# Honghao Chen

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## EDUCATION

**The Chinese University of Hong Kong, Shenzhen (CUHK-SZ) | China**          09/2019 – 07/2023

B.E. in Electrical Info Engineering - Computer Engineering | Cum GPA: 3.81/4.0 | Ranking: 4/101

**Core Courses:** Database System | Software Engineering | Machine Learning | Blockchain | Data Structures | Computer Architecture | Operating System | Video Games Design and Development | Optimization | Discrete Mathematics | Microprocessors and Computer Systems |

## RESEARCH EXPERIENCES

**CUHKSZ Metaverse**

***Research Assistant* | Human-Crypto Society Laboratory, CUHK-SZ**          10/2020 – 02/2022

➢ *CUHKSZ Metaverse* is a platform for delivering an integrated network of a 3D virtual world to our students. In this system, students can roam in a virtual CUHK-SZ campus scene, chat in real-time with other participants, create customized properties (e.g., furniture and pets), and trade properties using our blockchain-based economic system.

➢ *CUHKSZ Metaverse* project adopts a client-server-blockchain architecture, where Unity, Python, and Solidity are used as main development tools for the three parts, respectively. My contributions include:

- Developed an in-game model editor, allowing users to create their own user-generated content (UGC) and import the customized models into our metaverse system as NFTs.
- Responsible for the blockchain-related work of this project, including deploying the FISCO-BCOS blockchain platform to Linux servers; designing and implementing smart contracts for tokens, NFTs, and NFT market; as well as establishing interfaces between servers and smart contracts.
- Implemented the in-game chatting module of this project.
- Performed 3D modeling of the university campus using Blender.
- Cooperated with a development team of over ten members.

## WORKING EXPERIENCES

***Game Client Engineer Intern* | HyperGryph**          06/2022 – 08/2022

- Served as a game engineer for the popular mobile game project, *Arknights*.
- Accomplished several elementary production tasks, including gacha page implementation, check-in activity UI implementation, UI optimization for side mission page, art asset importing, etc.
- Refactored and implemented a new "Mid-Autumn Festival" check-in activity page, which required complex design under MVVM architecture to ensure backward compatibility, reusability, and maintainability.

***UG Student Teaching Fellow* | CUHK-SZ**          01/2022 – 05/2022

- **Teaching Course:** *Digital Systems Design Laboratory*.
- Served as a teaching assistant in the university's laboratory for 3 hours weekly.
- Helped students debug digital circuits, answered questions, and graded their lab performance.

## PROJECTS

***Software Engineering* Course Project: *Note Squared* | CUHK-SZ**          02/2022 – 04/2022

➢ *Note Squared* is a web-based note-taking application that allows users to create, manage, and share their notes. My contributions include:

- Responsible for the backend part of the project, which is based on Express framework of Node.js and MongoDB.
- Implemented core features, including user register, login, authentication, profile management, admin features, note searching, image uploading, etc.
- Leveraged waterfall model to guide software design and development, leading to enhanced modularity, extendibility, and robustness.
- Employed an array of software testing techniques for designing test cases, which fundamentally enhanced robustness of individual methods, GUI, and overall software.
- Leveraged Git, GitHub, and Trello to facilitate team collaboration among four developers.

***Blockchain* Course Project | CUHK-SZ**          02/2022 – 05/2022

➢ Designed, prototyped, and validated a blockchain-based battery traceability system, which monitors the production and logistics status of batteries throughout the supply chain. My contributions include:

- Designed the ER diagram to specify the entities and relations in the traceability system.
- Deployed the Hyperledger Fabric platform in Linux servers and was responsible for server maintenance.
- Implemented and deployed the smart contract prototype using Hyperledger composer and set up a RESTful API server allowing frontend requests to access and manipulate the blockchain.
- Cooperated with a team of four, with members from various major backgrounds.

### *Database System* Course Project: *CarlorTheLife* | CUHK-SZ      02/2022 – 05/2022

➢ *CarlorTheLife* is a web-based car rental system. It is a platform for "person-to-person" car renting, where car owners can post their cars on this platform for others to rent. My contributions include:
- Designed the relational database structure with ER diagram and established the MySQL database of this system.
- Implemented all necessary SQL queries for OLAP and OLTP purposes.
- Applied machine learning techniques to perform data mining and assist decision-making, including using Decision Tree Model to predict customer rating on cars and using Gaussian Mixture Model to predict car rental demand given the time of day.

### *Video Games Design and Development* Course Project: *One Door Away* | CUHK-SZ      11/2021 – 12/2021

➢ *One Door Away* is a 2D puzzle game in which players act as a person who lost her memory. Players can use "portals" to transport the character's position, collect her memory fragments and finally find out the truth. My contributions include:
- Developed this puzzle game using Unity with two other members.
- Responsible for implementing portal mechanism (a core mechanism of this game), main UI, progress saving, storytelling features, and part of the props and level layouts.

### *Operating System* Course Projects | CUHK-SZ      09/2021 – 11/2021

➢ Completed a set of mini tasks associated with operating system development, covering:
- Exported several symbols in Linux kernel and used them to implement a simple kernel module, which performs some signal handling tasks.
- Implemented two versions of a multithreaded game, using pthread and C# threading API, respectively.
- Built the mechanism of page-based virtual memory via GPU's memory, using CUDA. LRU (Least Recently Used) is implemented for the memory replacement policy.
- Implemented a simplified file system via GPU's memory, using CUDA.
- Made a simple device in Linux and a kernel module to control the device.

### *Computer Architecture* Course Projects | CUHK-SZ      01/2021 – 04/2021

➢ Completed two tasks associated with computer architecture, including:
- Developed a MIPS simulator, including two parts: one assembler translating MIPS instructions to corresponding machine codes; and one simulator executing the machine codes generated from the assembler.
- Implemented a 5-stage pipelined CPU, which can execute the MIPS instructions and handle hazards, using Verilog.

### Game Development: *Enclosure* | CUHK-SZ      08/2020 – 10/2020

➢ *Enclosure* is a 3D multiplayer strategy game where two players will control their characters to occupy slots in the game world. Once the path of one player's movement forms a circle, this player can occupy all the slots within this circle. Players can cut through the other's path to prevent the circle formation. When the time is up, the player with more slots occupied wins the game. My contributions include:
- Accomplished this multiplayer game using Unity with three other members.
- Responsible for the player networking part of this project, based on Mirror Networking API.

## AWARDS AND HONORS

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|---|---|
| Academic Performance Scholarship – Class C | 2021 |
| Undergraduate Research Awards | 2021 |
| Dean's List | 2020 \| 2021 \| 2022 |
| Shaw College Master's List | 2020 |
| Bowen Scholarship | 2019 |

## SKILLS

**Programming Languages:** C++, C#, Python, JavaScript, SQL, Solidity
**Frameworks & Software:** Unity, Node.js, MySQL, Blender, Git, LaTeX