Computer Modeling in Engineering & Sciences

Tech Science Press

DOI: 10.32604/cmes.2022.019665

EDITORIAL

Introduction to the Special Issue on "Innovation and Application of Intelligent Processing of Data, Information and Knowledge in E-Commerce"

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Received: 07 October 2021 Accepted: 26 October 2021

In the context of E-Commerce eco-system, there are hundreds of millions of consumers, thousands of businesses and shops, and hundreds of delivery people. Large E-Commerce businesses such as Alibaba Group need to support a large number of applications and business modules, and cater for hundreds of business requirements and independent changes on a daily basis. The intersection of these information technologies and business models provides ample research opportunities in intelligent processing of data, information and knowledge. In this special issue, we have accepted 7 papers from open calls and invitations. A summary of these papers is outlined below.

In the paper entitled "A Novel Named Entity Recognition Scheme for Steel E-Commerce Platforms Using a Lite BERT" by Chen et al. [1], the authors aim to improve the efficiency of purchasers searching for commodities on the steel E-Commerce platforms. They propose a novel deep learning-based loss function for named entity recognition (NER). The main contribution of the article are as follows: Aiming at the practical demand from buyers in the steel E-Commerce platforms, an efficient deep learning-based intelligent model is employed to recognize technical terms; Considering the impacts of few-shot and imbalanced data, focal loss, label smoothing, and cross entropy are combined as a novel loss function to improve the performance of the ALBERT-based model; To achieve a good generalization performance, several annotation schemes are explored to analyze their influences on the NER, and an ideal annotation scheme is chosen to tag data in the Chinese steel E-Commerce platforms.

In the paper entitled "A Knowledge-Enhanced Dialogue Model Based on Multi-Hop Information with Graph Attention" by Bi et al. [2], the authors aim to better promote the understanding of dialogue and generate more meaningful responses. The paper introduces knowledge information into the research of question answering system by using a knowledge graph and proposes the Multi-hop Knowledge Information Enhanced Dialogue-Graph Attention (MKIED-GA) model. The model first retrieves the problem subgraph directly related to the input information from the entire knowledge base and then uses the graph neural network as the knowledge inference module on the subgraph to encode the subgraph. The graph attention mechanism is used to determine the one-hop and two-hop entities that are more relevant to the problem to achieve the aggregation of

highly relevant neighbor information. This further enriches the semantic information to provide a better understanding of the meaning of the input question and generate appropriate response information.

In the paper entitled "Number Entities Recognition in Multiple Rounds of Dialogue Systems" by Zhang et al. [3], the authors propose a comprehensive method for number entity recognition, which is capable of extracting number entities in multiple rounds of dialogues systems. In multiple rounds of dialogue systems, the paper observes that the entities that are composed of numbers are divided into several parts and usually distributed in discontinuous positions. The authors find the reasons behind the observations and formally define the problem, i.e., how to effectively and efficiently extract the number entities. This paper compares the impact of BOW model and Doc2Vec model on performance of dialogue fragments extraction and finds that although Doc2Vec model leverages more information of words than BOW model, the combination of BOW model and HM-SVM model has a higher performance on dialogue fragments extraction.

In the paper entitled "Dynamic Pricing Model of E-Commerce Platforms Based on Deep Reinforcement Learning" by Yin et al. [4], the authors apply the deep reinforcement learning technology to the field of dynamic pricing. They build an intelligent dynamic pricing system, introduce the reinforcement learning technology related to dynamic pricing, and introduce existing research on the number of suppliers (single supplier and multiple suppliers), environmental models, and selection algorithms. A two-period dynamic pricing game model is designed to assess the optimal pricing strategy for E-Commerce platforms under two market conditions and two consumer participation conditions.

In the paper entitled "A User-Transformer Relation Identification Method Based on QPSO and Kernel Fuzzy Clustering" by Xiao et al. [5], the authors aim to get accurate user-transformer relations. This paper proposes an identification method for user-transformer relations based on improved quantum particle swarm optimization (QPSO) and Fuzzy C-Means Clustering. The main idea is: as energy meters at different transformer areas exhibit different zero-crossing shift features, they classify the zero-crossing shift data from energy meters through Fuzzy C-Means Clustering and compare it with that at the transformer end to identify user-transformer relations.

In the paper entitled "A Novel Collaborative Filtering Algorithm and Its Application for Recommendations in E-Commerce" by Zhang et al. [6], the authors propose two main innovations. First, they propose a mechanism that embeds temporal behavior information to find a neighbor set in which each neighbor has a very significant impact on the current user or item. Second, they propose a novel collaborative filtering algorithm by injecting the neighbor set into probability matrix factorization. They compared the proposed method with several state-of-the-art alternatives on real datasets. The experimental results show that their proposed method outperforms the prevailing approaches.

In the paper entitled "E-Commerce Supply Chain Process Optimization Based on Whole-Process Sharing of Internet of Things Identification Technology" by Xu et al. [7], the authors first introduce the advantages and disadvantages of shared IoT identification technology and the IoT resource sharing platform based on the three-layer abstract data model and representational state transfer (REST) style. Combining actual IoT applications and the characteristics of an existing platform, a REST-based IoT resource sharing platform is proposed. Combined with actual projects, a REST-based IoT resource sharing platform was built, and key technology experiments were conducted for verification. Finally, optimizing the E-Commerce supply chain management process under Internet of Things technology and explaining the advantages of

optimized E-Commerce supply chain management are discussed. Research on this subject provides a theoretical basis for the application of the Internet of Things in E-Commerce and has practical significance and practical value for managing service capabilities and service levels in E-Commerce.

Acknowledgement: We would like to thank the authors for their contributions to this special issue. We also thank the journal of CMES for their supports for publications of this special issue.

Funding Statement: The authors received no specific funding for this study.

Conflicts of Interest: The authors declare that they have no conflicts of interest to report regarding the present study.

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