INTELLIGENT ENGINEERING SYSTEMS THROUGH ARTIFICIAL NEURAL NETWORKS

VOLUME 17

SMART SYSTEMS ENGINEERING:
COMPUTATIONAL INTELLIGENCE IN ARCHITECTING COMPLEX ENGINEERING SYSTEMS

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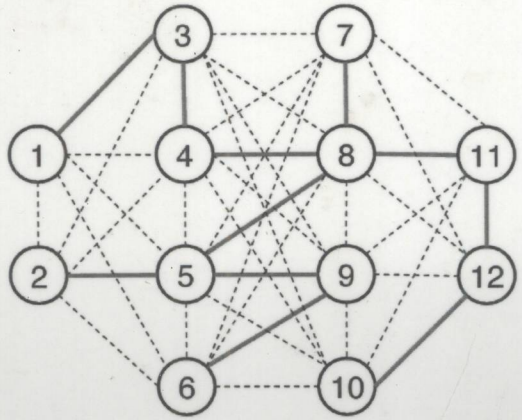

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Proceedings of the Artificial Neural Networks in Engineering Conference (ANNIE 2007) held November 11-14, 2007, in St. Louis, Missouri, U.S.A.

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PREFACE

As a follow up to the previous sixteen volumes of Intelligent Engineering Systems Through Artificial Neural Networks, edited by Dagli, C.H. et al., this volume contains the edited versions of the technical presentations of ANNIE 2007. The seventeenth international gathering of researchers interested in architecting complex engineering systems through computational intelligence was held from November 11-14, 2007 in St. Louis, Missouri, USA. The papers included in this volume provide a forum for researchers in computational intelligence field to exchange ideas on smart engineering systems architecting and design.

An extended version of each paper selected for inclusion was reviewed by two referees, then revised, edited, and condensed to the format herein. The papers in this edited book are grouped into seven categories:

- Bio-Informatics
- Infrastructure Systems
- Evolutionary Computation
- Financial Engineering and Data Mining
- Architecting and Engineering Complex Systems
- Fuzzy Systems and Machine Learning
- Smart Engineering Systems

There were six plenary sessions scheduled for ANNIE 2007. Dr. Matthia Scheutz began the conference with the Monday Morning Plenary talk titled: "Swarm Intelligence and Agent-Based Modeling". The Monday Luncheon Plenary talk was presented by Dr. Mitsuo Gen on "Evolutionary Scheduling in Manufacturing Systems". Dr. Robert Kozma opened the Tuesday presentations with his Tuesday Morning Plenary talk on "Cognitive Phase Transition in Brains and Brain Models and Applications". Dr. Gürsel Süer presented the Tuesday Luncheon Plenary on "Human-Profile Based Intelligent Systems". Dr. Lonnie Welch started Wednesday with his Wednesday Morning Plenary Talk "New Frontiers in Computational Genomics:. Dr. Mark Embrechts presented the Wednesday Luncheon Plenary with his talk titled: "An Introduction to Text Mining".

The ANNIE 2007 Banquet Plenary Speakers were K. Mark Bryden and Bill Fulkerson. Their presentation was titled "Looking Back . . .Stepping Forward: Open Systems and Narrative in Engineering".

Dr. Kenneth "Mark" Bryden is an Associate Professor of Mechanical Engineering, Iowa State University, Ames, Iowa, USA. Dr. Bryden has written more than 100 peer reviewed articles in the areas of modeling, complex systems and decision science. Currently he is an associate professor of the Mechanical Engineering Department and chair of the Complex Adaptive Systems Group at Iowa State University. He is the Program Director for the Simulation, Modeling and Decision Science Program in the DOE's Ames Laboratory and heads the Virtual Engineering Research Laboratory with the Virtual Reality Applications Center. The Virtual Engineering Research Laboratory focuses on integration of information technologies and cognition into the engineering process to support decision making for and the realization of complex systems. Prior to his arrival at ISU Dr. Bryden worked 14 years in a wide range of engineering positions at Westinghouse

Electric Corporation within the Naval Reactors Program. This included 8 years in power plant operations and testing and 6 years in engineering support. Dr. Bryden's primary research interests are in the integration of high performance computing, new computational algorithms, and new user interfaces to solve complex, tightly coupled engineering and decision analysis problems. Dr. Bryden is the recipient of numerous awards including a 2006 R&D 100 award for the development of the software package VE-Suite.

Bill Fulkerson serves as Technology Architect in the Information Systems group of Deere & Company, Moline IL. In this role, Bill facilitates the alignment of business and technology strategy and advises on organizational change initiatives. In his thirty year career with Deere, Bill has served in many areas including Information Technology, Business Development, Engineering& Technology, and Finance. Prior to joining Deere, Bill was employed as a military operations research analyst for the US Army and as instructor of mathematics at the University of Central Missouri. Bill received his BA and MA in Mathematics from the University of Central Missouri.

The editors would like to once again thank the plenary speakers, and the authors for their contributions. We would also like to recognize the organizing committee members of ANNIE 2007 for their excellent support in promoting the conference internationally. Further, we wish to express our gratitude to all the referees for their excellent and timely review efforts, which made this edited book possible within a short period of time.

We would like to mention our appreciation to Tina Dunn. Her ownership of the conference, excellent communication skills, her superb organizing capabilities, her excellent knowledge of computers, skills on databases and spreadsheets, quick adaptability to new internet portal for paper submission and review, and her attention to detail made her an integral part of the ANNIE 2007 conference and this book.

Lastly, but most importantly, we would like to thank all of our families for their patience and support during the many long hours that it took to create yet another ANNIE, ANNIE 2007, and subsequently, this book.

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BIO-INFORMATICS