Yiqian Li

Email: yiqianli@link.cuhk.edu.cn | Homepage: https://lee-7102.github.io/

EDUCATION BACKGROUND

The Chinese University of Hong Kong (CUHK), China 09/2020 – 07/2024
B.Sc. in Computer Science and Engineering | GPA: 3.6/4.0
The University of California, Irvine (UCI), United State 01/2023 – 06/2023
GPA: 4.0/4.0

RESEARCH INTEREST

Computer Vision | Reinforcement Learning | Robotics

PUBLICATIONS

[1] Aojun Jiang, Miao Hao, **Yiqian Li**, Jiaqi Wang, Chunfeng Yue, Zongjie Huang, Ying Yang, Meng Ma, Qifeng, Lyu, Yu Sun, Zhuoran Zhang, "Occlusion-Aware Multi-Object Tracking for Point-of-Care sperm Analysis Using Smartphone Imaging", **submitted to IEEE Transactions on Automation Science and Engineering (IF 6.636).**

[2] Zhijing Li, Qiuai Fu, Zhijun Huang, Jianbo Yu, **Yiqian Li**, Yuanhao Lai, Yuchi Ma, Pinjia He, "Revisiting Log Parsing: The Present, The Future, and The Uncertainties", **IEEE Transactions on Reliability (IF 5.883).**

[3] **Yiqian Li**, Miao Hao, Zhuoran Zhang, "Pseudo Labeling Semi-supervised Classification for Sperm Morphology Analysis Using Smartphone Imaging", **under review.**

[4] Yifan Mei*, **Yiqian Li***, Xiaoyu Shi, "A Diffusion Probabilistic Model for Medical image Denoising and Synthesis", **under review.**

RESEARCH EXPERIENCE (SELECTED)

Medical Image Synthesis and Denoising based on Diffusion Probabilistic Model [4]
***Prof. Xiaoyu Shi* | UCI** 06/2023 - Present

- Establish and validate a 2D medical image synthesis framework based on a diffusion model, covering a forward Gaussian noise process and a reverse denoising process using the transformer-based diffusion model;
- Evaluate the quality, diversity, and authenticity of the synthesized medical images based on a set of fit-for-purpose metrics, covering X-ray, MRI and CI images.

Sperm Morphology Analysis under Smartphone Imaging [3]
***Prof. Zhuoran Zhang* | CUHK** 12/2022 - Present

- Implement a specialized U-net network to segment every semen image into single sperm images;
- Design a pseudo label generation framework by applying DBSCAN and Agglomerative Clustering algorithms on morphological standard sperm images and unlabeled sperm images;
- Implement Resnet and Vision-transformer as semi-supervised classification models for sperms image sets with pseudo labels to calculate the morphological normal sperms ratio of the patient.

Sperm Video Segmentation and Tracking [1]
***Prof. Zhuoran Zhang* | CUHK Ph.D. student Aojun Jiang | University of Toronto** 08/2022 – 12/2022

- Optimized the up-sampling process in U-Net to accelerate segmentation of sperms in each video frame;
- Enhanced the occlusion-flag-enabled PFT model for improved recognition and tracking of sperms in videos by modifying the occlusion-judge mechanism to analyze the concentration and motility of sperms;
- Leveraged TensorRT for model acceleration.

Design of a Log Detection and Analysis System for Huawei Cloud Service [2]
***Prof. Pinjia He* | CUHK Ph.D. Zhijing Li | CUHK Huawei Cloud Service Lab** 09/2021 – 07/2022

- Implemented a semantic parser to parse logs; applied word2vec to calculate semantic similarity of logs to agglomerate logs from the same root cause;
- Extracted invariants among logs and monitor the dependency of invariants to inform log detection;
- Analyzed false detection by log parsing algorithms such as Drain, AEL, and IPLoM; Corrected some ground truth in log parsing datasets;
- Evaluated the accuracy and efficiency of CNN, auto decoder and LSTM algorithms for automated anomaly detection of logs;
- The log root cause detection system is implemented into Huawei Cloud Service.

PROJECT (SELECTED)

Reinforcement Learning for Optimal Traffic Signal Control
***Prof. Xiaohui Xie* | UCI** 03/2023 – 05/2023

- Designed, implemented, and validated in Python a set of reinforcement algorithms for optimal traffic signal control so as to minimize waiting time of vehicles;
- Simulated cross-road traffic condition using Simulation of Urban Mobility (SUMO), allowing vehicle flow visualization;
- Employed 1) Deep Q-network, Double Deep Q-network, Dueling Deep Q-network, and Proximal Policy Optimization (PPO) reinforcement learning algorithms, and 2) various exploration strategies including greedy, epsilon-greedy, and upper confidence bound (UCB) to drive control, followed by a comparative study on the effectiveness and efficiency.

Implementation of a Flight Control System Based on Kalman and PID Controller
CUHK UAV and Intelligent Vehicle Society 01/2023 - 03/2023

- Implemented in MATLAB an integrated flight controller based on Kalman filter and PID controller to allow the speed and roll/yaw/pitch angles control of a fixed-wing unmanned air vehicle (UAV) with short transition, decent stability and good anti-disturbance characteristics.
- Key steps include 1) derivation of flight dynamics model and transfer function of UAV, 2) PID controller design, 3) Kalman

filter for UAV state estimation, and 4) simulation of PID controller and Kalman estimator using MATLAB Simulink.

COMPETITION

DJI RoboMaster Robotics Competition
Prof. Simon Pun **| CUHK** 10/2020 – 05/2021

- Joined a multi-disciplinary team to prepare for the DJI Robomaster competition, developing and operating six robots that launch projectiles at opponent in order to deduct Hit Points;
- Established a simulation environment in Gazebo simulator to facilitate the intelligent robot development and testing;
- Analyzed QMIX and VDN algorithms for intelligent vehicle decision, covering engineering (loading and transporting bullets), infantry (fight with other robots), supply (ammunition management) and aerial (air combat) robots;
- Enabled route planning via A* algorithm, Dijkstra's algorithm, and a greedy heuristic.

SKILLS

Programming Languages: C/C++ | Java | Python | MATLAB | SQL | ARM Assembly | AHDL | Verilog HDL
Libraries: PyTorch | TensorFlow | Opencv | ROS | Scikit-Learn | LibTorch