

# CHEN LIU

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## EDUCATION

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### South China University of Technology (SCUT)

Guangzhou, China

S.Eng. Software Engineering GPA: 3.85/4 Rank: 15/278

July 2024

#### Related Courses

Linear Algebra and Analytic Geometry (98), Probability and Mathematical Statistics (97), Computer Organization and Architecture (96), Principles of Compiler (95), Database Systems (95), Operating System (94), Computer Network (93), High-level Language Programming (93), Machine Learning (95)

## PUBLICATIONS & SUBMISSION

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- Wenfang Yao\*, **Chen Liu\***, Kejing Qin, William K. Cheung, Jing Qin “Addressing Asynchronicity in Clinical Multimodal Fusion via Individualized Chest X-ray Generation” Accepted by **NeurIPS-24**. (\* These authors contributed equally.)

## RESEARCH EXPERIENCE

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### Research Assistant at Center for Smart Health

School of Nursing, Hong Kong Polytechnic University

Hong Kong, China

Supervisor Prof. Harry QIN

Dec 2023 - now

- Managed to generate up-to-date individualized CXR images based on latent diffusion model, conditioning on a previous reference image and the EHR data in between, integrating information regarding anatomical structures and disease courses accordingly.
- Proposed a multi-task EHR conditioning encoder that extracts information relevant to imaging manifestations and temporal disease progression from variable-length EHR to guide the dynamic generation.
- Conducted extensive experiments and qualitative analyses to show that our model could generate high-quality CXR images and outperform existing methods in multi-modal clinical prediction.

### Intern at Computational Cognition, Vision, and Learning (CCVL) Group

Computer Science, Johns Hopkins University

Online

Supervisor Prof. Alan L. Yuille and Dr. Zongwei Zhou

June 2024 - Oct. 2024

- Conducted a comparative analysis of segmentation errors in AI models across three pancreatic tumor subtypes. Identified unique patterns in hard cases, developing critical strategies to support more realistic and subtype-specific tumor synthesis.
- Developed synthetic models for pancreatic tumors with varied characteristics using conditional diffusion models. These models significantly enhanced training datasets, improving the Computer-Aided Detection and Diagnosis of different pancreatic tumor types.
- Collaboratively built a comprehensive, publicly accessible lesion dataset with per-voxel annotations for 10,136 CT scans, including 60,038 lesions across six organs. Utilized generative and segmentation models to assess the impact of data scaling on lesion segmentation and detection performance.

### Research Assistant at Artificial Intelligence and Big Data Laboratory

School of Software Engineering, South China University of Technology

Guangzhou, China

Supervisor Prof. Chen Jian

May 2022 - July 2024

- Converted Length-Controllable Image Captioning (LaBERT) from a non-autoregressive model to an autoregressive model and modified the iterative refinement inference method used in the original model to beam search, achieving comparable results to the original model.
- Extracted semantic masks using MedSAM, which was integrated with input data as prior knowledge to facilitate the report generation.

- Designed a novel clinical loss function based on image classification to enable the model to be more finding-aware, and proposed a new way of extracting topic-related finding knowledge based on pre-trained report generation model.

## **Project: Implementation of pharyngeal swab automatic collection system based on near-infrared navigator**

**School of Electronics and Information, South China University of Technology**

Guangzhou

*Core member*

May 2022 - Jan 2023

- Devised a near-infrared retro-reflective patch for the quick measurement of injecting normal vector (when used in coordination with an optical navigating system)
- Designed an accurate positioning algorithm for the robot arm end and the end of the arm tool, which considered the coordinates of the robot arm, the marker, and the optical tracking system in a closed-loop fashion to enable positioning of the robotic arm and precise control of injection angle.
- Integrated and orchestrated coordinate information acquisition, hand-eye calibration and automatic injection to the robot control platform based on C++ and QT.

## **HONORS**

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<i>National Encouragement Scholarship (Top 5%)</i>	2023
<i>The Second Prize Scholarship (Top 10% )</i>	2022
<i>National Encouragement Scholarship (Top 5%)</i>	2021
<i>Merit Student</i>	2021
<i>Excellent Student Cadre</i>	2021

## **SKILLS**

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- Programming Languages: Python, C++, Go, R
  - Technologies: Artificial Neural Networks/Machine Learning (PyTorch, Sklearn), Data Processing, SQL, Git, LaTeX
  - English proficiency: IELTS 7.0

## **OTHERS**

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- Developed a puzzle game called “Soma Cube” using QT, inspired by the TV show “The Brain”, which challenges players to observe a complex Asymmetric Cube and identify its three views from a set of distracting elements.
  - First prize in the “Ten Top Proposals” competition (school level).
  - Second prize in the School Golden Sunshine Cup Volleyball Competition.
  - Participated in the “2023 Half Mountain Marathon” (21km) held in Guangzhou Baiyun Mountain, and finished the race in 2 hours and 37 minutes successfully.