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 in September 2023
- Third Prize of Group C/C + + of the 14th Lanqiao Cup Guangdong Division in April 2023
- Bronze Medal in Kaggle HuBMAP + HPA in December 2022

PAPER PUBLICATIONS

- **Jiecheng Liao**, BMS^3: Bayesian Modeling Based SwinUNet Segmentation on Self-distillation Architecture (reviewing in *BIBM 2024*)
- **Jiecheng Liao**, Smart Contract Vulnerability Detection based on Bytecode Augmentation and Semantic Structure Graph (reviewing in *Transaction on Dependable and Security Computing*)

PROJECT EXPERIENCES

GBC: Gaussian-splatting Based Colorization 05.2024-Present

Demo: elucidator.cn/gbc-demo/

- Feature Selection from Video to featured images based on ColMap
- Fusion for DeOldify and Diffusion transformer model to colorize the sequence of images
- 3D/4D Gaussian-splatting of reconstruction for the whole scene

BFSSS: BayeSeg Features with SWINV2 Segmentation on Self-distillation Architecture 03.2024-08.2024

- Developed a novel medical image segmentation model based on SWINv2 combining Bayesian Modeling architecture.
- Implemented a self-distillation framework to improve the model's generalization on different organ's segmentation
- Conducted extensive experiments using MRI datasets from *NCI-ISBI I2CVB* and *PROMISE12*. It achieves a DICE score of 77.0 during experiment which is better than most state-of-the-art

ESP32-based Real-Time IV Drip Monitoring and Alert Platform 11.2023-06.2024

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

- Developed a real-time monitoring and control platform for intravenous drips using ESP32, which monitors drip rates and completion status with drip detectors, transmits alerts wirelessly to display units and activates buzzers and vibration motors for immediate emergency response, ensuring real-time information transmission and system scalability through a wireless local area network.

Mutual Information Calculation on Different Appearances 11.2023-12.2023

Paper: http://arxiv.org/abs/2407.07410

- Developed a novel approach applying MI to measure the similarity between images of different individuals on image pairs
- Compared MI with entropy and information-gain methods to assess image similarity based on pixel intensities and spatial relationships, and demonstrated the limitations of MI using experiments and visualizations on matrices and plots

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

Details: elucidator.cn/dataaug/

- Applied a Classification Model incorporating cGAN as a data augmentation component to enhance performance in low-data-resource scenarios. Improved accuracy and reduced false positive rates, particularly in medical datasets (e.g., chest X-rays, CT images). Achieved superior results compared to traditional data augmentation methods

HuMAP + HPA 07.2022-10.2022

- Identified and segmented FTUs across five human organs, and used dataset of tissue section images to build the model
- Conducted the semantic segmentation mainly with the model ASPP after extracting features by using FPN, and Proposed model fusion method to improve the accuracy, decrease the complexity. Grasped the public score of 0.79 on Kaggle

OpenGL My World: Interactive 3D Environment with Object Interaction 04.2024-05.2024

Details: github.com/ffftuanxxx/OpenGL-My-World

- Developed a 3D World using OpenGL: Featured dynamic object tracking, diverse textures, and detailed building structures. Enabled first-person movement and object interaction

- Addressed Technical Challenges: Focused on performance optimization, debugging, user input handling, collision detection, random object generation, gravitational physics, and skybox integration

BCI Signal Processing 12.2023-02.2024

- Utilize transfer learning on the "efficientnet" to classify six kinds of harmful brain activities based on EEG signal, and use both the semantic data signal and SWIN transformer to make the prediction
- Add new noise reduction methods to deal with the accident pulse, and finish the competition of HMS on Kaggle and the database obtains a high score; Works on this project will continue

Zone Counting, Cross Line, helmet and mask Detection Based on Yolov8 11.2023-12.2023

- Developed a real-time traffic and human detection system based on YOLOv8, including zone counting and cross line detection, with model adaptation from COCO to meet task-specific requirements

Non-chordal Music Generation 10.2022-11.2022

- Designed and implemented a non-chordal music generation system using Bi-LSTM. Provided two ways for generating the non-chordal music, Auto-generation and Continuation Generation. Employed temperature sampling and designed lexical lists to map the corpus for digital storage

Compiler Construction Development based on C 09.2023-01.2024

Details: github.com/ffftuanxxx/CCP

- Constructed a new compiler in C in 3 phases: lexical analysis, syntax analysis and semantic analysis. Implemented a C-based compiler with a DFA lexer, AVL tree symbol table, a parsing table for shift/reduce operations, and Hindley-Milner type checking with β-reduction.

Software, Web and Database development

Network Communication Software 05.2023-06.2023

Details: github.com/ffftuanxxx/Com-sot

- Developed a network communication software using C++ with QT for the GUI, featuring a multi-threaded server and client for data transmission, and MySQL for data storage.

Software of Film Analysis, Prediction and Auto-arrangement for Theatre 05.2023-06.2023

- Developed a software using QT and MySQL for film analysis, prediction, and auto-scheduling, featuring deep learning for data analysis and multiple visualization methods.

Designed Database for Medical Donation and Web Processing 10.2022-12.2022

Details: github.com/ffftuanxxx/Donation-Management-System

- Created a web-based donation platform that aims to facilitate donations to poverty and disaster-affected areas worldwide
- Designed a relational database for a web-based donation platform using MySQL, focusing on entities such as users, beneficiaries, donations, and comments, with a front-end implemented in Bootstrap

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

EXTRACURRICULAR EXPERIENCES

Chinese Traditional Archery Competition

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

ADDITIONAL INFORMATION

- **Computer Skills:** ①Programming Languages like Python, C, C + +, Java; 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 large models
- **Certificate:** ①Tencent Computer Vision Project Completion Certificate; ②Apsara Clouder Elastic Computing Certification