

Researchers develop new tool for writing code

April 2 2005

A collaborative research team led by Carnegie Mellon University's Jose M.F. Moura has developed a new set of software tools that may revolutionize the way computer code is written. The team involves Moura and Markus Pueschel, professors with Carnegie Mellon's Department of Electrical and Computer Engineering, and Maria Manuela Veloso, a professor with the School of Computer Science at Carnegie Mellon, as well as David Padua, a professor of computer science at the University of Illinois, Urbana-Champaign, and Jeremy Johnson, a professor of computer science at Drexel University. Moura said they have created a new breed of software called "SPIRAL" that automatically generates code for signal-processing applications – applications that help make computers run faster and cheaper.

"Essentially, what we have here is a software tool that helps end users exploit the potential of their computers," Moura said. "It often takes months to create and develop computer code for a given machine, and by the time the program is completed, the code is obsolete because there are better machines in the market, so the cycle of software development restarts all over again."

But this growing gap between what computers can do and what programmers can achieve could be solved by automatic code generators like SPIRAL, according to Moura.

"What SPIRAL does is permit users to develop high quality code for new and old applications automatically, say in 10 minutes or less, saving

time, money and aggravation for end users," Moura said.

At IBM, researchers working with Franz Franchetti from the SPIRAL team at Carnegie Mellon and the Technical University of Vienna, used SPIRAL to develop a highly optimized FFT library for IBM's Blue Gene/L supercomputer. Blue Gene/L was ranked the fastest supercomputer in the world in November 2004.

"An ultra-fast supercomputer like Blue Gene/L is useless if we are not able to harness that power to run a range of applications," said Jose Moreira, Blue Gene Systems architect, IBM Research. "Collaborating with Carnegie Mellon and Vienna using SPIRAL has played a key role in enabling IBM researchers to optimize applications to run on the system, including life sciences applications involving molecular dynamics." Shawn McCaslin, a development manager at National Instruments, said SPIRAL technology provides a broad range of different solutions to identify the best signal-processing and math functions for difficult computer implementations. The Texas-based company is a leader in virtual instrumentation, a revolutionary concept that has changed the way engineers and scientists approach measurement and automation.

Source: Carnegie Mellon University

Citation: Researchers develop new tool for writing code (2005, April 2) retrieved 10 May 2024 from <https://phys.org/news/2005-04-tool-code.html>

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