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Editorial

Preface to the Special Issue on "Advances in Machine Learning, Optimization, and Control Applications"

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Over the past few decades, data science and machine learning have demonstrated tremendous success in many areas of science and engineering, such as large-scale pattern recognition, computer vision, multiagent control, industrial engineering, etc. The connection between machine learning and control theory is becoming a popular research topic, which may endow control systems with learning ability and thus improve the control ability and performance of conventional control approaches. This Special Issue aims to present the latest theoretical and technical advancements in the broad areas of machine learning, optimization, and control applications, and also to explore potential problems and challenges in connections of these techniques. After a rigorous peer-review process, eight research articles and three reviews were accepted, see Table 1.

Wang et al. explored a possible way to extract spatial-temporal information channel by channel in videos and proposed a novel spatial-temporal aggregation network for action recognition. It could achieve competitive results with less computational cost, thus validating its lightweight and high efficiency.

Sun et al. proposed a sparse and low-rank joint dictionary learning method with structure characteristic constraints for person re-identification. Numerical experiments showed that this method is superior to traditional methods, and even better than some deep learning methods on some datasets.

Mayet et al. attempted to determine the type and amount of four petroleum products using a system based on the gamma-ray attenuation technique and the feature extraction technique in the frequency domain combined with a multilayer perceptron neural network. The proposed system could predict the volume ratio of products with a maximum root mean square error of 0.69.

Yang et al. combined density-based spatial clustering with a noise-based long short-term memory model for vessel prediction. The proposed model could provide a better prediction performance of vessel tracks, subsequently improving the efficiency and safety of maritime traffic control.

Malik et al. considered a fractured elbow classification approach based on a whale optimization algorithm that combined hand-crafted and deep feature learning methods. The performance was evaluated on the challenging MURA dataset, achieving an accuracy of 97.1% and a kappa score of 94.3%.

Abdel-Basset et al. constructed a new task scheduler, called hybrid differential evolution, to address the task scheduling challenges in cloud computing environments. Several experiments were conducted using randomly generated datasets and the CloudSim simulator to verify its efficiency.

Faridmehr et al. presented a mountaineering team-based optimization algorithm inspired by intellectual and environmental evolution with coordinated human behavior. Compared with existing competitors, this algorithm is more robust, easier to implement, and converges to the global optimal solution faster.

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Table 1. Articles published in the Special Issue "Advances in Machine Learning, Optimization, and Control Applications".

1. Wang, H.; Xia, T.; Li, H.; Gu, X.; Lv, W.; Wang, Y. A Channel-Wise Spatial-Temporal Aggregation Network for Action Recognition. *Mathematics* **2021**, *9*, 3226. https://doi.org/10.3390/math9243226
2. Sun, J.; Kong, L.; Qu, B. Sparse and Low-Rank Joint Dictionary Learning for Person Re-Identification. *Mathematics* **2022**, *10*, 510. https://doi.org/10.3390/math10030510
3. Mayet, A.M.; Nurgalieva, K.S.; Al-Qahtani, A.A.; Narozhnyy, I.M.; Alhashim, H.H.; Nazemi, E.; Indrupskiy, I.M. Proposing a High-Precision Petroleum Pipeline Monitoring System for Identifying the Type and Amount of Oil Products Using Extraction of Frequency Characteristics and a MLP Neural Network. *Mathematics* **2022**, *10*, 2916. https://doi.org/10.3390/math10162916
4. Yang, C.-H.; Lin, G.-C.; Wu, C.-H.; Liu, Y.-H.; Wang, Y.-C.; Chen, K.-C. Deep Learning for Vessel Trajectory Prediction Using Clustered AIS Data. *Mathematics* **2022**, *10*, 2936. https://doi.org/10.3390/math10162936
5. Malik, S.; Amin, J.; Sharif, M.; Yasmin, M.; Kadry, S.; Anjum, S. Fractured Elbow Classification Using Hand-Crafted and Deep Feature Fusion and Selection Based on Whale Optimization Approach. *Mathematics* **2022**, *10*, 3291. https://doi.org/10.3390/math10183291
6. Abdel-Basset, M.; Mohamed, R.; Abd Elkhalik, W.; Sharawi, M.; Sallam, K.M. Task Scheduling Approach in Cloud Computing Environment Using Hybrid Differential Evolution. *Mathematics* **2022**, *10*, 4049. https://doi.org/10.3390/math10214049
7. Faridmehr, I.; Nehdi, M.L.; Davoudkhani, I.F.; Poolad, A. Mountaineering Team-Based Optimization: A Novel Human-Based Metaheuristic Algorithm. *Mathematics* **2023**, *11*, 1273. https://doi.org/10.3390/math11051273
8. Bhatt, B.; Sharma, H.; Arora, K.; Joshi, G.P.; Shrestha, B. Levy Flight-Based Improved Grey Wolf Optimization: A Solution for Various Engineering Problems. *Mathematics* **2023**, *11*, 1745. https://doi.org/10.3390/math11071745
9. Chan, J.Y.-L.; Leow, S.M.H.; Bea, K.T.; Cheng, W.K.; Phoong, S.W.; Hong, Z.-W.; Chen, Y.-L. Mitigating the Multicollinearity Problem and Its Machine Learning Approach: A Review. *Mathematics* **2022**, *10*, 1283. https://doi.org/10.3390/math10081283
10. Yu, F.; Xiu, X.; Li, Y. A Survey on Deep Transfer Learning and Beyond. *Mathematics* **2022**, *10*, 3619. https://doi.org/10.3390/math10193619
11. Qu, W.; Xiu, X.; Chen, H.; Kong, L. A Survey on High-Dimensional Subspace Clustering. *Mathematics* **2023**, *11*, 436. https://doi.org/10.3390/math11020436

Bhatt et al. proposed a new metaheuristic algorithm based on Levy flight to reduce the probability of gray wolf optimization falling into local optimal solutions, thereby improving the convergence speed. The results on traditional benchmark functions and various engineering problems showed its powerful exploration and exploitation capabilities.

Chan et al. introduced the chronological developments to reduce the effects of multicollinearity including variable selection, modified estimators, and machine learning methods, and analyzed the advantages and disadvantages of these methods. Moreover, they discussed strategies for training machine learning models.

Yu et al. analyzed more than 50 representative methods of deep transfer learning in the last few years and systematically summarized them into four categories. In addition, they summarized the latest progress in transfer learning and unsupervised transfer learning, and provided the current challenges.

Qu et al. reviewed the development of subspace clustering methods in the past two decades and proposed a new classification criterion to divide them into three groups. In addition, they discussed the wide applications such as face recognition and motion segmentation, and pointed out several interesting directions.

As the Guest Editors of the Special Issue on "Advances in Machine Learning, Optimization, and Control Applications" , we would like to thank all the authors who submitted

their papers and reviewers for their valuable comments. We hope that these selected research papers will draw attention from researchers and inspire further exploration.

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