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# Editorial

The June 2023 (Vol. 31, No. 2) issue of *CIT. Journal of Computing and Information Technology* brings four papers from the areas of fault diagnostics, network security, data processing, and computer vision.

The first paper in this issue, titled *Automatic Diagnosis Method for Short Circuit Faults in Power Measurement Instruments Based on CNN*, deals with deep learning networks for automated detection of short circuit faults in power measuring instruments. Detecting these faults is important, as they lead to abnormal statistics of power data which affects decision-making in power grid allocation. The author of the paper, Xiuni Xu, proposes a diagnostic model based on a fusion of a convolutional neural network (CNN) and a long short-term memory (LSTM) network. The hyperparameters of the joint model are optimized using the sparrow search algorithm, an evolutionary computation method, for which population distribution is initialized according to the logistic chaotic mapping. The combination of the methods leads to an overall 97% average accuracy in detecting short circuit faults under several scenarios, significantly improving the results of individual previous models. The author plans to use the developed model in detection of other types of faults.

In the paper, titled *A Network Intrusion Detection Model Based on GA-Improved NSA*, the author Long Li deals with the topic of network security and, more specifically, network intrusion detection (NID). The main problem in this field is finding solutions that have high accuracy of detection and that minimize false alarms. The author proposes the use of a genetic algorithm (GA) to improve the negative selection algorithm (NSA), a traditional artificial immune systems' method. Detector generation in NID is replaced with GA, which is used to optimize the non-self-generating spatial distribution of the NSA detector. Also, an improved LeNet-5 deep learning network is used as an effective supplement to the improved NSA detector. Finally, the author experiments with optimization of the overall model using the SMOTE oversampling method to address class imbalance problem, which is common in intrusion detection. Detailed experimental results show that the changes made to the original detection models lead to improvements in accuracy, speed, and memory usage.

Digital archiving and conservation efforts for historical buildings present a challenge, as data volume and computational requirements dramatically increase when detailed and precise point cloud data from 3D scans needs to be processed by multiple users. In the paper titled *RANSAC Algorithm and Distributed Framework for Point Cloud Processing of Ancient Buildings*, the authors Zhu Shen, Ni Luo, Wei Wang, and Bo Yang focus on developing a distributed storage of extensive unstructured data such that data compression accuracy is increased, storage overhead minimized, and performance optimized, especially for prolonged storage periods. The authors propose an operation system design and scheduling algorithm based on distributed heterogeneous processes. Also, they introduce a random sampling consensus (RANSAC) algorithm with a designated threshold for the height parameter. Experiments demonstrate over 99% accuracy in point cloud segmentation, a 60% reduction in alignment, and a distributed computation efficiency of 0.8, making the algorithm comparable or better to the tested methods from related work.

In the last paper of the issue, titled *Research on Small Target Detection Method for Industrial Safety Helmets Based on Improved YOLOv8*, the authors Lan Yuanshuai, Chen Mo, Li Chuan, Wang Qian, and Liao Min deal with the topic of detecting small targets – safety helmets in images of complex environments. They propose a deep neural network model that improves on YOLOv8, a recently proposed single-stage object detection method. The improvements consist of a spatial-to-depth convolution layer used to reduce each spatial dimension of the input feature map to the channel dimension while preserving information within the channels; data augmentation for small targets, including random cropping and rescaling, rotation and flip augmentation, and color jittering; the use of large selective kernel network for adaptation of YOLO's receptive fields. The method was evaluated on a dataset consisting of 7581 images, including 9 044 headwear objects (front view) and 111 514 normal head objects where helmets are not worn. The results show an overall accuracy of over 90% for safety helmets' detection, which slightly outperforms both YOLOv5 and non-improved YOLOv8 architectures, thus demonstrating real-life use potential.

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