BOYUAN PENG

Phone: (+86) 13906328028 ◇ Email: pengby99@outlook.com
Homepage: xpeng1999.github.io
Google Scholar ◇ Github ◇ LinkedIn

EDUCATION

Tsinghua University (THU), China *Sep 2022 - Jun 2025 (expected)*
M.S. in Biomedical Engineering, Advisor: Peiwu Qin
GPA: 3.8/4.0
Major courses: Medical AI Technology and Practice(4.0); Medical Physics and Physical Therapy(4.0); Medical Optical Instruments(3.6).

China University of Mining and Technology (CUMT), China *Sep 2017 - Jun 2021*
B.E. in Electronic and Information Engineering
Average Grade: 80.37/100
Major courses: Signals and Linear Systems(96); Mobile Programming Technologies(91).

RESEARCH INTERESTS

- Microscopy Imaging
- Optical System Design
- Computer Vision Algorithms
- Cell Image Segmentation

PUBLICATIONS

1. **Practical Guidelines for Cell Segmentation Models Under Optical Aberrations in Microscopy** [link]
   Boyuan Peng*, Jiaju Chen*, P. Bilha Githinji*, Ijaz Gul, et al.
   Computational and Structural Biotechnology Journal, 2024, 26, 23–39. (* : equally contributed)
2. **Intelligent Proximate Analysis of Coal Based on Near-Infrared Spectroscopy** [link]
   Weinan Liu, **Boyuan Peng**, Xiaoyu Liu, et al.
   Journal of Applied Spectroscopy, 2021, 88(3), 645–652.

PREPRINTS

1. **Convolutional neural networks for rapid diagnosis and lesion detection of pediatric mycoplasma pneumoniae pneumonia using chest X-rays** [link]
   Jiaming Deng*, Jiaqi Yan*, **Boyuan Peng***, Dongmei Yu*, Zhiwei Ye, Liyan Lei, et al.
   Submitted to *Quantitative Imaging in Medicine and Surgery*. (* : equally contributed)

RESEARCH EXPERIENCE

An Integrated Device for Fundus Imaging and Refractive Testing Jun 2024 - Present
Research Assistant Lishui Hospital of Zhejiang University
Supervised by: Dr. Chenying Lu China

- Integrated a fundus camera and refractive measurement system into a single device by multiplexing the optical path using dichroic mirrors as well as semi-transparent and semi-reflective mirrors.
- Enabled users to obtain both retinal images and refractive index measurements in a single examination process, instead of two separate devices.
- Developed an automatic focusing method for the fundus camera based on the user's refractive data, enabling the device to adjust focus dynamically.

Benchmarking Cell Segmentation Models Under Aberrations Dec 2023 - Aug 2024
Graduate Research Assistant Tsinghua University
Supervised by: Peiwu Qin China

- Evaluated the robustness of cell instance segmentation models under various optical aberrations in fluorescence and bright field microscopy images, providing other researchers with guidelines about how to get high-resolution cell segmentation results.
- Recommended to use model based on a combination of FPN and SwinS architectures for segmenting cells which have similar pixel features.
- Tested online cell segmentation tools, with Cellpose 2.0 had strong performance for segmenting cells which have inconsistent morphological characteristics and tightly enclosed features.
- Developed the MobileNet-based model for predicting aberration types and amplitudes in PSF images, achieving 84.03% precision.

A Mobile Application for Pediatric Pneumonia Diagnosis Feb 2024 - Present
Graduate Research Assistant Tsinghua University
Supervised by: Peiwu Qin China

- Developed PneumoniaAPP, a mobile application for pediatric pneumonia diagnosis using a CNN model, achieving 88.20% accuracy.
- Integrated CAM techniques to visualize lung opacity areas, helping physicians localize pneumonia lesions and improve diagnostic reliability.

Intelligent Analysing Coal Using Near-Infrared Spectroscopy May 2019 - Jun 2020
Undergraduate Graduate Research Assistant China University of Mining and Technology
Supervised by: Meng Lei China

- Collected spectral data from 384 coal samples by using near infrared spectroscopy and correlated with moisture, volatile matter, and calorific value.
- Applied an optimized extreme learning machine for coal proximate analysis, improving prediction accuracy.

OTHER EXPERIENCE

THU Spectrum and Microscopy Course, Teaching Assistant *Fall 2023*

HONORS AND AWARDS

CUMT Second-class School Scholarship *2017 - 2018*
CUMT Second-class School Scholarship *2018 - 2019*
THU Second-class School Scholarship *2023 - 2024*
Innovation and Entrepreneurship Award, awarded by THU (Top 10%) *2024*

SKILLS/HOBBIES

Technical Skills Optical System Design, Microscope Optical Analysis
Programming Tools Python (Pytorch, Sklearn, Pandas, Numpy), Matlab
Hobbies Swimming and Hiking