

# Boyang Zhang

E-mail: theostnc@bu.edu / Phone: +1 (650)-788-4328  
Address: 9 Gardner St, Allston, MA 02134

## Education Background

<b>Boston University</b> College of Engineering <u>Master of Science in Electrical and Computer Engineering</u> GPA: 3.65/4 Core Courses: MS Project, Deep Learning, Intro to Embedded System, Product Design	<b>Boston, United States</b> Sept.2025 – Jan.2027 (Expected)
<b>Hubei University</b> Manchester MetropolitanJoint Institute <u>Bachelor of Engineering in Software Engineering</u> <b>Manchester Metropolitan University, Wuhan Campus</b> School of Computer Science and Information Engineering <u>Bachelor of Science in Software Engineering</u>	<b>Wuhan, China</b> Sept. 2021 – Jun. 2025  <b>Wuhan, China</b> Sept. 2021 – Jun. 2025
<b>Summer Course Program – University of California, Berkeley</b> Undergraduate Non-Degree Program Related Courses: Prototype & Fabrication (B+); Creative Programming & Electronics (A-)	<b>Berkeley, United States</b> Jul. 2023 – Aug. 2023

## ● Research Projects

### Multimodal Object Tracking for Intelligent Unmanned Systems

- Advisor-Supervised Research Project, Instructed by Dr. Weidai Xia Nov. 2025 – Present
- Reliable target tracking is critical for intelligent unmanned systems; however, single-modality sensing can be fragile in challenging conditions, motivating multimodal cues for robustness.
  - Built a cross-modal interaction design that uses template features to bridge modalities, gathering and propagating target-relevant context to suppress background distractors from naive fusion.
  - Incorporated event-stream characteristics (change-driven signals with reduced static redundancy) to bias fusion toward informative motion regions and reduce redundant background responses.
  - Next, we will unify RGB-T and RGB-Event settings with systematic ablations, and gradually explore lightweight semantic priors (e.g., text) toward higher-level scene understanding, including a path to 2D-to-3D semantics.

### Multi-Modal Fusion for Robust Assessment of Hoarding Clutter

- MS Project/Thesis, Advised by Prof. Janusz Konrad Sept. 2025 – Present
- Reproduced the method from “Classification of Indoor Clutter from Images: Application to Hoarding Assessment” (EUSIPCO 2025) on the HINDER-2025 dataset and established a baseline for further improvement.
  - Enhanced the ViT backbone by unfreezing 6 transformer blocks, applying AdamW with separated learning-rate control for backbone vs. MLP, and adopting cosine LR scheduling to improve the model's stability.
  - Designed a detection-aware module to provide ViT with explicit structural clutter cues by computing ObjectCount and AreaCoverage as global structural descriptors and applying logits-level late fusion.
  - Calibrated fusion weights and model parameters through iterative analysis to improve stability and consistency across clutter levels, achieving an overall +6.73% CCR and +1.96% CCR-1 improvement.

### RTDS: A Robust Two-Stage Tongue Diagnosis System with Swin-Hybrid Architecture

- Independent Research Project, Instructed by Prof. Chao Yang Mar. 2025 – Jun. 2025
- Proposed RTDS, a robust deep learning framework tailored for clinical environments; constructed and annotated a dataset of 2,100 in situ tongue images, establishing a taxonomy of 7 fine-grained categories mapped to 4 diagnostic states.
  - Engineered a segmentation module using U-Net++ with nested skip connections to isolate the Region of Interest (ROI), achieving a validation IoU of 0.9714 by effectively suppressing background noise and illumination artifacts.
  - Designed a novel Swin-Hybrid classification architecture integrating a ResNet-34 convolutional backbone with Swin Transformer blocks; this fusion captures both local textural details (e.g., fissures) and global semantic context to mitigate class ambiguity.
  - Implemented Focal Loss to address inherent label noise and class imbalance, achieving 91.30% diagnostic accuracy and 75.76% fine-grained accuracy, outperforming pure ResNet-18 baselines by +9.73%. Paper submitted to SIVP (Under Review).

### Intelligent Facial Feature Retrieval System Development Based on Big Data and Deep Learning

- Independent Research Project, Instructed by Prof. Lijun Xu Mar. 2024 – May. 2024
- Architected a ResNet-34 variant with expanded channel widths and integrated Channel Attention mechanisms. This design enhanced the network's sensitivity to fine-grained facial details (e.g., periocular regions) in large-scale datasets (MS1M subset).
  - Implemented Margin-based Loss functions during training to enforce compact intra-class variance and maximize inter-class separability in the high-dimensional embedding space, reducing feature overlap by 18%.
  - Engineered a high-performance retrieval pipeline using FAISS with Inverted File (IVF) indexing. Optimized vector quantization parameters to achieve 10–20ms query latency while maintaining over 92% Top-1 accuracy.

## Professional Experiences

### Wuhan WZZC Technology Co., Ltd

Wuhan, China

Algorithm Engineering Intern, Research Department

Jun. 2024 – Aug. 2024

- Engineered the inference pipeline for the "Segment Anything Model" (SAM) (ViT-B backbone) within an interactive educational platform. Successfully migrated the model from PyTorch to ONNX Runtime, implementing graph optimization and operator fusion to accelerate inference speed.
- Conducted comprehensive GPU profiling to diagnose performance bottlenecks in the FP16 inference path. Identified and resolved issues related to latency jitter and VRAM fragmentation, ensuring consistent model response under high-concurrency classroom scenarios.
- Designed an adaptive image preprocessing module to handle unconstrained user inputs. Implemented algorithms to robustly process images with low-light conditions, high noise, or extreme aspect ratios, preventing model performance degradation.
- Optimized the inference workflow by refining input scaling strategies and managing intermediate feature caching, which significantly stabilized memory usage and reduced end-to-end latency for real-time segmentation tasks.

### iSoftStone Technology Service Co., Ltd

Wuhan, China

Internship Team Lead, Algorithm Department

Apr. 2024 – Jun. 2024

- Directed the development of a box office prediction framework using XGBoost and LightGBM, leading the team in constructing the end-to-end pipeline from cleaning multi-source heterogeneous data to baseline model evaluation .
- Engineered domain-specific temporal features such as "promotion intensity" and time-decay functions for social sentiment, effectively modeling the non-linear impact of marketing activities and time-sensitive trends on box office performance .
- Diagnosed and mitigated a covariate shift issue where model generalization degraded due to inconsistent feature distributions across years; analyzed residual trends and redesigned the feature system using relative change rates and exponential decay to stabilize prediction performance for new release schedules .

### HQYJ Information Technology Co., Ltd

Beijing, China

Intern, Machine Learning Department

Jan. 2023 – Mar. 2023

- Developed a lightweight hybrid neural network combining 1D-CNN and GRU to predict human motion states based on pose keypoints, effectively replacing a legacy KNN-based approach to capture complex temporal dependencies.
- Constructed time-series input pipelines using sliding window techniques on sensor data; diagnosed an offline-online discrepancy where the model exhibited prediction jitter at action switching boundaries during real-time inference.
- Mitigated prediction instability by restructuring the label hierarchy to explicitly model "transition states" and implementing temporal smoothing strategies, significantly reducing boundary errors and improving system robustness in dynamic scenarios.

## Skills

**Programming & Tools:** Python, C/C++, SQL, MATLAB, Shell Scripting, LaTeX, Git, Docker, Linux/Unix

**Deep Learning & Computer Vision:** PyTorch, OpenCV, ONNX Runtime, FAISS, YOLO Series, TIMM, Hugging Face

**Model Deployment & Efficiency:** Model Quantization (FP16), Operator Fusion, GPU Profiling, TensorBoard

**Data Science & Analysis:** Pandas, NumPy, Scikit-learn, XGBoost, LightGBM, Matplotlib, Seaborn

**Languages:** Chinese (Native), English (Advanced), Spanish (Elementary)

## Honors & Awards

First Prize - National College Student AI Technology Competition (2024)

Third Prize - National College Student Artificial Intelligence Knowledge Competition (2024)

First Prize - National College Student Innovation and Entrepreneurship Ability Competition (2024)