ZHANG QIHANG

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EDUCATION BACKGROUND

The Chinese University of Hong Kong, Shenzhen 08/2023 - Present
Master of Philosophy

- Major: Computer Science
- Research Focus: Computational Photography and Low-Level Vision
- Advisor: Prof. Qilin Sun

Tokyo Institute of Technology, Japan 04/2025 - 09/2025
Research Assistant

- Supervised by Prof. Masayuki Tanaka and Prof. Yusuke Monno
- Research Focus: Polarized Image Processing

The Chinese University of Hong Kong, Shenzhen 08/2019 - 06/2023
Bachelor of Engineering

- Major: Computer Science and Engineering

WORK EXPERIENCE

School of Data Science, CUHK-Shenzhen 09/2023 - Present
Teaching Assistant *Shenzhen*

- Served as a teaching assistant for Computational Laboratory, Database Systems, and Parallel Programming courses across multiple semesters
- Help professors arrange tutorial course content outlines. Teach tutorial courses each week and answer questions during office hours
- Update the assignment structure and use the latest CS technology in assignments to meet current requirements, such as Triton in Parallel Programming course

Vivo Mobile Communication Co., Ltd 07/2021 - 10/2021
SDE Intern *Shenzhen*

- Developed and maintained the android test engine, completed the development and implementation of multiple automated test components, and achieved excellent results in improving test efficiency and coverage rate
- Extended the engine usage documents according to the development content, improved the work efficiency of the test team, and reduce the communication time
- Ensured that the test engine could support customized testing needs for different countries, and understood the cultural uniqueness of different regions during the development process
- Fulfilled with Google's test engineering requirements to automate the entire process of using Google's Android test benchmarks for mobile phones

RESEARCH EXPERIENCE

Joint Polarized Image Demosaicing AND Denoising 04/2025 - 09/2025
Tokyo Institute of Technology, Japan

- Proposed the first joint denoising and demosaicing framework for color-polarized imaging, addressing both degradations within a shared feature space
- Designed an encoder-based feature fusion mechanism to enhance reconstruction quality
- Built a real-world paired polarized image dataset to support model training and evaluation
- Outperformed existing methods across multiple metrics

Ultra-high Dynamic Range Sensor Fast Tone Mapping and ISP 04/2024 - Present
CUHK-Shenzhen & PointSpread Technology

- Design a hardware-based tone mapping algorithm to achieve LDR display of Ultra-HDR images which have dynamic range close to the human eye (130-140dB)
- Implement an end-to-end learnable simplified ISP algorithm that utilizes a small neural network to estimate the global tone mapping parameters for an image, enabling real-time estimation on a 24-bit video stream

- Incorporate end-to-end differentiability in the design of the ISP algorithm to guarantee future expandability. For example, the ISP's output image can be adapted for target detection tasks, enabling joint optimization between the ISP and the corresponding task, thereby enhancing the output metrics

RGB-IR Sensor ISP and Fast Reflection Removal 08/2023 - 12/2023

- Implement GPU-based RGB-IR sensor image ISP
- Design reflection removal algorithm based on the low reflection property of glass to infrared light, use infrared band information to remove the reflection of the visible light band and provide better multi-spectral images
- Utilize guided filter to accelerate the feature extraction and fusion from RGB-IR image

PROJECT EXPERIENCE

Camera Image Simulation Pipeline (Huawei Collaboration) 08/2024 - Present

Product Design and Programming

- Designed and implemented a full-stack simulation pipeline modeling the camera imaging process from optics to sensor
- Applied spatially varying Point Spread Function (PSF) kernels to simulate lens-induced degradation across the image
- Built a sensor noise modeling framework to generate realistic pixel-level noise maps
- Delivered an extensible and modular pipeline that can be adapted to different sensors/lenses, providing high-fidelity synthetic raw data for algorithm development and validation

Parallel Computing Operator Template 09/2024 - 12/2024

Programming

- Built a modular CPU/GPU parallel operator library including image operators (grayscale, blur, Sobel), matrix multiplication, and DNN layers (convolution, fully connected) with backpropagation support
- Optimized CPU kernels using MPI, Pthreads, OpenMP, and developed high-performance GPU kernels using CUDA and Triton
- Triton/CUDA implementations of image operators and matrix multiplication outperformed baseline PyTorch eager implementations under equivalent settings

HDR Plus Based HDR Video Processing Application 12/2022 - 03/2023

Programming

- Implemented a high dynamic range (HDR) video processing pipeline based on Google's HDR+ paper, utilizing multi-frame short-exposure RAW synthesis
- Integrated HDR+ ISP modules including multi-frame alignment and fusion, filtering for noise reduction, and local tone mapping
- Developed a graphical user interface (GUI) application using Python and PyQt5 framework for user-friendly operation, supporting RAW image sequence selection and processing, with FFmpeg integration for final HDR video synthesis

SERVICE & LEADERSHIP

Teaching Assistant CUHK-Shenzhen

- Parallel Computing (CSC4050) - 2024 Fall
- Computational Laboratory (CSC1002) - 2024 Spring
- Database System (CSC3170) - 2023 Fall

Volunteer 2020

Office of Student Affairs, CUHK-Shenzhen

LANGUAGE & SKILLS

- **Language**: IELTS: overall: 7.0(R: 8.5/ L: 7.5/ S: 6.0/ W: 6.0)
- **Programming Skills**: Proficient in Python, familiar with C/C++, CUDA
- **Research Interests**: Image Processing, HDR Imaging, Novel Sensors, Computational Photography, Low-Level Vision