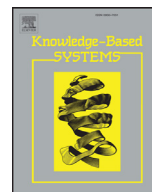




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# Knowledge-Based Systems

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## Editorial

# Decision Support Systems with Uncertainties in Big Data Environments



In a Big Data environment, organizations and individuals benefit from increased prediction accuracy and real-time data analysis results. Currently, Big Data continues to increase in complexity, particularly in respect of the uncertainty of the environments in which decisions are made, and many business decisions need to be made under a range of data uncertainties, e.g., ambiguous data or unlabelled data. This issue results in the business decision-making process itself becoming more dynamic, since big data distributions change over time, and the change is irreducible. Decision-makers must react quickly to insights to take full advantage of such dynamic data environments. More importantly, many organizational decisions need to be made across multiple dimensions, multiple data sources and/or multiple data types, such as text data or image data, and sometimes in time-critical situations. The increasing developments in decision data presentation, decision data analytics, data-based knowledge discovery and data-driven decision support systems have simultaneously resulted in a challenging need to deal with issues of data uncertainty. Thus, to effectively handle data uncertainties and fully use Big Data in decision support systems, there is an urgent and powerful requirement to develop new methodologies and techniques.

This special issue aims to offer a systematic overview of this research field and provide innovative, computationally intelligent approaches, machine learning methodology, models and systems to effectively support decision-making with uncertainties in Big Data environments. It provides a leading forum for disseminating the latest results of theoretical research, technological development, and practical applications for handling uncertainties in Big Data environments in the decision support systems area. It attempts to cover the issues related to data driven multi-criteria decision-making with uncertainty and inconsistency, intelligent knowledge modelling, data processing in social networks, fuzzy computational intelligence methods adapted to Big Data environments, industrial intelligent recommendation systems, and machine learning with human factors. These contributions represent an advance in the state-of-the-art of decision-making with uncertainties in Big Data environments.

This special issue collects 8 peer-reviewed papers from 30 submissions, including papers extended from related oral presentations at FLINS2016 and new submissions from a public call-out. The 8 papers accepted for this special issue can be classified into two groups. One group concerns data-driven decision support methodology with various uncertainties, including adaptive decision-making under concept drift, ontological and statistical reasoning, heterogeneous information fusion, and decision support

method based on deep reinforcement learning. The other group addresses data-driven decision and prediction applications, including stock market prediction, geo-located data-based human activity identification, complex supply chain scheduling, service planning, trust in online social networks, and tourism agglomeration area division, using novel technologies in data science such as evolutionary classification, online clustering, deep learning, support vector machine, social media mining, multi-label learning, and real-time learning.

We would like to take this opportunity to express sincere thanks to the authors who have shared their recent research ideas, results and achievements in this special issue. Our thanks also to the reviewers, whose expertise and critical, yet constructive, comments have been indispensable in improving the quality of the submissions in this special issue, and have significantly contributed to all publications in this journal [1–10].

Guest Editors

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