Contrastive Language Prompting to Ease False Positives in Medical Anomaly Detection

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INTRODUCTION



EXPERIMENTAL SETUP

Poster No.

- **Dataset:** BMAD benchmark covering MRI, CT, X-ray, OCT, and histopathology images.
- **Models**: EAR (U-Net), CLIP with positive language prompting (PLP) alone, and CLAP (ours).
- Evaluation: Image-level AUROC scores.

RESULTS

- False positives hinders accurate detection of disease regions.
- CLAP refines attention by leveraging both positive and negative text prompts.



CLAP suppresses false positives effectively



Anatomy	Brain MRI	Liver CT	Retinal OCT		Chest X-ray	Lymph node	Average	
Dataset	BraTS2021	BTCV + LiTs	RESC	OCT2017	RSNA	CAMELYON16		
EAR [2]	77.37	72.51	86.42	97.46	71.69	63.39	78.21	
PLP	73.54	72.76	90.08	96.77	65.23	64.98	77.23	



(a) Attention map generation by Contrastive LAnguage Prompting (CLAP)



(b) Unsupervised anomaly detection (UAD) scheme

CLAP (ours)	78.55	72.60	91.66	96.38	65.76	68.42	78.89
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CLAP improves image-level disease detection

CONCLUSION

- CLAP effectively reduces false positives to find suspected disease regions.
- Outperforms existing EAR and PLP methods in medical anomaly detection.
- Future work aims to automate fine prompt generation to enhance usability.

REFERENCES

- [1] Sheng Zhang, et al., "BiomedCLIP: a multi-modal biomedical foundation model pretrained from fifteen million scientific image-text pairs," arXiv, 2023.
- [2] YeongHyeon Park, et al., "Visual defect obfuscation based self-

Anatomy	P/N	Language prompt			
Drain MDI	P	Glioma, Astrocytoma, Oligodendroglioma			
	N	Normal, Healthy gray matter			
Liver CT	P	Malignant cells, Dysplasia, Hyperplasia			
	N	Normal, Healthy, Benign			
Retinal OCT	P	Retinal fluid, Drusen, Retinal detachment			
	N	Normal, Healthy, Clear			
Chest X ray	P	Consolidation, Fibrosis, Atelectasis			
Chest A-ray	N	Healthy, Clear fields, Normal			
I umph node	P	Metastatic carcinoma, Tumor metastasis			
	N N	Normal, Healthy tissue			

Examples of positive (P) and negative (N) language prompts

supervised anomaly detection," *Scientific Reports*, 2024. [3] Jinan Bao, et al., "BMAD: Benchmarks for medical anomaly detection," CVPR, 2024

