Wenfang Sun | Résumé

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Education

University of Science and Technology of China **Hefei**
Master, Computer Science *2021-2024*

Anhui University **Hefei**
Bachelor, Communication Engineering *2017-2021*

Research Interests

My previous research primarily focused on the probabilistic meta-learning in few-shot learning. I have also explored prompt learning for vision-language models. Currently, I am enthusiastic about foundation models.

Research Experience

Few-shot Learning with Fewer Tasks
Supervision of Dr. Xiantong Zhen and Prof. Cees Snoek.
⋆ Proposed MetaModulation, an innovative approach for few-shot learning, tackles the constraint of limited meta-training tasks by employing neural networks to modulate batch normalization parameters during training.
⋆ Proposed a variational extension of MetaModulation, introducing uncertainty-aware meta-learning through treating modulation parameters as latent variables.
⋆ Introduced learning variational feature hierarchies within the framework of variational MetaModulation, enabling modulation of features at all network layers.

Training-Free Semantic Segmentation via LLM-Supervision
Supervision of Yingjun Du and Prof. Cees Snoek.
⋆ Proposed a novel text-supervised semantic segmentation framework leveraging large language model supervision for enhanced class descriptors and improved segmentation accuracy.
⋆ Proposed an advanced subclass generation technique using a large language model, such as GPT-3, to refine class representations in text-supervised semantic segmentation.
⋆ Proposed an effective ensembling strategy that merges diverse segmentation maps from generated subclass descriptors, ensuring a comprehensive representation of unique characteristics in test images.

IPO: Interpretable Prompt Optimization for Vision-Language Models
Supervision of Yingjun Du and Prof. Cees Snoek.
⋆ Proposed a simple yet interpretable prompt optimizer that utilizes Large Language Models (LLMs) to generate textual prompts dynamically.
⋆ Introduced a novel prompt mechanism that guides LLMs in creating effective prompts while storing past prompts with their performance metrics, providing rich in-context information.
⋆ Incorporated a large multimodal model (LMM) to generate image descriptions, enhancing the interaction between textual and visual modalities.

QUOTA: Quantifying Objects with Text-to-Image Models for Any Domain
Supervision of Yingjun Du and Prof. Cees Snoek.

⋆ Proposed QUOTA, a domain-agnostic framework for object counting using text-to-image models, removing the need for retraining across domains.

⋆ Introduced a dual-loop meta-learning strategy for domain-invariant prompt optimization, enabling accurate counting in unseen domains.

⋆ Developed a benchmark for evaluating object counting accuracy and adaptability across domains, demonstrating superior performance over conventional methods.

Publications

⋆ [1] **Wenfang Sun***,Yingjun Du*, Xiantong Zhen, Fan Wang, Ling Wang and Cees Snoek. MetaModulation: Learning Variational Feature Hierarchies for Few-Shot Learning with Fewer Tasks (**ICML 23**). (Equal contribution)

⋆ [2] **Wenfang Sun***, Yingjun Du*, Gaowen Liu, Ramana Rao Kompella, and Cees Snoek. Training-Free Semantic Segmentation via LLM-Supervision (**In 2nd Workshop on What is Next in Multimodal Foundation Models? at CVPR 24**). (Equal contribution)

⋆ [3] Yingjun Du*, **Wenfang Sun***, and Cees Snoek. IPO: Interpretable Prompt Optimization for Vision-Language Models(**NeurIPS 2024**).(Equal contribution)

⋆ [4] **Wenfang Sun**, Yingjun Du, Gaowen Liu, and Cees Snoek. QUOTA: Quantifying Objects with Text-to-Image Models for Any Domain(**submitted to CVPR 2025**).

Awards

2024: Outstanding Graduate Award of Ordinary Colleges and Universities in Anhui Province USTC

2024: Outstanding Graduate Award of University of Science and Technology of China USTC

2023: National Scholarship USTC

Skills

Proficient: Python, ML/CV libraries (PyTorch, Tensorflow, OpenCV)

Reviewer

ICLR 2025, NeurIPS 2024 Workshop, ACMMM 2024, CVPR 2024 Workshop, TNNLS.

Academic References

⋆ **Dr. Xiantong Zhen**

Dr. Xiantong Zhen is currently the Director of AI Research at Central Research Institute, United Imaging Healthere, Co., Ltd. Previously, he was an Assistant Professor and Scientific Manager at the AI for Medical Imaging Lab at the University of Amsterdam, The Netherlands.

⋆ **Prof. Cees Snoek**

Prof. Cees Snoek is currently a Professor at the University of Amsterdam, specializing in computer vision through machine learning. With a decade of experience, he has authored over 300 papers, mentored 30 PhD students and postdocs. Additionally, he holds senior memberships in both the IEEE and the ACM and is recognized as an Ellis Fellow.