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## Editorial

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**Biographical notes:** Setsuya Kurahashi is working as an Associate Professor in Graduate School of Business Sciences at University of Tsukuba. His research interests include social simulation and agent-based modelling. He also continues to work very closely with industry in the areas of engineering management and manufacturing. He is a member of IEEE, the Japanese Society for Artificial Intelligence and so on.

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## 1 Introduction

The special issue promotes exchange of opinions among experts working in different areas of the growing fields of advanced data science and agent-based technologies. The main purpose of the special issue is to bring together scientists representing data science techniques, agent-based systems and related fields. It also aims sharing a common interest related to the advancement of intelligent systems and applications using data science and agent-based technologies. This issue covers a broad spectrum of disciplines working towards enabling these intelligent systems and technologies. The research and development of these systems, that exploit knowledge in the target domain, are at the forefront of modern researches. It also brings together the communities to exchange latest results, to join efforts in solving the common challenges, and to establish an effective communication among researchers and developers involved in the both areas in order to create a worthwhile synergy. Submitted papers were all peer-reviewed by 21 professional reviewers. Finally, 10 submissions were accepted for publication in this special issue on ‘Intelligent systems and applications of data science and agent-based technologies’.

## 2 Papers in this issue

The first paper titled ‘Towards effects estimation of ethical medicine from the package inserts with text mining’ provides a method of effect comparison from the package insert of ethical medicines by text mining. The information of ethical medicine effects is extracted in considering of experimental background data in the package insert. With this proposed method, the experiments are succeeded in extracting the effect information with less fluctuation among the target medicines and making an accurate comparison. This method is available not only to analgesic effect but antiallergic and can be used as one of the effect evaluation methods even for the people do not have the ethical medicine knowledge enough.

The second paper titled ‘Study on effective user registration procedure in business to business using web analytics’ identifies quantitative difference in user registrations and factors for the difference using web analytics. The analysis in context includes change in registration procedure and number of steps. Also, the analysis in web form content covers difference in questions being asked on the web forms. The authors confirmed that change in context and content of web registration form increased rate of B2B user registration as a result.

The third paper titled ‘A new compression method for double-array structures by a hierarchical representation’ presents a new method of the double-array by a hierarchical structure and changes allocations of the double-array. Theoretical observations show that the new method reduces the space usage of the double-array to ~60%. The new method reduces the size of BASE value from 4 bytes to 2 bytes theoretically.

The fourth paper titled ‘Hybrid textbook: fusion of digital textbooks and traditional learning tools’ discusses the paper-top interface (PTI), which is a note-taking support system developed as a fusion of a digital textbook and traditional learning tools. The PTI system projects a digital textbook onto a paper notebook using a pico-projector and enables students to annotate the textbook using a pencil and an eraser. The authors performed comparative experiments to clarify the effectiveness of the PTI as note-taking support for a digital textbook. The experimental results show that the PTI is not inferior

to other note-taking techniques and that the new interactions can increase learning motivation and effectiveness.

The fifth paper titled 'A new term weighting scheme for text categorisation' aims to examine the role of information for term weighting and therefore its effect on the task of text categorisation (TC) with  $k$ NN classifier. The authors examined different weighting measures proposed in the literature and they proposed a new measure that reflects the distribution of the term locally, at the class and globally.

The next paper titled 'A construction method by divided double array structures' proposes two methods to construct by dividing the double array. From experimental observation, it is confirmed the proposed methods construct faster than the traditional method. Increase of space usage in the proposed methods becomes  $<1\%$ .

The next paper titled 'Cost efficiency of each factor in local e-governments' presents a cost analysis model for clarifying the influence of each information system factor, namely cost efficiency. By using this model, the authors verified policies associated with streamlining of e-local governments. Its results confirmed that sharing information system jointly launched and operated among several municipalities, as aimed by government policies, would decrease the cost of information systems.

The next paper titled 'The analysis of implicit mechanism of information on liquidity in an artificial stock market' presents an artificial stock market with a two-layered network to study the effects of information dissemination on stock market liquidity. The experiment results show that with the lower of information issuing frequency, the difference of holdings decided by information between investors will increase, and the change of each investor's holdings in two adjacent periods will increase.

The next paper titled 'A novel rough set attribute reduction based on ant colony optimisation' proposes a Novel Rough Set Attribute Reduction based on ACO, called as NRSACO. It can identify global optimal attribute set with the help of rough set based mutual information as a heuristic aid for the ants. Experiments were conducted on 22 UCI datasets, and the results show that our approach has outperformed in convergence time with comparable or improved classification accuracies.

The last paper titled 'Search algorithm for optimal execution of incident commander guidance in macro action planning' presents a state space search algorithm that aims to solve the optimal execution problem of incident commander's guidance during disaster emergency management. To evaluate the validity of this algorithm, a scenario of search and rescue operation with a disaster response team were simulated, and the authors applied their approach to develop an intelligent software agent that collaborates with the commander and assists him to coordination of field units.