Ziheng Ding

dingziheng33@gmail.com (608) 236 3335 437 W Main St, Madison, WI 53703 https://blueheart22.github.io/

EDUCATION

University of Wisconsin-Madison

Master of Science, Electrical and Computer Engineering, Sep. 2023-Jun. 2025

Coursework: Digital Circuits and Components, Embedded Computing Systems, VLSI Systems Design (On-going), Introduction to Computer Architecture (On-going), Introducing Computer Science to K-12 Students (On-going)

Hong Kong University of Science and Technology (HKUST)

Bachelor of Science, Computer Engineering, Sep. 2019-Jun. 2023

Coursework: Introduction to Embedded Systems, Operating Systems, Signals and Systems, Fundamentals of Artificial Intelligence, Introduction to Computer Organization and Design, Introduction to Electro-Robot Design, System Modeling,Analysis and Control

SKILLS

CAD: Cadence, Verilog, CubeMX

Software: Node.js, React Native, Android Studio, XGBoost, SOFA4 framework

Programming Languages: Python, JavaScript, Java, C++, C,C#

Database: AWS DynamoDB,Oracle

Hardware: STM32, Arduino

Others: SolidWorks, MATLAB

ACADEMIC PROJECTS

Graph Neural Network (GNN) implementation

- Write the Verilog code for a deep neural network (DNN) that will be embedded into a graph.
- Write the Verilog code for a GNN that embeds the previous DNN.
- Synthesize the design using Design Compiler and verify the synthesized netlist.
- Perform automatic place-and-route (APR).
- Post-APR - export GDS, import the GDS into Virtuoso layout, and perform DRC/LVS on the final layout of the design.
- Make power/performance estimations.

Design and implement a processor

- Starting from a single cycle 16-bit processor architecture, having program counter, register file, ALU, as well as memory for both data and instruction.
- Extending the architecture above to support pipelining and full data forwarding.
- Implementing cache for the pipelined architecture.

Digital Circuits and Components

- Principles and characterization of logic circuits. Design and analysis techniques for applied logic circuits. Transmission lines in digital applications. Families of circuit logic currently in use and their characteristics.

Hiking app development, (Senior Capstone Project)

- Develop a hiking navigation mobile app.
- Implement real-time navigation, map display, route planning with Google Map APIs
- Collect data of blackspots where hiking accidents happened before and implement an alert module that can warn users when they are close to a blackspot.
- Has a user profile system including log-in, user page and backend data storage using Amazon AWS and DynamoDB
- Cooperated with two other teammates to complete the project in two semesters.
- Available for most regions in Hong Kong

Design and implementation of an Omni-directional Quadruped Robot

- Collaborated with team members, finished the designment of a 3D-printed robot that meets the expectation of moving omnidirectionally without turning its body.
- Used UCOSIII real time operating system on STM32 board to control 12 servo motors with three motors on each leg.
- Worked on CPU clock scheduling and multi-threaded processing; built the logic of the control algorithm based on gait analysis to make the 12 motors move synchronously to complete a smooth movement.
- Decided the algorithm's step size is at the beginning of each movement depending on the angle of the movement relative to the starting location; did repetitive tests to meet the project's requirement.

Path-search algorithm design

- Finished the path-search algorithm design that can determine the shortest route from two random locations to their respective endpoints in a 256x256 obstructed map scene.
- Within the scenario containing two agents, used bidirectional A* in the code implementation to save computation.
- Meet the computation time limit that generate the path within 1 second.

Application design

- Designing an app that allow the user to control a PC with a smartphone.
- Using a screen mirroring app to project the PC screen to the smartphone.
- Creating a flowing screen window on the smartphone to capture gestural inputs and block the screen mirroring app from receiving the input.

WORK EXPERIENCE

Community based learning

Introducing Computer Science to K-12 Students

- Work in team-of-3 to lead Computer Science clubs and workshops for K-12 students at sites in the Madison area.
- Design and lead activities based on Scratch to help K-12 students learn computational thinking and computer programming.

Full-time intern / App development, Jun. 2022-Aug. 2022

Ant Yunchuang Digital Technology Co.,Ltd, Beijing, China

- Worked in the Ant Technical Division of the Industry Technology Dept.
- Based on SOFA4 framework, participated in the development of the CMO program, focusing on developing the program template for hotel services.
- Implemented several live-in services for customers, such as instant Wifi connection, invoicing reservation, and personal identity verification by scanning QR code.
- Capable to displaying basic information and supporting advertising and promotions of hotels.
- Undertook the work of communication with other teams for sharing developing resource, such as the mocking server.
- Upon the end of my internship, several ISVs and retailers showed interest to the template and the releasing was under planning.

RESEARCH EXPERIENCE, Jun. 2021-Aug. 2021,Supervisor: Prof. Hui Pan

Machine Learning on Wearable Devices

- Interacted with users and programs on wearable devices through hand gesture recognition.
- Use Axis-Neuron and Unity to collect data from IMUs, and setup gesture detection AI with Python
- Studied the relationship between the number of IMUs and the complexity of hand poses, and conclusion is the following:
    a) Able to detect 80% to 90% of static gestures that does not involve transformation from one gesture to another gesture.
    b) More IMUs does not always lead to better accuracy. When more than 6 IMUs are placed, gestures become less distinguishable from each other.
    c) When more gestures are defined, detection becomes less accurate.