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## Editorial

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**Biographical notes:** B.B. Gupta received his PhD in the area of Information and Cyber Security from the Indian Institute of Technology Roorkee, India. He published more than 350 research papers in international journals and conferences of high repute including the IEEE, Elsevier, ACM, Springer, Wiley, Taylor & Francis, Inderscience, etc. He is working as an Assistant Professor in the Department of Computer Engineering, National Institute of Technology Kurukshetra, India. His research interest includes Information security, cyber security, cloud computing, web security, intrusion detection and phishing.

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With the development of cognitive-inspired computing and interaction systems, cognition is growing as an exciting and innovative paradigm that enables a wide range of applications and has the potential to transform our lives (Zhang, 2019; Pandey and Banerjee, 2019; Tewari and Gupta, 2020; Zheng et al., 2017). Recent advances in artificial intelligence (AI), edge computing, big data, help in cognitive computational theory and its applications, on the other hand, it also shows that multidisciplinary cognitive-inspired computing still faces security issues (Stergiou et al., 2020; Gupta and Gupta, 2018; John and Sam, 2021; Xiong et al., 2019; Xing et al., 2019). This special issue intends to bring together state-of-art research and developments in security and privacy of cognitive-inspired computing and applications, novel attacks over the users of internet to protect our data, and forensics security analysis for the applications, machines and data. Topics for this special issue include, but are not limited to (Pérez-Torres et al., 2019; Gupta et al., 2018; Fiorini, 2020):

- fundamental issues on cognitive-inspired computing
- security and privacy of cognitive-inspired computing systems

- security and privacy of cognitive-inspired computing with big data
- intrusion detection systems in cognitive-inspired intelligent interaction
- security and privacy of AI-assisted cognitive computing approaches
- security and privacy of brain analysis for cognitive-inspired computing
- intrusion detection systems in internet of cognitive things
- cognitive environment, sensing and data
- security of cognitive robots and agents
- security issue in cognitive-inspired computing
- security and privacy protocols.

This special issue contains 12 papers focuses on 'Security, privacy and trust in cognitive-inspired computing and applications' and other related areas (Gupta and Gupta, 2017; Kaddour and Lehsaini, 2021; Sumathi and Sangeetha, 2020) which were selected after rigorous review process. The first article entitled, 'Safety evaluation on central

separation opening of reconstructed freeway based on surrogate safety assessment', by Wei Hou et al., presents a model in order to reduce the risk of driving at the opening of the median strip of the old road of the freeway, the driving safety was quantified by taking the opening length of the central section of the old road and the main line flow as independent variables. Based on the VISSIM micro-simulation software, a typical simulation scenario is established. The vehicle speed, the position of the vehicle's change point, the number of conflicts, the severity of the conflict, and the conflict points are analysed by the surrogate safety assessment model (SSAM). The influence of the opening length of different median strips and the influence of flow on safety is quantitatively evaluated, so as to obtain a reasonable opening length of the median strip. The research results show that the flow has a greater impact on the number of collisions, and the length of the open section has a significant impact on the severity of the conflict. The conflict points are found to be concentrated at the front of the 400 m open section. The results of the study provide a theoretical basis for the opening length of the median strip and the setting of traffic signs.

The next article entitled, 'An improved sensorless strategy on the basis of improved PI regulator', by Haigang Zhang et al. The author presents the sensorless control strategy, which was implemented by replacing the conventional PI regulator with an improved fuzzy PI regulator, meanwhile a adjusted sliding mode observer was established for replacing the traditional rigid position sensor based on the principle of non-position sensor. The signals of rotor velocity and location were extracted from the counter electromotive force for reducing the error and complexity of the calculation of the angular and rotational speed. Compared with conventional PI observer, the regulate system of the PMSM has a preferable influence on the steady-state and dynamic response. A MATLAB platform has been built to validate this method, and the experimental results showed that the fuzzy PI sliding mode observer had strong robustness and restrained the chattering to a certain extent. On the other hand, it also could improve the stability, rapidity and dynamic performance of the SMO system. 'The cryptologic characteristics of circulant matrices' is presented by Haiqing Han et al. in the next article.

The next article entitled, 'Application of EPC internet of things and radio frequency identification technology in logistics', by Xiaobei Wang and Yaya Wang. The authors talked about ecommerce that it is growing stronger, more and more flexible and diverse application to various industries of society, initiating innovation in shopping and trading methods. In particular, major changes have taken place in the circulation of goods. Then, how to make electronic money safely and reliably purchase real-world items in a virtual network? Logistics plays a key role in this. Realising informationisation, automation and intelligence has become a new trend in the development of modern logistics. The continuous development of network development provides a broad development prospect and

technical support for logistics. Modern logistics and the internet complement each other, and support the commercial application of modern networks. How to apply existing network technology to effectively improve the logistics level is an important topic of our research. They focus on the practical application of electronic product code (EPC) and RFID technology in the field of logistics. The internet is the foundation of the internet of things, IoT using wireless communications, RFID technology, computer network technology, etc., constructs a huge system that covers the world. In order to meet the identification and efficient identification of individual products, the Automatic Identification Laboratory of the Massachusetts Institute of Technology proposed the concept of EPC, each item is assigned a unique identification code. The EPC code is usually stored in an electronic tag of a silicon chip material, and the tag is attached to the identified article. When an EPC tag is embedded in an item, the item and the product electronic code in the EPC tag are in one-to-one correspondence. It is identified, transmitted, and queried by high-level information processing software? On the basis of the internet, a logistics model that provides various information services for the supply chain is formed. As a wireless version of the barcode, RFID technology has its own advantages and features non-contact automatic identification. It mainly identifies the object objects in the logistics by issuing specific RF signals and obtains related item information. The perfect integration of electronic tags, EPC codes and internet technologies has created the internet of things known as the next generation internet.

The next article entitled 'The effects of green product trust and perception on green purchase intention in China' by Pinghao Ye et al. According to the theory of planned behaviour (TPB), the authors created a model of factors affecting customer green purchase intention, with such factors including green product experience, green purchase behaviour, subject social norms, perceived environmental protection value, green product trust and green product perception. Then, a questionnaire was developed based on the model. 307 respondents were involved and the feedback was analysed, using a structural equation model, to verify the data reliability and validity. Results show that green product trust and green product perception exerted significant positive effects on green purchase intention, green product experience had significant positive effects on green product trust, and subjective norms and perceived environmental protection value positively affected green product perception. These findings provide valuable information for studying factors affecting the green purchase intention of customers. The next article entitled 'Terrain frames classification based on HMC for quadruped robot' by Zhe Li et al. As a multi-body nonlinear rigid-flex system, the quadruped robot must maintain the correct perception and classification capabilities for the external environment. This ability is necessary to help quadruped robots make path planning, gait adjustment and attitude control while maintaining complex interactions with the external environment. The authors proposed

a terrain classification algorithm based on HMC (HMRF-MAP-CNN) as the basis for robot motion control strategy selection. Different from the classification method based on image features, the terrain-based classification method has higher accuracy and better computational efficiency. The raster map terrain frames classification method includes a rugged terrain recognition algorithm based on HMRF and a rugged formation algorithm based on convolutional neural network. In the process of solving the actual terrain classification problem, the algorithm firstly uses HMRF to classify the obtained terrain frames into two categories, flat and rugged, and then use CNN to filter, according to the causes of rugged terrain frames. Through the simulation experiment and comparative analysis, the superiority of HMC terrain frame classification algorithm is confirmed.

The next article entitled 'Energy efficiency optimisation for heterogeneous cellular networks-based small cell power allocation' by Pan Ziyu et al. During the study of wireless green communication, energy efficiency (EE) optimisation of heterogeneous cellular networks (HCNs) is always the hot topic. The authors studied the EE of HCNs in homogenous Poisson point process (HPPP) and proposed a new EE optimisation method based on small cell transmitting power allocation. They first, it modelled the HCNs by using HPPP and second, it derived the expression coverage probability and achievable rate in Rayleigh channel situations, and deduced the expression of EE in closed form. Finally, it optimised the small cell transmitting power via convex-optimum method in order to maximise EE for HCNs. The simulation results show that the small cells transmitting power has significant effects on the HCNs EE. Its essence is through reasonable setting of small cells transmitting power to available help improve its efficiency.

The next article entitled, 'Structural equation modelling and numerical simulation on the entire process of e-commerce model', by Xiaoxi Fu et al. In the study of e-commerce, the authors tried to explore the complex relationship between original enterprise operation and e-commerce model using numerical simulation. Through the simulation of the entire process of e-commerce mode introduction and implementation, the authors found that traditional operation could promote the implementation of e-commerce at initial phase. With the implementation of the e-commerce model, the original operational base will become an obstacle. To cope with this, companies need to break the inherent boundaries and industry concepts and simplify the organisational structure to promote the full utility of e-commerce model. The next article entitled 'Research on the evaluation system of smart tourism projects based on user experience' by Yipeng Wang. In recent years, with the rise of smart tourism, many tourist attractions invest a lot of money to build smart tourism projects to make tourism more intelligent. In order to evaluate the problems in the use of such projects and point

out the direction of improvement, the author proposed a smart tourism evaluation index system based on user experience. The evaluation index system probes into the actual feedback data of the users in the tour process from user's sensory experience, program experience, content experience and related experience. Then, the author utilised the fuzzy comprehensive evaluation method to process the collected data to obtain the evaluation index under the framework of the index system. In the application of this evaluation index system, it is compared with the commonly used evaluation index system in industry to point out the advantages and disadvantages of smart tourism projects and the direction of improvement more directly and effectively. The next article entitled 'Development of microcomputer protection and measuring-control device for 35 kV distribution line' by Tianpeng Zhang et al. According to the research status of 35 kV microcomputer protection device, a microcomputer protection and measuring-control device was designed to address common electrical failures during the running of 35 kV distribution line. In this device, a 32-bit high performance embedded microprocessor was used as the control centre, which could realise real-time detection on electric parameters such as current, voltage, active power, reactive power, and provide the distribution line different protections, include current direction protection, over-current acceleration protection, zero sequence current direction protection and under frequency load shedding. They focused on the overall structure of the device, gave design proposals of analogue acquisition module, switch processing module, communication module and power module. In addition, it also analysed various protection logic such as three-phase current direction protection with low-voltage blocking, over-current acceleration protection, three-phase zero sequence current protection and under frequency load shedding protection, moreover, partial test data was also showed. In general, this device combined functions of protection, measurement, control and communication, had a high application value.

The next article entitled 'Research on the sponge city smart platform of Wenzhou high-speed railway new city', by Shuang Han and Meng Li. Using the new technology of internet of things, big data and cloud computing, an intelligent sponge city platform with the functions of monitoring, data transmission, early warning and management is built. The hardware system based on NB-IoT and STM32 and the software system of T-S fuzzy neural network and BP neural network are designed. BP neural network is used to calculate and analyse the water quality data measured by the sensor, the calculation results are fed back to the drainage pipeline and drainage pump station facilities to control the water quantity and quality of the outlet. In addition, T-S fuzzy neural network is used to reasonably predict the changes in the water depth of the low-lying areas of the city from the flow data measured above, and make a warning response to possible

waterlogging as soon as possible. The relevant staff can use the timely monitoring data of the smart platform to take necessarily remedial measures through the special management application. The results show that the employment of the smart platform has reduced the annual runoff of Wenzhou City by 40%, the concentration of the suspended solids in river rainwater has been reduced by more than 40%, and the concentration of the chemical oxygen demand, ammonia nitrogen, total nitrogen and total phosphorus has been reduced by more than 30%, which reduces the economy loss by five million yuan and improved the aqueous environment to some extent.

The last article entitled 'An efficient and reliable approach based on adaptive threshold for road defect detection' by Xiaoliang Jiang et al. With the rapid development of economy, automatic detection of road crack becomes a hot research study. However, it still has very big challenges due to the shading, intensity in homogeneity and divots in the crack image. Traditional detection algorithms use the characteristic of the image such as intensity and texture to segment the crack regions, so they cannot achieve satisfactory performance. In this article, the authors introduce an automatically image-based method for road crack detection. Firstly, a new mask image is constructed based on the grey-mean of original image. Secondly, calculating the difference between the original image and the mask image and selecting the highest value to extract the targets from the image background. Finally, the redundant interference is removed by morphological operation. Experimental results concentrate on public datasets show that our method is more reliable than previous approaches

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