Guest Editorial:
Recent Advances in Communication Technology and Its Applications

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In the past decade, the fast development of information technology and engineering not only impacts people's way of life deeply, but also brings in novel and powerful tools for various fields of science and technology, which enables the researchers and developers to better extract, process, and interpret information from the object of their study.

This special issue presents five selected papers from CECNet2022, which was successfully held online during Nov. 4-7, 2022. For each selected paper, a brief introduction is given below.

First Paper: "Yarn Unevenness Prediction using Generalized Regression Neural Network" by Bao-Wei Zhang, Lin Xu, and Yong-Hua Wang.

In the field of textile research, yarn quality indices prediction and analysis is a critical issue, which directly affects the final fabric product quality. It is a high-dimension nonlinear problem to predict the yarn unevenness, since it involves a lot of parameters before and during the production. To solve this problem, a generalized regression neural network (GRNN) is introduced, which takes the parameters of raw cotton and machine operating as its inputs. Compared with common neural networks that have 3, 4, and 5 layers, the proposed GRNN has smaller test error, better fitting effect, and faster running speed, and thus it can predict the yarn unevenness more effective.

Second paper: "A computational method for identification of functional SNPs in human noncoding genome regions based on multi-feature mining" by Rong Li and Zhi-e Lou.

Single Nucleotide Polymorphism (SNP) refers to the variant on a single nucleotide in the genome, which is one of the most common types of genetic variants. It is the third-generation genetic marker that has been widely used in complex genetic diseases diagnosis and other related fields. To effectively identify the functional SNPs located in non-coding genome regions (which do not alter the amino acids of encoded proteins and thus are more difficult to detect), a prediction model is built, which makes use of random forest and multiple features (sequence context based features, position based features, Allele-specific based features, etc.). Compared to the existing GWAVA (Genome-Wide Annotation of Variants) and CADD (Combined Annotation-Dependent Depletion) methods, the proposed method is more effective on a very strict dataset.

Third paper: "A novel Brownian motion-based hybrid whale optimization algorithm" by Liyi Zhang, Xiaolin Wang, Ting Liu, Yong Zhang, and Yongsheng Hu.

The whale optimization algorithm (WOA) is a remarkable optimization algorithm, which has few adjustment parameters and simple implementation. To overcome its shortcomings, such as premature convergence, slow convergence in the later period, and low search accuracy, this paper presents a hybrid whale optimization algorithm (HWOA). The Harris Hawk strategy and Brownian motion are incorporated with WOA, so as to improve the search accuracy, convergence speed, and ability to jump out of the local optimum. In the test using IEEE CEC06-2019 benchmark functions, the proposed HWOA shows the highest averaged ranking compared with other six optimization algorithms (including WOA).

Fourth paper: "Factors analysis of consumers' purchasing intention under the background of live e-commerce shopping" by Bo Zhang, Jun Li, Yutao Feng, and Danni Liu.

At present, e-commerce that boosted by Internet and mobile communications has moved on to a new stage, which is conducted through live broadcasting. To better understand this live e-commerce, the authors utilize SmartPLS software to make descriptive statistics, reliability analysis and validity test on the collected questionnaires. The results show that opinion leaders have the greatest impact on consumers' purchase intention. Other factors, including live interactivity, live entertainment, and live promotional price, can also significantly affect consumers. Some suggestions for better developing live e-commerce are given by the authors as well.

Fifth paper: "A new device for two-way time-frequency real-time synchronization" by Ke Zhang, Decai Zou, Pei Wang, and Wenfang Jing.

High-accuracy time synchronization is crucial for wireless sensor network and coherent accumulation processing in multistatic radar imaging. In this paper, the hardware design for Two-Way Time-Frequency Real-Time Synchronization (TWTFRTS) is introduced. Besides, an automatic adaptive jitter elimination algorithm based on Kalman and PID is also proposed. In the flight test on a drone hovering at 2km, the TWTFRTS device shows 0.8ns (RMS) and 1.5ns (PP) time synchronization performance. Meanwhile, the frequency stability can achieve 3.8e-11 (slave, ADEV@1S) and 1.8e-11 (master, ADEV@1S), and the frequency accuracy is 4.1e-12 (slave) and 5.9e-13 (master) in the outdoor experiment.

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Guest Editors

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