Xiaolong Cui

PhD Student

Applying for Mellon Fellowship.

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Education

Ph.D in **Computer Science, University of Pittsburgh** Expected April 2017
Research interests: Distributed systems, especially in fault tolerance and power management
Advisors: Dr. Taieb Znati and Dr. Rami Melhem

B.Eng in **Computer Science, Xi'an Jiaotong University** (GPA 3.85) July 2012
Thesis: Measurement study on content distribution patterns in P2P networks **Advisor**: Dr. Chengchen Hu

Experiences & Services

Research Assistant, University of Pittsburgh May 2013 – Present
Project: Scalable, energy-aware fault tolerance approach for large scale systems

Software Engineer Intern, Avere Systems Inc. May 2015 – Aug. 2015
Project: Automation of cluster job management

Teaching Assistant, University of Pittsburgh Jan. 2013 – Dec. 2013
Courses: Computer architecture (graduate level)/Java/Python

Paper Reviewer May 2013 – present
Journal: Transactions on Computers, Transactions on Embedded Computing Systems
Conference: International Green Computing Conference.

Volunteer May 2015 – Present
Devopsdays Pittsburgh 2015, and Light of Life Rescue Mission

Class President, Xi'an Jiaotong University Sep. 2009 – Aug. 2011

Publications

Xiaolong Cui, Taieb Znati, and Rami Melhem. *Adaptive and Power-Aware Resiliency for Extreme-scale Computing.* International Symposium on High Performance Parallel and Distributed Computing (HPDC'16). [Under review]

Xiaolong Cui, Bryan Mills, Taieb Znati, and Rami Melhem. *Shadow Replication: An Energy-Aware, Fault-Tolerant Computational Model for Green Cloud Computing.* Energies 7, no. 8 (2014): 5151-5176.

Xiaolong Cui, Bryan Mills, Taieb Znati, and Rami Melhem. *Shadows on the Cloud: An Energy-Aware, Profit Maximizing Resilience Framework for Cloud Computing.* CLOSER, April 3-5, 2014.

Projects

Scalable, energy-aware fault tolerance approach for large scale systems May 2013 – Present
- Proposed a scalable, energy-aware fault tolerance approach, referred to as Shadow Replication
- Explored the performance of Shadow Replication in Cloud Computing environments
- Developing a MPI based library for fault-tolerant High Performance Computing

Automation of cluster job management May 2015 – Aug. 2015
- Developed a source code parser for extraction of cluster job traces
- Automated cluster job diagnosis based on job traces

Analytics database system with transactional support March 2014
- Designed and implemented a lock manager for Strict Two-Phase Locking protocol
- Designed and implemented a deadlock detector

MiniGoogle for documents indexing and searching Nov. 2013 – Dec. 2013
- Designed and implemented a distributed and multi-threaded algorithm to index and search large documents
- Implemented the above system with Hadoop MapReduce framework as an alternative approach

Light weight user-level thread (LWT) scheduling system Sep. 2013 – Oct. 2013
- Implemented a library for thread creation, wait, sleep, and exit
- Implemented priority-based thread scheduling using SIGALRM handler and semaphores for mutex
- Demonstrated the correctness of above system with producer-consumer problem

Simplified File Transfer Protocol (FTP) March 2013 – April 2013
- Implemented a simplified FTP protocol with both client and server using layered architecture
- Implemented and evaluated multiple ARQs by injecting errors and packet drops
- Supported concurrent access and file transfer with multithreading

Novel page replacement algorithm for databases on heterogeneous storage Feb. 2013 – April 2013
- Implemented an innovative page replacement algorithm called Scanning Group (SG) in MySQL
- Tested the performance and overhead of SG on a system with both SSD and HDD

Simulator for distributed directory cache coherence protocols in CMPs Nov. 2012
- Implemented MSI for CMP with private L1 cache and shared distributed L2 cache
- Simulated the delay of a mess NoC
- Performed comparative analysis among different configures for multiple benchmarks

Simulation of dynamically scheduled processor with MIPS64 ISA Oct. 2012
- Implemented Tomasolo algorithm with renaming registers and re-order buffer
- Implemented branch target buffer for dynamic branch prediction
- Evaluated the performance of different configurations for multiple benchmarks

Measurement study on content distribution patterns in P2P networks Feb. 2012 - June 2012
- Implemented BitTorrent protocol and deployed it worldwide to collect resource distribution information
- Modeled resource sharing among Private BitTorrent sites with Generalized Assignment Problem

Skills

Programming languages: C/Java/Python/Shell Script/X86 Assembly/SQL/VB/HTML

Tools: LaTeX/CSIM/MatLab/MySQL/MS Office/Xfig/Git/GDB

Misc: Nonlinear Optimization/Multithreading/Socket Programming/Hadoop MapReduce/CUDA

Honors & Awards

- People's Choice Award@Randall Family Big Idea Competition (2015)
- Research Competition Winner (2015)
- Dietrich School of A&S Fellow (2012)
- Excellent Student Leader (2010 + 2011)
- PengKang Scholarship (2009 + 2010)
- Excellent Graduate (2012)
- National Lizhi Scholarship (2011)
- Excellent student (2009)