Upcycling Models under Domain and Category Shift

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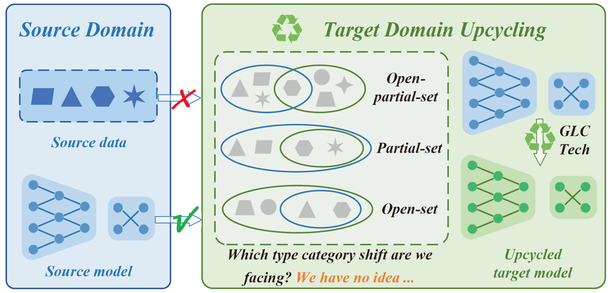
JUNE 18-22, 2023 CVPR VANCOUVER, CANADA

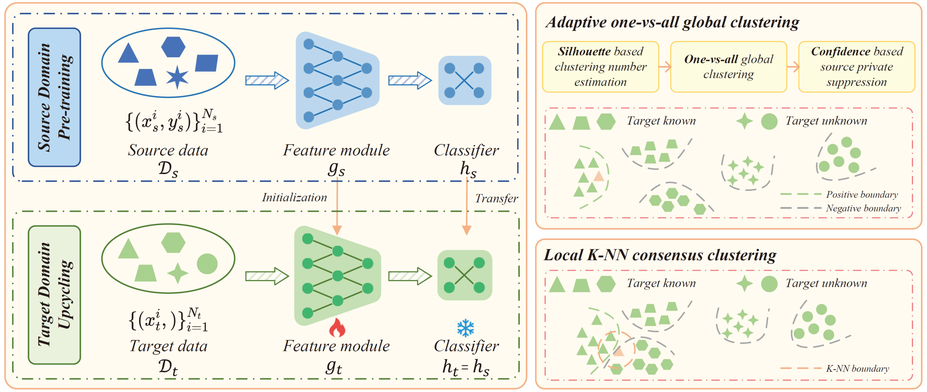
Introduction



- The source data free universal domain adaptation (SF-UniDA) based on standard pre-trained models and unlabeled target data.

Methodology

- Designing the one-vs-all global clustering to achieve pseudo-labeling under inconsistent label space.
- Introducing the K-NN local clustering to alleviate negative transfer.



Experiments on Standard Benchmark

Datasets Configuration:

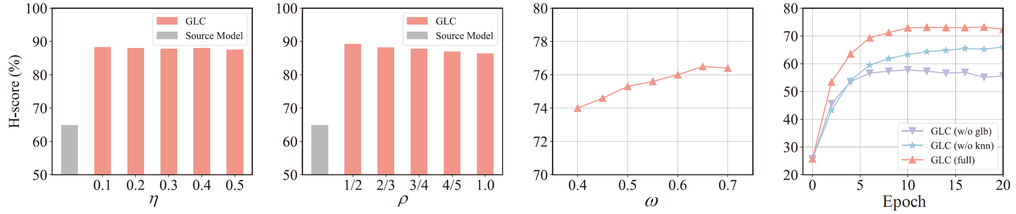
We evaluate GLC on Partial Domain Adaptation (PDA), Open-set Domain Adaptation (OSDA), and Open-partial Domain Adaptation (OPDA).

Dataset	Class Split($\mathcal{Y}/\bar{\mathcal{Y}}_s/\bar{\mathcal{Y}}_t$)		
	OPDA	OSDA	PDA
Office-31 [37]	10/10/11	10/0/11	10/21/0
Office-Home [44]	10/5/50	25/0/40	25/40/0
VisDA-C [34]	6/3/3	6/0/6	6/6/0
DomainNet [33]	150/50/145	-	-

Representative Results:

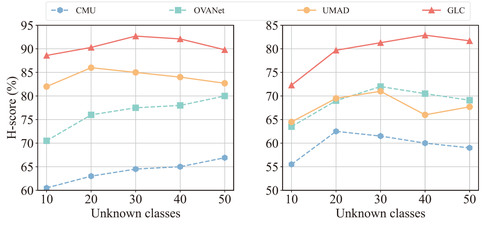
Methods	SF	OPDA	OSDA	PDA	Office-31							VisDA	DomainNet						
					A2D	A2W	D2A	D2W	W2A	W2D	Avg	S2R	P2R	P2S	R2P	R2S	S2P	S2R	Avg
UAN [47]	✗	✓	✗	✗	59.7	58.6	60.1	70.6	60.3	71.4	63.5	34.8	41.9	39.1	43.6	38.7	38.9	43.7	41.0
CMU [11]	✗	✓	✗	✗	68.1	67.3	71.4	79.3	72.2	80.4	73.1	32.9	50.8	45.1	52.2	45.6	44.8	51.0	48.3
DCC [20]	✗	✓	✓	✓	**88.5**	78.5	70.2	79.3	75.9	88.6	80.2	43.0	56.9	43.7	50.3	43.3	44.9	56.2	49.2
OVANet [39]	✗	✓	✓	✗	85.8	79.4	80.1	**95.4**	84.0	**94.3**	86.5	53.1	56.0	47.1	51.7	44.9	47.4	**57.2**	50.7
GATE [7]	✗	✓	✓	✓	**87.7**	**81.6**	84.2	**94.8**	83.4	94.1	**87.6**	56.4	57.4	**48.7**	**52.8**	**47.6**	**49.5**	56.3	**52.1**
Source-only	✓	-	-	-	70.9	63.2	39.6	77.3	52.2	86.4	64.9	25.7	57.3	38.2	47.8	38.4	32.2	48.2	43.7
SHOT-O [22]	✓	✗	✓	✗	73.5	67.2	59.3	88.3	77.1	84.4	75.0	44.0	35.0	30.8	37.2	28.3	31.9	32.2	32.6
UMAD [23]	✓	✓	✓	✗	79.1	77.4	**87.4**	90.7	**90.4**	**97.2**	87.0	**58.3**	**59.0**	44.3	50.1	42.1	32.0	55.3	47.1
GLC	✓	✓	✓	✓	81.5	**84.5**	**89.8**	90.4	**88.4**	92.3	**87.8**	**73.1**	**63.3**	**50.5**	**54.9**	**50.9**	**49.6**	**61.3**	**55.1**

Hyper-parameter Analysis:



(a) sensitivity to η ($\rho = 3/4$) (b) sensitivity to ρ ($\eta = 0.3$) (c) H-score w.r.t ω (d) H-score convergence

Robustnesss Analysis:



(a) Ar →Re in OPDA (b) Cl → Pr in OPDA

Experiments on Real-world Applications

- Not just only computer science benchmarks, we also conduct experiments on several realistic applications, including remote sensing recognition, wild animal classification, and single-cell RNA-seq analysis.