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## Editorial

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**Biographical notes:** Katsutoshi Yada is a Professor with the Faculty of Business and Commerce, Kansai University. He received his MA and PhD in Business Administration from the Kobe University of Commerce, Hyogo, Japan in 1994 and 2002, respectively. His research interests focus on information strategy concerning with data mining and effects on organisations by information technology, and he has published several papers on the field of data mining. He has played a leading role in research into applications for data mining in Japan. He is a Chair of the DSI Program, Visiting Professor of the Osaka University and serves as the Chairman or program committee member at several international conferences.

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The purpose of this special issue is to provide an overview of service science research rooted in a broad base of data, and to identify any research gaps with service science and data analysis technique to indicate future orientation. In recent years, not only in the developing but also in the developed nations, the ratio of the service sector to industry as a whole is increasing rapidly. From a scientific perspective, competition between corporations is an important factor in improving productivity of services as well as in creating new services. Through the papers presented in this series, we clarify precisely how analytic techniques such as data mining facilitate the creation of new services as well as improve existing service. It is our hope that we can provide a communication platform whereby service sector management personnel and data scientists can share new ideas.

The first paper in this special issue proposes a method of traffic behaviour surveys using information technology. This paper, entitled ‘Identifying behaviour objective from traffic behaviour log data by using facility ontology’ is the extended version of the paper presented at the 18th International Conference on Knowledge-Based and Intelligent Information and Engineering Systems (KES2014) held on 15–17 September 2014 in Gdynia, Poland. Conventionally, traffic behaviour surveys have been conducted by hand, a process that requires both substantial funds and human resources. Meanwhile, this method extracts staying points from GPS-based positional data obtained by smartphone to identify the types of staying facilities by using Google Places API and a facility ontology. This paper discusses the applicability of the proposed method for the automation of large-scale GPS data, through identification testing with GPS location data from the Traffic Behaviour Survey in Nagasaki, Japan.

The second paper, entitled ‘Prediction of consumer purchase behaviour using Bayesian network: an operational improvement and new results based on RFID data’,

seeks to improve the accuracy of consumer purchasing behaviour predictions based on radio frequency identification (RFID) data. An RFID tag attached to a customer's shopping cart enables us to monitor and record the in-store behaviour of that customer at any time. The author applies the Bayesian network (BN) to a clarification of non-monotonic relationship between purchase behaviour and the time spent shopping. Through experiments with RFID data, the paper identifies new and remarkable results in measuring customers' in-store behaviour, and examines significant methodological tasks in predicting purchase behaviour using a BN model.

The third paper, entitled 'Assessment of basic clustering techniques using teaching-learning-based optimisation', studies the clustering techniques related to the initial centre selection. A novel optimisation algorithm known as teaching-learning-based optimisation (TLBO) is a powerful method useful in selecting the optimum centres. In this study, the author selects the finest initial centre using TLBO, and examines the performance of three different TLBO-based clustering algorithms including the enhanced algorithms proposed by the author. The proposed method indicates a better performance in terms of an index of DI and DBI than the other two TLBO-based clustering methods (K-means and fuzzy C-means). Additionally, the enhanced clustering algorithms show few quantisation errors in comparison with the other two different clustering methods.

The purpose of the fourth paper is to clarify consumers' store choice factors from actual scanner panel data by applying the variable selection method, which was developed in the authors' existing research, to the construction of store choice model. Because the proposed method is based on mixed integer optimisation for logistic regression, it enables us to obtain solutions with standard mathematical optimisation software by using a piecewise linear approximation. Moreover, this method carries the optimality guarantee for the selected variables. This paper, entitled 'Using mixed integer optimisation to select variables for a store choice model' is the extended version of the paper presented at the 77th National Convention of Information Processing Society of Japan held on 18 March 2015 in Kyoto, Japan. In this paper, the experimental results in developing a store choice model demonstrated the effectiveness of the proposed method.

The fifth paper is related to the application of RFID technology in customers' in-store behaviour. This paper, entitled 'Estimation of customer behaviour in sales areas in a supermarket using a hidden Markov model', is the extended version of the paper presented at the Service Research and Innovation Institute Global Conference 2012 (SRII), held on 24–27 July 2012 in San Jose, California, USA. To overcome the fact that shopping path data only provides coordinate information in store – which is a limitation – the author proposes a method for customer behaviour modelling by using RFID data and the hidden Markov model. With this method, 'stop' and 'pass by' behaviours are estimated and the proposed method is evaluated by predicting the sales areas where customers actually purchased items. Using this approach, we identify the customers who are experiencing shopping momentum, and compare their purchase results with those of other customers.

The last study focuses on the relationship between cultural characteristics and consumer attitudes toward advertiser websites and brands. This paper, entitled 'A two-nation experiment to investigate the relationships among national culture, individual-level cultural variables and consumer attitudes toward advertising websites and the brand', is the extended version of the paper presented at the 19th International Conference on Knowledge-Based and Intelligent Information and Engineering Systems (KES2015) held on 7–9 September 2015 in Singapore. In this study, the authors perform

a two-nation experiment to investigate the impact of national-culture and self-construal on consumer attitudes toward three types (i.e., informative, socially interactive, and entertaining) of advertiser websites and brands. Through this research, the authors confirm that both national culture and individual-level variables are found to be useful predictor variables for consumer attitudes toward advertiser websites and brands to some extent, and point to several directions for further research.

As a concluding note, we would like to thank the authors for providing excellent papers and timely extended revisions. Thanks are also due to all the reviewers, who help us to shape this special issue. Finally, we gratefully acknowledge the support of Professor Lakhmi C. Jain and Professor Mika Sato-Ilic, the Honorary Editor and Editor-in-Chief of this journal, respectively, for giving us the opportunity to compile this special issue.