ZHEN BIAN

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EDUCATION

Sun Yat-sen University Guangdong Province, China
BS in Microelectronics Science and Technology September 2020 – Present

- GPA: 3.8/4.0
- TOEFL: 99 (Reading:27 Listening:27 Speaking:22 Writing:23)
- Outstanding classes: Further Mathematics (97 1/83), Discrete Mathematics (100 1/86), Calculates (97 6/93)

SELECTED AWARDS AND HONORS

- The Progress Scholarship (Intramural) 2020
- The 3rd Excellent Students' Price Scholarship (Intramural) 2021
- The 3rd Price Award of Contemporary Undergraduate Mathematical Contest in Modeling, GD (Provincial) 2021
- The 2nd Price Award of Asia and Pacific Mathematical Contest in Modeling (Provincial) 2021

SELECTED RESEARCH AND PROJECT EXPERIENCE

Sun Yat-sen University Guangdong Province, China
Projects in class MST210 under the instruction of 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 to handle the structure hazard, used Pipeline Stalling to handle the controlling hazard, and combined the Pipeline Stalling with Data Push Forward to handle the data hazard.

Projects in 2021 Asia and Pacific Mathematical Contest in Modeling November 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 the image;
- Combined the Camera calibration methods with the Sub-pixel interpolation methods to increase the precision;
- Achieved high accuracy in products' contour segmentation and measurement, winning the 2nd Prize in the contest.

Research Assistant to Associate Professor Shuyan Zhu January 2022 – April 2022

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

- Read papers about AES Algorithm, Finite Field Multiplier, and Faster Multiplication Algorithm;
- 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, and finally chose Toom-Cook's algorithm for the multiplier in AES.

Research Assistant to Assistant Professor Yao Liu April 2022 – Present

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

- Read papers about inverters over Finite Field, affine transformation, and Field Extension;
- Built the AES S-Box with the Tower Field architecture with optimal parameters to lower its compactness;
- Trying 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 MingYu Wang September 2022 – Present

A Brain Assisted Autonomous Robot

- 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;
- Read papers about the BCI algorithms and try to apply models to the robot.

COMPUTER AND LANGUAGE SKILLS

- Programming skills: Verilog, C&Cpp, ROS, MATLAB, Python, Assembly Language, LaTeX, MarkDown;
- Electric circuit simulation tools: Vivado, Virtuoso, AutoCAD, Design Compiler, Proteus;
- Languages: Chinese (native), English (fluent)

INTERESTED RESEARCH FIELDS

- Brain-Computer Interface, Human-Computer Interface
- Computer Vision
- Encryption algorithm

LEADERSHIP AND EXTRACURRICULAR EXPERIENCES

- Working for the Student Council for the department MST. (October 2020 – July 2022)
- Interest: Fitness, Cycling, Sketch, Personal Health.