Preface

Artificial intelligence (AI) is a branch of computer science that seeks to understand the nature of intelligence and produce a new intelligent machine that can respond in a manner similar to human intelligence, a simulation of human consciousness, the informational process of thought. Artificial intelligence is not human intelligence but can think like and possibly exceed human intelligence. Research in this field includes robotics, language/image recognition, natural language processing, and expert systems. Artificial intelligence also involves many disciplines, such as information theory, cybernetics, automation, bionics, biology, psychology, mathematical logic, linguistics, medicine, and philosophy. The main research areas of AI disciplines include knowledge representation, automatic reasoning and search methods, machine learning and knowledge acquisition, knowledge processing systems, natural language understanding, computer vision, intelligent robotics, and automatic programming. In general, a major goal of AI research is to enable machines to perform complex tasks that normally require human intelligence to perform.

However, AI needs to be further explored, and AI systems are still far from capable of complex tasks requiring expert knowledge, logical reasoning, or domain migration. Statistical-based deep learning focuses on correlational relationships and lacks causal analysis, making AI systems poorly interpretable, weak in handling dynamics and uncertainty, difficult to interact naturally with humans, and prone to bringing security and ethical risks in sensitive applications. Brain-like intelligence, cognitive intelligence, and hybrid augmented intelligence are important development directions. This book summarizes the contributions of experts in this research area. It serves as a platform to disseminate and share the latest scientific developments in the field of artificial intelligence, introducing interested readers and industry experts to state-of-the-art interesting topics and comprehensive expert perspectives for practical applications. The journal consists of six papers dedicated to research advances in artificial intelligence as follows:

Data analysis and mapping of research interest in clinical trials of tuberculosis by text mining platform of artificial intelligence using the open-source tool- Orange Canvas:

Orange Canvas, an open-source machine learning and data visualization tool that intuitively builds data analysis workflows using a large, diverse toolbox, has had a positive impact on research interest in analyzing and mapping clinical trials in tuberculosis.

A multi-objective evolutionary algorithm based on the decomposition of two reference points and the prediction of historical information:

Multi-objective evolutionary algorithms are used to solve multi-objective optimization problems using evolutionary algorithms combined with multi-objective optimization strategies:The authors propose a strategy based on the decomposition of two reference points and the prediction of historical information, which positively affects the algorithm performance of multi-objective evolutionary algorithms.

A many-objective evolutionary algorithm based on a two-phase selection:

The multi-objective evolutionary algorithm is good for multi-objective optimization problems where several conflicting objectives exist and need to be processed simultaneously. The strategy proposed in this paper has a positive impact on the performance improvement of the multi-objective evolutionary algorithm.

A differential evolution algorithm for multi-objective sparse reconstruction:Differential evolutionary is a class of population-based adaptive global optimization algorithms, which is widely used in data mining, pattern recognition, digital filter design, artificial neural network, electromagnetism, *etc*. The strategy proposed in this thesis brings a positive impact on the algorithm performance of differential evolution.

Application of the support vector regression and the time series method in the short-term electricity load forecast with regional differences:

Short-term power load forecasting is an important basis for safe dispatch and economic operation of power systems. The accuracy of load forecasting directly affects the reliability, economy, and power supply quality of power system operation, and this thesis applies support vector regression and the time series method to maximize the forecasting accuracy.

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