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## **Preface: Bridging three gaps is the supreme vocation of IJDATS**

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### **John Wang**

Department of M & IS  
Montclair State University  
Montclair, NJ 07043, USA  
Fax: 973-655-7678  
E-mail: j.john.wang@gmail.com

**Biographical notes:** John Wang is a Full Professor at Montclair State University, USA. Having received a scholarship award, he came to the USA and completed his PhD in Operations Research (OR) from Temple University. He has published more than 100 refereed papers and six books. He is the Editor-in-Chief of *Int. J. Data Analysis Techniques and Strategies*, *Int. J. of Applied Management Science* and *Int. J. of Information and Decision Sciences*. Also, he is the Editor of *Data Warehousing and Mining: Concepts, Methodologies, Tools, and Applications* (6 volumes) and *Encyclopedia of Data Warehousing and Mining* (4 volumes), 2nd ed. His long-term research goal is on the synergy of OR, data mining and cybernetics.

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Many current data analysis techniques are beyond the reach of most managers and practitioners. Obscure mathematics and daunting algorithms have created an impassable chasm for problem solvers and decision-makers. *IJDATS* bridges *three* gaps: first, a gap between academic ivory tower and the real world; secondly, a gap between quantitative data analysis techniques and qualitative data analysis techniques; and finally, a gap between a specific technique and an overall strategy.

The objectives of *IJDATS* are to promote discussions, deliberations and debates on different data analysis principles, architectures, techniques, methodologies, models, as well as the appropriate strategies and applications for various decision-making environments. Two main data analysis schools of thoughts, in terms of quantitative and qualitative, can intersect, interchange, and integrate their ideas. Practitioners can learn the down-to-earth practice. Certainly, quantitative data analysis techniques are very important. However, qualitative data analysis techniques cannot be ignored. In this effort, a best fit, if any, may be found between a strategy and a specific data analysis technique.

There are six articles in this issue. Kumar and Ravi solved bank credit card customer churn prediction problem using data mining. They developed an ensemble incorporating majority voting, wherein multi layer perceptron, logistic regression, decision tree, random forest, radial basis function network and support vector machine are chosen as the constituents. Since the dataset, taken from the Business Intelligence Cup organised by the University of Chile in 2004, is highly unbalanced with 93% loyal and 7% churned customers, they followed under-sampling, over-sampling, a combination of under-sampling and over-sampling and the SMOTE technique for balancing it.

Further, tenfold cross-validation is performed in testing. The authors observed that SMOTING outperformed other techniques in terms of overall accuracy. On top of that, SMOTING and combination of under-sampling and over-sampling improved sensitivity and overall accuracy in majority voting. In addition, Classification and Regression Tree (CART) is used to perform feature selection, which resulted in some numeric and no categorical variables as the most important variables. Moreover, the set of rules, given by the decision tree, act as an early-warning expert system.

Ordinal panel data become increasingly available in management research. Most past relevant researches are developed under mixed effects model frameworks, which are theoretically useful but computationally very challenging. As a very simple solution, Luo and Wang proposed here a composite logistic regression method, which transfers the original ordinal response into a multivariate binary data. Thereafter, a standard logistic regression method for binary panel data can be directly applied. Consequently, the resulting loss function is strictly convex, which makes the computation very simple and stable. Rigorous asymptotic theory is also established by the authors, which are useful for statistical inference. The limitation of this research is obvious. Depending on datasets, the logit-type parametric model assumption might be restrictive. Nevertheless, how to relax such an assumption without destroying the computational simplicity (a very desirable property for real practitioners) is not immediately obvious. Further research along this line is very welcomed here.

Researchers have proposed theoretical models of problem solving that work a problem in a sequential and rational manner. Chakravorty *et al.* explored 'How Problem Solving Really Works?' Their professional experience and an action research study discovered fundamental differences between what these models describe and what actually happens when problems are solved in a real world setting. They discovered that when a problem is properly identified, problem solving generally follows the theoretical models. When a problem is difficult to identify, problem solving proceeds in a cyclical and apparently irrational manner. Cyclical problem solving increases average time of problem solving, and production cost. They found that the relationships among problem solving steps are much more complex than implied in existing literature. Incorporating this new understanding into process improvement training reduced the variability of problem solving time from 44 to 21 min. Based on these results the authors proposed a new cyclical problem solving model.

An algorithm is presented by Subramanyam *et al.* for mining fuzzy temporal patterns from a given process instances. Fuzzy representation of time intervals embedded between the activities is used for this purpose. Initially, the activities are portrayed with their temporal relationships through temporal graphs and then the defined data structures are used to retrieve the data suitable for the proposed algorithm. Similar to the familiar k-itemsets and k-dim sequences, their counterparts are introduced in this paper. The proposed process-instance level data structure generates an optimum number of temporal itemsets. The proposed algorithm differs from other existing algorithms on this topic in representation of data and patterns mined. An example is provided to demonstrate the algorithm.

In the past few years, various quality standards and quality systems have been attempted for the improvement in the product and services in our lives. One such quality tool which has the ability to generate creative and novel solutions is *Quality Function Deployment* (QFD). Sharma and Rawani present a detailed literature review on the topic and application of QFD. This literature review is based on a reference bank of

more than four hundred QFD and its allied publications, organisations, software, tools and web-sources. The literature review is extended with thorough description of methodologies adopted, exemplified with an elaborate categorical application analysis of its varied functional areas *viz.* primary, secondary and tertiary fields; industrial, non-industrial and service applications; and the methodological progressions. Their paper concludes with some of the insight gained from a large number of research papers, publications and other available literature.

Cross-bordering shopping has been of interest for the past decade. Given the close proximity of Singapore and Johor Bahru (located at the southern tip of Malaysia), outshopping has become a notable feature of cross-border visits. Hui and Wang compared the travel frequencies of 203 Singapore residents who traveled to Malaysia for shopping purposes. They also identified and measured the factors that might influence their cross-border shopping behaviour. Their results revealed that there was a significant difference in the travel frequencies between the younger and older respondents. However, there were no significant differences between males and females, and between the low income earners and the high income earners. As for the determinants of outshopping behaviour, it was found that marketing mixes, accessibility as well as economical factors all had significant and positive influences on cross-border shopping.

*IJDATS* presents a forum to help professionals, researchers and policy-makers to exchange their innovative ideas and functional experiences. It also creates a bridge between practitioners and academics to discuss challenges and opportunities in all aspects of data analysis. It further establishes an interface between two main data analysis schools of thoughts, with respect to quantitative and qualitative analysis.

*IJDATS* publishes research papers, reviews or surveys, technical or management reports, case studies, innovative ideas, research notes, practice comments, book reviews, commentaries and news. Special Issues may occasionally be published.

Hopefully, *IJDATS*, *IJIDS*, *IJAMS* will be able to share a manager's burdens, meet a practitioner's challenges, explore an executive's opportunities and realise an entrepreneur's dreams.

Together, let's celebrate the *birth* of *IJDATS*, nurture its *growth*, contribute to its *strength* and protect its *health*.