ZHEN (MARK) BIAN

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EDUCATION

University of California, San Diego San Diego, CA, United States
Master of Science, Electrical and Computer Engineering Sep 2024 – Dec 2025(Expected)

Sun Yat-sen University Guangdong, China
Bachelor of Engineering, Microelectronic Science and Engineering (CGPA: 3.8/4.0) Sep 2020 – Jun 2024

TECHNICAL SKILLS

- **Programming**: Python, Verilog, C&Cpp, Linux, Assembly Language
- **Hardware**: Vivado, Cadence Virtuoso, Arduino, Proteus
- **Software**: MATLAB, ROS, Git, LaTex, Markdown
- **Machine Learning**: PyTorch, Tensorflow, Scikit-Learn, Numpy, Pandas, Matplotlib

RESEARCH EXPERIENCE

A*STAR, Institute for Infocomm Research (I2R) Singapore
Intern Student under Senior Principal Scientist Kai Keng Ang Aug 2023 – Nov 2023

HCCSP: combining Histogram based Contrast with Common Spatial Patterns (CSP) for interpretable quality evaluation algorithm on motor imagery EEG data

- Built Python codes to perform Source Estimate on EEG signals and projected the results on the cortical surface in 3D view for convenient analysis;
- Worked on combining the Self-Organizing Maps (SOM) and Kullback-Leibler Divergence to make CSP-based interpretable clustering of different EEG sessions;
- Proposed a novel and efficacious evaluation algorithm implanting the Histogram based Contrast (HC) from the Computer Vision Field to execute CSP recognition to measure the data quality and predict its performance before classification.

PROJECT EXPERIENCE

Research Assistant to Associate Professor MingYu Wang Sep 2022 – Apr 2023

A Self-Driving Robot based on Ubuntu-implanted ZYNQ-7000

- Built ROS environment for the robot and got the Point Cloud Data and RGB Infrared Visual Data from the binocular camera;
- Applied the SLAM algorithm with the binocular camera to the robot;
- Implanted Ubuntu18.04 LST system on the development board ZYNQ-7000.

Research Assistant to Associate Professor Shuyan Zhu and Assistant Professor Yao Liu Apr 2022 – Jul 2022

A Small circuit footprint and compact S-Box architecture over Finite Field applied in AES

- Built the AES S-Box with the Tower Field architecture with optimal parameters to lower its compactness;
- Worked to find a general algorithm of field transformation to explore all the possibilities of the field extension to find a faster field transformation architecture for AES S-Box generating.

Research Assistant to Associate Professor Shuyan Zhu Jan 2022 – Apr 2022

A Low Complexity Polynomial Multiplier applied in the AES Algorithm over Galois Field (2^{128})

- Reproduced the AES algorithm by Python, Cpp, and Verilog, and tested the algorithm on FPGA;
- Tested the complexity of the SBM multiplier, M-term Karatsuba-like multiplier, Toom-Cook's algorithm, and LCBA multiplier while applied in AES;
- Implanted Toom-Cook's algorithm for the multiplier in AES.

Asia and the Pacific Mathematical Contest in Modeling (Awarded 2nd Prize) Nov 2021

An Automatic Measurement System for Industrial Products' Contour Monitor

- Built the measurement system using OpenCV and used the Laplacian algorithm to detect the edge of images;
- Combined the Camera calibration methods with the Sub-pixel interpolation methods to increase the precision;
- Achieved high accuracy in products' contour segmentation and measurement.

Course Final Project under the instruction of Assistant Professor Jun Wang May 2021

A MIPS 5-Stage Pipeline CPU Architecture with Hazard Handling

- Built a MIPS 5-stage pipeline CPU architecture using Verilog, and tested it on FPGA with Vivado;
- Used Harvard architecture and Pipeline Stalling to handle the structure hazard and control hazard;
- Combined the Pipeline Stalling with Data Push Forward to handle the data hazard.