Dual Relation Semi-supervised Multi-label Learning

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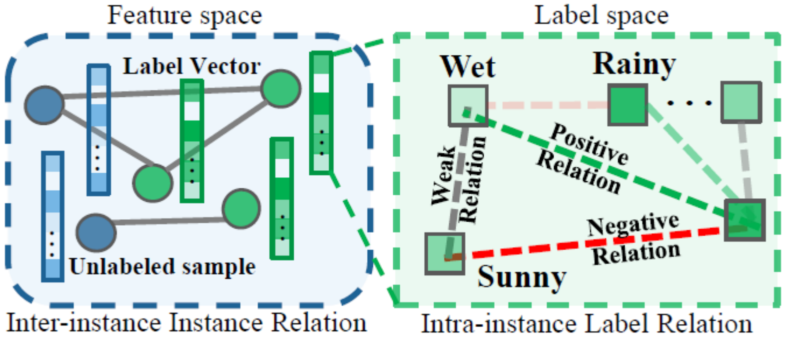
Smile lab
Synergetic Media Learning Lab

Multi-label learning:

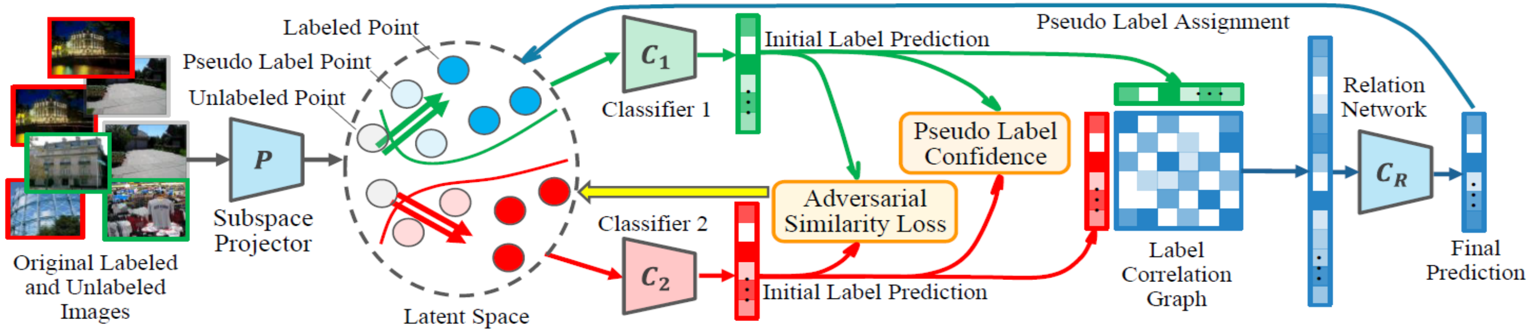
Predict multiple labels from a single instance.

Difficulties & insights:

- ➢ Multi-label follows long-tail label distribution. No enough samples to well train all labels.
- • Semi-supervised approach is deployed to utilize unlabeled samples
- ➢ Label correlations are crucial information
- • Label-correlation graph and co-training strategy is proposed to explore label relation from both labeled and unlabeled samples.



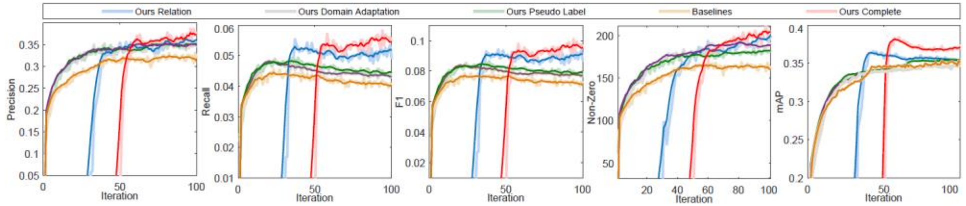
Our model:

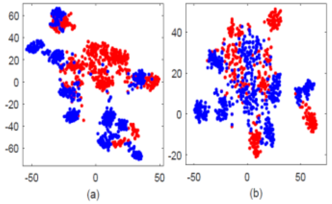


- Two-classifier structure is utilized to align distributions of labeled and unlabeled samples.
- A co-training strategy is specifically designed which gradually assigns labels to unlabeled samples.
- A label-correlation graph is utilized to explore the label relations from labeled and unlabeled samples.

Experiments:

- Six datasets, four experimental settings, and ablation studies





SUN	LR	0.6209	0.1473	0.2457	102	0.6807
	SSMLDR	0.6879	0.1700	0.2726	102	0.6723
	FastTag	0.6816	0.1473	0.2457	102	0.6914
	ML-PGD	0.7110	0.1614	0.2631	101	**0.7087**
	SAE	0.7183	0.1638	0.2668	98	0.7012
	AG2E	0.7685	0.1765	0.2871	99	0.6778
	Ours	**0.7906**	**0.1793**	**0.2923**	**102**	0.6800
CUB	LR	0.2010	0.0239	0.0428	157	0.0638
	SSMLDR	0.3410	0.0473	0.0832	178	0.2329
	FastTag	0.2147	0.0359	0.0615	167	0.3144
	ML-PGD	0.3334	0.0451	0.0794	155	0.3288
	SAE	0.3383	0.0514	0.0908	196	0.3255
	AG2E	0.3409	0.0531	0.0911	190	0.3106
	Ours	**0.3714**	**0.0548**	**0.0955**	**202**	**0.3542**
AWA	LR	0.8798	0.0821	0.1500	75	0.8626
	SSMLDR	0.7812	0.0858	0.1546	67	0.8346
	FastTag	0.7861	0.0949	0.1694	72	0.8791
	ML-PGD	0.5395	0.0635	0.1136	57	0.9121
	SAE	**0.9683**	**0.0957**	**0.1742**	73	0.9397
	AG2E	0.8483	0.0827	0.1507	73	0.9033
	Ours	0.8689	0.0835	0.1523	**75**	**0.9441**

Code will be available: https://github.com/wanglichenxj/Dual-Relation-Semi-supervised-Multi-label-Learning

Feel free to contact us: wanglichenxj@gmail.com