Yiyang (Lawrence) Luo

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Education

Nanyang Technological University (NTU) Singapore
M.Sc. in Artificial Intelligence (MSAI) Jan 2023 - Present
Relevant Coursework: Deep Learning & Applications, Mathematics for Artificial Intelligence

The Chinese University of Hong Kong (CUHK) Hong Kong, China
B.Sc. in Computer Science Aug 2018 - Jul 2022
Relevant Coursework: Fundamentals of Artificial Intelligence (A-), Software Engineering (A-), Design and Analysis of Algorithms (A-), Open-source Software Project Development (A-), Probability and Statistics for Engineers (A)

Skills

- Programming Languages: C, Python, Java, JavaScript, JSON, YAML, Rust, Prolog (logic programming), Standard ML (functional programming)
- Software Skills: Latex, Git, PyTorch, OpenCV
- Language Skills: Mandarin (native), English (fluent)

Publication

J. Zhou, C. Leong, **Y. Luo**, M. Lin, W. Liao and C. Li, *"Unified Feature Fusion Network with Path Router for Multi-task Image Restoration,"* 2021 IEEE 21st International Conference on Communication Technology (ICCT), 2021, pp. 1206-1210, doi: 10.1109/ICCT52962.2021.9658001.

Internship

SmartMore Shenzhen, China
Computer Vision Algorithm Engineer Jun 2022 – Dec 2022

- Analyzed industrial image data and preprocessed datasets based on defects with multiple data augmentation methods to enlarge the dataset and add variance to data, therefore enhancing the model's robustness and prediction accuracy
- Improved SmartMore's SMAP codebase, a full-functional modularized AI training codebase, by adding new features such as label area filter, multi-channels image augmentation, and auto machine learning (hyper-parameter search)
- Designed and finetuned models to conduct segmentation tasks on detecting different products' defects including wireless charging coils, earphone spiales, hard drive filters, etc.
- Applied an auto machine learning algorithm to search the optimal hyper-parameter settings for defect segmentation tasks on Airpods spiale, and designed SDK for further algorithm development and project management
- Developed and improved Dataflow, a full-functional AI training platform with a user-friendly interface supported by SMAP, by adding new features such as data distribution visualization, local deployment, etc.

Undergraduate Summer Research Internship, Faculty of Engineering, CUHK Hong Kong, China
Undergraduate Researcher, supervised by Sidharth Jaggi (Associate Professor, CUHK) May 2020 - Aug 2020

- Designed and developed a satellite simulation system in MATLAB which is applicable to other satellite network research
- Applied A* Algorithm to realize real-time shortest path calculation for multi-height multi-orbit satellite system to generate the optimal signal transfer path
- Utilized satellite data from Starlink for program testing and debugging, which was endorsed by the professor

Research Experience

Intriguing Properties of Long-tailed Recognition Problem, Final Year Project Hong Kong, China
Supervised by Jiaya Jia (Professor, CUHK) & Bei Yu (Associate Professor, CUHK) Sep 2021 - May 2022

- Researched 12 artificial intelligence papers and gained insights into these methods on long-tailed recognition problem, including data augmentation, knowledge distillation, and decoupling training; reproduced and analyzed the experiment results of different approaches to compare their features and find their relationship using Pytorch
- Found and verified that the influence of batch size setting can be different on different classifier retraining methods, conducted further research on different methods' influences on model's prediction variance
- Completed a 20-page report on research results and presented the result to professors; got A- at the end of the semester

Unified Feature Fusion Network with Path Router for Multi-task Image Restoration, Non-Territories Network Lab, School of Electronics and Communications Engineering, Sun Yat-sen University Guangzhou, China
Supervised by Congduan Li (Associate Professor, Sun Yat-sen University) Jun 2021- Aug 2021

- Applied multiple data augmentation methods including CutOut, MixUp and CutMix using Python to enlarge the training dataset and therefore enhance the model's robustness
- Programed the AI agents based on Multi-task Learning with Multi-gate Mixture-of-Experts (MMoE) in Pytorch
- Evaluated model performance and adjusted to acceptable results, collected and analyzed experiment data for paper writing
- **Released *Unified Feature Fusion Network with Path Router for Multi-task Image Restoration* on ICCT2021 as co-author**

Project Experience

Parallel Computing Project | Hong Kong, China Jan 2022 - Apr 2022

- Used three different parallel computing tools, SIMD, CUDA on GPU, and MPI, to compute the Pareto optimality of vectors as fast as possible, and finally managed to compute the correct answer of 1,024,000 5-dimension vectors in less than 1.5 seconds using SIMD and less than 0.5 seconds using CUDA

- Applied various optimization algorithms on different platforms, such as complex data structure KD Tree on SIMD and full use of CUDA memory buffer, to maximize the algorithm performance

Cloud Storage Deduplication Project | Hong Kong, China Sep 2021 - Dec 2021

- Worked as a team of 3 to realize a storage-efficient deduplication algorithm in Java based on chunking and Rabin fingerprint, which supported uploading, downloading, and deleting, to simulate popular cloud storage applications like Dropbox or OneDrive
- Designed tricks to decrease chunking computation and Rabin fingerprint computation time by reaching a balanced trade-off point on computation time and memory, such as storing duplicate computation constant in Rabin fingerprint in memory, reducing algorithm time complexity by searching for targeted chunk using the tree data structure
- Used Azure APIs to access remote storage and deploy the cloud storage service on the Azure server

EgoPod, A Web-based Podcast App Supports Note Taking | Hong Kong, China Jan 2021 - Apr 2021

- Worked as a team of 2 to design, develop and deploy a podcast app that supports login with a Google account, searching podcasts from iTunes, subscribing to podcasts, bookmarking episodes, note taking, audio clipping, and note downloading
- Developed frontend base on React framework, developed backend with Express Node.js to handle HTTP requests and manage user data using MySQL system
- Deployed Egopod service using Docker and Yarn to generate a stable distributed environment that ensures the application works stably on any platform and is easily deployable by any user

Extracurricular Experience

Mandarin Debating Club | *Debater* | Hong Kong, China Sep 2018 – Jun 2022

- Perused and explored given topics, outlined mind maps to clarify ideas and accepted daily training to obtain frequency
- Ranked 3rd place in Hong Kong Inter-collegiate Debate Competition 2018 and 8th place in RNG Debate Competition 2019

Orientation Camp of CUHK | *Team Leader* | Hong Kong, China Aug 2019 - Sep 2019

- Discussed the details with faculties and revised the plan accordingly
- Schemed 20+ activities for 20 days long orientation camp to help 300+ fresh students get accustomed to new environment
- Led a team of 8 senior students from different faculties to provide support for 8 fresh students' first year life in university