

# Zhang, Zeyu



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## EDUCATION

**The University of Hong Kong, Hong Kong SAR**

09/2022 – 12/2023

*MSc in Computer Science*

- GPA: 3.38/4.3
- Selected Courses: Deep learning, Data mining, Natural language processing, Machine learning in trading and finance, Artificial intelligence of things, Topic in artificial intelligence, Analysis and design of enterprise applications in UML, Introduction to cyber security, Financial fraud analytics, Distributed ledger and blockchain technology

**Wuhan University, China**

09/2018 - 06/2022

*BEng Computer Science and Technology*

- GPA: 3.736/4.0 (Cumulative Score: 88.737%)
- Selected Courses: Machine Learning and Pattern Recognition, Introduction to Artificial Intelligence, Computer Graphics, The Design and Analysis of Algorithms, Data Structure, Database Systems, Operating Systems, Computer Networks, Advanced Mathematics, Linear Algebra, Probability and Mathematical Statistics, Discrete Mathematics, Combinatorial Mathematics, Information Processing of Cognitive Processes, Creative Interpretation of Film Masters, Audio-Visual Language, Chinese Modern Drama Masterpieces Intensive Reading, A Guide to Humanities and Social Sciences

## PUBLICATION

Qing Xu, Wenwei Kuang, **Zeyu Zhang**, Xueyao Bao, Haoran Chen, and Wenting Duan (2023, October). "SPPNet: A Single-Point Prompt Network for Nuclei Image Segmentation." In *International Workshop on Machine Learning in Medical Imaging* (pp. 227-236). Cham: Springer Nature Switzerland.

<https://doi.org/10.48550/arXiv.2308.12231>

## RESEARCH INTERNSHIP

**Research Assistant, HKU Metaverse Innovation Lab, Drone-to-Drone Tracking Project**

10/2023 – 07/2024

*Supervisor: Dr. Loretta Choi & Prof. S.M. Yiu, The University of Hong Kong*

- Constructed datasets for model training. I annotated drone-to-drone tracking datasets which are provided by project client. And added self-synthesized data, web-scrape data, also used the data generated by the stable diffusion model to increase the amount of data. The drone dataset contained various conditions including mountains, forests, buildings, rainy, foggy, twilight and so on.
- Used YOLOv8 model as the detection model and the deep-sort model as the tracking algorithm to implement drone tracking. After training the YOLOv8 model using a large amount of training data, the model can obtain good tracking results. Tuned the model in order to have a good performance on edge-computing devices.
- Constructed the tracking model by splicing the CSP DarkNet53 backbone network and the Spatio-Temporal Swin Transformer. This design allows for efficient extraction of spatial and temporal features from the input frames, enabling robust tracking performance. Even in scenarios where the target drone flying into complex backgrounds, the model can still achieve good tracking.
- Deployed the tracking models with good performance to the Raspberry Pi chip of the drone to achieve real-time tracking applications. Evaluated and iterated the models, and tested the tracking effect, metrics, and FPS of the models.

**Research Assistant, HKU Metaverse Innovation Lab, 3D Scenes Splicing Project**

02/2024 – 07/2024

*Supervisor: Dr. Loretta Choi & Dr. Lei Yang, The University of Hong Kong*

- Reproduced the 3D Gaussian Splatting paper and applied it to our own custom datasets for 3D reconstruction.
- Conducted extensive literature research to investigate existing point cloud registration methods and papers and reproduced some of the classic papers.
- Proposed the method for 3D scene stitching: Upsample the Gaussian Scene, calculate the color and opacity of the newly generated points; conduct feature matching to find corresponding similarities; establish a transformation between the two scenes using the identified correspondences, converting them into the same coordinate system.
- Implemented ellipsoid sampling methods for Gaussians. Combined KNN and Gaussian rendering formulas to calculate the colors of the sampling points.

## RESEARCH EXPERIENCE

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### AI Sign Language Generation in Concert

01/2025 – present

Supervisor: Dr. Wai Tong, Texas A&M University

- Project Goal: Develop an AI-driven system to generate real-time American Sign Language (ASL) during concerts, providing accessibility to Deaf and hard-of-hearing audiences.
- Utilized Whisper API for accurate real-time speech-to-text conversion. Integrated ChatGPT API to transform text into ASL gloss. Constructed an ASL lexicon by leveraging the WLASL dataset. Converted ASL gloss into ASL poses.
- Developed the workflow that enables real-time conversion from speech to text, text to gloss, and gloss to ASL poses, improving the accessibility and inclusivity of live performances.

### HKU MSc Final Year Project: Medical Image Analysis Based on Deep Learning Methods

02/2023 - 08/2023

Supervisor: Dr. Ping Luo, The University of Hong Kong

- Collected various medical image datasets, including cell and nuclei datasets, tumour and polyp datasets, and tissue and vessel datasets. Standardized the label format of the dataset and converted mask to NumPy format. Analysed datasets.
- Improved three prompts based on Segment Anything Model: point prompt, box prompt, text prompt.
- Improved SAM with automatically generated bounding box prompt. Implement YOLOv8 model in the object detection module to automatically generate bboxes for SAM's box prompt input. The constructed YOLO\_SAM model achieved good segmentation accuracy and improved the efficiency and applicability of medical segmentation tasks.
- Wrote the paper *SPPNet: A Single-Point Prompt Network for Nuclei Image Segmentation*, which has been accepted by MICCAI-MLMI 2023.
- Proposed and achieved three architectures for nuclei image segmentation: SPPNet, YOLO\_SAM model, Mask GroundingDINO, and compared model performance and metrics on different medical image datasets. Summarized and organized all experimental results and completed the Final Year Report.

### WHU Undergraduate Graduation Project: Image Annotation Algorithm Based on Object Segmentation Network

12/2021 - 06/2022

Supervisor: Prof. Jing Li, Wuhan University

- Modified the Polygon-RNN model using the modified Swin Transformer as the backbone network and performed image annotation on the Cityscapes dataset.
- Modified the network architecture of each stage of Swin Transformer, and merged the output feature maps of each stage of the Swin Transformer network through skip connections, so that it contains both low-level corner information and high-level semantic information. A complete network model is obtained by splicing the modified backbone network and the RNN prediction network.
- Achieved better image annotation results than the original Polygon-RNN model on the Cityscapes dataset by the modified model.
- Designed ablation experiments in two different ways: 1. without shifted window; 2. using the padding method to fill the shifted boundary window. Organized experimental models and data and wrote graduation essay.

## SELECTED AWARDS IN COMPUTER SCIENCE

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|---|-----------|
| • Class C scholarship for Outstanding Students of Wuhan University for four years   | 2018-2022 |
| • American College Students' Mathematical Contest in Modeling (MCM/ICM) (Honorable Mention Award)   | 03/2020   |
| • Wuhan University Zero Cup Web Design Competition (Excellence Award)   | 07/2019   |
| • Wuhan University College Student Innovation and Entrepreneurship Training Project: "Development of a Two-dimensional Retouching System Based on AI" | 06/2019   |

## SELECTED AWARDS IN FILM & DRAMA

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|---|---------|
| • Director/Scriptwriter/Editor of the Short Film 'Comet Spleen', currently being submitted to international film festivals worldwide.               | 10/2024 |
| • Official Selection of the Shanghai International Short Week Summer Script Competition ('Comet Spleen') (Scriptwriter)                             | 08/2024 |
| • Outstanding Original Script Award of Wuhan New Youth Drama Festival ('An Evening of the Plum Rain Season') (Scriptwriter)                         | 06/2022 |
| • First prize of the "New China 70 Years and struggle for a New Era" Film Contest ('Daybreak') (Director)   | 12/2019 |
| • Third Prize in the Drama Contest at the Wuhan University Golden Autumn Arts Festival ('The Last Dialogue in the Tanjong Kedai Forest') (Director) | 11/2019 |

## OTHER SKILLS

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**Professional Skills:** Python, C, C++, C#, Pytorch, TensorFlow

**Languages:** English (IELTS 7.0), Chinese (native speaker)