# Yuqi HU

50 Nanyang Ave, Singapore 639798
+65 88854495 | e230043@e.ntu.edu.sg | Linkedin: Yuqi Hu
Personal Website: https://johnnyyuqi.github.io/yuqiwho.github.io/

## EDUCATION BACKGROUND

### Nanyang Technological University — Singapore
*Master of Engineering in Signal Processing* — *Aug.2023-Jul.2024*

- GPA: 5.00/5.00
- Main Courses: Genetic Algorithm & Machine Learning, Neural Network & Deep Learning, Video Signal Processing, Probability & Random Processes, Advanced Digital Signal Processing

### Beijing University of Posts and Telecommunications — Beijing, China
*Bachelor of Engineering in Information Engineering* — *Sep.2019-Jul.2023*

- GPA: 3.69/4.00 (88.63/100)  Rank: 21/200
- Relevant Coursework: Introduction of Data Science, Natural Language Understanding, Deep Learning Theory and Practice, Intelligent Information Network
- Honours & Awards: Third Prize of Scholarship for Excellent Students (2020, 2021, 2022)

## RESEARCH EXPERIENCES

### AI-Powered Virtual Nuclear Staining for Microscopy Images — Singapore
*Graduate Researcher (Supervisor: Prof. Hanry Yu)* — *Oct. 2024 - Present*

- Conducted comprehensive analysis of state-of-the-art image translation architectures, including GANs (Pix2Pix, CycleGAN) and diffusion models (Stable Diffusion), for virtual staining applications
- Developed and optimized a deep learning pipeline for DAPI nuclear staining prediction, achieving SOTA performance on standard metrics (SSIM > 0.91, PSNR > 31.20dB) using publicly available histological datasets
- Successfully validated the model's generalization capability on novel lab-generated differentiated cell lines, enabling label-free nuclear visualization without physical staining

### Neurite Morphology Analysis — Singapore
*Graduate Researcher (Supervisors: Dr. Crystal Jing Jing Yeo, Dr. Damien Leow Meng Kiat)* — *Oct. 2024 - Present*

- Developed an automated pipeline for high-throughput neurite analysis, incorporating rigorous validation against expert manual annotations to ensure reliability
- Enhanced neurite detection accuracy by integrating a deep learning-based semantic segmentation model into the analysis pipeline, achieving superior delineation of fine neuronal structures compared to original methods

### Contextual Ranking — Singapore
*Graduate Researcher (Supervisor: Prof. Lihui Chen)* — *Oct. 2023 - May 2o24*

- Conducted comparative analysis of supervised and self-supervised learning approaches in contrastive frameworks, evaluating performance metrics on semantic similarity tasks
- Developed a ranking-enhanced contrastive learning framework, integrating pairwise and listwise ranking objectives to improve semantic representation learning
- Implemented knowledge distillation techniques using OPT foundation model and ensemble teacher architectures, achieving improved representation quality and model efficiency

### Object Detection Algorithms Based on Spiking Neural Network — Beijing, China
*Undergraduate Researcher (Supervisor: Prof. Chuang Zhu)* — *Dec. 2022 - May 2023*

- Developed a spike-vision dataset conversion pipeline for COCO, PASCAL VOC, and proprietary datasets, enabling efficient training of spiking neural networks
- Implemented and optimized ANN-to-SNN conversion algorithms for object detection tasks, focusing on spike-based inference efficiency
- Designed and implemented optimization techniques including Channel Normalization and Robust Normalization, achieving 90% energy efficiency reduction while maintaining comparable accuracy to CNN-based models

### Computer Vision-based Early Cancer Detection

Beijing, China

*Group Member (Supervisor Prof. Chuang Zhu)*

*May 2022 - Oct.2022*

- Conducted comprehensive literature review on state-of-the-art deep learning models for cancer histopathology image classification, focusing on early detection methodologies
- Developed a robust data pipeline incorporating advanced augmentation techniques for processing histopathological images from partner hospitals; implemented a fine-tuned transfer learning model with optimized hyperparameters
- The model achieved an average AUC of 0.97 in the internal validation cohort and 0.82 in the independent external validation cohort which outperformed the traditional models
- Co-developed a production-ready early cancer screening system, winning First Prize in the Beijing region of "China College Students' Internet+ Innovation and Entrepreneurship Competition"

### Health Management Application Development

Beijing, China

*Project Leader*

*Mar.2022 - Jun.2022*

- Responsible for the loading and welcome page's implementation with Java; designed and developed the application's functional prototype on the Android platform
- Organized and scheduled meetings and discussions to ensure the development progress and team coordination

### Vaccination Service System Development

Beijing, China

*Undergraduate Researcher (Supervisor: Prof. Yumei Wang)*

*Mar.2022 - Apr.2022*

- Collected a dataset regarding the vaccination scenarios with a field survey for further exploration, which included the queue number, the waiting time, the service time for vaccination, etc,
- Modelled the signing service and the vaccinating service as a quadratic system, mapped the arrival process and the service process as Poisson processes, and analyzed the time of each part of the system with the identification of arrival rate and service rate
- Validated the theoretical result with event scheduling in MATLAB

## INTERNSHIP

### Data Analyst Intern

Beijing, China

*Beijing YingRan Cultural Communication Co., Ltd*

*Aug.2022 - Sep.2022*

- Utilized Python to build a multivariate regression model with transaction price as the dependent variable to provide a reference for base price formulations
- Automated the label generation process for prints with the employment of the K-means method

## EXTRA-CURRICULUM

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|---|---|
| Personal Tutor of Deep Learning internship | Dec.2024-Present |
| Member of the United Nations Global Competency Training Program | Jun.2021-Jul.2021 |
| Volunteer of Study Assistance Program | Jan.2021-Dec.2021 |

## SKILLS & INTEREST

**Programming Languages**: Python (PyTorch, NumPy, Matplotlib, Pandas, scikit-learn), C, C++, Java, Verilog, R
**Development Software**: ImageJ/Fiji, MATLAB, Android Studio, Quartus, Visual Studio, ns3, Multisim, LaTeX
**Interests**: Erhu, Guitar, Flag Football, Jogging, Music