

Lingyu Gong

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EDUCATIONAL BACKGROUND

Trinity College Dublin

Postgraduate Degree Programme

Dublin, Ireland

09.2023-Present

- **Programme:** MSc Electronic Information Engineering
- **Coursework:** Algorithms for Quantum Computing, Integrated Systems Design, Self Organising Technological Networks, Open Reconfigurable Networks, Deep Learning and Its Applications, etc.

Capital Normal University

Undergraduate Degree Programme

Beijing, China

09.2019-06.2023

- **Programme:** BSc Computer Science and Technology (Education)
- **GPA:** 3.51/5.0
- **Coursework:** Digital Logic Circuits, Principles of Computer Composition, EDA and its Practice, etc.

AI/FPGA-ORIENTED PROJECT EXPERIENCE

Enhancing NoC Network Predictions with Advanced AI Techniques

Project Holder/Researcher

Dublin, Ireland

12.2023-Present

- Apply cutting-edge AI techniques to significantly improve the efficiency and accuracy of network-on-chip (NoC) key parameter prediction, provide data support and intelligent guidance for NoC network design and optimization
- Build and simulate multiple NoC network scenarios utilising Booksim2 to generate datasets containing rich features and high-quality labels, providing a solid foundation for AI model training
- Perform strict data cleansing and preprocessing on the simulated dataset, and implement feature selection and extraction strategies to enhance the characterization ability of the dataset and improve the model training effect
- Select and apply appropriate machine learning algorithms according to the specific needs of NoC performance parameter prediction, especially linear regression models
- Train the linear regression model using the pre-processed dataset, run the test dataset with this model, and compare the predicted results of the trained model with the real results generated by the Booksim2 simulator

Tumor Segmentation and Classification

Project Holder/Researcher

Dublin, Ireland

10.2021-10.2022

- Collected medical imaging data containing various types of tumors, such as CT, MRI or PET scans, covering tumors of different sizes, shapes and locations
- Adopted convolutional neural network (CNN) or its variants, such as U-Net, Mask R-CNN, etc., for pixel-level segmentation of tumor regions; trained the model using labeled datasets, and adjusted the model parameters by back-propagation algorithm to minimize the segmentation error
- Extracted features such as shape, size, texture, and possible depth features (e.g., feature vectors extracted by CNN) based on the segmented tumor region; classified the tumor based on the extracted features using machine learning algorithms such as Support Vector Machines (SVMs), Random Forests, etc., and the F1 score for this result was 0.89

FPGA-Based Implementation of the VGA Gluttonous Snake Game

Project Holder/Developer

Beijing, China

10.2021-11.2021

- Utilized Quartus II and VGA technology to implement the classic Gluttonous Snake game on FPGA, including VGA display controller design, game logic design and input interface design, as well as tested and optimized on FPGA development boards
- Generated clock signals, line synchronization signals and field synchronization signals required for VGA, used FPGA internal RAM as frame buffer to store the pixel data of the game screen, and controlled the output of RGB signals according to the content of the frame buffer to display the game screen
- Wrote the game logic and defined the game states, including game start, game progress, game end, etc., designed the state machine to manage the transitions between these states, and completed the snake movement control, food generation and detection, collision detection, and score calculation and other functions
- Carried out functional simulation and debugging using Quartus II, downloaded compiled code to FPGA development board for real board testing, and performed continuous optimization of code and algorithms to improve frame rate and response speed of the game

Multi-Cycle CPU Design

Project Holder/Developer

Beijing, China

03.2021-04.2021

- Designed a multi-cycle CPU to implement arithmetic instructions (addition, subtraction, immediate number addition), logical instructions, shift instructions, compare instructions, memory read/write instructions, branch order and jump instruction, as well as designed and implemented a multi-cycle hard-wired controller (purely combinational circuits)
- Conducted functional testing using Logisim to verify the correctness of the design, implemented a fully functional multi-cycle CPU and successfully passed full instruction functionality testing

Continued

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AL/FPGA-ORIENTED PROJECT EXPERIENCE

Single-Cycle CPU Design

Beijing, China

Project Holder/Developer

02.2021-03.2021

- Determined the instruction set to be supported by the CPU, including arithmetic logic instructions, data transfer instructions, etc., and assigned opcodes and the necessary number of operands to each instruction
- Drew single-cycle MIPS CPU datapaths and utilized Verilog to write code for each module, including instruction memory modules, register bank modules, ALU modules, controller modules, etc.
- Simulated and tested the designed CPU using Logisim, debugged the code and fixed potential errors
- Downloaded the written hardware description language code to the FPGA development board, configured the FPGA chip, implemented the datapath and controller of a single-cycle MIPS CPU, as well as verified its functional integrity through a variety of test instructions

RESEARCH EXPERIENCE

Realisation of Laboratory Swipe Card Notation System

Beijing, China

Core Participant

07.2022-09.2022

- Designed a laboratory card system, achieved efficient and intelligent personnel registration and management through the integration of a variety of hardware components and software development, consisted the front-end display, back-end processing and hardware implementation
- Conducted PCB and hardware design, utilised magnetic cards, a RFID module, a Led display, a buzzer, and the ESP8266 development board to complete the design, as well as carried out system integration and testing

Design and Research of a 3D Modelling Course

Beijing, China

Team Leader

11.2020-04.2022

- Led the team to carry out in-depth design and research of 3D modeling courses, with a special focus on the use of Rhino modeling software, and explored how AI technology could enhance the teaching and learning process to improve modeling efficiency and innovation
- Explored how AI could assist the 3D modeling process, such as using machine learning algorithms to optimise model topology, automatically generating detailed textures, predicting design trends, etc., and introduced AI-assisted design plug-ins to improve modeling efficiency and creativity

PROFESSIONAL TRAINING

Institute of Computing Technology, Chinese Academy of Sciences

Beijing, China

Visiting Student

08.2022-05.2023

- Responsible for researching and implementing NoC modules, organizing project materials, attending group meetings, and participating in the relevant discussions regularly
- Enhanced information system development and programming skills and collaboration/problem-solving capacities

Massachusetts Institute of Technology

Boston, United States

Engineering, Design, Gaming and Entrepreneurship (EDGE) Program for STEM

08.2022-05.2023

- Studied the entire process of game making systematically, such as determining the users for the game, defining the meaning of making the game, determining the type and presentation, and building a system model
- Grasped the application of Tale Blazer and APP Inventor in game design and development
- Designed and developed a physics history popular science story game for all ages within the team

SELECTED AWARDS

- Title of Outstanding Graduation Thesis, 2023
- Beijing Merit Student, 2021-2022 Academic Year
- University-level Merit Student/Major First Class Scholarship, 2021-2022 Academic Year
- Major 2nd Class Scholarship, 2019-2020 Academic Year
- Irish Badminton Intervarsities Champions, 2023-2024 Academic Year
- Student Sport Ireland Badminton Cup Champions, 2023-2024 Academic Year
- Student Sport Ireland Badminton League Champions, 2023-2024 Academic Year

LEADERSHIP & EXTRACURRICULAR ACTIVITIES

- Beijing Winter Olympics Volunteer Regional Chief PROFESSIONAL, 2022
- Beijing Winter Paralympics KMS/BMS Mock Athlete, 2022
- President of the Student Union, Capital Normal University, 2020-2023

OTHER SKILLS & SELF-EVALUATION

- **Languages:** Mandarin (Native), English (Fluent)
- **Software Skills:** Proficient in C++, C, Verilog, Matlab, Python, MS Office, etc.
- **Self-Evaluation:** Target-oriented with passion and willpower, rational and logical with intellectual curiosity