

Guest Editorial Preface

Special Issue on Efficient Feature Representation for Intelligent Information System Modeling

Ziyang Guo, Huazhong University of Science and Technology, China

Ansong Feng, Shenyang University of Chemical Technology, China

More and more artificial intelligence (AI) technologies are used in our daily life, which make our life more swift and convenient. For an efficient information system, AI technology becomes an indispensable part. In an intelligent information system, the data is collected from various devices or sensors. Generally, the raw data cannot be used directly since the raw data may contain massive redundant information, be corrupted by noises, and is difficult to understand. Thus, how to represent the raw data becomes an important step for intelligent information system modelling. This special issue will focus on using intelligent feature representation to support intelligent information system modelling and spurring feature representation research in various intelligent system modelling and design. Additionally, the feature representation is also widely used in data integrity, knowledge representation, conceptual modelling, business process modelling etc. The research progress about feature representation is also beneficial for these areas.

This special issue is expected to spur further research and development of feature representation for intelligent information system modelling and to provide a unique opportunity to allow researchers in academic and practitioners in industry to contribute to feature representation for intelligent information system modelling. Five papers are selected in this special issue to cover the theme.

The first article, “Fault Recognition for Mechanical Arm by Using Relative Margin SVM,” by Dongzhe Yang proposes a mechanical arm fault monitoring and detecting framework by using relative margin SVM. First, the mechanical arm signals are collected by sensors. Second, the collected signals are represented as time domain features and frequency domain features. Lastly, the extracted features are used to learn a relative margin SVM model. The experimental results demonstrate the effectiveness of the proposed fault detection framework.

The second article, “Network Security Monitoring by Combining Semi-Supervised Learning and Active Learning,” by Yun Pan proposes a network intrusion detection method by combining semi-supervised learning and active learning. The experimental results demonstrate active learning can utilize minor labeled sample to reduce the cost of manual labeling work in network intrusion detection

The third article, “AI-Driven Virtual Simulation for Packaging Customization,” by Lei He proposes an intelligent virtual simulation environment for packaging customization to help workers cope with emergencies in the workplace. The emergencies in the workplace are simulated by using social force model. The simulation shows that the workers can better grasp the skills and avoid the accidents during working.

The fourth article, “Fatigue Monitoring and Recognition During Basketball Sports via Physiological Signal Analysis,” by Zhenhua Xie proposes a fatigue monitoring and recognition

framework for athletes by using physiological signals to help coaches improve their daily training. The experimental results demonstrate the effectiveness of the proposed fatigue monitoring system.

The fifth article, "Intelligent Fault Diagnosis for Bridge via Modal Analysis," by Wenjun Zhuang proposes an intelligent fault diagnosis system to monitor the status of bridge. First, the bridge status signals are collected by distributed sensors. Second, the collected signals are processed by signal processing to extract the features in time and frequency domain. Lastly, the extracted features are used to learn an intelligent classifier. The simulation results have proven the feasibility of proposed bridge fault recognition structure.

In conclusion, the article presented in this special issue demonstrates fruitful research in the field of feature representation in information system modelling. We wish to thank both the authors and the reviewers for their hard work in helping us assemble this Special Issue, and would also like to express our sincere gratitude to the Editor-in-Chief, Prof. Remigijus Gustas, for providing this opportunity and lots of guidance throughout the process.

Ziyang Guo
Ansong Feng
Guest Editors
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