Zhiyu Liu (Quentin Liu)

(+86) 13970084072 | lizhyuxi@outlook.com | https://lizhyuxi.github.io

EDUCATION

Shanghai Jiao Tong University | ParisTech Elite Institute of Technology (SPEIT) Sept. 2020 - June 2024

Bachelor's Degree in Information Engineering & French Language

- **GPA: Information Engineering (91/100)**, French Language (87/100)
- **Selected courses:** Linear Algebra and Dual Linear Algebra (94), C Program and Algorithm Analysis (91), Data Structure (94), Probability & Statistics (96), Graph Theory (92), Database System Concepts (93), Optimisation (92)
- **Honors and Awards:** University student B scholarship of excellence (15%), **Merit Student Honor (4%)**

SELECTED PROJECTS

Medical Image Segmentation of Brain Tumors July 2022 - Aug. 2022

Imperial College Data Science Summer School - **The Best Computer Vision Project Award (1st out of 12 groups)**

- Led a team of 3 in a medical image segmentation project, focusing on accurately labeling and segmenting brain tumors within a dataset of over 3,000 MRI scans with corresponding masks
- Adopted widely-used Unet++ architecture. Conducted a comprehensive evaluation of alternative loss functions including Lovasz Hinge and BCE-DICE, selecting BCE-DICE for its superior validation Intersection over Union (IoU) vs Lovasz Hinge (0.825 vs. 0.792)
- Achieved outstanding results in an undisclosed dataset, with a Dice score of 0.779 vs. the average of 0.699

Analyzing and Forecasting Beijing House Prices May 2022 - July 2022

NUS SOC Summer Workshop - **The First Prize (1st out of 10 groups)**

- Curated and cleaned an extensive dataset of 300k+ property transactions in Beijing of various property attributes (area/floor/type/material, etc.)
- Employed Tableau for insightful visualizations to compare average house prices of different property combinations and identify variables with substantial impacts
- Implemented Long Short-Term Memory (LSTM) network for accurate housing price growth predictions, empowering valuable data-driven investment recommendations for real estate investors

Crowd Counting Model Based on CNN and ViT Dec. 2022 - Apr. 2023

- Designed a sophisticated crowd counting model which has excellent global contextual comprehension by integrating Convolutional Neural Network (CNN) with Vision Transformer (ViT). Addressed global feature capture limitations in classic CNN models such as Multi-Column CNN (MCNN)
- Demonstrated remarkable performance vs. the original MCNN on the UCF_CC_50 dataset, with a MAE of 362.7 (vs. 377.6) and a MSE of 467.6 (vs. 509.1). Paper accepted for publication

High Frequency Grammar Points Analysis of Engineering & French Materials Dec. 2022 - Sept. 2023

- Leveraged Natural Language Process (NLP) techniques with Python incl. NLTK and spaCy to analyze Maths and Physics textbooks written in French. Presented research results at teachers' conference
- Integrated findings such as grammar point frequency to help French and Engineering professors synchronize their teaching schedules, enhanced the learning experiences of future students

Topography Measurement by EBSD Calibration Jan. 2023 - Present

- Improved 6-parameter IDIC-EBSD (Integrated Digital Image Correlation framework for Electron Backscatter Diffraction) calibration method. Established a conversion relation between diffraction pattern center coordinates (xyz) and surface topography (h), reducing calibration parameters from 6 to 4, significantly boosting measurement precision
- Conducted particle diffraction experiments, obtaining multiple diffraction patterns for silicon crystalline samples
- Designed a novel loss function employing 4 parameters: three Euler angles and surface topography. Coded algorithms, using Forward Additive Gauss-Newton method to optimize the loss function and derive the corresponding topography. Patent and research paper are in preparation

PUBLICATIONS

- **Zhiyu Liu** and Yongqing Qu: Crowd Counting Model based on CNN and Transformer. *Computer Engineering and Information Processing (CEIP), 2023.*

EXTRACURRICULAR ACTIVITIES

Project Leader at the Science and Innovation Center Nov. 2020 - Nov. 2022

- Organized educational projects, designing hands-on experiments to foster primary school students' scientific innovation literacy and practical skills, recruiting 10+ volunteers to conduct teaching activities for 200+ students

College Orchestra Team Leader & Violin Performer (c.15 members) Apr. 2021 - Present

- Arranged regular group practices and rehearsals, performing in various activities such as college graduate graduation ceremony and "Le Flambeau Vivant" play, attracting 200+ attendees

MISCELLANEOUS

- **Languages**: Chinese (Native), English (Fluent), French (Intermediate)
- **Hobbies**: Violin (amateur performer)
- **Programing skills:** Python, C/C++, MATLAB, SQL
- **Tools**: MS Office, Tableau, Git, LaTeX