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RECENT ADVANCES in EVOLUTIONARY COMPUTING

Proceedings of the 10th WSEAS Int. Conf. on
EVOLUTIONARY COMPUTING (EC'09)

Prague, Czech Republic, March 23-25, 2009

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Preface

This year the 10th WSEAS International Conference on EVOLUTIONARY COMPUTING (EC '09) was held in Prague, Czech Republic. The Conference remains faithful to its original idea of providing a platform to discuss theoretical and applicative aspects of mathematical foundation of genetic algorithms and evolutionary computing, evolution strategies, evolutionary programming, probabilistic and statistical problems in evolutionary computing, multiobjective evolutionary algorithms, fuzzy evolutionary methods etc. with participants from all over the world, both from academia and from industry.

Its success is reflected in the papers received, with participants coming from several countries, allowing a real multinational multicultural exchange of experiences and ideas.

The accepted papers of this conference are published in this Book that will be indexed by ISI. Please, check it: www.worldses.org/indexes as well as in the CD-ROM Proceedings. They will be also available in the E-Library of the WSEAS. The best papers will be also promoted in many Journals for further evaluation.

A Conference such as this can only succeed as a team effort, so the Editors want to thank the International Scientific Committee and the Reviewers for their excellent work in reviewing the papers as well as their invaluable input and advice.

The Editors

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Plenary Lecture 1

Adaptive Tabu Search (ATS) and Management Agent (MA)

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Institute of Engineering, Suranaree University of Technology
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Abstract: The lecture will cover the tabu search (TS), its generic algorithms, and a brief look at its variations. The adaptive tabu search (ATS) with the following topics will be covered: adaptive mechanisms, algorithms, convergence property, and search performance. After a discussion on parallel taxonomy, the management agent (MA) will be presented. The lecture will cover the MA(ATS), its convergence, and search performance subject to symmetrical and asymmetrical problems. Real-world applications of the algorithms will be discussed.

Brief Biography of the Speaker: Sarawut Sujitjorn was born in Bangkok, Thailand, in 1961. He received his B.Sc. (Hons) in electrical engineering from the Royal Thai Air Force (RTAF) Academy in 1984, and Ph.D. in electronic and electrical engineering from the University of Birmingham, UK, in 1987. He joined the Department of Electrical Engineering, RTAF Academy, in 1987, where he became an Assistant Professor. Since 1993, he has been with Suranaree University of Technology (SUT), Thailand, where he was the cofounder of the Center for Scientific and Technological Equipment, and School of Electrical Engineering. At SUT, Dr. Sujitjorn, while remains active in research, has served the university under various administrative positions including Vice Rector for Academic Affairs, Deputy Dean of the Institute of Industrial Technology, Deputy Director of the Center for Scientific and Technological Equipment, and Chairperson of the School of Electrical Engineering. At present, he is a Professor of electrical engineering, and Director of the Institute of Research and Development, SUT. His research interests include control and identification, evolutionary algorithms and applied AI, applied signal processing, harmonics and power filters, and electric drive. He has held 14 filed patents, 4 software copyrights, authored 1 book and 1 monograph, co-translated 1 book, and published as authors and coauthors about 100 research and technical articles in peer-reviewed journals and conference proceedings nationally and internationally. He is survived by his wife Suganya Sujitjorn. His hobbies are dog training, and playing various Thai musical instruments and piano accordion. He and his late Golden Retriever made a local championship team in an obedience contest in 2003.

Plenary Lecture 2

Knowledge Discovery in Remote Access Databases

Assistant Professor Zakaria Suliman Zubi
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Abstract: Data mining is an emergent field, whose main goal is to discover useful patterns hidden in large databases. Because of its interdisciplinary nature, there is a wide variety of techniques and methods that come from diverse disciplines, such as statistics, database, machine learning, knowledge representation, and visualization. The Knowledge Discovery in Databases (KDD) process is modeled as an iterative process composed of several phases, each of which contains many obstacles, open problems, and research questions needing to be investigated and resolved. These reflect the current limitations of both humans and machines to generate, analyze, and interpret knowledge from large databases. To improve the data mining process requires strong theoretical and empirical research, that involves, mainly, the creation of better interfaces to database systems, new strategies to simplify the pre-processing stage, optimization and tuning of inductive learning algorithms and creation of a proposed new ones, and better techniques to interpret and evaluate patterns produced by data mining methods.
In this lecture, I will focus on two research problems within the KDD process: algorithm selection and algorithm engineering. Currently, the selection of a data mining algorithm that performs well in solving a data mining problem is rather subjective and it may lead to users and data analysts to make wrong decisions about the most appropriate technique for the problem being solved, or they may spend significant amount of time and effort trying to apply a technique that is not best suited to the problem. Thus, this course of research will introduce a set of heuristics to guide the user in the selection of the most appropriate methods for searching for patterns in a data set, for a particular problem or data mining task. In addition, other issues arise when the selected data mining algorithm is applied to a training dataset to induce a model. A model to data mining could be one of the remote access KDD models. One of these models which we used to call it ODBC _ KDD (2), was proposed by us. The methodology of this model began when an end user submitted a query. This query will be reconstructed to be what we used to call it knowledge discovery query language (KDQL). To meet the KDD process requirements the classical user query must have some extra parameters or rules to extract the hidden information or patterns in the databases. Many data mining algorithms rely on several parameters that the user must set, and that significantly affect the quality of generated patterns. Generating these patterns requires logical investigation in the form of data mining to be able to find out the association rules that we used to discover or mine. These rules help us to discover many associations in one particular database. Association rules can drive us to understand the behavior of our databases. The requirement of discovering the association rules in our databases leads us to think for a strong query language that could express more complex questions then the classical SQL. Such type of languages is called data mining query language (DMQL). Commonly, the user is forced to explore a huge parameter space without clues about which parameter settings are more convenient to induce an appropriate model for the dataset being explored. Also, when the induced model is used to predict new cases, it is fundamental that the model be represented in such form that the user can understand how the model is really working in making decisions, and then exploring alternative models based on the query language and also to the databases that have to be retrieved. According to the databases we implement a database concept called i-extended database. The main aim of this is to extract all the useful information from classical databases and store it a standard form to make it suitable for establishing the knowledge discovery query language (KDQL). Regarding to the data mining query language we implement a data mining query language named as knowledge discovery query language (KDQL). The syntactic of KDQL came from the Structured Query Language (SQL) since several extensions to the SQL have been proposed to serve as a data mining query language (DMQL) . However, they do not sufficiently address how to visualize query results. I will investigate the requirements for a SQL describing the graphical representation of Knowledge Discovery Query (KDQ) results from the perspective of a large database system. With frequent map output and assesses several SQL extensions with

respect to their treatment of the graphical representation. It concludes that the SQL + DM (rules) = is the appropriate form for this task at the user interface. DM rules are based on the association rules to interact i-extended database. I-extended database can access to other type of databases such as relational databases. The association rules will be obtain by the use of KDQL rules, and then graphically represented in a 2D and 3D charts. The KDQL syntax will be notified as well. The syntax was practical used and showed great results. It provide some practical scripts from the KDQL program by displaying some retrieving results with charts of four different types. Visualization result can significantly presented in 2D or 3D in forms such as: pie, bar, line and points charts.

Brief Biography of the Speaker: Ph.D. in Computer Science (Information Technology) (Database Managements System) , Institute of Mathematics and Informatics, University of Debrecen ,Debrecen, Hungary, 1998-2002. M.Sc. in Computer Science (Artificial Intelligent), Institute of Mathematics and Informatics, University of Debrecen , Debrecen, Hungary, 1996-1998. B.Sc. Degree from the Department of Computer Science , Faculty of Science ,Al-Tahadi University , Sert , Libya , from 1989-1993.

Many academic positions include graduate study coordinator, Computer Science Department, Faculty of Science, Al-Tahadi University Sirt, Libya, from 2003 till now. Head of Computer Science Department , Faculty of Science, Al-Tahadi University, Sirt, Libya, From 2003 until 2005. General Graduate Study Coordinator at the Faculty of Science, Al-Tahadi University , Sirt, Libya, from 2004 until 2005.Undergraduate and postgraduate lecturer in computer science department.

Scientific activities such as external and internal member of many postgraduate examination committee boards in Libyan universities. Official reviewer in many scientific local journals in Libya. Member of the Libyan Quality Assurance Agency in Higher Education.

Research activates published many papers in several International Conferences. Published some of them in WSEAS. Research area in Knowledge discovery in distributed databases.

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