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Education

Ph.D. in Computer Science, Iowa State University, Iowa, USA 2004 - 2009
*Award: **Research Excellence Award** (Honor for students whose research accomplishments are among the top 10% at ISU in overall quality)*

M.S. in Applied Mathematics, National Chung Cheng University, Taiwan 2000 - 2002
*Award: **Phi Tau Phi Award** (Honor for top ranking students in Taiwan)*

B.S. in Mathematics, National Taiwan Normal University, Taiwan 1995 - 1999

Research Experience

The Inertia of Matrices
(Worked with Dr. Yu-ling Lai) 2000 - 2002

My Master's thesis was about the inertia of matrices, which is related to the signs of eigenvalues of matrices. I generalized the properties of symmetric matrices to normal matrices. Some methods in numerical analysis, such as Lanczos algorithm, were applied in the study.

Software Project Management Including Personnel Risk Management
(Worked with Dr. Carl K. Chang) 2004 - 2006

Software project management is necessary since effective project assignment can directly result in good productivity. Due to the fact that software becomes larger and more complex nowadays, technologies for automatically generating optimal schedule become crucial. Personnel risk management is identified to be one of the important issues since it directly impacts the success of software projects. In this research, we applied Genetic Algorithms to automatically generate optimal schedule. Based on objective historical data, I extended the earlier model, the capability-based scheduling framework, by including risk analysis.

Evolution of Software Traceability Links Using Latent Semantic Indexing
(Worked with Dr. Carl K. Chang and cooperated with Dr. Tien Nguyen) 2006 - 2007

During software development, software artifacts are constantly in evolution. Traceability links among them are also changing over time. Many research and tools in the field of traceability links are focused on a snapshot of the artifacts at a particular time. The evolution of traceability links has not been well-addressed, which makes it difficult for developers to fully understand the evolution of software. In this research, we developed an incremental approach for traceability link recovery and management with the latent semantic indexing method.

The Applicability of Genetic Algorithms to Real-World Optimization Problems
(Worked with Dr. Carl K. Chang and Dr. Andrew S. Miner) 2006 - Present

My dissertation is about the link between theories of Genetic Algorithms and real world applications, especially in Software Engineering problem domains. For more detailed information, please read my research statement.

Software Testing (including Evolutionary Testing)

(Worked with Dr. Carl K. Chang)

2007 - Present

Software testing is a critical element of software quality assurance and represents the ultimate review of specification, design, and coding. My interests in this area are to derive methodologies for the test case generation in order to reach better branch coverage from the current state of the art.

Software Service Evolution

(Worked with Dr. Carl K. Chang)

2008 - Present

In this project, I investigated human mental states and applied statistic models to predict them. Based on that, a framework for software evolution was formulated. Since the set of human mental states is intrinsically open, certain assumptions are carefully made for this work. Currently, we are conducting experiments to verify the entire framework. Besides that, I am interested in the part from requirement specification (or intention specification) to software evolution. More specifically, we formulate software using services (i.e., a composite service), or a service package. Based on different requirements, newly defined services may be added into the package, and the existing services may be deleted from the package. The process from the original service package to a new service package is service evolution. How to derive the service package to meet the requirement specification is an issue.

Multiple Sequence Alignment Using Genetic Algorithms (Bioinformatics)

(Worked with Dr. Xiaoqiu Huang)

2009 - Present

DNA or protein sequences are used for various purposes nowadays. Because of the increasing need, the sizes of their data repositories grow exponentially. The technologies for managing and analyzing the valuable information from huge amount of data become crucial. I am now trying to investigate an approach to apply Genetic Algorithm to sequence alignment problems.

Teaching Experience

Teacher, Mathematics (Junior), Yuan-Lin Junior High School, Taiwan, Fall 1999 and Spring 2000

Teaching Assistant, Advanced Calculus (B.S.), National Chung Cheng University, Taiwan, Fall 2001

Teaching Assistant, Software Construction (B.S.), Iowa State University, Fall 2005

Teaching Assistant, Online Course - Computer Applications (B.S.), Iowa State University, Summer 2006 and Fall 2006

Instructor, Software Construction (B.S.), Iowa State University, Spring 2008

Teaching Assistant, Design and Analysis of Algorithms (B.S.), Iowa State University, Summer 2008

Teaching Assistant, Applied Computer Programming (Visual Basic) (B.S.), Iowa State University, Spring 2009

Papers in Progress

Hsin-yi Jiang et al., "A Self Evaluation Metric for the Applicability of GAs to Optimization Problems," to be submitted to *IEEE Transactions on System, Man and Cybernetics Part B*.

Hsin-yi Jiang et al., "Dynamic Partition Testing Using Genetic Algorithms," to be submitted to *IEEE Transactions on Software Engineering*.

Hsin-yi Jiang et al., “Efficient Approximation on the Number of Generations for the Global Optima of GAs,” to be submitted to *MIT Press Journals - Evolutionary Computation*.

Publications

Journal Papers

Hsin-yi Jiang, Carl K. Chang, Daniel Tauritz, Shuxing Cheng, Taiming Feng, and Travis Service, “A Framework for Estimating the Applicability of GAs for Real-World Optimization Problems,” to be submitted to *MIT Press Journals - Evolutionary Computation*.

Carl K. Chang, **Hsin-yi Jiang**, Hua Ming, Katsunori Oyama, “A Situation-theoretic Approach to Human-Intention Driven Runtime Software Evolution in Context-Aware Service Environment”, *IEEE Transactions on Service Computing (TSC)*. Vol. 2. pp. 261-275, 2009.

Carl K. Chang, **Hsin-yi Jiang**, Di Yu, Dan Zhu, and Yujia Ge, “Time-line Based Model for Software Project Scheduling with Genetic Algorithms,” *Information and Software Technology (IST)*, Elsevier. Vol. 50. pp. 1142-1154, 2008.

Conference Papers

Hsin-yi Jiang, Tien Nguyen, Ing-xiang Chen, Hojun Jaygarl, and Carl K. Chang, “Incremental Latent Semantic Indexing for Effective, Automatic Traceability Link Evolution Management,” *IEEE/ACM International Conference on Automated Software Engineering (ASE)*, pp. 59-68, 2008.

Hsin-yi Jiang, Katsunori Oyama, Carl K. Chang, “An Input Adjustable Tree Algorithm for the Flag Problem of Evolutionary Testing,” *IEEE International Computer Software and Applications Conference (COMPSAC)*, pp. 124-127, 2008.

Hsin-yi Jiang, Carl K. Chang, “Deriving Evaluation Metrics for Applicability of Genetic Algorithms to Optimization Problems,” *Genetic and Evolutionary Computation Conference (GECCO)*, pp. 1113-1114, 2008. Award: **ACM/GECCO Student Travel Grant**

Hsin-yi Jiang, Carl K. Chang, Dan Zhu, and Shuxing Cheng, “A Foundational Study on the Applicability of Genetic Algorithm to Software Engineering Problems,” *IEEE Congress on Evolutionary Computation (CEC)*, pp.2210-2219, 2007.

Hsin-yi Jiang, Carl K. Chang, Tien Nguyen, and Fei Dong, “Traceability Link Evolution Management with Incremental Latent Semantic Indexing,” *IEEE International Computer Software and Applications Conference (COMPSAC)*, pp. 309-316, 2007.

Hsin-yi Jiang, Carl K. Chang, Jinchun Xia, and Shuxing Cheng, “A History-Based Automatic Scheduling Model for Personnel Risk Management,” *COMPSAC - KASET Workshop*, pp. 361-366, 2007.

Hsin-yi Jiang, “Can the Genetic Algorithm Be a Good Tool for Software Engineering Searching Problems?” *COMPSAC - Doctoral Symposium*, pp. 362-364, 2006.

Service

Web Chair and Program Committee Member, IEEE International Computer Software and Applications Conference, 2010

Hsin-yi Jiang

Program Committee Member, IEEE International Computer Software and Applications Conference, 2009

Fast Abstract Chair (Program Committee Member), IEEE International Computer Software and Applications Conference, 2008

Web Chair, IEEE International Computer Software and Applications Conference, 2007

Registration Chair, IEEE International Computer Software and Applications Conference, 2007

References

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