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Pedestrian Attribute Recognition: A New Benchmark Dataset and A Large Language Model Augmented Framework

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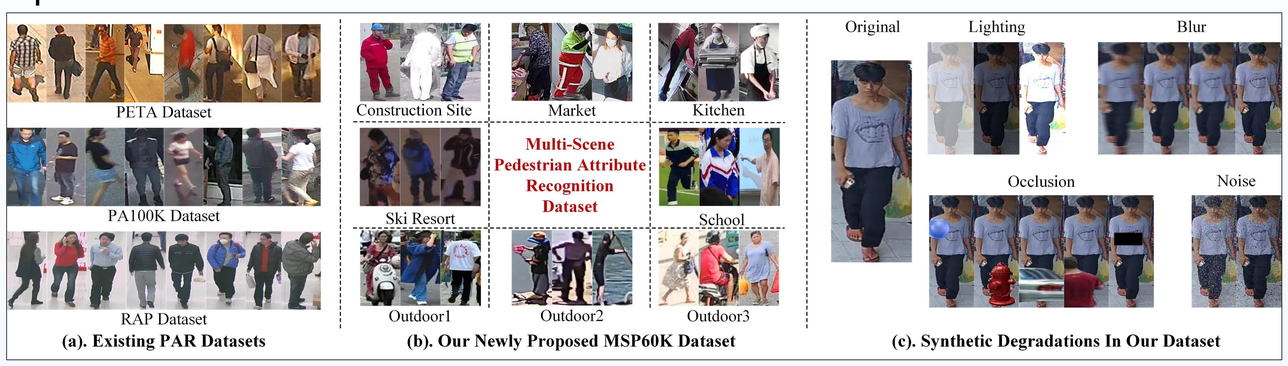
WeChat | Paper | Code/Dataset

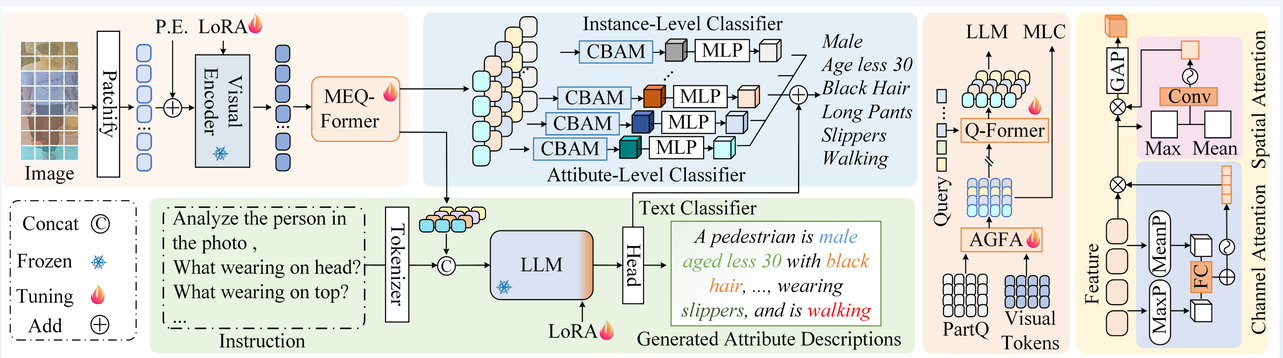
https://github.com/Event-AHU/OpenPAR

♦ Abstract

1. Existing datasets **neglect different domains** (e.g., environments, times, populations, and data sources), only conducting **simple random splits**, and the performance of these datasets has already approached saturation.
2. In the past five years, no large-scale dataset has been opened to the public.

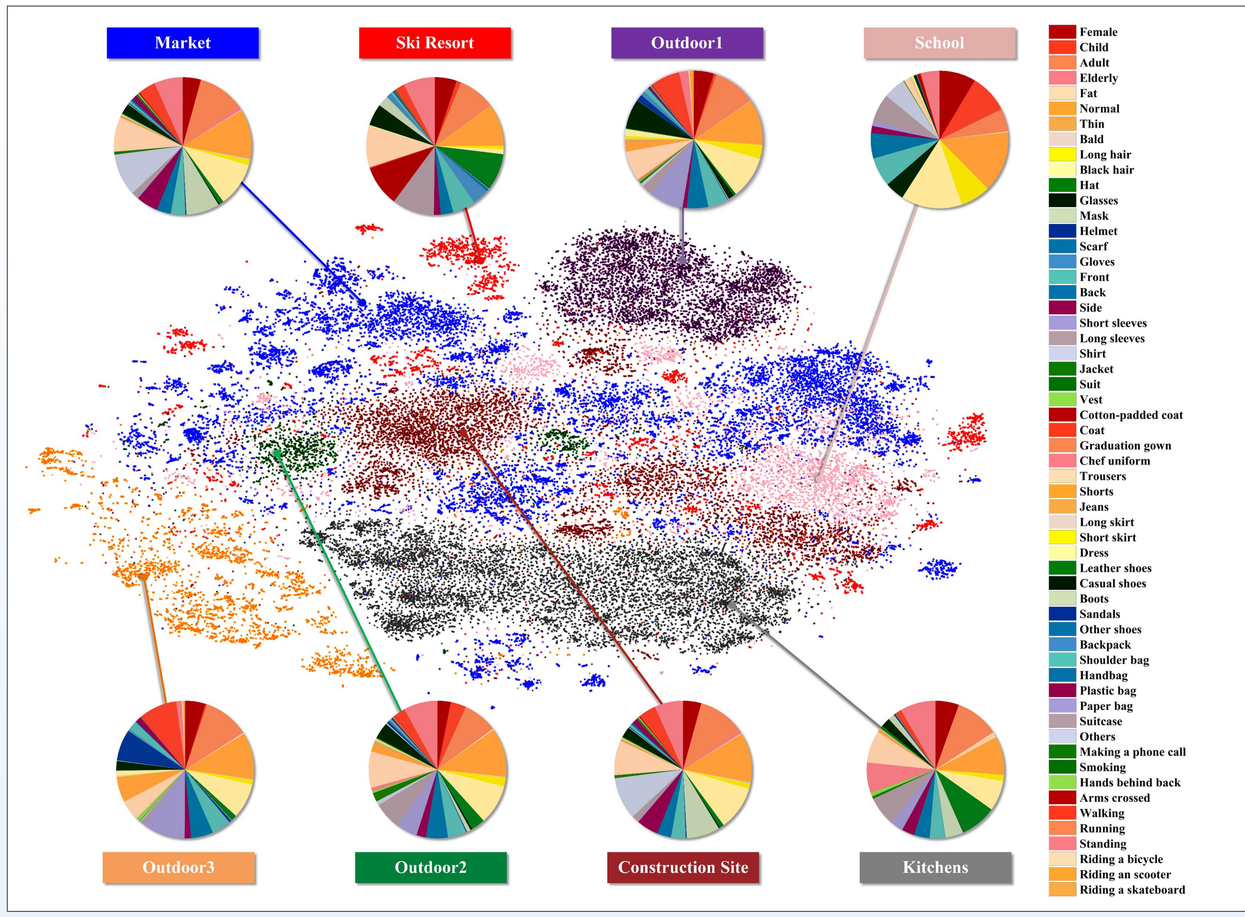


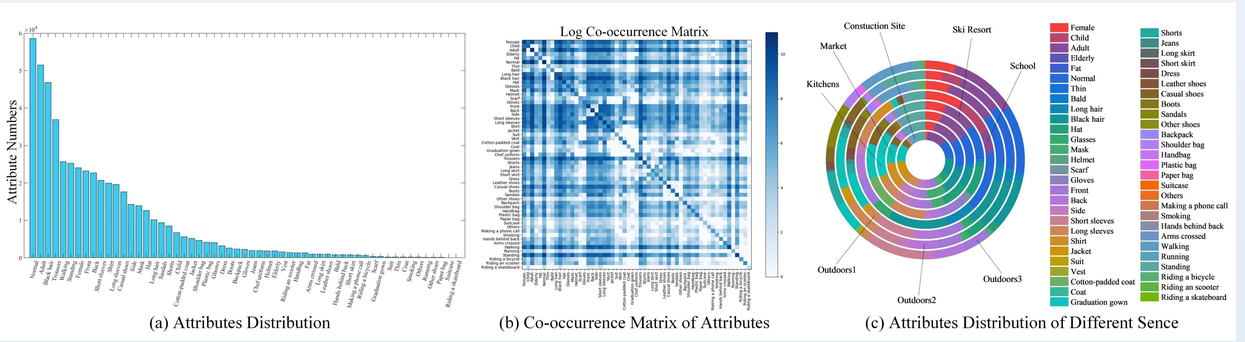
♦ Methods



♦ Contributions

A new benchmark dataset for PAR, termed **MSP60K**, which **contains 60122 images**, over **5,000 IDs**, and fully reflects the key challenges in **Eight** real-world scenarios.





♦ Result On Public Dataset

Methods	Publish	PETA					PA100K					RAPv1				
		mA	Acc	Prec	Rec	F1	mA	Acc	Prec	Rec	F1	mA	Acc	Prec	Rec	F1
SSCNet (Jia, Chen, and Huang 2021)	ICCV21	86.52	78.95	86.02	87.12	86.99	81.87	78.89	85.98	89.10	86.87	82.77	68.37	75.05	87.49	80.43
CAS (Yang et al. 2021)	IJCV21	86.40	79.93	87.03	87.33	87.18	82.86	79.64	86.81	87.79	85.18	84.18	68.59	77.56	83.81	80.56
IAA (Wu et al. 2022)	PR22	85.27	78.04	86.08	85.80	85.64	81.94	80.31	88.36	88.01	87.80	81.72	68.47	79.56	82.06	80.37
DRFormer (Tang and Huang 2022)	NC22	89.96	81.30	85.68	91.08	88.30	82.47	80.27	87.60	88.49	88.04	81.81	70.60	80.12	82.77	81.42
VAC (Guo, Fan, and Wang 2022)	IJCV22	-	-	-	-	-	82.19	80.66	88.72	88.10	88.41	81.30	70.12	81.56	81.51	81.54
DAFL (Jia et al. 2022)	AAAI22	87.07	78.88	85.78	87.03	86.40	83.54	80.13	87.01	89.19	88.09	83.72	68.18	77.41	83.39	80.29
VTB (Cheng et al. 2022)	TCSVT22	85.31	79.60	86.76	87.17	86.71	83.72	80.89	87.88	89.30	88.21	82.67	69.44	78.28	84.39	80.84
PromptPAR (Wang et al. 2024a)	TCSVT24	88.76	82.84	**89.04**	89.74	89.18	87.47	83.78	**89.27**	91.70	90.15	85.45	71.61	79.64	86.05	82.38
PARformer (Fan et al. 2023)	TCSVT23	89.32	82.86	88.06	91.98	89.06	84.46	81.13	88.09	91.67	88.52	84.43	69.94	79.63	**88.19**	81.35
OAGCN (Lu et al. 2023)	TMM23	89.91	82.95	88.26	89.10	88.68	83.74	80.38	84.55	90.42	87.39	**87.83**	69.32	78.32	87.29	82.56
SSPNet (Shen et al. 2024)	PR24	88.73	82.80	88.48	90.55	89.50	83.58	80.63	87.79	89.32	88.55	83.24	70.21	**80.14**	82.90	81.50
SOFA (Wu et al. 2024)	AAAI24	87.10	81.10	87.80	88.40	87.80	83.40	81.10	88.40	89.00	88.30	83.40	70.00	80.00	83.00	81.20
FRDL (Zhou et al. 2024)	ICML24	88.59	-	-	-	89.03	89.44	-	-	-	88.05	87.72	-	-	-	79.16
Zero-shot	-	61.32	50.75	68.57	64.00	65.52	65.26	56.99	79.21	65.20	70.75	65.46	50.90	64.48	65.20	66.06
Ours	-	**92.25**	**84.59**	88.41	**92.94**	**90.39**	**91.09**	**84.12**	87.73	**94.09**	**90.41**	87.80	**71.86**	78.36	**88.20**	**82.64**

#	CLS-Attr	FT Q-Former	LoRA	CLS-LLM	AGFA	CLS-IN	PETA Dataset		
							mA	Acc	F1
1	✓						71.54	58.24	71.96
2	✓	✓					82.89	72.32	81.89
3	✓	✓	✓				90.14	83.25	89.38
4	✓	✓	✓	✓			90.89	83.64	89.60
5	✓	✓	✓	✓	✓		91.78	84.47	90.27
6	✓	✓	✓	✓	✓	✓	92.25	84.59	90.39

♦ Result On Our **MSP60K** Dataset

Methods	Publish	Random Split					Cross-domain Split				
		mA	Acc	Prec	Recall	F1	mA	Acc	Prec	Recall	F1
#01 DeepMAR (Li, Chen, and Huang 2015)	ACPR15	70.46	72.83	84.71	81.46	83.06	54.84	44.97	63.38	58.81	61.01
#02 Strong Baseline (Jia et al. 2021)	-	74.09	73.74	84.06	83.51	83.31	55.91	46.25	63.28	61.34	61.64
#03 RethinkingPAR (Jia et al. 2021)	arXiv20	74.01	74.20	84.17	83.94	84.06	55.98	46.52	62.85	62.09	62.47
#04 SSCNet (Jia, Chen, and Huang 2021)	ICCV21	69.71	69.31	79.22	82.47	80.82	52.84	40.88	56.26	58.64	57.43
#05 VTB (Cheng et al. 2022)	TCSVT22	76.09	75.36	83.56	86.46	84.56	58.59	49.81	65.11	66.11	65.00
#06 Label2Label (Li et al. 2022b)	ECCV22	73.61	72.66	81.79	84.32	82.56	56.38	45.81	59.67	64.20	61.19
#07 DFDT (Zheng et al. 2023a)	EAAI22	74.19	76.35	**85.03**	86.35	85.69	57.85	49.97	65.34	66.18	65.76
#08 Zhou et al. (Zhou et al. 2023)	IJCAI23	73.07	68.76	78.38	82.10	80.20	54.26	41.91	56.23	60.11	58.11
#09 PARFormer (Fan et al. 2023)	TCSVT23	76.14	76.67	84.77	86.93	85.44	57.96	50.63	62.28	71.04	65.82
#10 SequencePAR (Jin et al. 2023)	arXiv23	71.88	71.99	83.24	82.29	82.29	57.88	50.27	65.81	65.79	65.37
#11 VTB-PLIP (Zuo et al. 2023)	arXiv23	73.90	73.16	82.01	84.82	82.93	56.30	46.77	61.20	64.47	62.18
#12 Rethink-PLIP (Zuo et al. 2023)	arXiv23	69.44	68.90	79.82	81.15	80.48	57.18	46.98	63.57	62.16	62.86
#13 PromptPAR (Wang et al. 2024a)	TCSVT24	78.81	76.53	84.40	87.15	85.35	63.24	53.62	**66.15**	71.84	68.32
#14 SSPNet (Shen et al. 2024)	PR24	74.03	74.10	84.01	84.02	84.02	56.15	46.75	62.44	63.07	62.75
#15 HAP (Yuan et al. 2024)	NIPS24	76.92	76.12	84.78	86.14	85.45	58.70	50.59	65.60	66.91	66.25
#16 MambaPAR (Wang et al. 2024c)	arXiv24	73.85	73.64	83.19	84.29	83.28	56.75	47.34	61.92	64.98	62.80
#17 MaHDFT (Wang et al. 2024b)	arXiv24	74.08	74.40	82.82	86.41	83.93	58.67	50.65	62.39	71.13	65.85
Zero-shot	-	56.93	52.97	72.26	64.69	67.46	52.19	39.26	60.12	52.09	55.15
Ours	-	**80.13**	**78.71**	84.39	**90.52**	**86.94**	**66.29**	**58.11**	65.68	**81.21**	**72.05**