Jiecheng LIAO

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EDUCATIONAL BACKGROUND

Beijing Normal University-Hong Kong Baptist University United International College (UIC) 09.2021-06.2025

- **Major:** Computer Science and Technology
- **GPA: 3.81**/4.00 **Rank:** 4th, Top 5%

Scholarships:

- Second-class Scholarship in November 2023
- First-class Scholarship in November 2022

HONORS & AWARDS

- Second Prize in the Guangdong Science and Innovation Competition of **Artificial Intelligence Wheeled Robot** *Sep. 2023*
- Third Prize of Group C/C++ of the 14th **Lanqiao Cup** Guangdong Division *Apr. 2023*
- Bronze Medal in **Kaggle** HuBMAP + HPA - Hacking the Human Body Dec. 2022
- Certificate: ①Tencent Computer Vision Project Completion Certificate; ②Apsara Clouder Elastic Computing Certification

PAPER PUBLICATIONS

- Jiecheng Liao, Weifeng Su, Shi He, Shuhong Chen, et al. **"BMS^3: Bayesian Modeling Based SwinUNet Segmentation on Self-distillation Architecture".** *IEEE International Conference on Bioinformatics and Biomedicine. Under Review, 2024*
- Shuhong Chen, Zhenkun Luo, Jiecheng Liao, et al. **"Smart Contract Vulnerability Detection based on Bytecode Augmentation and Semantic Structure Graph".** *IEEE Transactions on Dependable and Security Computing. Under Review*

RESEARCH & PROJECT EXPERIENCES

GBC: Gaussian-splatting Based Colorization 06.2024-Present

Demo: *elucidator.cn/gbc-demo/*

Outline:

- Pioneered an innovative system for colorizing and three-dimensionally reconstructing monochrome historical films and documentaries, enhancing the preservation and visualization of archival footage.

Key Responsibilities:

- Implemented a real-time colorization using segmented optical flow based on the DeOldify algorithm with ColMap feature extraction. Developed an end-to-end 3D reconstruction framework utilizing Gaussian Splatting, enabling immersive visualization of colorized historical content.

BMS^3: Bayesian Modeling Based SwinUNet Segmentation on Self-distillation Architecture 03.2024-08.2024

Outline:

- Developed a novel approach for medical image segmentation enhancing domain invariance and generalization.

Key Responsibilities:

- Integrated Bayesian modeling with Swin Transformer-based U-Net architecture and implemented self-distillation mechanism, conducting experiments on multiple prostate MRI datasets.

Achievement:

- Outperformed state-of-the-art methods with 74.9% average DSC on target datasets and improved computational efficiency for about 40%.

ESP32-based Real-Time IV Drip Monitoring and Alert Platform 11.2023-04.2024

Details: *github.com/ffftuanxxx/ESP32-liquid* **Documents & Demo:** *elucidator.cn/esp32hosp-demo/*

Outline:

- Developed an innovative IoT-based system for real-time monitoring and control of intravenous drips in hospital settings.

Key Responsibilities:

- Designed and implemented an integrated system using ESP32, incorporating drop sensors for real-time monitoring, servo motors for flow control, wireless communication for alert transmission, and a centralized nurse terminal as monitor for multiple IV stations.

Mutual Information Calculation on Different Appearances 11.2023-12.2023

Paper: *https://doi.org/10.48550/arXiv.2407.07410*

Outline:

- Conducted research on applying mutual information (MI) to assess similarity between images, particularly focusing on comparing appearances of different individuals.

Key Responsibilities:

- Implemented and analyzed mutual information, entropy, and information gain algorithms for image matching and similarity assessment, including pre-processing techniques, probability density function calculations, and performance evaluations across various image scenarios.

U-Net Conditional GAN-Based Data Augmentation in Classification Problem with Low Data Resource 10.2023-12.2023

Outline:

- Modified an innovative data augmentation technique using conditional Generative Adversarial Networks (cGANs) to address low data resource challenges in medical image classification.

Key Responsibilities:

- Designed and implemented a U-Net based cGAN architecture for generating synthetic medical images, integrating it with classification models to enhance performance on datasets including ChestXray8, LiTS, NCT-CRC-HE-100K, and BreastUltra.

Precision Area Control and Line Crossing Alerts based on YOLOv8 10.2023-12.2023

Outline:

- Developed an advanced real-time detection system for traffic monitoring and human tracking applications on certain area and lines.

Key Responsibilities:

- Implemented a YOLOv8-based detection system with custom zone counting and cross line detection functionalities, adapting and fine-tuning the COCO-trained model to optimize performance for specific traffic and human detection requirements.

HuBMAP + HPA - Hacking the Human Body (Kaggle Competition) 07.2022-10.2022

Outline:

- Participated in a Kaggle competition focused on identifying and segmenting functional tissue units (FTUs) across five human organs using tissue section images.

Key Responsibilities:

- Developed a semantic segmentation model using ASPP and FPN for feature extraction, implementing model fusion techniques to enhance accuracy and reduce complexity, achieving a public score of 0.79 on Kaggle.

Achievement:

- Won a bronze medal in the competition.

More related and early project can be accessed from my **Personal Page.*

INTERNSHIP

BEA (Bank of East Asia), *Research and Development Engineer* 07.2024-08.2024

- AI based Vulnerability detection for bank system and database
- Designed supervisory system and server script

ITSC (Information Technology Service Center), *Student Assistant* 11.2021-09.2023

- Data processing and visualization for staff
- Provided technical support for staff and students, Managed computing centers and classroom

PROFESSIONAL TRAINING

EXTRACURRICULAR EXPERIENCES

Chinese Traditional Archery Competition

- Participated in the 7th competition and won the 3rd place 12.2021-01.2022
- Participated in the 8th competition and won the 5th place 05.2022-06.2022

SKILLS

- **Computer Skills:** ①Programming Languages like Python, C, C++, Java, Bash, LaTeX; ②Deep Learning Frameworks like Pytorch, TensorFlow, Scikit-learn; ③HTML; CSS; JavaScript; ④MySQL
- **Language skills:** Chinese (Native); English (IELTS 6.0); Japanese (Average)
- **Hobbies:** Web building, Construction of IoT, e.g. telecontrol; bot chat, Fine-tuning language models; Traditional Archery