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SPECIAL SECTION ON ADVANCED ARTIFICIAL INTELLIGENCE TECHNOLOGIES FOR SMART MANUFACTURING

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EDITORIAL

IEEE ACCESS SPECIAL SECTION EDITORIAL: ADVANCED ARTIFICIAL INTELLIGENCE TECHNOLOGIES FOR SMART MANUFACTURING

I. INTRODUCTION

Industry 4.0, also known as the fourth industrial revolution, is an area that many scientists and manufacturers are pursuing. Industry 4.0 consists of many topics such as the Internet of things (IoT), big data, cloud computing, smart manufacturing, and so on. Smart manufacturing is a crucial and valuable topic which aims at developing advanced techniques to improve the quality and costs of manufacturing. Through sensors, networks, and high-performance computers, powerful algorithms for smart manufacturing can be developed and implemented. Thanks to an innovative variety of sensors, reliable, and high-resolution information can be collected and utilized. Networks allow signals to be exchanged quickly between sensors, machines, and computers. Artificial intelligence (AI) requires huge computation power. Modern computers provide graphic cards with parallel computing, breaking this restriction. Algorithms related to smart manufacturing will be more complicated than before. As a result, this Special Section aims to speed up the development of smart manufacturing, attract the attention of communities, and disseminate novel research.

This IEEE ACCESS Special Section includes ten research articles with different innovative topics to helps readers gain insight into this domain and to boost and inspire their research. These accepted articles were reviewed by professional and independent researchers. A brief introduction to each of these articles follows.

The first article "The optimization of lathe cutting parameters using a hybrid Taguchi-genetic algorithm," by Chu *et al.*, uses the multi-objective hybrid Taguchi-genetic algorithm (HTGA) to search for the best processing parameters. A linear regression model is defined by the processed quality and the processing parameters. Then, HTGA is used to optimize the parameters. The experimental results show that HTGA surpasses conventional genetic on convergence rate and robustness.

The second article "A high-precision random forest-based maximum Lyapunov exponent prediction model for spherical porous gas bearing systems," by Kuo *et al.*, proposes a high-precision machine learning-based maximum Lyapunov exponents (MLEs) prediction model for spherical porous gas bearing (SPAB) systems. In this article, the governing equations of the SPAB system are solved to acquire dynamic behaviors. By generating MLEs, the performance of different conditions can be examined. The experimental results show the efficiency and high accuracy of the proposed method.

The third article "Sliding mode observer based multi-layer metal plates core temperature on-line estimation for semiconductor intelligence manufacturing," by Tsai and Peng, applies a new sliding mode observer (SMO) proposed to cope with unknown system interference. The experimental results show that the proposed SMO accurately estimates core temperature.

The fourth article "Intelligence bearing fault diagnosis model using multiple feature extraction and binary particle swarm optimization with extended memory," by Lee and Le, proposes an effective bearing fault diagnosis model based on multiple extraction and selection techniques. The proposed model excels compared to the other five models under different conditions.

The fifth article "Drill fault diagnosis based on the scalogram and mel spectrogram of sound signals using artificial intelligence," by Tran and Lundgren, proposes a method that uses deep learning architecture to extract rich features from the image representation of sound signals combined with machine learning classifiers to classify drill fault sounds of drilling machines.

The sixth article "Industrial artificial intelligence in industry 4.0—Systematic review, challenges and outlook," by Peres *et al.*, reviews current industrial artificial intelligence research. The challenges and outlook are also described to guide researchers for future works.

The seventh article "Adaptive vision-based method for rotor dynamic balance system," by Chung and Chen, proposes a new adaptive vision-based method (AVBM) to automatically detect rotor balancing. The experimental results of industrial examples indicate that AVBM is better than conventional methods in different aspects.

The eighth article "Fault diagnosis of bearings based on multi-sensor information fusion and 2D convolutional neural network," by Wang *et al.*, proposes a convolutional neural network (CNN)-based method for fault diagnosis of industrial equipment represented by bearings. A new multi-sensor

information fusion provides high-quality signals for CNN. The proposed CNN model performs high prediction accuracy on a bearing database and a dataset form designed bearing fault test rig.

The ninth article "Probabilistic indoor positioning and navigation (PIPN) of autonomous ground vehicle (AGV) based on wireless measurements," by Lin *et al.*, proposes a method for wireless indoor positioning and navigation of autonomous ground vehicles. The proposed method is tested by two trajectories and shows promising experimental results.

The tenth article "An end-to-end intelligent fault diagnosis application for rolling bearing based on MobileNet," by Yu and Lv, proposed a lightweight convolutional neural network MobileNet for fault diagnosis. The lightweight model enables it to implement in an end-to-end system to classify faults.

Finally, the editors would like to express gratitude for the authors' enthusiastic participation and contributions to this IEEE ACCESS Special Section. They are also grateful to the IEEE ACCESS editorial staff who helped to support this Special Section.

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