Chen Sihan

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GitHub: https://github.com/sihan-chen-yes?tab=repositories

EDUCATION

Beihang University, Shen Yuan Honors College Sept. 2019 – Present

Major in Computer Science

- CS-related GPA:**3.88**/4.0, CS-related Weighted Average Score:**93**/100
- Overall GPA: **3.84**/4.0, Weighted Average Score: **92**/100
- Programming Language: Proficient in C/C++, Python, Java, Swift, Go, SQL and Verilog

Main Course and Score

Higher Algebra (2)	100	Object Oriented Design and Construction	97
Mathematical Analysis (1)	96	Swift Programming Experiments	98
Probability Statistics (A)	99	Assembly Language for x86 Processors	100
Discrete Mathematics (1)	98	Discrete Mathematics (2)	94
Computer Organization	94	Formal Language and Automata	96
Data Structure	90	IoT and Big Data Systems Design	100
Operating System	93	Principles of Database Systems	95
Compiler Technology	92	Mathematical Modeling	92

Awards and Honors

1st Prize in Lanqiao Cup National Programming Competition (top 2%)
2nd Prize in Feng Ru Cup Competition of Beihang University (top 2%)
Merit Student of Beihang University (top 5%)
1st Prize of Academic Competition Scholarship of Beihang University (top 1%), three times
2nd Prize of Excellent Learning Scholarship of Beihang University (top 5%), three times
2nd Prize of Excellent Social Work Scholarship of Beihang University (top 5%)
Shen Yuan Honors College To Cambridge Short-term Visiting Scholar Fund

RESEARCH

VLN Model Optimization May. 2022 – Present

Research Assistant, Supervised by Prof. Si Liu

- Proposed the Structured state-Evolution (SEvol) module to solve the flaw of over-compression of object-level spatial-temporal information in NvEM, and enhanced the performance of it on R2R, R4R and REVERIE datasets
- Based on A2C algorithm, used Reinforced Layout clues Miner (RLM) module to select objects appropriately
- Employed Dynamic Graph Neural Network (DGNN) to aggregate the spatial-temporal information of objects
- Based on GRU model, proposed mGRU model (matrix version), accomplished the renewal of weight in DGNN at every time step

Interactive Robotic Dog Oct. 2021 – May. 2022

Research Assistant, Supervised by Prof. Si Liu

- Built a robotic dog with the function of voice interaction and guiding the blind
- Implemented object detection and speech recognition module based on YOLOv5 and CMUSphinx respectively
- Implemented main control module based on SDK of motion and information generated by two modules mentioned

INTERNSHIP

ByteDance, Beijing July. 2022 – Sept. 2022

Back-end Intern of Master Data Department of Lark Suite

Responsible for data management (query, storage and transfer) and participated in three important projects as below:

Message Deduplication of the ETL Module

- Combined the messages with same content in the Message Queue of ETL module, which reduced the pressure of query interfaces of Vault Service

- Chose distribution architecture based on Partition Key of RocketMQ rather than centralized architecture based on Redis, to avoid complex and inefficient lock operation and consideration
- Changed the offset of RocketMQ to the one before fault for disaster recovery, which assured the consistency of data and no messages loss

Optimization of Data Table Design
- Changed the *manage_relations* table which has been put into use into *job_data* table, because of the poor performance on both function and efficiency of the former one, due to the imperfect design before
- Kept two tables working simultaneously using double-write strategy to avoid data loss and pollution
- Wrote Go script to assure the correctness of combination and storage of data
- Increased the rate of flow online slowly, which prevented huge online fault during the table-change process

MultiGeo Function of Vault Service
- Transferred the sensitive information of Singapore employee from China to Singapore, due to the legal requirements
- Used the strategy of soft deletion followed by a hard deletion, which avoided data loss in transfer process
- Added the support for cross-region storage and cross-region query for Vault Service

PROJECT

Multifunctional Movie Website Sept. 2021 – Dec. 2021
Principles of Database Systems Course Project
- Developed a website for watching movies, deployed it on my private cloud server already
- Click to visit (http://movie.ito.vin/), Account:123, Password:123 for tourist
- Used Vue and Django frame to build the front and back end respectively, and chose MySQL as database
- Built E-R Diagram to design tables which met the requirement of 3NF for a trade-off between stability and efficiency
- Improved the security of website via anti-injection of database and ciphertext of password storage

SysY-based Compiler Sept. 2021 – Dec. 2021
Compiler Technology Course Project
- Built a compiler using Java, which can transform SysY (a subset of C) from source code to MIPS assembly code
- Included modules of Lexical Analysis (Automata Theory-based), Syntax Analysis (Recursive Descent-based), Semantic Analysis (Abstract Syntax Tree-based), Middle Code Generation (Quaternary Formula-based), Target Code Generation (MIPS-based)
- Optimized the compiler via Inline Function, Loop Optimization, Register Allocation Optimization, among others

ARC-based Page Replacement May. 2021 – June. 2021
Operating System Course Project
- Simulated the page replacement of cache in operating system, and used Adaptive Replacement Cache (ARC) algorithm to decrease miss rate, which considered both recency and frequency, with adaptivity to the current memory access mode by adjusting capacity of cache for both dynamically
- Built data structure with specific function and low memory usage from scratch rather than using STL container
- Ranked 1/250 (according to the weighted result of perf instruction on Linux operating system)

MIPS-based Operating System Kernel Mar. 2021 – June. 2021
Operating System Course Project
- Built a MIPS-based operating system kernel via Linux platform, using C programming language
- Supported memory management, virtual address, interruption handling, inter-process switch and communication, disk management, file system and IO operation of device

Elevator System Simulator Mar. 2021 – Apr. 2021
Object Oriented Design and Construction Course Project
- Used multithreading of Java to simulate the elevator system to deliver people to their target floor with the least time
- Considered the load and number of elevators, used the LOOK scheduling algorithm for each individual elevator, and global transfer strategy to arrange all elevators to reach the least total of waiting time

MIPS-based CPU Oct. 2020 – Jan. 2021
Computer Organization Course Project
- Implemented a CPU supporting five-stage pipelines (IF,ID,EX,MEM,WB) and interruption and exception handling
- Supported 53 instructions totally in MIPS instruction set, where assembly instructions of C programs can be run