Zhaoyang Wang

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EDUCATION BACKGROUND

University of Southern California (USC), Los Angeles, USA 01/2022 - 05/2023
Master of Science in Electrical Engineering
GPA: 3.71/4.0
Courses: EE457-Computer systems organization | EE477-MOS VLSI circuit design | EE560-Digital system design | EE557-Computer systems architecture | EE577a-VLSI system design

University of Liverpool (UoL), Liverpool, UK 09/2019 - 06/2021
BEng Electrical & Electronic Engineering (**First class**)

Xi'an Jiaotong-Liverpool University (XJTLU), Suzhou, P.R. China 09/2017 - 07/2019
BEng Electrical & Electronic Engineering (Cooperative program with UoL) (**First class**)

Courses (Math & Software): Multi-variable Calculus | Field Theory & Partial Differential Equations | Engineering Mathematics I&II | C Programming and Software Engineering | C++ Programming and Software Engineering | Machine Learning

Courses (Hardware): Computer systems organization | MOS VLSI circuit design | Digital system design | Computer systems architecture | VLSI system design | Diagnosis and Design of Reliable Digital Systems | Digital/Analog Circuits | Electromagnetism and Electromechanics | CMOS Integrated Circuits | Integrated Electronics and Design | Communication Systems | Instrumentation & Control | Signals and Systems | Embedded Computer System | Power Generation, Transmission and Distribution | IoT System Design: Software and Hardware Integration

SKILLS

Programming Languages: C/C++ | MATLAB | Verilog | VHDL | Assembly | Python
Software: Altera Quartus II | SPICE | Cadence Virtuoso | Modelsim/ Questasim | Xilinx Vivado
Hobbies: Singing | Violin | Tennis | Kickboxing

COURSE PROJECTS

***Soft electronics*, Zhao Research Group led by Prof. Hangbo Zhao, USC** 01/2023 - 05/2023
- To build a wireless platform for test the soft electronics devices.
- Communicate the MCU msp430 with the slave device AD7746, the ADC and sensor, by I2C channels.
- Set up the master device to send the required signals to request the data from the slave device, verified by using an oscilloscope.
- Maintain and improve the project to better fit the goal.

Interconnection network -- three by three mesh, USC 01/2023 - 05/2023
- To design and synthesize an interconnection network composed by nine routers using Verilog HDL and EDA software in a group of three.
- Designed the router with five bidirectional communication channels with two virtual channel using Verilog.
- Designed and test a simple cardinal processor.
- Completed and tested the top design module.

Fault simulation and ATPG (Automatic Test Pattern Generation) program, USC 01/2023 - 05/2023
- To write a program of Fault simulation and ATPG using C++ in a group of five.
- Composed by user interface, logic simulator, levelizer, DFS (Deductive Fault Simulation), PFS (Parallel Fault Simulation, ATPG with PODEM and D-Algorithm.

***SRAM design* Course Project, USC** 10/2022 - 11/2022
- Designed and plot the schematic of 8x64 bit SRAM with Cadence virtuoso, including its control unit and memory array.
- Test the function of the circuit in ADE.
- Plotted the CMOS layout of the design.
- LVS and DRC.
- Extract from the layout and test.

***Digital design* Course Project, USC** 01/2022 - 08/2022
- Designed 5-stage-pipeline CPU (MIPS ISA) with Verilog, and simulated on modelsim.
- Designed components of Tomasulo 1 & 2 Out-Of-Order excution CPUs with Verilog, and simulated on modelsim.
- Designed components of Tomasulo 3 Out-Of-Order excution CPU with VHDL, and simulated on modelsim.
- Designed components of PCIe with VHDL, and implemented on FPGA board.

Final year Project, *Development of a sensing prototype for the Internet of Things*, UoL 10/2020 - 03/2021

- Designed a prototype of IoT, basing on Raspberry Pi.
- Communicated sensors with Raspberry Pi.
- Read and transmit the data from the sensors via Internet.

Second year Project, *Voice-controlled car*, UoL 10/2019 - 03/2020

- Designed a voice-controlled car, basing on Raspberry Pi in a group of 5.

***Applied Design & Industrial Awareness* Course Project, UoL** 09/2019 - 12/2019

- Designed and experimentally characterized a common amplifier circuit with resisters, capacitors, DC voltage, and its core, a bi-polar transistor, focusing on error analysis.
- Implemented a Monte Carlo simulator in MATLAB to statistically predict the scoring in penalty kicks of football matches; leveraged variance reduction methods (antithetic, control variates, and stratifications) to boost computational efficiency.

***Electromagnetism and Electromechanics* Course Project, XJTLU** 02/2019 - 06/2019

- Experimentally determined equipotential in parallel plates and concentric cylinders conductors, and deduce distributions of their electric field
- Measured the transformation ratio and parameters of a single-phase transformer, covering no load test and short circuit test.

Team Leader, *C++ Programming and Software Eng. II* Course Project, XJTLU 02/2019 – 06/2019

- Led a team of three to develop the classic board game Monopoly in C++ and Visual Studio 2013 IDE.
- Led a team of five to design, implement, and test an online library management system using C++, key accomplishments include:
  - Allowed management of asset collections, relationships with members, keeping track of books and their checkouts, and members' subscriptions and profiles.
  - Optimized database query data structure and algorithm to reduce space and time complexity.
  - Implemented a book recommender system based on collaborative filtering and content-based filtering.
  - Completed a systematic software testing to verify the functionality of individual components and overall performance.

Development of an Autonomous Car
***Experimental, Computer Skills and Sustainability* Course Project, XJTLU** 02/2019 – 06/2019

- Designed and prototyped an Arduino-based smart car capable of performing line tracking and falling/obstacle avoidance.
  - Conducted assembly and tuning of collision and ultrasonic sensors; performed single-board microcontroller programming in C++ to allow components integration and autopilot control.
  - Designed and implemented an algorithm for obstacle avoidance trajectory generation by proposing a smooth local modified trajectory of a global path based on a parameterized sigmoid function and a rolling horizon.

WORK EXPERIENCES

Assistant Intern
Xunfei Zhiyuan Information Technology Co., Ltd., Anhui, P.R. China 01/2019 – 02/2019

- Document Handling
- Software testing

IoT Engineer Intern
Xunfei Zhiyuan Information Technology Co., Ltd., Anhui, P.R. China 08/2019 – 09/2019

- Helped establish a mathematical model to optimize the layout of public facilities in an IoT-driven smart city.

IoT Engineer Intern
Intech Technology Co., Ltd., Anhui, P.R. China 08/2021 – 09/2021

- Designed a system to communicate a fire alarm system with data center.
  - Connected and tested Data Transfer Unit, central controller, and sensors.
  - Programmed on a Programmable logic controller to control the system and collect data, and tested.

EXTRACURRICULAR EXPERIENCES

Volunteer | Sichuan Giant Panda Sanctuary, China 06/2018 – 07/2018

- Prepared food for the pandas, cleaned panda enclosures, and participated in observation and research.

Volunteer | St John Ambulance, UK 10/2019 – 12/2019

- Joined a group of volunteers and healthcare professionals to deliver event health and community services, raise funds, attend events, and run the St John youth programs.

Attendee | UoL Chinese Singing Competition, UK 02/2020