Singho HUI

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Education

The Chinese University of Hong Kong Hong Kong
Master of Science in Computer Science *Sep. 2020 – Aug. 2021*

- A- grade in Master research project
- CGPA: 3.443 out of 4

Hong Kong Metropolitan University Hong Kong
Bachelor of Science with Honors in Computer Engineering *Sep. 2018 – Aug. 2020*

- Graduation with first-class honors
- Award GPA: 3.65 out of 4
- CGPA: 3.59 out of 4

Research Experiences

Adder: Multimodal Self-supervised Learning by Complementary Sensing
| *Supervisor:Prof. Sung Chi Chu* Aug. 2021 – Present

- Focus on solving the formula "$IoT + Vision =$?"
- We consider the question: what can be learned by "adding" different sources of unlabeled data, and what does the "adding" denote?
- Propose Adder, a framework for learning multimodal representations through self-supervised learning.
- Specifically, the proposed framework takes multimodal raw signals as input and learns representation from multimodal data by complementary sensing data. Complementary sensing mitigates the incompleteness of sensor data.

BanditMF: Multi-Armed Bandit Based Matrix Factorization Recommender System
| *Supervisor:Prof. John C.S. Lui* Sep. 2020 – May. 2021

- Propose a multi-armed bandit based collaborative filtering recommender system, named BanditMF.
- The matrix factorization (MF), which is model-based collaborative filtering, is combined with the multi-armed bandit algorithm in this system.
- System contains an offline subsystem focused on matrix factorization and an online subsystem with a multi-armed bandit algorithm as the core.
- BanditMF solves the coldstart problem of the collaborative filtering method and gives the ability to recommend new items to users.
- BanditMF reduces the loss of new users with low loyalty due to irrelevant recommendations from the bandit algorithm during the exploration period.

AI-based System for Automatic Detection and Recognition of Weapons
| *Supervisor:Prof. Hung King Fai Kevin* Aug. 2019 – May. 2020

- Collaborative project with the company named Integrated and Hong Kong Metropolitan University.
- The aim of this work is to develop a low-cost, efficient, and artificial intelligence-based solution for the real-time detection and recognition of weapons in surveillance videos under different scenarios.
- The system can detect 7 weapons within 6 categories, including handguns, shotguns, automatic rifles, sniper rifles, sub-machine guns, and knives.
- At the intersection over union (IoU) values of 0.50 and 0.75, the system achieved a precision of 0.8524 and 0.7006, respectively.

Publication

- S. Xu and K. Hung, "Development of an AI-based System for Automatic Detection and Recognition of Weapons in Surveillance Videos," IEEE 10th Symposium on Computer Applications and Industrial Electronics (ISCAIE), 2020, pp. 48-52, doi: 10.1109/ISCAIE47305.2020. 9108816.
- Shenghao Xu. Banditmf: Multi-armed bandit based matrix factorization recommender system. CoRR, abs/2106.10898, 2021. URL https://arxiv.org/abs/2106.10898.[**pre-print**]

Honors and Awards

Inter-Institutional Competition on Facility Management Project by IFMA Oct. 2020
- Merit Award

Entrance Scholarship, CUHK Oct. 2020
Dean's List Aug. 2020
The Katie Shu Sui Pui Charitable Trust Scholarship Jun. 2020
Outstanding Student Award Jun. 2020
The ACEU sponsorship Apr. 2020
Dean's List Jul. 2019

Experience

Cloud Engineer Aug. 2021 – Present
Center of Cyber Logistics, The Chinese University of Hong Kong *Hong Kong*
- IoT + Vision
- Led a comprehensive cloud architecture migration and upgrade to optimize resource allocation, reduce costs, and improve system performance. The project involved migrating services from GCP to on-premise, upgrading Kubernetes and OS versions, and streamlining AWS infrastructure to enhance efficiency.
- Delivered the first phase of the LLM Project, focusing on enhancing the base model using Retrieval-Augmented Generation (RAG) and function calls, specifically tailored for the aviation domain. Developed and delivered a functional Proof of Concept (PoC), integrating innovative tools and techniques, and showcasing the model's enhanced capabilities in aviation-related use cases.

Research and Development Intern Jul. 2019 – Aug. 2019
YY Inc. *Guang Zhou, China*
- Participate in the internationalization of the YY apps
- Established an Android live broadcast system based on Real-Time Messaging Protocol

Electronic Engineer Intern Jul. 2016 – Sep. 2016
Sightseeing Cable Co., Ltd. *Anhui, China*
- Monitoring the daily operation of electronic instruments
- Maintenance and repair of electronic equipment

Professional Activities

Journal Reviews:

- ACM Transactions on Information Systems

Teaching Assistant

DSME 6686IS/6696BAP1 Advanced Information Systems/Business Analytic Practicum Fall 2023
DSME 6696BAP1 Advanced Business Analytic Practicum Fall 2021

Technical Skills

Languages: Python, Java, C/C++, Dart, HTML/CSS, LaTeX
Developer Tools: Git, Spyder, VS Code, Visual Studio, PyCharm, IntelliJ
Libraries: Pytorch, Pandas, NumPy, Matplotlib, etc.