NJIT

Department of Computer Science

Sympiler: Transforming Sparse Computations

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Hosted by Dr. Iulian Neamtiu

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Abstract: Sparse matrix computations are an important class of algorithms frequently used in scientific simulations such as computer graphics and weather modeling as well as in data analytics codes and machine learning computations. The performance of these simulations relies heavily on the high-efficient implementations of sparse computations.
In this talk, I answer the fundamental question of how to optimize complex sparse codes and algorithms in real-world applications. I will introduce Sympiler, a new solution to automating and redesigning sparse computations. I will describe how Sympiler decouples symbolic information in sparse computation and automates the optimization of sparse linear algebra kernels. I will demonstrate how the proposed solutions in symbolic decoupling can automatically generate high-performance code that significantly outperforms high-optimized code from state-of-the-art libraries.

Bio: Kazem Cheshmi is a PhD candidate at the University of Toronto. He works on domain-specific compiler design and parallel algorithms for sparse numerical methods. Kazem received his M.A.Sc degree from the University of Tehran in 2013 in computer engineering. Before joining the University of Toronto, he was a researcher at Microsoft research, Adobe research, and Rutgers University. He is a recipient of ACM-IEEE CS George Michael Memorial HPC Fellowship, the grand final award of the 2017 ACM Student Research Competitions, the Wolfund fellowship 2019, and Adobe fellowship 2018.

Website: https://www.cheshmi.cc/