

Sheng Zhang

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EXPERIENCE

Research Assistant

June 2023 – Present

Mohamed Bin Zayed University of Artificial Intelligence, UAE

Supervisor: [Prof. Kun Zhang](#) (from CMU)

Master of Science(Graduate Research Assistant)

August 2021 – May 2023

Mohamed Bin Zayed University of Artificial Intelligence, UAE

GPA: 3.9/4.0

Supervisor: [Prof. Salman Khan](#); Co-supervisor: [Dr. Zhiqiang Shen](#)

Bachelor of Software Engineering

September 2016 – June 2021

Tongji University, Shanghai, China

GPA: 86/100

RESEARCH INTERESTS

- * Visual Concept learning: novel category discovery, self-supervised learning, representation learning.
- * Vision-Language Learning: under open-world assumption in downstream vision tasks.
- * Latent Variable Models: generative models based on causality for concept discovery.

PUBLICATIONS

1. PromptCAL: Contrastive Affinity Learning via Auxiliary Prompts for Generalized Novel Category Discovery.
Sheng Zhang, Salman Khan, Zhiqiang Shen, Muzammal Naseer, Guangyi Chen, Fahad Khan. CVPR 2023. [Paper](#) [Code](#).
2. Towards Realistic Zero-Shot Classification via Self Structural Semantic Alignment.
Sheng Zhang, Muzammal Naseer, Guangyi Chen, Zhiqiang Shen, Salman Khan, Kun Zhang, Fahad Khan.
Preprint. [Paper](#) [Code](#).
3. L-SNet: From Region Localization to Scale Invariant Medical Image Segmentation.
Jiahao Xie, **Sheng Zhang**, Jianwei Lu, Ye Luo. ICIP 2021. [Paper](#).
4. A Channel Attention Based Deep Neural Network for Automatic Metallic Corrosion Detection.
Sheng Zhang, Xinling Deng, Yumin Lu, Shaozheng Hong. Journal of Building Engineering, 2021. [Paper](#).

RESEARCH EXPERIENCE

Realistic Zero-Shot Classification with Vision-Language Learning

Jan. 2023 – June. 2023

My individual research supervised by Prof. Salman Khan.

MBZUAI, UAE

- ★ Proposed a novel framework to address the challenging Realistic Zero-Shot Classification based on semantic structural alignment augmented by Large Language Models.
- ✓ Benchmarked our method with SOTA performance on six generic, fine-grained and out-of-vocabulary datasets.
- ✓ Adapted multiple previous SOTAs to our setting as baselines for performance comparisons.

Generalized Novel Category Discovery

June 2022 – Dec. 2022

My individual research supervised by Prof. Salman Khan.

MBZUAI, UAE

- ★ Proposed a novel contrastive affinity learning framework to address the problem of generalized category discovery.
- ✓ Proposed a novel visual prompt regularization technique to enhance backbone semantic discriminativeness.
- ✓ Achieved SOTA performance on seven challenging benchmarks including fine-grained Herbarium19 and CUB.

Weakly-Supervised Semantic Segmentation on Medical Images

Jan. 2021 – June 2021

My bachelor thesis supervised by Dr. Ye Luo.

Tongji University, China

- ★ Proposed a two-stage framework to address semi-supervised domain adaptation in medical image segmentation.
- ✓ Proposed a novel patch rotation prediction pretext to enhance the representation transferability on downstream dense-prediction tasks.
- ✓ Outperformed previous segmentation SOTA models on both few-annotation and domain-shift scenarios.

Solution to Mask-Scale Variations in Medical Image Segmentation

July 2020 – Jan. 2021

My extended research for the MICCAI2020 TN-SCUI challenge advised by Dr. Ye Luo.

Tongji University, China

- ★ Proposed an entirely differentiable two-stage network to solve the large-scale variations problem in medical image segmentation.
- ✓ Adapting UNet architecture with various techniques, including channel/gate attention and D-LinkNet.

Metallic Corrosion Detection System

Mar. 2020 – Jan. 2021

Advisor: Dr. Ye Luo

Tongji University, China

- ★ Proposed an automatic framework to detect multi-level metallic corrosion based on channel attention mechanism.
- ✓ Adapted squeeze-and-excitation network for metallic corrosion detection with channel-wise explainability.

A Study on ncRNA-Protein Interactions

Mar. 2019 – Nov. 2019

My cooperative project with a Bioinformatics PhD.

Tongji University, China

- ★ Designed ML models to predict ncRNA-Protein interactions in the development of cardiovascular diseases.
- ✓ Conducted bioinformatics feature engineering and modeled with explainable learning-based models.

PROJECT EXPERIENCE

Class-agnostic Open-Set Object Detection

Sep. 2021 – June. 2022

Advised by Prof. Salman Khan

MBZUAI, UAE

- To detect unannotated out-of-vocabulary objects with a class-agnostic detector.
- Enhanced the openness of detectors by implementing a neat copy-paste data augmentation strategy.
- Designed and implemented an uncertainty-based box-jittering method to refine detector localization prediction.

Partially-Supervised Medical Image Segmentation

Mar. 2021 – June 2021

Advisor by Dr. Mohammad Yaqub

MBZUAI, UAE

- To conduct semantic segmentation on 3D MRI-scan datasets with only partial-class voxel-wise annotations.
- Benchmarked existing SOTA on a novel public datasets and conducted ablation experiments.
- Proposed CutMix with Spatial Priori and partially-supervised contrastive loss to improve SOTA performance.

A Study on Visual Relationship Detection with Large-Scale Pre-trained Models

Mar. 2022 – May. 2022

Course project

MBZUAI, UAE

- To leverage large-scale pre-trained models, e.g., CLIP, BERT, to address the visual relationship detection task.
- Adapted pretrained CLIP to the visual relationship detection task.
- Proposed a novel and effective semi-supervised framework for visual relationship plausibility detection.

Semi-Supervised Speech Sentiment Analysis with Pre-trained Models

Mar. 2022 – May. 2022

Advised by Shady Shehata

MBZUAI, UAE

- To explore the application of pre-trained LLM for Semi-Supervised Speech Sentiment Analysis.
- Recreated a SOTA semi-supervised speech-to-text sentiment analysis technique on well-known benchmarks.
- Enhanced the approach using the pre-trained Wav2Vec model.

TECHNICAL SKILLS

Language: English (fluent), Chinese (native)

Programming: Python, JAVA, Oracle

Libraries: Pytorch, Scikit-learn, Matplotlib, Pandas, NumPy

ACADEMIC SERVICES

CVPR <i>Reviewer</i>	2024
ACM Computing Surveys <i>Reviewer</i>	2023
AISTATS <i>Reviewer</i>	2024
International Conference on Computer Vision (ICCV-Workshop) <i>Reviewer</i>	2023
Conference on Empirical Methods in Natural Language Processing (EMNLP) <i>Volunteer</i>	2023