HK.NCCP

International Journal of Intelligent Information and Management Science
ISSN: 2307-0692, Volume 7, Issue 5, October, 2018

Design of Peer to Peer Transmission System For Large Scale DVE Scene in Distributed Virtual Network

Wangqin Liu
Nanchang Normal University, Nanchang, 330029, China

Abstract: With the continuous development of information society, the performance of large-scale DVE scene peer-to-peer transmission system in distributed virtual network is required higher. In the case of limited bandwidth in real networks, large-scale and complex large-scale DVE scene peer-to-peer transmission has always been a bottleneck problem which is difficult to solve. This paper summarizes the research on this challenging problem. The large-scale DVE scene mapping and transmission module is optimized with the distributed virtual network scene mapping node localization algorithm to form a high-density multi-dimensional optical network and improve the transmission capacity of the optical network. Combined with the multi-dimensional optical network structure, the operation flow and system hardware of large-scale DVE scene peer-to-peer transmission system are optimized. Finally, experiments show that compared with the traditional WDM optical network scene peer-to-peer transmission system, the large-scale DVE scene peer-to-peer transmission system in distributed virtual network is more operable, and its transmission accuracy is improved by more than 30%.

Keywords: Distributed virtual network; Large-scale DVE scenario; Peer to peer transmission system

1. Introduction

Applying the concept of large-scale DVE scene peer-to-peer transmission in distributed virtual network, a software transmission multi-dimensional optical network control architecture is designed and implemented. On this basis, virtual resources are formed by abstracting the underlying physical resources of the multi-dimensional optical network, and virtual resources are allocated to the virtual network to realize the virtualization of the multi-dimensional optical network[1]. To solve the problem of virtual optical network mapping in software-defined multidimensional optical networks, a virtual optical network mapping mechanism considering mode loss is proposed. At the same time, the cooperative virtualization mechanism of DVE scene resources in data center and transmission resources in multi-dimensional optical network between data centers is considered in the application of multi-dimensional optical network in the scene of interconnection between data centers. In order to achieve the goal of efficient peer to peer transmission.

2. Design of Peer to Peer Transmission System for Large-scale DVE Scene in Virtual Network

2.1. Distributed virtual network scene mapping node localization algorithm

Distributed virtual networks support multiple network architectures, experiments, and services running simultaneously on a shared underlying physical network. Its structure is usually represented as a bottom-level physical network shared by multiple virtual networks consisting of a group of virtual nodes and virtual links connecting virtual nodes. Its structure is shown in the following figure.

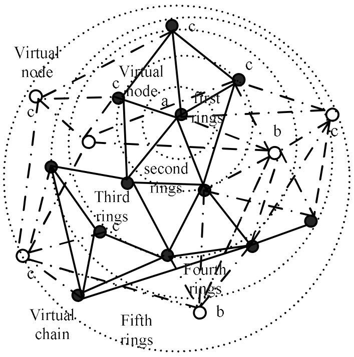

Figure 1. Underlying physical structure of virtual network nodes

As shown in the figure, virtual nodes and virtual links are mapped to underlying physical nodes and underlying physical paths, respectively. The underlying physical nodes can carry one or more virtual nodes. Under the premise of satisfying resource constraints, the underlying physical network resources can efficiently utilize the scene transmission target mapped by virtual network, and at full time With sufficient constraints, the virtual network obtained by efficient mapping algorithm can achieve maximum benefits[2].If the benefit obtained by processing virtual network requests at n times is pij, the goal of virtual network mapping is to minimize the long-term average benefit to $\gamma_{\min}$, the formula of the long-term average benefit function of the virtual network is as follows:

$$a_{ij} = \frac{1}{n}\sum_{i=1}^{j-1} n\sqrt{(p_{ij} - \gamma_{\min})} \tag{1}$$

For a specific virtual network mapping task, F (x, y, z) is assumed to be a node mapping function between the virtual network and the underlying physical network to maximize the benefit of the scene mapping task. ΔE_x is set as a node mapped to the underlying physical network in the virtual network. ΔR_y is used to represent the link mapping relationship between the virtual network and the virtual network. ΔT_z is used to represent the link mapping node of the underlying virtual network in the virtual network. Therefore, the virtual network scenario mapping integer programming form can be expressed as:

$$\psi = \mathrm{a}_{ij} - \sqrt{\Delta E_x{}^2 + \Delta R_y{}^2 + \Delta T_z{}^2} \tag{2}$$

According to the above algorithm, considering the resource constraints required to satisfy the transmission requests of large-scale scene mapping in virtual network mapping, it is found that resource transmission constraints mainly include node constraints and link constraints. To deal with the constraints in the peer-to-peer transmission of the above two scenarios, the distributed virtual network architecture is implemented. Optimize and get the following figure.

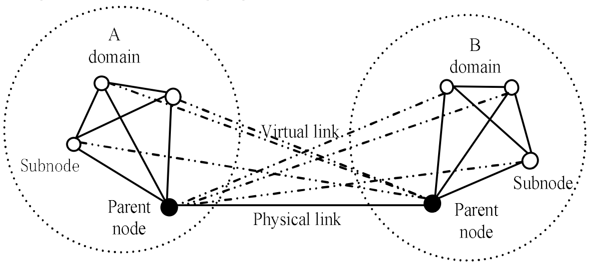

Figure 2. Distributed virtual network optimization structure

As shown in the figure, as long as the underlying physical network can reserve sufficient bandwidth for each virtual network request, multiple virtual links in the distributed virtual network can be mapped to the same physical link in order to effectively solve node constraints and link constraints, and for delay constraints or distance constraints, adjacent virtual links can be limited. The distance between quasi-nodes guarantees the QoS of virtual networks. In addition to resource constraints, access control, location and type of nodes and links may constitute constraints for network mapping[3].

2.2. Large scale DVE scene mapping transmission module

In order to effectively avoid the problem that the underlying physical nodes can not or can not accept the mapping of virtual nodes due to network security or other considerations, the search space of mapping virtual nodes and links is reduced and the complexity of the problem is reduced[4].Multi-core optical fiber space division node can effectively map a virtual link to multiple physical paths under bandwidth requirements, and dynamically adjust and optimize the mapping relationship in the process of virtual network task execution, which brings more flexibility to virtual network scheduling and configuration, greatly reduces or even eliminates the virtual network. The constraints of the network mapping problem satisfy as many virtual network requests as possible[5].Combined with the virtual network scene mapping integer programming algorithm, the location of multi-core optical fiber space division node is calculated and arranged, and the following figure is obtained.

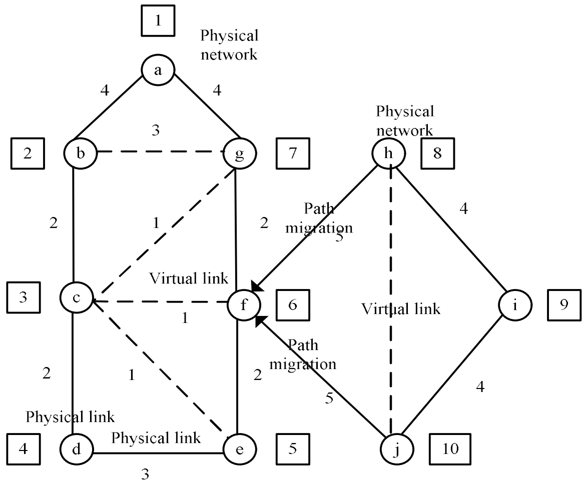

Figure 3. More than 3 positioning of core optical fiber air separation node

As shown in the figure, a virtual link can be mapped to multiple underlying paths in the underlying physical network by this method. The path migration method is mainly used to deal with the problem of online virtual network requests. This method periodically optimizes the existing mapping relationships, and the methods adopted include re-mapping to new underlying paths or changes. Path partitioning rate in the current deployment process of various data sensor network nodes, sensor node movement is relatively small, most of the static state, part of the sensor network node location often changed by the impact of anchor nodes, easy to cause the location of sensor nodes difficult to fix, resulting in a large number of redundant unknown nodes, resulting in Massive consumption and other problems[6].In order to solve the above problems and improve the efficiency of the system, the genetic algorithm is used to calculate the sample weight $A(\vec{v})$ of the area distribution density of the transmission nodes in the multi-dimensional optical network.

$$A(\vec{v})=\sqrt{\frac{\sum_{i=1}^{y}F(x,y,z)_{\delta}(\psi-G_0)}{za_{ij}}} \tag{3}$$

Where G_0 is the node location mean square error, B indicates that there are δ nodes in the node distribution area F (x, y, z), and z is the actual number of mobile nodes. Combining the above genetic algorithm can effectively reduce the error range of the virtual network node positioning system and accurately calculate the standard distribution density of the network transmission node area.

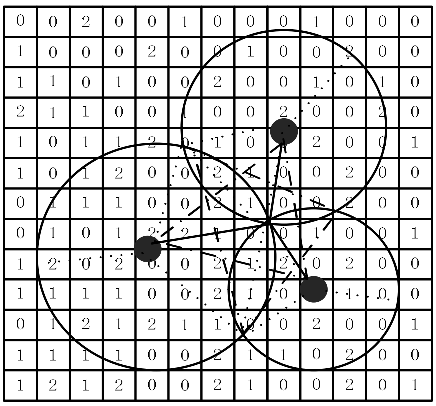

Figure 4. Distribution density of transmission nodes in multidimensional optical networks

As shown in the figure, some unknown network node location information in the sample area will deflection, displacement and other issues, node location ranging results are difficult to ensure accuracy and uniqueness[7].Therefore, combined with genetic algorithm, the node scene mapping transmission method is optimized[8].Assuming that the distance between nodes in the region remains constant, the location of unknown nodes can be confirmed by fixing anchor nodes[9].Based on the above principle, the mapping transmission of Medium-Large-Scale DVE scene is optimized. The specific structure of the free mapping transmission method of network node scene is as follows.

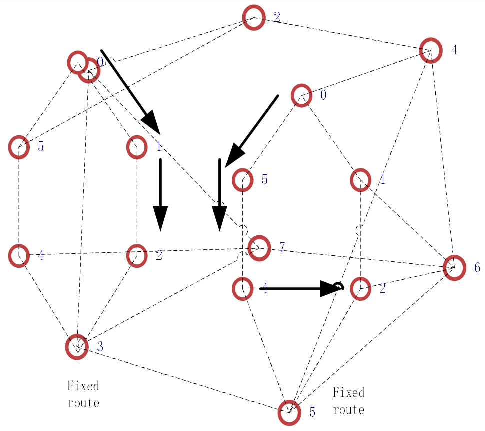

Figure 5. Free mapping and transmission method for virtual network node scenario

As shown in the figure, in the process of virtual network node scene free mapping transmission, the common fixed methods of sensor self-localization node network should be analyzed, and the unknown distance of sensor nodes should be calculated according to the propagation time and data propagation speed of node localization signal, so as to achieve the information transmission and self-localization system of sensor nodes. The design requirement of time synchronization for receiving data to minimize the running time of the system[10-11].

2.3. Process design of peer to peer transmission system for medium and large scale DVE scenarios

In the process of transmitting the self-localization signal in the data node localization system, it is assumed that the receiving signal time of the data localization node A is T, the receiving signal time of the node A1 is T1, and the receiving signal time of the node A2 is T2, and so on. Assuming the distance between the transmitting node and the receiving node is d, the signal propagation speed of the node is calculated. Assuming the distance between the transmitting node and the receiving node is V, the peer-to-peer transmission process of Medium-Large-Scale DVE scene is shown in the following figure.

In the process of scene information peer-to-peer transmission, combined with network node mapping information, a single thread is used to receive all network node mapping transmission events and network readable data, and the communication packets are distributed to the corresponding message queue of the node [12]. For multiplexing, it realizes unified management of network node mapping and scene peer to peer transmission. According to the data flow, it can be divided into sending message queue and receiving message queue[13].The basic work flow is shown below.

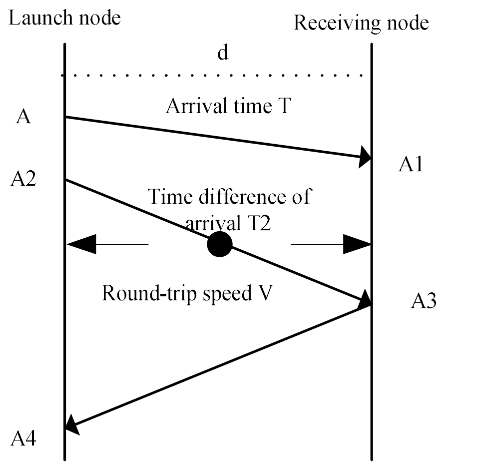

Figure 6. Self localization data transmission process of mobile node

As shown in the figure, through the acquisition and analysis of network node mapping information data, the scene corresponding transmission information is collected. According to the localization node deployment of scene information collection area network, the peer-to-peer transmission process of large-scale DVE scene is reasonably controlled, and the node self-localization information data is accurately calculated. In the system, the perceptual range of the node can be overlapped, or even cover the whole mapping area, so as to maximize the efficiency of the starting node, avoid redundant nodes, and reduce system energy consumption[14]. In order to improve the efficiency of system positioning, it is necessary to maximize the coverage of system nodes. Genetic algorithm is used to calculate and deploy the scene peer-to-peer transmission data to reduce the error rate of scene transmission to the greatest extent and avoid overlapping areas[15].

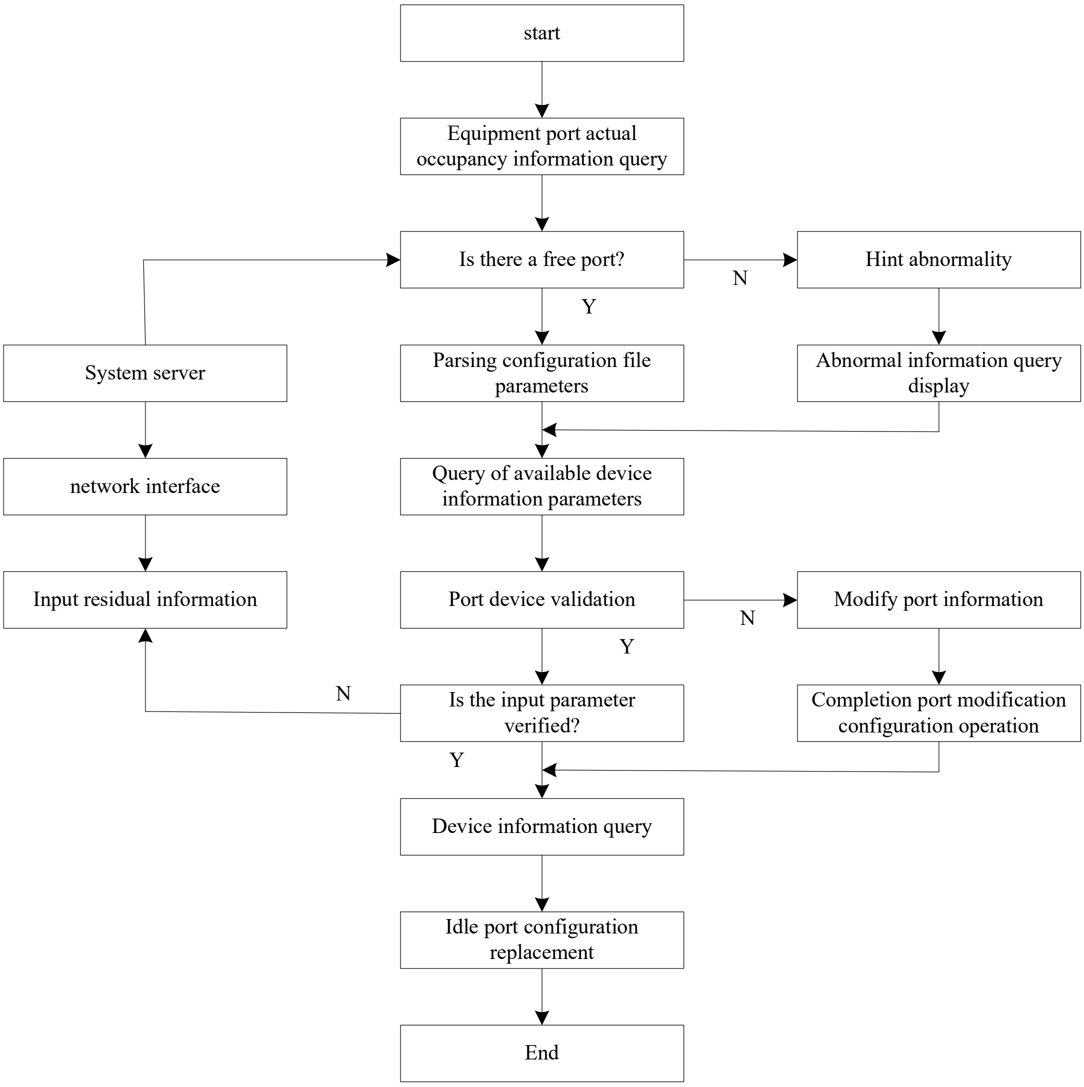

Figure 7. Peer to peer transmission process for large-scale DVE scenarios

2.4. System hardware design

In order to reduce the dependence of the system on the network ports in the hardware platform, a single-port pipelining information transmission mechanism is designed. All communication data are transmitted through the pipeline formed by the connection, and no new connection is created to process the message queue of the scene peer-to-peer transmission. The two ends of the message queue are connected to the application layer buffer respectively. With the basic communication module, the message queue caches both data streams and preprocesses the data. Message queues consist of task queue, queue lock, thread pool and preprocessing chain. In order to ensure the contention of transmission, the system needs to design a thread-safe application buffer, in which the processor connects to the message queue through the application buffer. Application buffers provide thread-safe data caching and exchange data with kernel buffers through message queues. The structure is shown in the diagram.

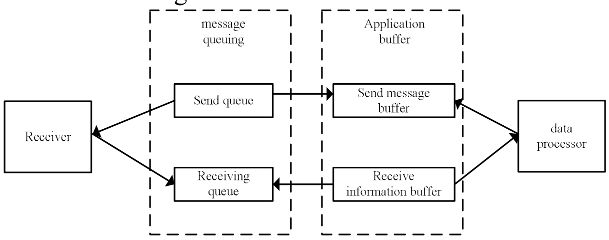

Figure 8. Single port pipelining information transmission mechanism

In order to better accept node mapping connection requests, it is necessary to set up connectors in the system to manage all network connections, detect nodes in the body based on heartbeat mechanism, and manage the list of online nodes, timely recover the related resources of failed connections to ensure the accurate operation of the system.

3. Analysis of Experimental Results

In order to verify the practical performance of the system, a simulation experiment is carried out. After the design of the intelligent power communication operation and maintenance system based on the Internet of Things technology, the functional and non-functional experiments are compared with the traditional flavor system. And in view of the problems in the test, timely modification and improvement. By comparing and analyzing the correctness of the data collected and transmitted by the system, the performance is tested. The detection results of traditional methods and experimental methods are as follows.

As shown in the figure, it is not difficult to find that the accuracy of large-scale DVE scene peer-to-peer transmission system for scene acquisition, transmission and processing in distributed virtual network is much higher than that of the traditional method, and the accuracy of system operation can be effectively improved by 30%. . It fully meets the design goal and greatly improves the efficiency of the system.

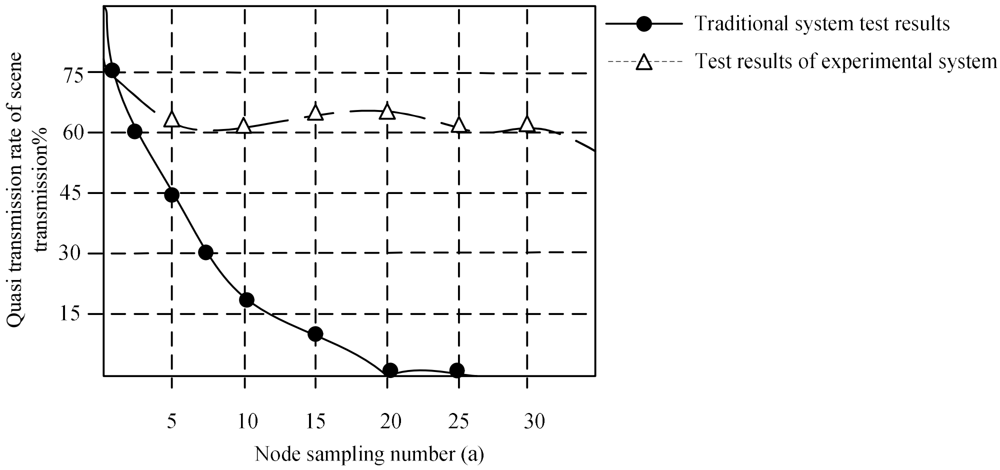

Figure 9. Comparison of correctness of system operation

In order to verify the validity of the system, the transmission time of the traditional scene peer-to-peer transmission system and the transmission time of the large-scale DVE scene peer-to-peer transmission system in the distributed virtual network designed in this paper are respectively detected under the same conditions. Several test points are selected in the location area and the experimental data are recorded. In order to compare the results according to the experimental results, the experimental results are as follows.

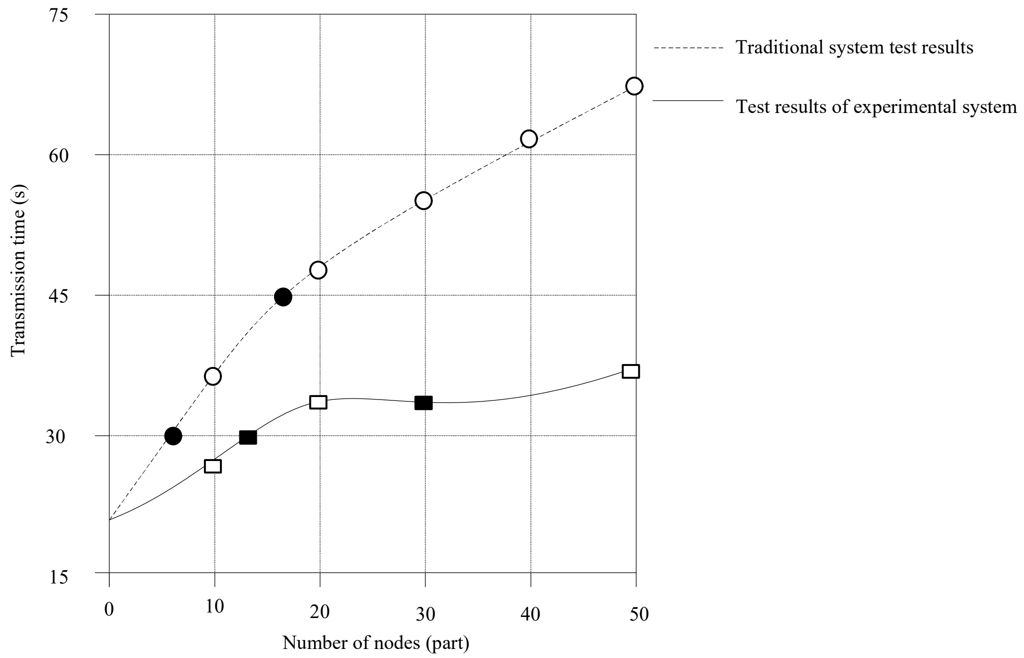

Figure 10. Comparison test of system running speed

According to the above test results, it is not difficult to find that the large-scale DVE scene peer-to-peer transmission system designed in this paper is much faster than the traditional system in transmission time, and can quickly complete the scene peer-to-peer transmission. This proves that the large-scale DVE scene peer-to-peer transmission system in distributed virtual network has more efficient and accurate operation efficiency, the system average error is relatively low, the running time is relatively small, and the information transmission speed is 5-30s higher than the traditional method, which shows that the method has a strong scene transmission efficiency.

4. Concluding Remarks

With the development of MANET, MANET is the next development direction of information transmission system. However, due to the characteristics of mobile ad hoc networks, such as no center, limited network resources and limited node processing capacity, large-scale DVE scene peer-to-peer transmission in distributed virtual networks still needs to be improved. Therefore, the distributed virtual network scene mapping node localization algorithm is used to analyze the process around the characteristics of mobile ad hoc network, optimize the structure of high-density multi-dimensional optical network, and design the peer-to-peer transmission flow of Medium-Large-Scale DVE scene with the method of network node mapping. Finally, the experiment proves that the system has high performance. The system can reduce the dependence on hardware resources, improve the efficiency of scene transmission, and fully meet the design requirements of large-scale DVE scene peer-to-peer transmission in distributed virtual network.

5. Acknowledgment

This paper is a scientific and technological project of Jiangxi Provincial Education Department, DVE Peer-to-Peer Network Transmission: Research on Neighbor Discovery Strategy Based on Interest Behavior (No. 171125).

References

[1] Kambouri N. Digitalising sex commerce and sex work: a comparative analysis of French, Greek and Slovenian websites[J]. Gender Place & Culture, 2016, 23(3):345-364.

[2] Yang Y, Li H, Chen X X, et al. Electro-acupuncture treatment for internet addiction: Evidence of normalization of impulse control disorder in adolescents[J]. Chinese Journal of Integrative Medicine, 2017, 23(11):1-8.

[3] Liu J, Zhou M, Wang S, et al. A comparative study of network robustness measures[J]. Frontiers of Computer Science, 2017, 11(4):1-17.

[4] Yanqing H U, Fan Y, Zengru D I. Orientation in Social Networks[J]. Journal of Systems Science & Complexity, 2017, 30(1):20-29.

[5] Johansen S V, Bendtsen J D, R.-Jensen M, et al. Data Driven Broiler Weight Forecasting using Dynamic Neural Network Models[J]. 2017, 50(1):5398-5403.

[6] Guo Y S, Wang J Q, Xu C, et al. [Study on the immunization status and its influencing factors among workers from the polio

network laboratories in China][J]. Zhonghua Liu Xing Bing Xue Za Zhi, 2017, 38(6):737-739.

[7] Xu X J, Bao J S, Yao B, et al. Reverse Furthest Neighbors Query in Road Networks[J]. Journal of Computer Science & Technology, 2017, 32(1):155-167.

[8] Zhang X. Day-to-day Road Network Vulnerability Identification Based on Network Efficiency[J]. Jiaotong Yunshu Xitong Gongcheng Yu Xinxi/ Journal of Transportation Systems Engineering & Information Technology, 2016, 17(2):176-182.

[9] Poggio T, Mhaskar H, Rosasco L, et al. Why and When Can Deep-but Not Shallow-networks Avoid the Curse of Dimensionality: A Review[J]. International Journal of Automation and Computing, 2017, 14(5):1-17.

[10] Wang K F, Gou C, Duan Y J, et al. Generative Adversarial Networks:The State of the Art and Beyond[J]. Acta Automatica Sinica, 2017, 43(3):321-332.

[11] Liu J, Tang M, Zheng Z, et al. Location-Aware and Personalized Collaborative Filtering for Web Service Recommendation[J]. IEEE Transactions on Services Computing, 2016, 9(5):686-699.

[12] Palmer N D, Goodarzi M O, Langefeld C D, et al. Genetic Variants Associated with Quantitative Glucose Homeostasis Traits Translate to Type 2 Diabetes in Mexican Americans: The GUARDIAN (Genetics Underlying Diabetes in Hispanics) Consortium.[J]. Diabetes, 2016, 64(5):1853-1866.

[13] Li H L, Hu C, Jiang Y L, et al. Pinning adaptive and impulsive synchronization of fractional-order complex dynamical networks[J]. Chaos Solitons & Fractals the Interdisciplinary Journal of Nonlinear Science & Nonequilibrium & Complex Phenomena, 2016, 92(12):142-149.

[14] PANG, Zhonghua, Guoping, et al. Data-Based Predictive Control for Networked Nonlinear Systems with Packet Dropout and Measurement Noise[J]. Journal of Systems Science & Complexity, 2017, 30(5):1072-1083.

[15] Ying K T, Zhang M, Doherty B, et al. Insight from the horsemeat scandal[J]. Industrial Management & Data Systems, 2016, 116(6):978-980.