Haoyu (Marco) LIU

Phone: +852 51330847 | Email: marco.hyliu@gmail.com | https://www.marcoliu.com/

EDUCATION

The Chinese University of Hong Kong, CUHK — **Hong Kong SAR**
*Bachelor of Science in **Computer Science*** — *Sep. 2019 - May 2023*

- CGPA: **3.793/4.0**, Major GPA: **3.872/4.0**, Dean's List in 2020/21, 2019/20
- Engineering Leadership, Innovation, Technology and Entrepreneurship (ELITE) Stream
- Courses: Fundamentals of AI, Introduction to Python, Design & Analysis of Algorithm, Data Structures, Intro to Operating Systems, Formal Lang & Automata Theory

The University of Melbourne — **Melbourne, Australia**
Term-time Exchange Student — *Feb. 2022 – June 2022*

- Weighted Average Mark: **82.25/100**
- Courses: Machine Learning, Software Modelling and Design, AI Planning for Autonomy (Graduate course), Web Information Technologies

HONORS & AWARDS

Outstanding Academic Performance, HKD 10,000, Department of Computer Science and Engineering, CUHK — July 2022
Dr Ng Tat-Lun Memorial Scholarship, HKD 10,000, Top 15%, CW Chu College, CUHK — July 2022
Reaching Out Award, HKD 10,000, Secretary for Education, HK SAR — Mar. 2022
ELITE Stream Scholarship, HKD 16,000 (per year), Faculty of Engineering, CUHK — Oct. 2021 & Oct. 2020
Yasumoto International Exchange Scholarship, HKD 2,500, Office of Academic Links, CUHK — Aug. 2021
Talent Development Scholarship, HKD 10,000, Secretary for Education, HK SAR — June 2021
Hong Kong, China-Asia-Pacific Economic Cooperation Scholarship, Secretary for Education, HK SAR — June 2021
Liao Yuan Tung Memorial Scholarship, HKD 10,000, Top 15%, CW Chu College, CUHK — June 2021
Zhiyuan Scholarship, RMB 200,000 (50,000 per year), China Soong Ching Ling Foundation — Nov. 2019

PAPER IN PROGRESS

Xuebin Sun, Jingxin Du, **Haoyu Liu**, Danny Siu Chun Ng, and Shing Shin Cheng, Cataract Surgical Instruments Segmentation Free of Motion Blur Influence

RESEARCH

Video Analysis and Computer Vision for AI Interview System — **Hong Kong**
Graduation Thesis, supervised by Professor Kuo Chin King, CUHK — *Sep. 2022 – Ongoing*

- Built the video processing and analysis module of an AI interview system that provides AI assessment and comments of interviewees in terms of their facial/body, sentiments, tone of voice, and content performances
- Designed the structure and the hierarchical workflow of the video module under the framework of the whole system
- Implemented face detection, recognition, and analysis using Microsoft Azure and different Python libraries/frameworks such as MediaPipe and FER, then processed and analyzed raw data to obtain higher-level information
- Designed and implemented various AI assessment criteria for video performance evaluation in five domains (head, eyes, accessories, facial expressions, and hands/body)
- Tested the module using videos in the database and established the evaluation rules for AI comments
- Collaborated with the back end to make the video module compatible with the system's needs

Deep Learning-Based Time Series Analysis and Forecasting — **Hong Kong**
Summer Research Intern, Supervised by Professor Qiang Xu, CUHK — *May 2022 – Aug. 2022*

- Worked on building a large-scale repository for time-series analysis and forecasting on GitHub, including different state-of-the-art deep learning models (https://github.com/VEWOXIC/REPO_skeleton)
- Worked on creating a systematic pipeline to implement, use and evaluate time series prediction models in a unified platform, and implemented unified data preprocessing procedures, model instantiation interfaces, and standardized evaluation procedures
- Reproduced and implemented various spatio-temporal traffic prediction models and dataset loader into the repository; modified the models to make them compatible with the pipeline and interfaces of the repository, configurable, and adaptable for different datasets and tasks
- Implemented evaluations and comparisons on the models to make sure the characteristics and the original results of the models are well preserved

Haoyu (Marco) LIU

Phone: +852 51330847 | Email: marco.hyliu@gmail.com | https://www.marcoliu.com/

Simultaneously Deblurring and Segmentation for Cataract Surgical Instruments **Hong Kong**

Summer research intern, supervised by Assistant Professor Shing Shin Cheng, CUHK *June 2021 – Sep. 2021*

- Worked in PyTorch and TensorFlow for a spatio-temporal information-based network, consisting of the deblurring module and a subsequent segmentation module for cataract surgical instrument segmentation
- Designed and conducted various experiments on model evaluation and comparison; analyzed and identified potential situations where and how our network outperforms other state-of-the-art networks
- Further improved the performance of the segmentation network by integrating leading-edge deep learning modules
- Designed and constructed a cataract surgical instrument dataset to conduct both deblurring and segmentation experiments so as to demonstrate the novelty of our network
- Investigated the background and current state of research in the field of surgical skill assessment, proposed the motivation and the future research directions of the project

SELECTED PROJECTS

Yinsh Game AI Agent *April 2022 – May 2022*

Course: AI Planning for Autonomy

- Implemented an autonomous agent that can play and compete in a tournament for the game Yinsh
- Applied various AI techniques, including Monte Carlo Tree Search, Alpha-beta Pruning Minimax, A Star, and Greedy BFS
- Designed heuristic functions and reward shaping on nodes expansion to improve the performance of the agent
- Analyzed design decisions, strengths and weaknesses of different techniques, challenges, and possible improvements

Diabetes-Home: A Diabetes Management Web Application *March 2022 – May 2022*

Course: Web Information Technologies

- Participated in building a web application that allows diabetes patients to record health data, contact clinicians, and enable clinicians to monitor patients' data and take notes
- Worked on the front end, designed the UX/UI prototype of the web app, and made a clickable prototype using Adobe XD
- Built the back end of the website using Node.js, Express, Handlebars, JavaScript, and managed the data using MongoDB Atlas and Mongoose, and deployed the website on Heroku

Twitter Sentiment Prediction *April 2022 – May 2022*

Course: Machine Learning

- Developed a Twitter sentiment classifier based on the given dataset
- Implemented different machine learning methods, including Naïve Bayes, Logistic Regression, SVM, and Stacking Model, and compared and analyzed their performances, advantages, and limitations on this task
- Implemented different data preprocessing techniques (such as Removal of stop-words, Tweet tokenization, stemming, and lemmatization), feature extractors (such as Bag of Words and TFIDF approaches, unigrams, and bigrams), and evaluation metrics, and analyzed the reason and critical factors to improve the model performances
- Our final model ranked 8th out of 343 groups in the Kaggle competition

Checkers AI Player Program *Nov. 2019*

Course: Problem Solving by Programming

- Developed a checkers program using C to support both human-human players mode and human-AI players mode
- Implemented Alpha-beta pruning algorithm in the AI player part to make the AI player execute the best possible strategy in 5 seconds via lab computer
- My AI Player ranked 2nd out of 45 students in the AI tournament of the course.

SKILLS

Programming Languages	Python	C/C++	Java	HTML/CSS
	Strips/PDDL	JavaScript	LaTeX	
Platforms & Tools	**Machine Learning**	TensorFlow	PyTorch	Docker
		Anaconda		
	Cloud Computing	Microsoft Azure		
	Web Development	Handlebars	Node.js/Express	Heroku
		MongoDB		
	Others	Linux	Git	Adobe XD
		Adobe Illustrator	Adobe Premiere Pro	
Languages	Mandarin Chinese (Native)	English		