

SICHENG CHEN

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EDUCATION

University of California, Irvine, Irvine, CA

September 2024-Present

Master of Engineering, Electrical Engineering and Computer Science

Xi'an Jiaotong University, Xian, Shaanxi, China

September 2020-July 2024

Bachelor of Engineering, Microelectronics Science and Engineering

EXPERIENCE

Undergraduate Researcher | Beihang University, Beijing, China

July 2022- July 2024

- Focused in the field of pathology image diagnosis by machine learning, including downstream tasks of tumor classification, grading, sub-typing and cell segmentation on both ROI and WSI.
- Participated in several works including comprehensive dataset construction, general model pre-training method proposal, segmentation model learning method proposal and WSI backbone model proposal.
- Be familiar with multiple instance learning, curriculum learning, incremental learning and other novel model learning methods.

Data Analyst Intern | Micron Xi'an Branch, Xi'an, Shaanxi, China

December 2023-June 2024

- Worked as a full-stack engineer for the development of real-time detection and alarm system in SMAI group.
- In charged of system layout design, responsibility coordination, technical presentation, coding and test run.
- Participated in three programs and mainly responsible for one program. All of them have been officially implemented in the industry.
- Effectively decreased the loss and cost of the company by giving in-time alarm or detecting potential threats by each system.

ACADEMIC PROJECTS

PathRWKV, NUS

July 2024-Present

- Proposed a novel slide-level feature extraction backbone model, explicitly aligned the features from different scales in a whole slide image for better feature comprehension and modeling.
- Used a parallelable RNN with refined attention mechanism to let the model posses both spatial and temporal information for multi-scale feature modeling.
- Designed BigModel, a general WSI end to end workflow to fit different downstream tasks and efficiently training and testing different models in one framework.

PuzzleTuning, BUAA

July 2022-April 2024

- Proposed a large scale Puzzle Tuning framework, identified task focuses: appearance consistency, spatial consistency, and misalignment understanding to effectively bridge pathological and natural domains
- Devised a multiple puzzle restoring task to explicitly pre-training the model with these focuses, and introduced an explicit prompt-tuning process to incrementally integrate the domain-specific knowledge with the natural knowledge
- Designed a curriculum-learning training strategy that regulates the task difficulty, making the model fit the complex multiple puzzles restoring task adaptively; and demonstrated results that Puzzle Tuning framework outperforms the previous SOTA methods in various downstream tasks on multiple datasets

CPIA Dataset, BUAA

July 2022-October 2023

- Presented the comprehensive pathological image analysis (CPIA) dataset, a large-scale SSL pre-training dataset combining 103 open-source datasets with extensive standardization
- The dataset contained 21,427,877 standardized images, covering over 48 organs/tissues and about 100 kinds of diseases, which includes two main data types: whole slide images (WSIs) and characteristic regions of interest (ROIs)
- Proposed a four-scale WSI standardization process based on the uniform resolution in microns per pixel (MPP), divided the ROIs into three scales artificially; and built a multi-scale dataset with the diagnosis habits under the supervision of senior pathologists
- Conducted SOTA baselines of SSL pre-training and various downstream evaluations and proved the possible usage of the CPIA dataset that will inspire future research on digital pathological analysis

Segmix, BUAA

December 2022-March 2023

- Proposed a novel shuffle-based feedback learning method inspired by curriculum learning to improve the quality of pseudo mask; and performed patch level shuffle of pathology images, while model adaptively adjusting the shuffle strategy based on feedback from previous learning
- Achieved multi-scale learning of pathological features and instance associations by adaptively adjusting the learning strategy through feedback using the novel shuffle-based feedback learning
- Implemented the method on the ROSE dataset, the WBC dataset, and the MARS dataset to confirm it significantly out-perform other weakly supervised methods, which achieves pixel-level annotations with only image-level labels; and explored effective supervised segmentation methods for 3D medical images

ENGINEERING PROJECTS

Real-time Worker's Mis-operation Detection and Alarm System, Micron

December 2024-June 2024

- The system is built up for detecting worker's manual operation, and giving in-time alarm when worker makes an mis-operation
- The system has a front-end to allow both workers and administrators to easily use the system by graphic interface. It provides an interactive page for the worker to confirm the system's judgement, and automatically upgrades itself due to the worker's feedback
- The system has a SQLite3 database engine to store all the data generated during the system running, including pictures, videos, model weights, history records, etc
- The system uses FP16 quantized model to reduce the computation costs of system
- The system can automatically update itself by learning from the feedback of the workers

Real-time Phone Camera Tapes Detection and Alarm System, Micron

March 2024-April 2024

- The system assists security department to check whether the workers' phones are following the privacy policy of the company to use tape blind their phone cameras
- The system detects whether the tapes on the phone's cameras are intact. If any of the them is not, the security worker will check the tape manually
- The system is estimated to enormously reduce the human cost by cut down the security workers' amount

Deep Learning Model Quantization, Micron

October 2023-February 2024

- Quantized YOLOv8 into different precision scale in different formats of specific platforms. The precision includes FP16, BF16 and INT8, the formats include pt, ONNX, TensorRT and OpenVINO. The quantization method is post-training quantization. The quantization libraries includes PyTorch, TensorRT, OpenVINO, ONNX and PPQ
- The model speed increased enormously about 500% while the precision only falls less than 5% after the quantization

Real-time Distraction Detection and Alarm System, Micron

December 2023-January 2024

- The system detects whether workers are walking or running while watching their cellphones through surveillance cameras, and give notice to those distracted ones in real-time
- The system reports the number of workers who are distracted by the cellphone to the security department with the picture of each target with face mosaic. Due to the privacy policy, it won't store any picture with the worker's face appear in the picture
- The system is estimated to enormously reduce the cost of the company on the compensation to the accidents

Real-time Fall Detection and Alarm System, Micron

June 2023-July 2023

- The system detects worker's movement through surveillance cameras by YOLOv8 detection model. When detected a fall, it will report the security department to check whether the worker is alright
- Trained the model to reach SOTA performance on private dataset

SKILLS

Programming: Python, HTML, CSS, JavaScript, SQL

Applications: Pycharm, VSCode, Git

Processes: System Layout, Architecture Mindmap, Technical Documents, Presentation Slides