SECOS: Semantic Capture for Rigorous Classification in Open-World Semi-Supervised Learning

Supplementary Material

Compatibility with Multiple PEFT Methods

SECOS does not rely exclusively on the adapter-based parameter-efficient fine-tuning (PEFT) strategy. We replace the Adapter for Semantic Feature Alignment stage with alternatives such as CoOp and LoRA, updating only these modules with the same objective while keeping the backbone model frozen. The experimental results are presented in Tab. 6 and Tab. 7. As shown, CoOp, LoRA, and Adapter yield comparable performance, demonstrating the robustness of SECOS to different PEFT strategies and validating the effectiveness of its semantic capture and supervision enhancement design.

Evaluating without Hungarian Matching

To demonstrate that existing OWSSL and GCD methods cannot directly predict textual labels, we exclude Hungarian Matching from the evaluation. Instead, classification accuracy is computed by directly comparing the predicted labels with the ground truth. The results are shown in Tab. 8 and Tab. 9. Existing methods suffer severe drops in Novel accuracy, indicating their inability to directly predict textual labels. At the same time, SECOS remains stable, providing evidence for the necessity of SECOS and the tractability of the RC-OWSSL problem.

Table 6. Performance of SECOS using different PEFT strategies on CIFAR10 and ImageNet100.

Method	PEFT	CIFAR10			ImageNet100		
		K	N	A	K	N	A
SECOS	Adapter	97.9	98.8	98.1	93.4	89.8	91.7
SECOS	CoOp	94.0	95.3	94.6	91.4	89.6	90.5
SECOS	LoRA	98.0	97.9	97.9	93.0	90.2	91.6

Table 7. Performance of SECOS using different PEFT strategies on OxfordFlowers and OxfordPets.

Method	PEFT	OxfordFlowers			OxfordPets		
		K	N	A	K	N	A
SECOS	Adapter	98.4	83.7	90.0	95.9	95.5	95.4
SECOS	CoOp	97.4	82.7	89.1	95.2	95.2	95.2
SECOS	LoRA	97.5	83.3	89.1	96.4	95.1	95.8

Table 8. Evaluation on CIFAR10 without Hungarian Matching. All methods are evaluated by directly comparing predicted labels with ground truth.

Methods	Backbone	CIFAR10		
		K	N	A
ORCA	ResNet	88.29	14.57	39.02
TRSSL	ResNet	96.58	6.48	51.53
TIDA	ResNet	97.12	13.60	55.36
TRAILER	ResNet	93.50	19.04	56.27
OwMatch	ResNet	94.72	17.36	56.04
SimGCD	DINO	96.10	0.27	32.22
TextGCD	CLIP	81.00	22.86	51.93
ORCA + CoOp	CLIP	96.77	87.46	90.55
TRSSL + CoOp	CLIP	96.54	57.04	76.79
TIDA + CoOp	CLIP	20.00	0.00	10.00
TRAILER + CoOp	CLIP	96.12	87.38	91.75
OwMatch + CoOp	CLIP	92.56	91.34	93.78
TIDA + Adapter	CLIP	22.24	0.00	11.12
TRAILER + Adapter	CLIP	98.68	17.92	58.30
OwMatch + Adapter	CLIP	96.10	38.96	67.53
SECOS (ours)	CLIP	97.85	98.76	98.14

Table 9. Evaluation on CIFAR100 without Hungarian Matching.

Methods	Backbone	CIFAR100		
		K	N	A
ORCA	ResNet	67.17	1.81	23.48
TRSSL	ResNet	77.12	1.94	39.53
TIDA	ResNet	78.64	1.08	39.86
TRAILER	ResNet	71.62	1.58	36.60
OwMatch	ResNet	77.22	1.10	39.16
SimGCD	DINO	81.59	2.00	55.06
TextGCD	CLIP	67.36	2.88	35.12
ORCA + CoOp	CLIP	65.23	45.42	51.99
TRSSL + CoOp	CLIP	76.88	0.78	38.83
TIDA + CoOp	CLIP	2.12	1.40	1.76
TRAILER + CoOp	CLIP	78.58	49.66	64.12
OwMatch + CoOp	CLIP	78.88	62.74	70.81
TIDA + Adapter	CLIP	2.06	1.20	1.63
TRAILER + Adapter	CLIP	87.06	33.60	59.34
OwMatch + Adapter	CLIP	83.82	4.64	44.23
SECOS (ours)	CLIP	87.06	82.62	84.68