Dedong Xie

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GitHub: github.com/ddxxdd-code

Education

University of Toronto — Toronto, ON, Canada
Honours Bachelor of Science — Sept. 2020–Jun. 2023 (expected)

- Majors in computer science and mathematics, minor in statistics
- Cumulative GPA (cGPA): 3.99/4.0
- 90 or above in all Computer Science courses
- 96 or above in all programming courses

University of New South Wales — Sydney, NSW, Australia
Completed 54 credits towards a bachelor's degree in Computer Science — Sept. 2019–Aug. 2020

- Weighted average marks (WAM): 92.33/100

Publication

[1] **Dedong Xie**, Zhen Jia, Zili Zhang, and Xin Jin, "Optimizing half precision winograd convolution on arm many-core processors", in *Proceedings of the 13th ACM SIGOPS Asia-Pacific Workshop on Systems*, ser. APSys '22, Virtual Event, Singapore: Association for Computing Machinery, 2022, pp. 53–60, ISBN: 9781450394413. DOI: 10.1145/3546591.3547529.

Research Experience

Research Assistant — May 2022–Present
SysNet Lab. Department of Computer Science. University of Toronto.
Supervisor: Prof. Eyal de Lara

- Participated in IBM CAS Canada project 1153 - Reducing JVM memory costs in the cloud https://www-40.ibm.com/ibm/cas/canada/projects?projectId=1153
- Sole developer of the run-time memory profiler of OpenJ9 JVM JIT-compiler.
- Proposed instrumenting dynamic memory allocation logger in OpenJ9's memory allocator.
- Proposed visual illustration of memory usage over time to find source of peak usage.
- Implemented the memory allocation logger, post-process pipeline, and visualizer with 3,000 lines of code in C++ and Python.
- Found external fragmentation and late release of memory to be main causes of memory inefficiencies.
- Proposed using program slicing to identify memory that could have a shorter lifetime.
- Currently working on identifying the scope of each allocated memory.
- Video of my presentation, and slides of the presentation.

Research Intern — Jun. 2021–Jul. 2022
AI Lab. Amazon Web Services (AWS).
Supervisors: Dr. Zhen Jia (AWS) and Prof. Xin Jin (Peking University)

- Sole developer of HAWC, a half-precision Winograd convolution system for Amazon Graviton-2 ARM architecture chips.
- Proposed customized memory layout for Amazon Graviton-2 chips, ARM-specific matrix multiplication kernel generator, and minimal multi-threading scheduler to accelerate Winograd convolution.

- Implemented 3000 lines of code using C++ and ARM assembly.
- Studied and adapted baseline systems for comparison.
- Extensively tested on a variety of representative convolution layers against state-of-the-art solutions.
- Achieved on average 11× and up to 28× speedup.
- Generated matrix multiplication kernels exploited up to 89% of theoretical maximum TFLOPS of the hardware.
- Published a first-author paper in ACM Asia-Pacific Workshop on Systems (APSys 2022).
- Video and slides of my presentation in APSys 2022.

Awards and Achievements

- **Dean's List Scholar** Jun. 2021, Jun. 2022
  - Faculty of Arts and Science, University of Toronto
- **Dr. James A. & Connie P. Dickson Scholarship In Science & Mathematics** Sept. 2022
  - "Given to the best students enrolled in science and mathematics programs."
  - University College, University of Toronto
- **Department of Computer Science Undergraduate Research Award** May 2022
  - Department of Computer Science, University of Toronto
- **Galois Awards in Mathematics** Oct. 2021
  - "Given to the best students enrolled in a mathematics specialist program."
  - University College, University of Toronto
- **The Faculty of Engineering Dean's Award** 2020
  - "For the best performance in year 1, 2 or 3."
  - University of New South Wales
- **COMP1511 (Programming Fundamentals) Hall of Fame** Sept. 2019
  - "A list of students who have achieved great distinction and honour by completing large amounts of extra work."
  - http://web.cse.unsw.edu.au/~cs1511/hall_of_fame/
  - COMP1511 Teaching Team, University of New South Wales

Skills

- **Programming languages:** C/C++, Python, Java, Racket, and Haskell.
- **Assembly programming:** MIPS, ARM Aarch64, Intel x86 instruction sets.
- **Database management systems:** Microsoft Access, MySQL.
- **Mathematical computation and data analysis:** R, Mathematica, MATLAB.

Languages

- **English:** proficient
  - **IELTS:** Overall 8.0 (Aug. 2019)
- **Chinese:** native speaker