ndkimhao.github.io

Hao Nguyen

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Education

Ho Chi Minh, Viet Nam **VNU High School for the Gifted** **Aug. 2016 – May 2019**

- Computer Science honor class (focus on Data Structures and Algorithms).

Nebraska, USA **University of Nebraska-Lincoln** **Aug. 2019 – May 2023**

- Bachelor of Science, double major in Computer Science and Mathematics (Discrete Math and Cryptography).
- GPA: 4.0/4.0 (23 A+ courses, 4 A courses).

Employment

Software Engineer **Jump Trading** **June 2023 – Present**

- Core Development team: develop low-latency, performant, and scalable software stack for trading (C++).

Software Engineer Intern **Jump Trading** **June 2022 – Aug 2022**

- Core Development team, working on HFT (high frequency trading) software and infrastructure (C++).

Production Engineer Intern **Facebook** **May 2021 – Aug 2021**

- Implement fine-grained access control list (ACL) for the control plane storage of Shard Manager (*C++*), a generic service to manage shard assignment for sharded applications.
- The project significantly improves the security and reliability of Shard Manager, an important core service at Facebook. Unauthorized access to the low-level storage can cause a site-wide outage.

Production Engineer Intern **Facebook** **Jun 2020 – Aug 2020**

- Implement automatic resources allocation adjustment based on historical usage for a distributed batch job scheduler (*C++, Java*).
- Based on a preliminary analysis, the project can potentially free up to 10% of unused CPU/memory resources.

Undergraduate Research **UNSAT Group, UNL** **Mar 2020 – May 2022**

- Research software testing and verification: using dynamic and static analysis techniques to learn program interactions and invariants.
- Published papers in top software engineering conferences, including ICSE, OOPSLA, and ASE.

Software Engineer (Part-time) **Zalo Group, Vietnam** **Aug 2018 – Aug 2019**

- Implement on-disk data encryption and fast key scanning for an in-house key/value database *(C++)* handling data of 100M users; implement a new WebSocket interface for an in-house HTTP long polling server *(C++)* handling millions of concurrent TCP connections at peak.
- Identify and fix performance bottleneck via micro and macro-optimizations, improve from 1% up to 50% in CPU and memory usage.

Languages and Technologies

- Proficient: C++.
- Intermediate: Python, C#, Node.JS, Java, Go, Embedded systems (C/C++/Assembly).
- Exposure: VHDL, Rust, PHP, VB.NET, ASP.NET, MongoDB, HTML5, JS, CSS, SQL.

Personal Projects

- **Weeekly3006 Soft Processor** (2023). Built a toy CISC processor from scratch (*VHDL*), with a custom ISA, a macro assembler (using a DSL based on *Python*), and a simple runtime library. Inspired by Nand2Tetris, I also wrote a demo Tetris game for my homebuilt computer.
- **Gomoku** (2018). Gomoku AI Engine. *C++* (AI, HTTP+WebSocket Server), *HTML/CSS/JS* (Web UI).
- **Energy Mesh** (2016). Monitors the electric energy consumption of each device using a wireless sensor network. *C++* (embedded firmware), *NodeJS* (back-end), *AngularJS* (front-end).
- **Laser Bot** (2015). Laser engraving machine. *C++* (embedded firmware), *Java* (PC software).
- **Smart Home** (2013). Controls home appliances using mobile or computer via the internet. *Assembly (8051)*, *C* (AVR), *VB.NET* (Windows, Windows Mobile).

Publications

1. KimHao Nguyen and ThanhVu Nguyen. *GenTree: Using Decision Trees to Learn Interactions for Configurable Software*, **ICSE** (International Conference on Software Engineering), pages 1598-1609, 2021.
2. KimHao Nguyen and ThanhVu Nguyen. *GenTree: Inferring Configuration Interactions using Decision Trees* (Tool Demonstration), **ASE** (Automated Software Engineering), *accepted*, 2021.
3. Didier Ishimwe, KimHao Nguyen, and ThanhVu Nguyen. *Dynaplex: Analyzing Program Complexity using Dynamically Inferred Recurrence Relations*, **OOPSLA**, *accepted*, 2021.
4. ThanhVu Nguyen, KimHao Nguyen, and Matthew B. Dwyer. *Using Symbolic States to Infer Numerical Invariants*, **TSE** (Transactions on Software Engineering), *accepted*, 2021.
5. ThanhVu Nguyen and KimHao Nguyen. *Using Symbolic Execution to Analyze Linux KBuild Makefiles*. **ICSME NIER**, pages 712–716, 2020.

Awards/Activities

- **Outstanding Undergraduate Research Assistant Award** (2021), one recipient a year, selected by the faculty.
- **Top Presenter Award** at the **Nebraska Student Research Days** (2021), six recipients out of 154 participants.
- **UCare Scholarship** (2020) for undergraduate researchers, $2,400/year.
- **Garmin Scholarship** (2020 and 2021), three concurrent recipients, $8,000/year.
- **UNL Global Laureate Tuition Scholarship** (2019-2023), $15,000/year.
- **First Prize** at site, **Second Prize** in region at the ICPC 2019 North Central Regional Contest.
- **First rank** (2018), Asia-Pacific Informatics Olympiad — Online Contest.
- **Best Young Inventor Award** (2014), by World Intellectual Property Organization (WIPO).
- **2 Gold Medals** (2013 & 2014), at Asian Young Inventors Exhibition 2013 and 2014.
- **Special Award** (2013), by Korea Invention Academy (KIA), for Smart Control Panel project.