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EDUCATION

Wuhan University (WHU), Hongyi Honor College   **Wuhan, China**
- B.Eng. in **Microelectronics Science and Technology**   Sept. 2021 - Jun. 2025
- GPA: 3.87/4.0

University of California, Berkeley   **Berkeley, CA**
- Visiting Undergraduate student   Jan. 2024 - May 2024
- Coursework: EECS 151 Intro to Digital Design and Integrated Circuits, EE 140 Linear Integrated Circuits, MSE 243 Electronic Materials Characterization

RESEARCH EXPERIENCES

Embedded & Cyber-Physical Systems Lab @ UC Irvine   **Irvine, CA**
Mentor: Prof. Mohammad Al Faruque,   May 2024-Present

Project: Robust Autonomous Vehicle Perception with Sensor Fusion and AnomalyGPT
- Fine-tune the AnomalyGPT model to adapt it for anomaly detection in autonomous driving scenarios
- Integrate AnomalyGPT into HydraFusion to enhance the autonomous vehicle's ability to perceive anomalous situations

Laser and Ultrafast Imaging Laboratory @ Wuhan University   **Wuhan, China**
Mentor: Prof. Cheng Lei   Sept. 2023 – Apr. 2024

Project: Medical Ultrasound Image Segmentation
- Imported the parameter weight files of the Segment Anything Model (SAM) and adapted them for medical ultrasound image segmentation, adopting the default point prompt of SAM to avoid the impact of prompt learning
- Modified the Swin-Transformer model by incorporating CBAM to optimize the transformer module
- Designed a Wisefusion module to implement feature fusion of SAM and improved Swin-Transformer, achieving segmentation results on the BUSI dataset with metrics like mIOU, dice, Jaccard exceeding 90%

Yang Research Lab @ UC Davis   **Davis, CA**
Mentor: Prof. Wenjian Yang   Jul.2023 – Present

Project: Arterial Hemoglobin Oxygen Saturation (SpO2) Measurement Model based on Monte Carlo Simulation
- Constructed a 3D model of the blood vessel using MATLAB and assigned different optical absorption parameters to each layer of the vessel
- Utilized Monte Carlo simulations to obtain the time-of-flight (TOF) curves of the vessel, calculated and plotted the beating signal curves with the TOF curve data, and leveraged the MBLL (Modified Beer-Lambert Law) formula to compute SpO2
- Designed a fitting neural network that correlated absorption parameters with TOF values, allowing for the prediction of vessel parameters from TOF curves
- Expanded the measurement model to dual targets by devising an adaptive algorithm to separate the mixed signals from the mother and the baby, enabling the calculation of SpO2 for each individual with a model error within 5%.

Riscv Lab @ Wuhan University   **Wuhan, China**
Mentor: Prof. Wei Liu   Oct. 2022 – Jul. 2023

Project: Electrocardiogram (ECG) image classification based on Deep Learning
- Collected dual-lead ECG signals from the MIT-BIH database, used generative adversarial networks to perform data enhancement, and designed a lightweight model to address the real-time requirements of ECG-based preliminary diagnosis
- Built the XGBoost-based diagnostic model after comparing the performance of AdaBoost, CatBoost, XGBoost, and random forests
- Designed a voting system consisting of four Xgboost models, achieving an accuracy of 97.4% within a short time and with limited resources as well as nearly perfect identification of normal ECG signals
- Developed a deep learning model comprising a combination of CNN and RNN, in which the RNN's hidden states incorporated the self-attention mechanism, resulting in an accuracy of 99.2%

SELECTED INDEPENDENT PROJECTS

Efficient Mixed Text Recognition in Complex Scenes Using DLoRA-TrOCR   Feb. 2024 – May 2024
- Fine-tuned the weights of the pre-trained Transformer OCR model, TrOCR, on the self-made mixed dataset of handwritten, printed, and complex scene texts
- Adopted DoRA and LoRA methods for optimizing the image encoder and text decoder respectively, leveraging Parameter-Efficient Fine-Tuning (PEFT) methods to reduce the trainable parameters while improving recognition performance

- Conducted comprehensive experiments of the proposed DLoRA-TrOCR model, validating its state-of-the-art performance on complex scene data sets with an accuracy of 84.63%

RISC-V Based 3-Stage CPU Processor Design (EECS 151/251A Project at UC, Berkeley)   Mar. 2024 – May 2024
- Designed a 3-stage RISC-V CPU pipeline using Verilog and developed a vector testbench to verify the functionality of the ALU
- Implemented a CPU pipeline without a cache that supports the basic RISC-V instruction set, CSR, and reset functionality, and then integrated a direct-mapped cache component using SRAM into the pipeline
- Utilized VLSI tools to synthesize the Verilog design optimize the layout and ensure the design passed all required functionality tests.

Two-Stage Amplifier Design for LCD Driver (EECS 140 Project at UC, Berkeley)   Mar. 2024 – May 2024
- Performed manual calculations to determine the required gain and slew rate of the two-stage amplifier based on given specifications
- Identified suitable circuit structures and corresponding components (PMOS/NMOS) and wrote MATLAB scripts to optimize circuit component parameters
- Utilized Cadence for layout and parameter tuning, ensuring compliance with design rules and achieving optimal circuit performance

FPGA-based Image Acquisition and Hardware Acceleration   Mar. 2023 – Jul. 2023
- Labeled the images in the provided dataset of traffic lights, trained the YOLO5 model on the dataset, and adjusted the parameters, achieving an accuracy of more than 95%
- Developed a PCIe hardware driver that allowed the transmission of HDMI data from the FPGA to the host computer
- Employed FPGA's hardware computing unit to accelerate image recognition, stored the processed data in DDR4 memory, and continuously read the processed data from DDR4 memory, thus outputting the results of vehicle recognition in real-time

Effect of Mask Material and Process Parameters on Performance   Aug. 2022
- Constructed the relationship between process parameters and structural variables by using the decision tree models GBDT, XGBoost, LightGBM, and linear regression models Ridge and Lasso
- Applied the grid search strategy to select the decision tree and the optimal hyperparameters of linear regression models
- Calculated the arithmetic average of two models to reduce the impact of notice and optimize the prediction results
- Constructed relationship between structural variables and product performances with decision tree models and BP neural networks

PUBLICATIONS

Li, Y., Hu, Y., Chen, J., Wang, B., & Liu, W. (2023). ECG Classification with Dual Models: XGBoost Voting and Deep Learning with Attention. In 2023 16th International Conference on Advanced Computer Theory and Engineering (ICACTE) (pp. 202-206). IEEE.

Lv, S., Zeng, S., **Li, Y.**, Yang, K., & Chen, Y. (2024). Local optimum time-reassigned synchrosqueezing transform for bearing fault diagnosis of rotating equipment. IEEE Sensors Journal.

Chang, D.*, & **Li, Y.*** (2024). DLoRA-TrOCR: Mixed Text Mode Optical Character Recognition Based On Transformer. arXiv preprint arXiv:2404.12734.

Li, Y., & Huang, J. (2023). DSATNet: Dual branch SAM-Transformer Fusion Network for accurate breast ultrasound image segmentation. *Medical Image Analysis*. Manuscript submitted for publication.

*These authors contributed equally to this work.

PATENTS

Li, Y. Energy-saving calculation method, energy-saving controller, terminal and medium for split air conditioner. Chinese Patent CN202310099177.0, filed Jan 30, 2023, issued February 23, 2024.

HONORS & SCHOLARHSIPS

- Innova International Exchange Scholarship   May 2024
- Innova Excellence Scholarship, Top 3%   Sept. 2023
- First-Class Scholarship, Top 5%, Twice   2023 & 2022
- Academic Excellence Scholarship, Top 5%   Apr. 2023
- 3rd Prize, the 14th Huazhong Cup Mathematical Modeling Competition for College Students   May 2022

SKILLS

- Programming: Python, MATLAB, C++, C, Verilog
- Libraries: Pytorch, Tensorflow, Keras, Scikit-learn, OpenCV
- Platforms: Linux (Ubuntu), FPGA, ASIC, Docker
- Applications: Jupyter Notebook, Anaconda, Git, TensorBoard, Cadence, Vivado, VCS, Quartus