Mario Méndez-Lojo

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Education/Research

Postdoc in CS: *Parallelization of Irregular Programs* U.T. Austin (USA), 2009-2011
supervisor: K. Pingali

Parallelization of *irregular* applications (which manipulate pointer-based data structures) is challenging. My contributions towards solving this problem were a) characterization of certain algorithmic structure that results on a more efficient parallelization; b) implementation of a parallel points-to analysis, which is 6 times faster than the sequential version.
Tags: concurrency, graph algorithms, lock-free data structures, bytecode instrumentation, CMP/GPU.

Ph.D. in CS: *Sharing analysis of Java bytecode* U. of New Mexico (USA), 2004-2008
supervisor: M. Hermenegildo

Static analysis allows proving interesting properties of a program, such as the absence of errors, at compile time. I designed and implemented a novel static analysis that can tell whether two pointers might reach the same memory location with higher precision than existing techniques.
Tags: Java bytecode, Soot compiler, Prolog.

B.S. in Software Engineering U. of La Coruña (Spain), 2000

Employment

Automatic Scraping of Semi-Structured Web Information Google (USA), 2007
Assisted the Search Quality team in the development of a tool that scrapes relevant information out of a web page containing search results.

Tags: XPath, Regex, Swing, unit testing.

Scalable Web Application Group Manager GIT Consultors (Spain), 2002-2003

Managed a group of nine people in the sucessful implementation of a module of the Social Security IS; my main contribution was the introduction of the Extreme Programming methodology in our daily routine.

Product Metasearch DeNodo Technologies (Spain), 2001

Design and coding of a metasearch engine that aggregates the results of searching for a product in several web merchants, à la Google-Products.

Software

Galois `http://iss.ices.utexas.edu/galois`

Platform for the parallelization of irregular programs: library of transactional data structures, runtime system, etc. Implemented in Java, runs on top of multi-core CPU systems. Software developed in collaboration with the other members of prof. K. Pingali's group at UT Austin.

Parallel Points-to Analysis `http://clip.dia.fi.upm.es/~mario/hardekopfPointsTo.html`

First parallelization of a points-to analysis ever done. The parallel analysis is up to 8× faster than the sequential version on a 24-core machine. Includes a concurrent Binary Decision Diagram implementation.

Teaching Experience

Object-Oriented Programming University of Holguín (Cuba), 2000

Introductory and intermediate OO concepts were taught to sophomore students. The final project consisted in the development of a J2EE web application.

Selected Publications [1]

Keshav Pingali, Donald Nguyen, Milind Kulkarni, Martin Burtscher, M. Amber Hassaan, Rashid Kaleem, Tsung-Hsien Lee, Andrew Lenharth, Roman Manevich, Mario Méndez-Lojo, Dimitrios Prountzos, and Xin Sui. The tao of parallelism in algorithms. In *Proceedings of the 32nd ACM SIGPLAN conference on Programming language design and implementation*, PLDI '11, pages 12–25, 2011.

Mario Mendez-Lojo, Augustine Mathew, and Keshav Pingali. Parallel inclusion-based points-to analysis. In *Proceedings of the 24th Annual ACM SIGPLAN Conference on Object-Oriented Programming, Systems, Languages, and Applications (OOPSLA'10)*, October 2010a.

Mario Mendez-Lojo, Donald Nguyen, Dimitrios Prountzos, Xin Sui, M. Amber Hassaan, Milind Kulkarni, Martin Burtscher, and Keshav Pingali. Structure-driven optimizations for amorphous data-parallel programs. In *Proceedings of the 15th ACM SIGPLAN Symposium on Principles and Practiceof Parallel Programming (PPoPP'10)*, pages 3–14, January 2010b.

M. Marron, M. Méndez-Lojo, M. Hermenegildo, D. Stefanovic, and D. Kapur. Sharing Analysis of Arrays, Collections, and Recursive Structures. In *ACM WS on Program Analysis for Software Tools and Engineering (PASTE'08)*. ACM, November 2008.

M. Méndez-Lojo, O. Lhoták, and M. Hermenegildo. Efficient Set Sharing using ZBDDs. In *21st Int'l. WS on Languages and Compilers for Parallel Computing (LCPC'08)*, LNCS. Springer-Verlag, August 2008.

M. Méndez-Lojo and M. Hermenegildo. Precise Set Sharing Analysis for Java-style Programs. In *9th International Conference on Verification, Model Checking and Abstract Interpretation (VMCAI'08)*, number 4905 in LNCS, pages 172–187. Springer-Verlag, January 2008.

Selected Activities, Honors, and Awards

PPoPP'12 program committee member.

Reviewer for PLDI, ASPLOS, PPoPP, SAS, CGO, LCPC, etc.

Prince of Asturias Graduate Research Fellowship in Information Science and Technology at the University of New Mexico (2004-2008).

References

Available upon request.

[1] For a complete list of publications, please refer to my webpage.