

Curriculum Vitae

Xiao Qu

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Research Interests

I am currently conducting research to provide cost effective prioritization techniques for regression testing configurable software systems. My interests include software testing, especially prioritizing configurable systems, applying and prioritizing combinatorial interaction testing, and the application of machine learning techniques in software engineering research. I am also interested in converting research ideas to real tools that are applicable for practitioners.

Education

University of Nebraska – Lincoln, Lincoln, Nebraska (August 2005 – March 2010)

Ph.D. candidate in Computer Science and Engineering

Advisor: Myra B. Cohen

Committee: Myra B. Cohen, Sebastian Elbaum, David R. Pitts, and Gregg Rothermel

Dissertation Title: *Configuration Aware Prioritization in Regression Testing*

Cumulative GPA: 3.9 / 4.0

Sichuan University, China

M.S. in Software Engineering, Computer Science (September 2003 – June 2006)

Dissertation Title: *Research on Software Testing and application in Industrial Practice*

Cumulative GPA: 3.8 / 4.0

Sichuan University, China

B.E. in Computer Science and Technology (September 1999 – June 2003)

Dissertation Title: *Analysis of Schedule-ability in the Real-Time System*

Minor in Business Management (March 2001 – June 2003)

Cumulative GPA: 3.77 / 4.0 Ranking: 2% among 365 students

Academic Experience

Graduate Research Assistant (August 2005 – present)

University of Nebraska – Lincoln, Lincoln, Nebraska

Under the guidance of Dr. Myra Cohen, conduct research in prioritizing configurable systems with combinatorial design. In particular, I have been involved in following areas:

- Investigated effective prioritization for configurable systems – examined the impact of configurations on testing and prioritized configurations using several techniques to improve regression testing efficiency; examined relative importance of test case and

- configuration, and other factors that may have impact on the prioritization such as test execution order; extended prioritization involving cost of configuration setup.
- Developed research questions and designs of the experimentation on some open source software subjects, as well as a large scale industrial system (of IBM).
 - Implemented programs and created scripts to collect experiment data and analyzed data with statistical methods and tools.
 - Developed different prioritization techniques and implemented them.
 - Prioritized test suites in combinatorial interaction testing – examined effectiveness of the combinatorial interaction testing technique in generating regression test suites and applied several prioritization techniques to improve regression testing efficiency.
 - Conducted fault seeding on the experimental software programs.
 - Developed designs of the experimentation and created programs and tools to run the experiment.
 - Developed tools and scripts to collect and analyze data.
 - Implemented different prioritization techniques.
 - Developed new metrics to evaluate prioritization techniques.
 - Generated test suites in combinatorial interaction testing – applied **Ant Colony System** to test suite generation for interaction testing.
 - Implemented and modified an algorithm which uses Ant Colony System to generate test suites in interaction testing.

Graduate Teaching Assistant (August 2005 – December 2005)

University of Nebraska – Lincoln, Lincoln, Nebraska

Graded assignments and exams for an undergraduate honors JAVA programming course

Graduate Teaching Assistant (June 2004 – July 2005)

Sichuan University, China

Graded assignments and examinations for undergraduate courses

Industrial Experience

Internship (May 2008 – August 2008)

Microsoft Research & Windows Protocol Product Group, Redmond, WA

Integrating Combinatorial Interaction Testing into Model Based Testing

- Developed concepts and algorithms, introducing research work into the real world.
- Implemented Prototype in product environment.
- Investigated possible optimization for real product implementation.
- Resulted in a published paper.

Internship (June 2004 – July 2005)

Wisesoft Software Company, Sichuan University, China

Software Quality Assurance Engineer in a national large-scale system:

Air Traffic Control system is applied in large-scale aerodromes, to avoid aircraft collisions, so as to maintain the traffic order and guarantee a rapid and efficient air traffic flow. It is a

real-time system of special purpose and critical mission, with high-level requirements for real-time, reliability, stability and security.

- Developed and executed test cases for functional testing and performance testing.
- Developed a Flight Data Process (FDP) program that handles information communicated between the pilot and the air traffic controller.

Journal Publications

J.1. **Xiao Qu**, Hongyu Yang and Zihai Dai, “Optimize test cases using CATS”, Journal of China Civil Aviation Flying College 2006 Vol.17 No.2 pp.62-64.

Conference and Workshop Publications

C.1. Wolfgang Grieskamp, **Xiao Qu**, Xiangjun Wei, Nico Kicillof, Myra B. Cohen, “Interaction Coverage meets Path Coverage by SMT Constraint Solving”, International Conference on Testing of Communicating Systems and International Workshop on Formal Approaches to Testing of Software (TESTCOM /FATES), November 2009.

C.2. Hema Srikanth, Myra B. Cohen, **Xiao Qu**, “Reducing Field Failures in System Configurable Software: Cost-Based Prioritization”, International Symposium on Software Reliability Engineering (ISSRE), November 2009, pp. 61-70.

C.3. **Xiao Qu**, “Configuration Aware Prioritization Techniques In Regression Testing”, Doctoral Symposium, International Conference On Software Engineering (ICSE), May 2009.

C.4. **Xiao Qu**, Myra B. Cohen and Gregg Rothermel, “Configuration-aware regression testing: an empirical study of sampling and prioritization”, International Symposium on Software Testing and Analysis (ISSTA), July 2008, pp. 75-85. (26% acceptance rate)

C.5. **Xiao Qu**, Myra B. Cohen, and Katherine M. Woolf, “Combinatorial Interaction Regression Testing – A study of Test Case Generation and Prioritization”, IEEE International Conference on Software Maintenance (ICSM) , Paris, October 2007, pp. 255-264. (21% acceptance rate)

Papers in Submission

C.1. **Xiao Qu**, Myra B. Cohen and Gregg Rothermel, “Effectively Prioritizing Configurable Systems: Test Cases vs. Configurations”.

Conference Presentations

- “Configuration Aware Prioritization Techniques In Regression Testing”, at the Doctoral Symposium, ICSE2009, Vancouver, Canada, May, 2009
- “Configuration-aware regression testing: an empirical study of sampling and prioritization”, at the ISSTA2008, Seattle, WA, July, 2008
- “Combinatorial Interaction Regression Testing – A study of Test Case Generation and Prioritization,” at the 23rd ICSM, Paris, France, October, 2007

Honors and Awards

- *Outstanding Graduate Research Assistant* of Department of Computer Science and Engineering (top 2), University of Nebraska – Lincoln, April, 2009
- Travel Scholarship for ICSE 2009 Doctorial Symposium
- Dohrmann Fellowship, University of Nebraska – Lincoln, 2005 to 2008
- Graduate Research Assistantship, University of Nebraska-Lincoln, 2005 to present
- Graduate Teaching Assistantship, University of Nebraska-Lincoln, August 2005 to December 2005
- Travel Award for 2006 and 2007 CRA-W Grad Cohort Workshop
- First prize in Sichuan Province in *National Mathematical Contest in Modeling* in 2002
- Second Prize in “Sichuan University Creative Student Award” in June, 2002
- Second Prize in Sichuan University of the “Challengers Cup - National Prospective Business Planning Contest for College Students” in June, 2002
- First - grade Scholarship with *Sichuan University’s Outstanding Undergraduate Student* in 2002, 2001, and 2000

Activities

- Student Volunteer at ICSE 2009, May, 2009
- Poster Session at ICSE 2009, May, 2009
- Volunteer as Income Tax Preparer for US citizen/residents, February and March, 2009
- Volunteer as Income Tax Assistant for international students/scholars, March, 2008
- Volunteer as Income Tax Assistant for low-income working families, January, 2007
- Attended 28th and 29th ICSE, May, 2006 and 2007
- Attended 2006 and 2007 CRA-W Grad Cohort Workshop (with a Poster Exhibition in 2007), March, 2006 and 2007
- Music DJ in Voice of China program, 89.3FM Community Radio Station, 2006 and 2007
- Vice president of *Sichuan University Computer association*, September 2000 – June, 2003
- President of *Summer School of Spoken English at Sichuan University*, August, 2000
- Member of Sichuan University Chorus, September 2004 – June, 2005

Professional Skills

- *Programming Languages*: Deep understanding of C, C++, familiar with Java, Assembly, VHDL, MATLAB, Shell Script, Perl
- *Development Environments*: Visual Studio / C++, gcc, Eclipse (UNIX, Linux, Windows)
- *Database*: familiar with SQL, experience with Oracle and SQL server
- *CASE tools*: Rational tool suite, experience with UML
- *Hardware*: assembling and configuration, Altera Board

Other Skills

- *Foreign Languages*: Chinese (native), French (reading knowledge)