

KELING YAO

The Chinese University of Hong Kong, Shenzhen

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EDUCATION

The Chinese University of Hong Kong, Shenzhen

Sep. 2020 – Jul. 2024

Bachelor of Science in Data Science and Big Data Technology (CS track)

Shenzhen, China

- Major GPA: **3.87/4.00**, Cumulative GPA: 3.74/4.00

- **Selected Awards:** The Full Tuition Admission Scholarship (1%), The Academic Performance Scholarship (3%), The Undergraduate Research Award (5%), The Outstanding Leadership Award (1%), The Dean's List Award (2020-22)

University of California, Berkeley

Aug. 2022 – May 2023

Exchange Student in Computer Science

Berkeley, United States

- Major GPA: **4.00/4.00**, Cumulative GPA: **4.00/4.00**

Research Interests

- **Computer Vision:** 3D understanding, and VR/AR/MR.
- **Robotics:** Robotics Pre-training, Reinforcement Learning.

CORE COURSEWORK

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|------------------------------|------------------------------|------------------------------|---------------------------------|
| • Deep Learning (A) | • Reinforcement Learning (A) | • Computer Vision (Coursera) | • Machine Learning (A-) |
| • Data Structures (A+) | • Algorithms (A) | • Computer Architecture (A) | • Operation System (A) |
| • Programming (A) | • Data Science (A+) | • Stochastic Processes (A) | • Imaging Processing (Coursera) |
| • Stochastic Simulation (A+) | • Numerical Analysis (A) | • Calculus (A) | • Probability (A-) |

PUBLICATIONS

- Huang, Z.^{*}, Yao, K.^{*}, Zhao, S. Z.^{*}, Pan, C.^{*}, Xu, T., Feng, W., & Yang, A. Y. (2023). Towards Subcentimeter Accuracy Digital-Twin Tracking via An RGBD-based Transformer Model and A Comprehensive Mobile Dataset. arXiv preprint arXiv:2309.13570. **(TPAMI under review, co-first author)**.
- Yang, J., Tan, W., Jin, C., Yao, K., Liu, B., Fu, J., Song, R., & Wang, L. (2023). Transferring Foundation Models for Generalizable Robotic Manipulation. arXiv preprint arXiv:2306.05716. **(ICRA under review, co-author)**.

RESEARCH EXPERIENCE

Transferring Foundation Models for Generalizable Robotic Manipulation @ Microsoft Research Asia

Jun. 2023 – Present

Research Assistant, supervised by Dr. Jianlong Fu, Senior Research Manager, Microsoft Research Asia

Beijing, China

- Published a real-world multi-modal imitation learning policy model to address a generalization of pick-and-place robot manipulation tasks.
- Accomplished independently a 30Hz robotic manipulation paradigm involving VR teleportation, control of dexterous hands, and Franka robot arm.
- Contributed to the design of the model by utilizing Vision Foundation Models and multi-modal fusion of semantic, geometric, and temporal observations, achieving sample-efficient generalization learning with an overall accuracy of 81.25%.

Towards Robust Mobile Digital-Twin Tracking @ Berkeley OpenARK Lab

Dec. 2022 – Present

Research Assistant, supervised by Prof. Allen Yang, Executive Director of FHL Vive Center for Enhanced Reality

Berkeley, United States

- Published an RGBD-based 6DoF pose estimation paradigm for Digital Twin applications, withstanding the low-quality depth data in mobile devices.
- Led and established the only RGBD 6DoF pose estimation database (DTTDv2) captured by iPhone 14 Pro, including 18 rigid objects and 100 scenes.
- Conducted LiDAR depth analysis on 47668 frames of the DTTD database and introduced a novel depth-ADD metric for quantitative measurement.
- Contributed to a Transformer-based 6DoF pose estimator designed to withstand noisy depth, surpassing performances of all existing baselines.
- Developed an efficient data collection paradigm (open-source), utilizing OptiTrack system and a self-developed software in iPhone 14 Pro.

Facial Recognition and Interaction Robotics @ Robot Laboratory of South China University of Technology

May 2022 – Sep. 2022

Research Assistant, supervised by Prof. Zhijun Zhang, South China University of Technology

Guangzhou, China

- Explored face recognition algorithms and independently implemented SOTA algorithms (yolov5, dlib, arcface) on robot Ubuntu Linux system.
- Developed an innovative software enabling robots to engage in conversations with users, memorize unfamiliar faces, and recognize previously encountered faces in real-world robots, which was successfully deployed into a commercial robot.

SELECTED PROJECTS

General Computational Machine based on GPT-2 | Python, PyTorch

Apr. 2023 – Aug. 2023

- Constructed a General Computational Machine by incorporating a pre-trained GPT-2 model and explored the generalization capabilities of transformers in diverse domain tasks beyond traditional language tasks (Bit-wise operation, Bit Memory, and Image Classification).
- Explored the advantages of the General Computational Machine model compared to ResNet-50 by visualizing the attention map for each task.

Cal Course (A Start-up at Berkeley Campus) | React, TypeScript, Python, Amazon Web Services (AWS)

Sep. 2022 – Apr. 2023

- Designed and implemented the front-end login interface for Cal-Course website (Berkeley On-Campus Organization) using React and TypeScript.
- Integrated and processed user data from the Cal-Course backend and WeChat API, subsequently storing the information on Amazon Web Services.

Simulation for Video Game Server Under Different Matchmaking Strategies | Python, Simio

Sep. 2022 – Dec. 2022

- Designed innovatively a Markov Chain model to simulate players' strategies on leaving a game server by their game experience.
- Established the simulation experiments with various matchmaking strategies of the game server (fair match, random match, and target match).
- Accomplished the optimal match-making strategy with the presence of AI bots to significantly maximize the revenue of a game company.

Machine Learning in Protein-Ligand Docking

Jun. 2021 – Jan. 2022

Supervised by Prof. Baoting Zhu, the Chinese University of Hong Kong, Shenzhen

- Explored machine learning approaches in protein-ligand docking, and ran dynamics simulations using Discovery Studio and Gaussian.
- Analyzed the diverse Cyclooxygenases-flavonoids simulation data by statistics and machine learning to predict the protein-ligand binding affinity.
- Summarized output statistic data of 10 ligands and explained their biological meaning with activators or inhibitors.

LEADERSHIP

Vice-President - Resident Student Association of Harmonia College

Aug. 2021 – Sep. 2022

- Steered the team to secure the "Outstanding Student Organization Award" from university — highest accolade for student organizations.
- Orchestrated 5 large-scale student events, each with over 100 attendees, overseeing both the administrative tasks and on-site management.
- Led a dedicated team of 30+ members, ensuring the fulfillment of daily needs and concerns of the college residents.

SKILLS

- **Languages:** English (Full professional proficiency - TOEFL: 105, GRE: 326), Chinese (Native proficiency)
- **Programming Languages:** Python, C, C++, C#, Java, Swift, JavaScript, SQL, MATLAB, Linux Kernel, LaTeX
- **Developer Tools:** Unity, Blender, Git, Anaconda, Docker
- **Frameworks:** PyTorch, TensorFlow, OpenCV, ROS