-of-distribution	
	ImageNet	ImageNet-O	SUN	aYahoo
Proposed	0.46	0.25	0.22	0.27
KNN+	-0.57	-0.62	-0.64	-0.63
SSD+	803.64	913.72	905.61	929.67
MCM	-0.001126	-0.001102	-0.001097	-0.001112
CIDER	147.22894	147.2075	147.1546	147.22241

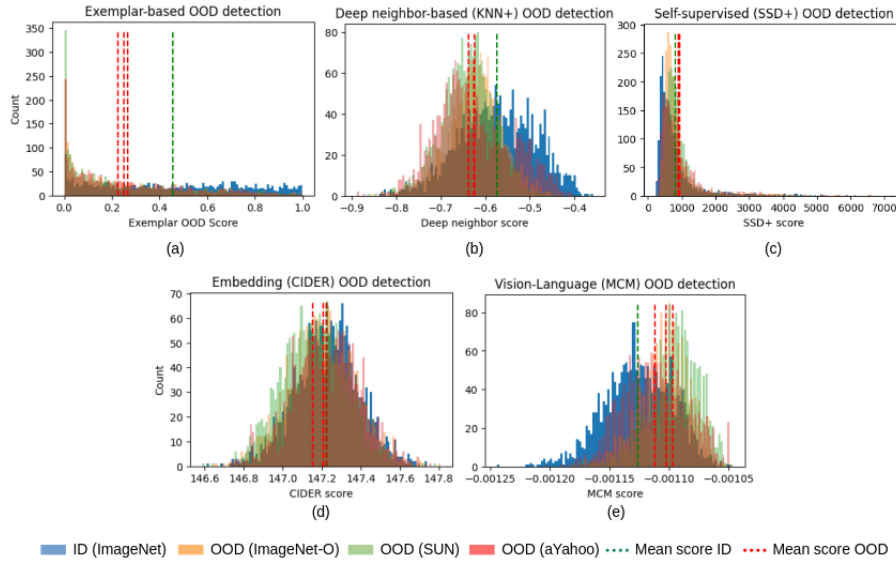


Figure 2: Histogram for the data prediction percentile of ID and OOD data points for (a) Exemplar-based, (b) Deep neighbor KNN+, (c) Self-supervised SSD+, (d) Embedding CIDER, and (e) vision-language MCM methods.

3 Threshold optimization results

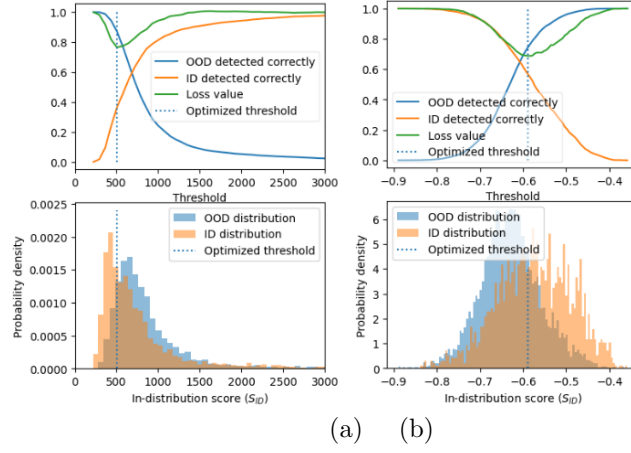


Figure 3: Threshold optimization for (a) **SSD+** and (b) **KNN+** methods

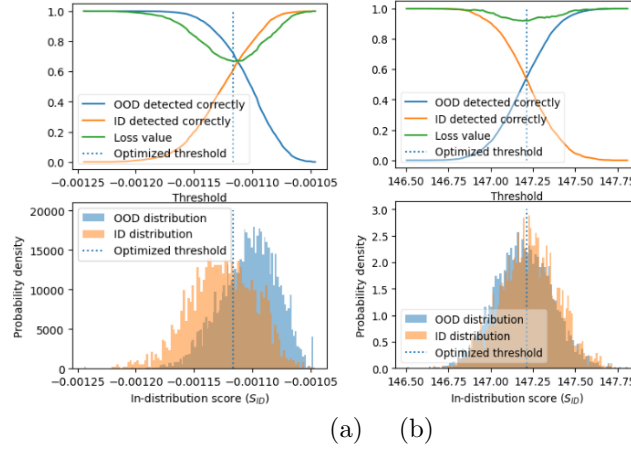


Figure 4: Threshold optimization for (a) **MCM** and (b) **CIDER** methods

4 OOD data samples

In this section, we show some sample OOD images from ImageNet-O, SUN, and aYahoo datasets.

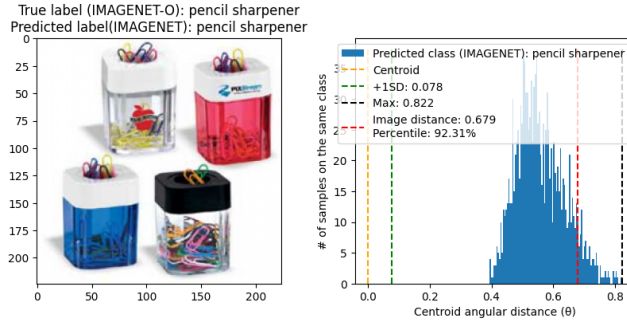


Figure 5: OOD sample image from ImageNet-O dataset

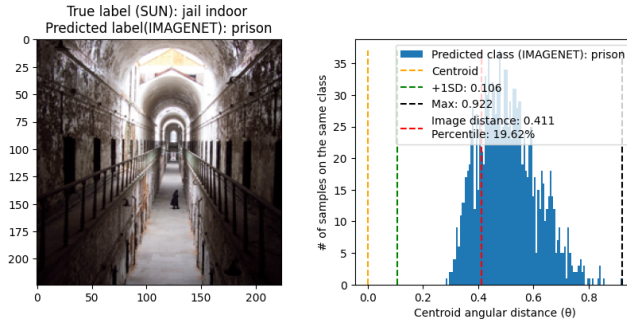


Figure 6: OOD sample image from SUN dataset

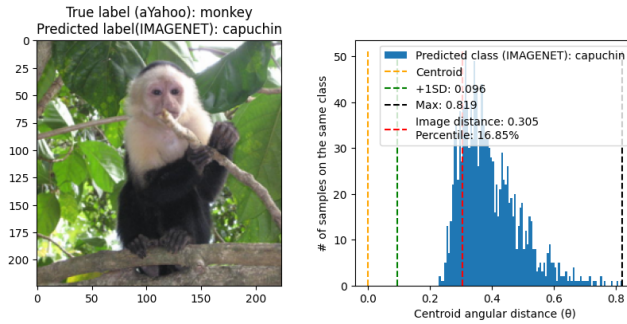


Figure 7: OOD sample image from aYahoo dataset