Matthew Schuchhardt, PhD

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RESEARCH TOPICS

Research Area — Computer architecture and systems

- *User-facing system performance debugging*: Automated localization of Android graphical performance bugs using user-facing metrics
- *Context-aware system configuration*: Using system and user contextual information to automatically adjust system state
- *Biometric-based power optimization*: Analyzing biometric data from users to understand and provide minimum threshold of acceptable performance
- *Multicore directory placement*: On-chip interconnect power reduction via intelligent directory placement

EDUCATION

Northwestern University — Evanston, IL — September 2009 – Present
PhD, Computer Engineering
Advisor: Prof. Gokhan Memik
GPA: 3.82/4.0

Valparaiso University — Valparaiso, IN — August 2005 – May 2009
Bachelor of Science, Computer Engineering
GPA: 3.71/4.0, Magna Cum Laude

PROFESSIONAL EXPERIENCE

Intel Corp. — Hillsboro, OR — June – December 2013, June – September 2014
Graduate Research Intern

- Created an online learning system which improves adaptive brightness model accuracy
- Utilized user input and contextual information to train and improve model
- Used a modified machine learning library and custom code to enable online model creation

- Built a system which automatically identifies sources of graphical performance degradation
- Utilized system-level trace data to understand OS and graphical subsystem state over time
- Leveraged machine learning feature selection and domain-specific data analysis

Caterpillar, inc. — Peoria, IL — May – August 2008
Corporate Intern

- Created a VPN-based remote access system for GPS and laser guidance base stations
- Automated GPS firmware upgrade process to reduce likelihood of human error
- Led group through a day-long workshop on newly designed and implemented systems

ACADEMIC EXPERIENCE

Research Assistant — September 2009 – Present

- Used Python, Java, and data mining techniques to design a system which predicts user satisfaction and optimizes system power via biometric sensors
- Helped design and analyze a processor directory placement system which reduces on-chip interconnect power by up to 37%
- Expanded upon multiple projects from Intel internships

NSF GK-12 Fellow — July 2010 – July 2012

- Led a group of 15 K-12 teachers in a weekend seminar on Python programming and integrating Python into the classroom
- Designed and led two separate 6-hour programming seminars: one for 25 high school students, one for 70 middle school students

Teaching September 2009 – June 2014

- *Assistant*: Fundamentals of Computer System Software, Advanced Digital Logic Design, Computer Architecture
- *Instructor*: Computer Architecture Projects Course

PUBLICATIONS

M. Schuchhardt, S. Jha, M. Kishinevsky, G. Memik. **"System-Level Performance Bug Localization Via Causality Analysis"**. Under submission.

M. Schuchhardt, S. Jha, R. Ayoub, M. Kishinevsky, G. Memik. **"Optimizing the Relationship Between Mobile Screen Power Consumption and User Satisfaction"**. Proceedings of the International Conference on Compilers, Architecture and Synthesis for Embedded Systems (CASES), 2015.

M. Schuchhardt, S. Jha, R. Ayoub, M. Kishinevsky, G. Memik. **"CAPED: Context-aware Personalized Display Brightness for Mobile Devices"**. Proceedings of the International Conference on Compilers, Architecture and Synthesis for Embedded Systems (CASES), 2014.

M. Schuchhardt, A. Das, N. Hardavellas, G. Memik. **"The Impact of Dynamic Directories on Multicore Interconnects"**. IEEE Computer, vol.46, no.10, pp.32–39, October 2013.

M. Schuchhardt, B. Scholbrock, U. Pamuksuz, G. Memik, P. Dinda, R. P. Dick. **"Understanding the impact of laptop power saving options on user satisfaction using physiological sensors"**. Proceedings of the International Symposium on Low Power Electronics and Design (ISLPED), 2012.

A. Das, **M. Schuchardt**, N. Hardavellas, G. Memik, and A. Choudhary. **"Dynamic Directories: Reducing On-Chip Interconnect Power in Multicores"**. Proceedings of Design, Automation & Test in Europe (DATE), 2012.

A. Das, **M. Schuchhardt**, N. Hardavellas, G. Memik, and A. Choudhary. **"PAD: Power-Aware Directory Placement in Distributed Caches"**. Technical Report NWU-EECS-10–11, EECS Department, October, 2010.

ENRICHMENT PROJECTS

Weka for Android July 2014
Open-source project https://github.com/Shookit/android-ml-weka

- Weka is a common Java machine learning package, but is incompatible with Android
- Removed incompatible pieces from Weka to allow for machine learning on Android platform

Gitminder November 2012
Open-source project https://github.com/Shookit/gitminder

- Created an open source project in Qt C++
- Monitors user's git repositories, reminds them to commit stale code
- Notifies the user when someone else pushed remote code

Stable WiFi October 2012
Android application https://play.google.com/. . . /id=matt.app.stablewifi

- Application monitors WiFi connection
- When WiFi is unreliable, the program causes the phone to use the cellular data connection instead
- 4.6/5 rating, 10,000+ downloads

Software Project Management & Development Course Fall 2011
Phonegap Android application https://github.com/Shookit/EECS394

- Created an app which helps users decide on a meeting location without a central organizer
- Written with 3 other programmers, and managed by a team from the Master of Product Design and Development program

- Developed using an Agile, continuously integrated, test-driven environment
- Programmed for Android using the Phonegap framework
- Extensively used Git, HTML, JavaScript, AJAX calls, and JSON app-server communication

HONORS AND AWARDS

Northwestern EECS Poster Fair Winner — First place poster in the Computer Engineering department (2014): "CAPED: Context-aware Personalized Display Brightness for Mobile Devices"
Tau Beta Pi — Engineering Honor Society
NSF GK-12 Fellowship — Northwestern University, 2010, 2011
Walter P. Murphy Fellowship — Northwestern University, 2009

TECHNICAL SKILLS

Primary programming languages: Java, Python
(Current) favorite language: Scala
Also experienced with: C, C++, Qt
Mobile: Android (application and platform-level)
Web technologies: Django Framework (Python), Play Framework (Scala), HTML/CSS, JavaScript/jQuery
Machine learning: Weka, scikit-learn
Embedded systems: Arduino
Tools: Git, IntelliJ Idea, Eclipse