Xiao Chen

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PLT@Northwestern at Mudd 3418, 2233 Tech Drive, Evanston, Illinois, US

EDUCATION

Northwestern University | Evanston, IL, US   Sep. 2022 – Present
M.Sc in Computer Science

- **Coursework**: Programming Languages (A) | Code Analysis and Transformation (A) | Compiler Construction (A) | Dynamics of Programming Languages (A) | Proving Properties of Programs with Mechanized Logic (A) | Advanced Topics in Compilers (A)
- **GPA**: 3.97/4.00

Nanjing University | Nanjing, Jiangsu, China   Sep. 2020 – Jun. 2022
M.Eng in Electronic Information

- **Coursework**: Advanced Computer Network (90) | Software Engineering Management (93) | Linux System Foundation (94) | Advanced Software Design (93) | Cloud Computing (100) | Agile Software Development (92) | Advanced Algorithm (95) | Software Quality Assurance (97)
- **National Scholarship for Postgraduates** (1%, Oct. 2021)
- **GPA**: 4.58/5.00

Nanjing University | Nanjing, Jiangsu, China   Sep. 2016 – Jun. 2020
B.Eng in Software Engineering

- **Coursework**: Software Engineering and Computing (96) | C++ Programming Language (88) | Computer Network (95) | Computer and Operating System (95) | Software Construction (95) | Software Testing and Quality (90) | Human-Computer Interaction Systems (90) | Software Process and Management (92)
- **First-class People's Scholarship** (5%, Oct. 2019) | **Third-class People's Scholarship** (20%, Oct. 2018/17)
- **GPA**: 4.28/5.00

RESEARCH EXPERIENCE

New Syntactic Techniques for Complete Monitoring   May. 2023 – Present
Northwestern University PLT   *Evanston, IL, US*

- Advisor: Prof. Christos Dimoulas, Northwestern University.
- Worked on Complete Monitoring, a property that formalizes the flow of values in gradual typing systems using ownership annotations and propagation rules for ownership to identify the responsible component when a runtime type mismatch occurs.
- Derived new syntactic techniques to eliminate the necessity for ownership annotations by introducing collecting semantics derived almost mechanically from the original dynamic semantics of the surface language, along with the rigorous proof to show the program behavior is preserved.
- Enhanced the collecting semantics based on uniform rules about how locations are associated with types they must satisfy, in order to not only track but also enforce the type integrity of the program.

Privatizer in Parallelizing Compilers   Jan. 2023 – Aug. 2023
Arcana Lab, Northwestern University   *Evanston, IL, US*

- Advisor: Prof. Simone Campanoni, Northwestern University.
- Implemented a new intraprocedural flow-insensitive may points-to analysis for the parallelizing compiler system.
- Developed privatizer using this points-to analysis, converting dynamic memory allocations and global variables into local variables to enable transformations only applicable to AllocaInsts.
- Removed overly conservative loop-carried memory dependencies in the program dependence graph, to eliminate unnecessary synchronizations and achieve higher speedup for parallelization.
- As part of the NOELLE Project, my work helped map programs to multicore platforms gaining nontrivial speedup.

Evaluation of CFG-based Code Similarity Detections   Oct. 2020 – Jan. 2021

ISE Lab, Nanjing University   *Nanjing, Jiangsu, China*

- Advisor: Prof. Jia Liu, Nanjing University.
- Investigated methods for evaluating accuracies of control-flow graph based code similarity detection algorithms.
- Implemented the evaluation method by generating converted CFGs with respect to a reference CFG and calculating the standard ranking based on the minimum conversion cost.
- Compared the standard ranking with the rankings obtained from these algorithms to evaluate algorithm accuracy.

Sketch-based Image Synthesis   Feb. 2020 – Jun. 2020

HCI Lab, Nanjing University   *Nanjing, Jiangsu, China*

- Advisor: Prof. Guihuan Feng, Nanjing University.
- Surveyed the mainstream semantic image synthesis algorithms with their pros and cons thoroughly compared.
- Implemented spatially-adaptive normalization to help preserve semantic information in image synthesis tasks.
- Constructed a neural network to generate photorealistic landscape images based on user-sketched semantic segmentation masks, allowing user control over both semantics and style as synthesizing an image.

COURSE PROJECTS

FocusHour | *A productivity app*   Feb. 2021 – Apr. 2021

- An app allowing users to grow virtual trees by focusing on daily tasks away from their phones and show their trees in the real world using augmented reality techniques.
- Heterogeneous visualization of user activities, focus records, to-do lists, and task completion details.
- The highest score and the top creativity award winner in the peer review of more than 100 students.

Orange'S | *Adding new features into an experimental OS*   Mar. 2018 – Jun. 2018

- Enhanced the experimental operating system installed on a Bochs virtual machine, implementing calculation of Fibonacci sequence, file system management, exception handling, and process scheduling.
- Gained hands-on experience with OS design, virtualization, file systems, security, and concurrency.

WORK EXPERIENCE

Tencent Holdings Ltd. | Shenzhen, Guangdong, China   Jul. 2021 – Jan. 2022

iOS Development Intern, Technology Engineering Group

- Developed an iOS multimedia messaging app, taking advantage of the speed of 5G communication technology.
- Designed novel messaging card styles and interaction models to handle multimedia messages.
- Revamped the user guide interface and error detection logic for network connection.

Microsoft Software Technology Center Asia | Suzhou, Jiangsu, China   Jul. 2019 – Oct. 2019

Software Engineering Intern, Speech Recognition Group

- Automated the training process of a speech recognition model for conference scenarios using the Microsoft AEther platform, providing higher computational efficiency.
- Applied Gaussian blur and SG filter to recognition results, improving the accuracy for short conversation scenarios.

TECHNICAL SKILLS

Language Skills: Mandarin (native), English (proficient), Japanese (fluent)
Programming: C++, Racket, Swift, Python, LLVM (IR), Redex, Agda, Rust, OCaml
Frameworks and Tools: Linux Shell, Vim, LaTeX, Git, HTCondor