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Editorial

The September 2023 (Vol. 31, No. 3) issue of *CIT. Journal of Computing and Information Technology* brings four papers from the areas of telecommunications, power load forecasting, computer vision, and social networks.

The first paper in this issue, titled *Signal Processing and Channel Modelling for 5G Millimeter-Wave Communication Environment*, deals with analyzing channel characteristics of 5G millimeter-wave technology. Although 5G technology offers high-speed benefits compared to the fourth generation, higher signal attenuation is a known issue which happens due to susceptibility to environmental influences. To improve the use of 5G millimeter-wave frequencies, detailed channel modeling is necessary. The author of the paper, Yu Qian, focuses on accurate channel measurements and proposes a phased-array antenna-based method for analyzing the readings. The method is compared with the standard 3GPP channel model both in line-of-sight and non-line-of-sight scenarios. In a series of tests, the author provides evidence for the method's efficiency and proximity of the results to the standard 3GPP model.

In the paper, titled *Refining Short-Term Power Load Forecasting: An Optimized Model with Long Short-Term Memory Network*, the authors Sile Hu, Wenbin Cai, Jun Liu, Hao Shi, and Jiawei Yu deal with the topic of efficient and accurate power load forecasting. Namely, power load forecasting is traditionally difficult, due to large load fluctuations and a significant impact of environmental factors on the data. The authors propose an artificial intelligence-based approach, were particle swarm optimization (PSO) is used for hyperparameter optimization, one-dimensional convolutional neural network (CNN) is used to extract additional weather data features, and long short-term memory network (LSTM) is used to predict power load based on power load time series and the extracted weather features. The experiments conducted on two commonly used datasets show that the PSO-CNN-LSTM combination improves the results of individual methods and manages to obtain an average absolute error of less than 1.0%, thus showing high stability and accuracy.

Instance segmentation (IS) in computer vision aims at accurately discerning individual objects in images. Traditional IS methods have some limitations when dealing with complex scenes, as they often rely on low-level image features such as color, texture, and edges. In the paper titled *An Innovative Deep Learning Approach for Image Semantic and Instance Segmentation*, the authors Chuangchuang Chen, Guang Gao, Linlin Liu, and Yangyang Qiao focus on optimizing the fully connected convolutional neural network (FCN) to better handle IS. For that purpose, they use class activation mapping (thermal mapping) with global average pooling. For evaluation purposes of both semantic segmentation (a simpler problem also tackled in the study) and IS, the authors used PASCAL VOC2012 dataset. Mean intersection over union metric was used as a metric for IS evaluation and several optimization functions were considered. The results indicate that the proposed approach is better in terms of mean precision than related methods. Also, the optimized method significantly improved accuracy of the original FCN.

In the last paper of the issue, titled *Big Data Analysis and User Behavior Prediction of Social Networks Based on Artificial Neural Network*, the authors Zhanbo Liu and Tieshi Song deal with the topic of predicting short-term and long-term individual and group behavior (activity) of users on

social networks. The topic is important for social network operators, content creators, marketing strategists, and others. Based on a list of historical behaviors and features of social network users, the method proposes several modeling steps that lead to behavior prediction. For both individual and group behavior, LSTM-based neural network models were proposed. Specifically for group behavior, a topic (clicking, responding, or questioning) prediction model was proposed. The methods were evaluated on a social network dataset consisting of data from more than 10,000 users. The results of the model compare favorably to a convolutional neural network model in terms of accuracy.

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