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Editorial

The December 2022 issue (Vol. 30, No. 4) of *CIT. Journal of Computing and Information Technology* brings five papers from the areas of error detection and prediction in transformers, vehicle detection in traffic, visual navigation for mobile robots, and natural language processing.

The first paper in this issue, titled *Design of Electronic Voltage Transformer Error Pattern Recognition and Classification Algorithm Based on Data Mining*, deals with electronic voltage transformers and the ways in which their measurement accuracy can be verified. The authors, Deqian Kou and Yan Su, propose that a data mining method, recursive principal component analysis, is used for error state evaluation. The method improves upon the traditional principal component analysis by using a continuous update of the sample points and a rank correction method for modifying the principal components. The Q-statistic is used for comparison with the data control limit and for prompting fault detection. Lastly, the authors combine the proposed method with a regression support vector machine, which leads to improved results compared to similar work, reaching 96.23% precision and 85.12% average accuracy. They conclude that improved accuracy and monitoring effectiveness of transformer error assessment is of great significance for the power industry, as it can improve the stability and reliability of the power grid.

In the paper titled *Construction of Transformer Fault Diagnosis and Prediction Model Based on Deep Learning*, the author Xiaomeng Li proposes a deep learning framework for transformers' fault diagnosis and prediction. For diagnosing faults, a model was constructed based on focus loss stack sparse noise reduction autoencoder, while for predicting faults, a long short-term memory network's hyperparameters were optimized based on Bayesian optimization for parameter adjustment of the tree structured Parzen estimator. The analysis was conducted on a total of 1518 sets of samples from openly available Chinese datasets and a private company owned ones, all containing five gases in different concentrations for several transformer states. The fault diagnosis accuracy reached 93.30%, while in error prediction, three common error indices (MAPE, MAE, and RMSE) reached the levels of 0.0562, 0.0465, and 6.8565. These results bring an improvement with respect to related work models on the same datasets.

In their paper, titled *Attention Mechanism and Detection Box Information Based Real-time Multi-Object Vehicle Detection*, the authors Hao Wu, Wei Wu, Xiaoyan Sun, Jin Zhong, and Fengyun Cao deal with the topic of real-time object detection in traffic images. Since the commonly used YOLOv5 object detection framework has certain issues, the authors propose three improvements to the framework, which enabled them to perform about 8% better on the UA-DETRAC dataset compared to the original method. More precisely, the introduced improvements include a self-attention-based gating mechanism, a loss term related to area ratio, and a category suppression method for multi-class detection frames. The improved algorithm also performed better on the well-known COCO 2017 dataset compared to the related models. Thus, the method proposed by the authors effectively improved the effect of vehicle object detection while satisfying the real-time video demands.

Mobile robots play an important role in many fields of contemporary technology. In the paper, titled *Deep Learning-Based Visual Navigation Algorithms for Mobile Robots: A Comprehensive Study*, the authors Wei Yu and Xinzhi Tian focus on methods used by the mobile robots for navigating complex environments. Since most of the current algorithms primarily rely on manually created features and rules that are limited by feature representation and constraints, the authors propose a deep learning-based solution. Their method combines the attention mechanism with the next expected observations (Neo) method, adds split-attention and a cross-connected ResNeSt50 network, and modifies the network's Kullback-Leibler divergence-based loss function to include Sinkhorn distance for a better navigation stability. The results show superiority over the related work and similar, but improved results compared to the baseline Neo method.

In the last paper of the issue, titled *Negative Emotion Recognition Algorithm of Network Catchwords Based on Language Feature Dimension*, the authors Min Wang, Tian Chen, and Yanjun Xiao provide a natural language processing study on recognition of negative emotions from online, buzzword-rich discussions. The study compares several methods and proposes the use of a deep belief network based on restricted Boltzmann machines to efficiently classify emotions. The method was verified on the IEMOCAP dataset, a commonly used emotional speech dataset, comprising of a total of 120 negative and 90 positive emotion segments. The experimental results show that the deep belief network model performs well in the recognition of anger, sadness, fear, and disgust, with the accuracy reaching 93.56%, 93.58%, 89.84% and 88.53% respectively, superior to other machine learning methods. The authors demonstrate that the method can effectively classify sentiment on a large scale and with high efficiency.

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Editor-in-Chief