Yaping Jing

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Research Interests Stochastic modeling; Simulation;
Compact data structures; binary and multi-valued decision diagrams;
Program Analysis;
Program Specification and Verification;
Probabilistic Model Checking;
Statistical Software Testing;
Bioinformatics; Bio-medical-informatics;

Education

Iowa State University 05/2005 - Present
PhD Candidate in Computer Science; Advisor:Andrew S. Miner

Iowa State University 05/2005
Master of Science in Computer Science

Iowa State University 02/2005
Bachelor of Science in Computer Science

Rsearch Projects

Performance and Reliability Analysis for Complex Systems Potential PhD topic
April'06-present
On-going: studying various high-level modeling techniques like SPN for communication systems; investigating reliability and performance evaluation techniques and model checking algorithms for underlying probabilistic systems like CTMC, and DTMC.

Lattice Energy (Interdisciplinary) Research Assistant
May'05 - June'06, Physics Department, ISU
Improved, simplified, and fully tested the existing *LatticeEnergy* system. Also, I have re-designed and translated the existing C++ system into Java. Used C++, OpenGL, FLTK, and Java

Abstract: While one can readily obtain the minimum energy of 0 if particles are arranged in a plane geometry, it is very difficult to get optimized minimum energy when particles are distributed in other 3D geometries like Sphere, Torus, etc.. The LatticeEnergy system is developed to address this issue by placing defects among particle arrangements such that total energy is minimized to the limit. The system consists of an application and a visualization tool. Given the 3 aspects, namely, a *network* which describes the structure of the interacting particles with or without the involvement of the *defects*, a *geometry* which is given at the run-time by the user, and the *Initial configuration of the network*, the application computes the optimal particle distribution constrained on a particular geometry. In addition, by using the polymorphism characteristic in objected-oriented language, the application is able to provide a practical solution to the problem with unprecedented level of flexibility and generality. The visualization tool provides users with vivid animation and interaction with the application.

The project result, as a Java applet, is now visible at:
http://www.physics.iastate.edu/staff/travesset/latticeEnergy.htm

Model-based Techniques for Automated Testing
spring'06, Computer Engineering Department, ISU
Explored Automated Testing Techniques and Tools based on models like Simulink, Stateflow, etc.; investigated some software reliability issues in distributed systems, middleware, sensor networks, and fault tolerance. Did 3 presentations in Dr. Kumar's group out of the exploration.

Meanwhile, I explored software testing techniques based on stochastic processes and statistical measures for determining the probability that software correctly adheres to its specification.

Eos Implementations on Design Patterns Student Research Helper
fall'05 (did 2 weeks), Computer Science Department, ISU
Helped Professor Hridesh Rajan implement a subset of Design Patterns in Eos, a new language implemented as an extension of C#.

Helped analyze the Eos implementation improvements on design patterns in terms of certain properties. The improvements is based on a comparison to the AspectJ implementations on design patterns by Hanneman and Kiczales.

Design Patterns Research Assistant
August'02 - May'03, Computer Science Department, ISU
Explored and experimented GoF's 23 design patterns;
Developed a novel method for the analysis of design patterns' *code reusability*;
Developed a concrete approach to promote design patterns to *design components*

FCModeler Software Developer
May'04 - August'04, Virtual Reality Application Center, ISU
Designed and Implemented a *Property Viewer* for the *FCModeler* Bioinformatics Research Project. FCModeler captures the intuitions of biologists and provides a modeling framework for assessing large amounts of information. The Property Viewer is part of the visualization techniques that extracts and displays data properties dynamically.
Used Java, Jaxb, SOAP, and R.

Summer Internship

Mayo Foundation Software Development/Research
June'06 - August'06, Division of Engineering
Participated in 3 Medical Research/Clinical Projects:
1. *Ocular Pressure Data Acquisition System* in Ophthalmology research
2. *Nasal Tip Elastometer*
3. *CardioVascular Audio Visual System*

From theoretical level, I applied a Stochastic Modeling technique to predict software reliability for project 1. From practical level, I implemented a back up component for project 3 and a multi-threaded logging file for project 2; Also, I refined design documents and developed system testing plans for project 2 and project 3.

Apart from those engineering projects, I also helped bridging the relationship between the Mayo DOE and Iowa State University for an Internship Agreement.

Teaching Experiences

Teaching Assistant
August'03 - May'05, Computer Science Department, ISU
Computer Literature and Practice;
Principles of Programming Languages (used Scheme);
Object-Oriented Analysis and Design (used Java);
Data Structures and Other Objects (used C++);
Introduction to Computer Programming (used C++);

Taught an hour-long section each week, hold office hours, and helped grade problem sets and exams.

M.S. Thesis

Towards the Representation of Design Patterns as Design Components

Publication

Yaping Jing and Markus Lumpe. "Towards the Representation of Design Patterns as Design Components". (to be submitted)

Alex Travesset and Yaping Jing. "Put Computer Science and Astrophysics at Work: Introducing OO-design and Visualization Techniques to Optimal Particle Distribution on Arbitrary Geometries" (work in preparation)

Qualifications

Programming Languages: C++, C#, Java, Scheme, Visual Basic, Haskell, HTML, Smalltalk, MIPS assembly
Operating Systems: UNIX, Linux, Windows 2000 & NP & XP, Solaris
Libraries and Tools: STL, OpenGL, LaTeX, GIMP, Adobe Suite, Microsoft Visual Studio, Eclipse