

Qihao Qian

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EDUCATION

University of California, San Diego (UCSD)

Master of Science in Electrical Computer Engineering, Machine Learning and Data Science

Sep 2024 – Dec 2026

San Diego, US

University of Electronic Science and Technology of China (UESTC)

Bachelor of Engineering in Software Engineering

Sep 2020 – June 2024

Chengdu, China

INDUSTRY EXPERIENCE

Xbrain(Early Stage Startup)

Feb. 2024 – June 2024

AI Engineer Intern

Nanjing, China

- Built an audio-driven digital-human lip-sync system using U-Net + PatchGAN, trained with multi-GPU DDP.
- Built a **Ray**-based distributed data preprocessing pipeline covering face detection (**RetinaNet**), speech enhancement (**FRCRN/Demucs**), mel-spectrogram extraction, and **SyncNet** audio-video temporal alignment filtering, enabling automated cleaning and filtering of **1000+ hours** of training data.
- Designed a composite loss combining **L1** reconstruction, **VGG** perceptual loss (**LPIPS**), **PatchGAN** adversarial loss, and **SyncNet** lip-sync loss, with three-stage progressive training (L1+LPIPS → +GAN → +SyncNet).
- Compared to Baseline-Wav2Lip, achieved **10.2%** lower LSE-D, **20.5%** higher LSE-C, and **12.1%** lower FID.

China Institute of People's Life Safety

Jan. 2023 – June 2023

AI Engineer Intern

Chengdu, China

- Synthesized around 5,000 instruction-style training samples from PubMed medical abstracts using **GPT-3.5**, and built a multi-stage data-cleaning pipeline covering JSON validity checks, length/blacklist filtering, information-density detection, and word-overlap deduplication, significantly improving SFT data quality.
- Designed a SentenceTransformer-based **semantic consistency filter** that enforces similarity constraints between extracted fields and source sentences, reducing hallucination risk and ensuring that structured fields such as Background / Objective / Methods / Results / Conclusion stay faithful to the original text.
- Enhanced data diversity through **paraphrase** augmentation and **JSON schema** perturbation to mitigate overfitting to fixed templates and field orders; additionally adopted **curriculum learning** progressing from short to long abstracts, improving training stability and generalization.
- Applied **LoRA** fine-tuning on LLaMA, with weighted loss on JSON-structural tokens and key medical fields (Results, Conclusion), ultimately lifting the JSON validity rate to **95%+** and improving field-level Token-F1 by **20%**.

DJI

June 2022 – Dec 2022

AI Engineer Intern

Shenzhen, China

- Improve the **30-minute per scene** bottleneck in autonomous-driving lane annotation to **under 5 minutes** by building an AI-assisted web platform where users annotate lanes via rough bounding boxes
- Trained **PointNet++** on Toronto3D, and introduced **Random Drop**, **Global Scaling & Rotation**, and lane **Oversampling** data augmentation to handle sparse real-world lane point clouds
- Achieved **85.3%** F1 on lane segmentation, and deployed via **ONNX** export with **Docker** to reliably serve **200+ req/min** concurrent requests.

RESEARCH EXPERIENCE

∇ -SDF: Online Euclidean SDF Mapping

Jan 2025 – Mar 2026

Existential Robotics Lab (UC San Diego) | IROS 2026, under review

San Diego, US

- Targeting the challenges in Online ESDF Mapping—balancing real-time performance, memory efficiency, and geometric accuracy while providing effective supervision in free space—led the proposal and implementation of the ∇ -SDF (Prior + Residual) framework, enabling efficient, accurate, and spatially continuous ESDF mapping.
- Designed a **semi-sparse octree** that improves memory efficiency and interpolation accuracy (**-45%** SDF MAE, **-38%** Grad. MAE) compared with the sparse octree, enabling faster training and smoother surface reconstruction.
- Proposed a **projection loss** that provides supervision for free-space regions, improving reconstruction accuracy by over **6×** in Chamfer distance and **+14%** in F1 score on the Replica dataset while achieving faster convergence.
- Implemented all the training and evaluation pipeline and conducted extensive ablation and baseline experiments, demonstrates that ∇ -SDF outperforms the state of the art in terms of accuracy and efficiency.
- Validated the model on the challenging Newer College dataset and successfully **deployed the pipeline on a Clearpath Jackal robot** and in simulation, demonstrating robust real-world performance in complex environments.