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Discussion on Continuous Airworthiness and Maintenance of Civil Aircraft

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Abstract: With China's rapid economic development, the civil aviation market's development area has expanded. On this basis, the state has proposed more extensive and stringent civil aviation rules. Many factors can affect the civil aircraft during the real operation process, and this can have an impact on the aircraft's regular functioning to some level. To ensure that civil aircraft remain airworthy, appropriate maintenance work must be performed on a regular basis to prevent compromising the aircraft's safety performance. For the purpose of reference, this paper discusses the continual airworthiness and maintenance of civil aircraft.

Keywords: Civil aircraft; Continuous airworthiness; Repair

Online publication: January 18, 2022

1. Introduction

According to the current state of the civil aviation sector, there have been several flight accidents caused by inappropriate maintenance of civil aircraft both at home and abroad in recent years, resulting in large-scale property losses and deaths. In reality, numerous external factors can have an impact on the functioning of civil aircraft. It is vital to carry out scientific and reasonable maintenance to promote the continuing normal functioning of aircraft in order to improve its performance during operation.

2. Concept of continuous airworthiness of civil aircraft

Civil aircraft airworthiness is a standard that ensures the safety of aircraft while in flight, and it is separated into "initial airworthiness" and "continuous airworthiness." Initial airworthiness means that all parts of the aircraft must be manufactured in accordance with current airworthiness standards at the start of the design process, whereas continuous airworthiness means that after the aircraft has received airworthiness approval from the national department, the entire process from putting it into use to scrapping must be followed, and appropriate maintenance work must be carried out during the application process to ensure the safety and stability of its operation. One of the most significant qualities of a civil aircraft is its continuous airworthiness; that is, the civil aircraft should function normally within the scope authorized by the state, and its parts and design should conform with applicable rules.

3. Maintenance management of civil aircraft

The purpose of maintenance management for civil aircraft is to provide guarantee for the safety and stability of its use process. Under normal circumstances, the maintenance management mainly contains the corresponding technical performance and specific rules, the implementation of maintenance management,

from the manufacturing structure, maintenance methods, principles of use, design principles and other aspects, to carry out scientific and reasonable management. Before carrying out maintenance on aircraft, its use principle should be fully considered first, because maintenance work must run through the whole use process of aircraft, so it is necessary for relevant maintenance management units to carry out regular audit on the repaired aircraft and confirm that the audit is passed before obtaining the certificate of conformity. Only then can the aircraft be reasonably used within the effective range. Therefore, we must actively improve the management effect of continuous airworthiness and the corresponding maintenance level, so as to lay a foundation for the safe application of aircraft [1].

In the process of aircraft application, the natural environment or failure can make it deviate from the airworthiness standard. In this case, the deviation must be corrected in a timely manner by means of maintenance, so as to ensure that the aircraft can be in a normal and stable operation state. Moreover, in the process of aircraft operation, a certain degree of wear is bound to occur, including parts aging, tire wear, etc. all aspects of wear can cause the degradation of aircraft performance, and even directly lead to mechanical failure. Moreover, the longer the aircraft is put into operation, the greater the possibility of failure. At the initial stage of design, the performance of aircraft is completely determined by design and manufacturing, so its quality can have a very important impact on the effect of later maintenance work. Under normal circumstances, the purpose of the design and production of various types of aircraft is to effectively meet a variety of use needs. For different types of aircraft, the maintenance methods applied in the maintenance process are also different. However, during the maintenance, the work shall be carried out strictly according to the aircraft's own performance, so as to promote the timely clarification of airworthiness information, and be able to reasonably design the maintenance scheme according to the actual situation to ensure the good airworthiness of the aircraft.

4. Main contents of continuous airworthiness and maintenance of civil aircraft

On the basis of the continuous expansion of the scale of airlines, the maintenance of civil aircraft is becoming more and more difficult, so it is necessary to appropriately increase the corresponding maintenance investment. Turbofan engine aircraft have the largest application range among civil aircraft. It works on the principle of supplemental energy and fluid energy created by machine rotation. The circulating components primarily consist of a high-pressure compressor, a low-pressure compressor, a high-pressure turbine, a low-pressure turbine, a fan blade, and a combustion chamber, with the high-pressure turbine, combustion chamber, and the high-pressure compressor referred to as the "core engine," which can discharge gas and generate a certain thrust, allowing the aircraft to operate normally.

Overall, the maintenance management system for turbofan engine aircraft is highly complicated, and its airworthiness management is strongly tied to many sectors. It is important to conduct various management and supervision on its airworthiness from a variety of perspectives, including "person, machine, material, technique, and environment." For example, collecting and sorting data is a crucial part of everyday maintenance labor. On this basis, if the maintenance department has difficulties with its job, the airworthiness department can act quickly. Furthermore, when the airworthiness department's maintenance work is finished, it should be inspected at least once to give essential assurance for the aircraft's operation status [2].

4.1. Continuous airworthiness standard

From a technical point of view, the main purpose of airworthiness standard is to provide guarantee for the minimum safety standard in the operation of civil aircraft. Compared with other types of standards, airworthiness standard is a national standard with strong clarity. At present, its corresponding government departments and relevant authorized management departments have put forward corresponding regulations,

and the basis of the regulations is the safety of civil aircraft. Moreover, its corresponding laws and regulations have been incorporated into the maintenance management system of civil aircraft. In this process, in order to effectively ensure flight safety and minimize aircraft operation costs, the formulation of airworthiness standards has specific and pragmatic characteristics, which can facilitate the continuous operation of aircraft. Moreover, the birth background of most airworthiness standards is several previous air accidents, so scientific and reasonable airworthiness standards for civil aircraft are of great practical significance.

4.2. Main maintenance methods

During the maintenance of civil aircraft, reasonable maintenance methods shall be selected according to the actual situation. Generally speaking, the applicable maintenance methods include planned / unplanned maintenance and aircraft flight status monitoring. The above different maintenance methods are based on the corresponding airworthiness standards of turbofan engine aircraft. In particular, maintenance standards such as aircraft flight status monitoring must be based on the aircraft's own flight status and parameters. Only through scientific and reasonable detection of the aircraft can we have a fuller understanding of all aspects of the situation, and if there are problems, they can also be clarified and repaired in time, so as to reduce the flight risk of the aircraft as much as possible. At the same time, planned maintenance is to carry out comprehensive and detailed maintenance for the aircraft within a certain time range to ensure that the aircraft can meet the existing design requirements after maintenance. Planned maintenance usually takes a long time, but the degree of maintenance is relatively deeper. Finally, unscheduled maintenance is mainly applied in case of aircraft failure. Although this maintenance mode has low cost, it has greater risk. Therefore, the maintenance unit needs to reasonably select the maintenance mode based on the actual operation of the aircraft [3].

4.3. Security system

When carrying out maintenance work for turbofan engine aircraft, it shall be comprehensively evaluated according to different technical standards to ensure that the maintenance process, methods and ways are consistent with the corresponding technical standards. At the same time, the maintenance unit shall carry out real-time management and supervision for the maintenance process. In case of failure in the aircraft, the maintenance personnel shall immediately carry out detailed detection. If the maintenance personnel violate the rules in this process, it will affect the continuous airworthiness of the aircraft to a certain extent and may cause safety problems. However, in fact, some staff are prone to negligence during maintenance, resulting in more serious potential safety hazards during aircraft operation. In addition, according to relevant statistics, the proportion of human factors in accidents caused by aircraft has increased significantly in recent years, so the maintenance of civil aircraft is currently carried out. It is necessary to reconstruct and build the corresponding safety system to effectively control human errors in the maintenance process.

4.4. Continuous airworthiness and maintenance management

For maintenance units, they should pay attention to improving their own level of aircraft management and maintenance. Therefore, relevant staff are required to continuously strengthen their theoretical knowledge on civil aircraft safety, promote their professional skills, and regularly carry out education and training. By strengthening the awareness of relevant staff on the significance of the continuous airworthiness of civil aircraft and providing more power for them to carry out in-depth research on the continuous airworthiness of aircraft, relevant staff can effectively avoid mistakes in the work process, and then improve the maintenance quality and the safety of the maintenance process, which can effectively reduce the risk of aircraft in operation. In addition, airworthiness management department also needs to reasonably manage

and supervise the maintenance of aircraft, so as to ensure the continuous airworthiness and flight safety of aircraft [4].

5. Airlines and airworthiness safety

In reality, difficulties in aviation maintenance work include low technical requirements for airline work, which can easily lead to maintenance personnel's neglect during the work process or inability to follow norms and regulations. Simultaneously, regular scheduled maintenance can easily lead to tiredness among important staff, compromising the maintenance impact.

To carry out maintenance management among airlines, first of all, we need to pay attention to the cultivation of airworthiness safety ideology, so that relevant staff can gradually change their work consciousness from initial "want me to be airworthy" to active "I want to be airworthy." At the same time, we also need to take "sustainable airworthiness" as the core, carry out education and training, and effectively implement relevant documents, any mistakes in this work are strictly prohibited. Furthermore, strict management shall be carried out for relevant maintenance personnel. When carrying out maintenance work, the staff must be authorized to work and carry out maintenance operations, and the identity certificates used in the work process must be managed by special personnel and cannot be distributed at will. In the whole process of work, relevant departments need to provide scientific and reasonable supervision and management to ensure the effective implementation of all aspects of work [5].

6. Conclusion

In general, the operation impact of civil aircraft may be influenced not only by ongoing airworthiness, but also to some part by maintenance. As a result, in order to keep civil aircraft in normal operation, it is required to choose a maintenance mode that is appropriate for the aircraft's ongoing airworthiness and maintenance concept. At the same time, maintenance personnel must focus entirely on their own job and strive to improve the safety of the maintenance process as much as possible. In order to successfully increase the continuous airworthiness level and maintenance impact of civil aircraft, relevant departments must provide reasonable monitoring and management during this process.

Disclosure statement

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References

[1] Cui G, 2021, Discussion on Risk Management Strategy in Civil Aircraft Maintenance. (22): 279.

[2] Su X, He Q, Zhang B, et al., 2020, A Comprehensive Maintenance Platform for Civil Aircraft Brake Device, CN210210316U[P].

[3] Li Z, Zhang W, Jiang S, 2019, Analysis of Qualitative Risk Assessment Method for Continuous Trial Flight of Civil Aircraft. Science and Technology Innovation Herald, 16(07): 20-21.

[4] Xiao J, Huang C, Liu Y, 2019, Research on Continuous Airworthiness of Domestic Civil Helicopter. China Flights, 000(013): 1-3.

[5] Huang F, 2021, Analysis on Pilot Work of Aircraft Maintenance Professional "N+1" License Training Model. (10): 87-89.

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Thoughts on the Emergency Guarantee of Library Electronic Resources in the Post-Pandemic Era

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Abstract: In the post-pandemic era, libraries need to improve the emergency support of electronic resources and establish a relatively perfect electronic resource support system in order to adapt to the construction goal of the national emergency system as well as realize their own transformation and development. It must be realized through enhancing awareness and planning, strengthening policy support and top-level design, realizing rapid response and intelligent response, improving technical support, promoting resource synergy, integration, and sharing, strengthening community integration, as well as providing intelligent management and services.

Keywords: Electronic resources; Emergency guarantee; Collaborative integration; Sharing of resources; Intelligent management and services

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1. Introduction

What is needed in emergencies is not only the information resources in key emergency areas. In view of the outbreak of COVID-19 in the later part of 2019, adults and children can only stay at home during that period. However, when class stops, learning cannot stop. From education and teaching to various scientific research activities, as well as e-government, public propaganda, and other fields need libraries to provide electronic resource services. All libraries responded quickly, strengthened the integration and provision of electronic resources, and did a lot of information resource emergency support for online teaching, scientific research, academic and government decision-making, think tanks, and so on during the epidemic. However, the ecological development of the library's own electronic resource system is imperfect, especially in the post-pandemic era with the normalization of prevention and control. Traditional literature resources and space services have lost their advantages. How the library should transform and develop is worthy of in-depth study.

The General Office of the State Council issued the *National Emergency Response System Construction "13th Five-Year Plan"* in 2007. The construction goal is to comprehensively strengthen the emergency support ability, improve the social collaborative response ability, and further improve the emergency management system. In 2020, it was pointed out that the fight against COVID-19 should focus on both scientific research and material production. Under this social background, libraries urgently need to improve their emergency service mechanism, establish a relatively perfect electronic resource guarantee system, improve the emergency guarantee ability of electronic resources, and provide services for teaching as well as scientific research in emergencies.

2. Improving the emergency support capacity of electronic resources

An accepted definition of emergency support capability is that it is the comprehensive application of organizational system, emergency plan, technology, resource guarantee, and social mobilization in response to emergencies [1]. Based on previous research, it is believed that the emergency support ability of library electronic resources should be a perfection based on the relationship among the subjects, environment, and resources in the supply chain. It includes resources, system platform, network infrastructure, talent cultivation, mechanism, etc. The work of library electronic resources includes the purchase and collection of electronic resources, reserve and application, integrated supply, management service, supervision and evaluation, etc. The library's emergency support capability should closely focus on the supply chain and related work of electronic resources as well as strengthen the coordination and integration of electronic resources, intelligent management and service, technology, platform, as well as personnel.

In the post-pandemic era, as the organizer, coordinator, manager, and service provider in the emergency electronic resource supply chain, the library is limited by adverse conditions, such as the decrease in resource construction funds, the proliferation of online users, the improvement of requirements for technology and facilities, etc. Converting the adverse conditions into favorable conditions and actively adapting to the environment are very important. Only by combining the specific requirements of national prevention and control as well as grasping the main factors can a powerful electronic resources emergency support system be established. Specifically, it is a trinity system with system guarantee, main structure, and emergency service centered on the construction and guarantee of electronic resources [2]. The framework of the electronic resources emergency support system constructed in this paper is shown in **Figure 1**. In this system, all social forces, including the government, enterprises, libraries, communities, and individuals, need to play a role in order to achieve an orderly and efficient emergency management. In terms of libraries, it is necessary to strengthen accurate procurement, development, and integration of electronic resources, optimize service content, as well as improve remote service ability. It is also imperative to upgrade the intelligent management service platform, realize metadata cross system sharing, big data processing, knowledge discovery, and knowledge link, in addition to actively carry out alliance cooperation as well as collaborative integration and sharing of information resources based on the electronic resource supply chain.

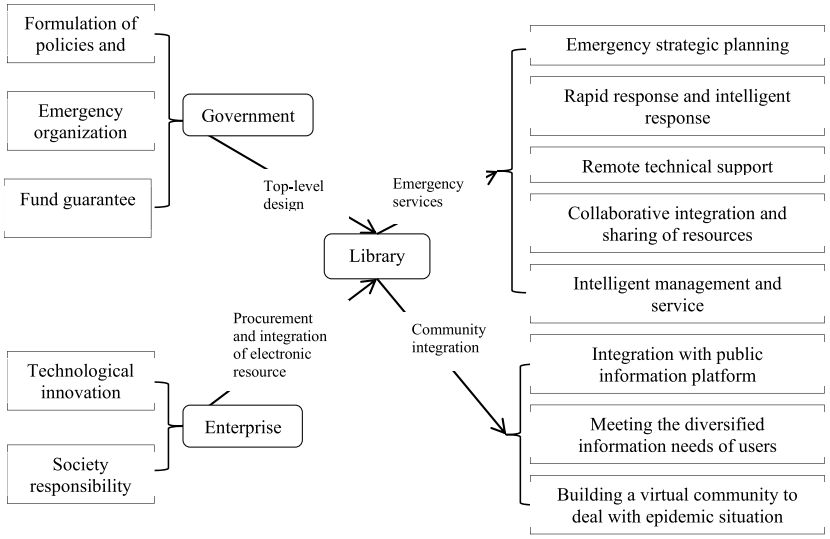

Figure 1. Framework of the library resource emergency support system

3. Realizing rapid response and intelligent response

In the post-pandemic era, in order to improve the response to emergencies, libraries need to improve the

rapid response and institutional response to emergencies, form the concept of normalized emergency support, strengthen the awareness of risk prevention and safety, as well as build a flawless emergency support and management system. Strengthening the revision of relevant laws and regulations, policies, systems, strategic planning, and emergency plans needs to be carried out from multiple levels: at the government level and the library level.

3.1. Measures at the government level

In the *Law of the People's Republic of China on Public Libraries (2018)* and the *Regulations on Libraries of Ordinary Institutions of Higher Learning (2015)*, there are several provisions and contents related to the library's handling of emergencies and pandemic prevention. Emergency protection measures were lacking for all libraries in the face of COVID-19. The contents and standards of online services were not uniform, and the network security and public opinion management were not experienced. The main body of collaborative emergency management should be the government. The relevant state organs should formulate laws, regulations, and articles according to the characteristics of the library to standardize the standards and requirements of emergency support services. Local governments should carry out overall design from a top-level perspective and establish perfect emergency guarantee mechanism, linkage mechanism, and information sharing mechanism [3], which include emergency organization setting, fund management, monitoring and early warning, information submission, as well as emergency plan [3]. It is also necessary to strengthen the cooperation of organizations inside and outside the library, establish an emergency information service platform, improve the effectiveness of emergency linkage, promote the rapid concentration and use of important electronic resources at home and abroad, as well as strive for resources to reach the grid community.

3.2. Measures at the library level

Firstly, libraries should formulate an emergency support service system and clarify the objectives, tasks, key contents, organizational structure, and coordination mechanism of emergency support service through the system [4]. As an important task, resource emergency support is included in daily work deployment and future development planning. In addition to the daily preparation, training, and drill of emergency work process (emergency plan), as well as the reserve and guarantee of resources, it is also necessary to be forward-looking, ensure strategic thinking, and formulate strategic planning for emergency management of electronic resources. The content of the plan should be integrated with the sustainable development goal, which not only needs to improve the quality of electronic resources, but also to deepen the application [5]. It includes business architecture, application architecture, data architecture, technical architecture, etc. [5]. It is also necessary to build and improve a cross domain collaborative electronic resource intelligent service platform, integrate knowledge resources distributed in different systems, allocate resources scientifically and reasonably, as well as establish an effective resource discovery mechanism and recommendation mechanism relying on the service platform and information environment [6]. Other than that, it is imperative to actively participate in and develop knowledge sharing and academic open access resources at home and abroad. Under the guarantee of security mechanism, open data will be processed to build a knowledge base and think tank for the integration of public data and government data.

As the emergency management gradually develops in the direction of data, intelligence, and even ecology, the emergency support work of the library needs to realize the intelligent decision-making of experts, joint and coordinated response, intelligent management and service, as well as assume measures according to the crisis level. The libraries should provide users with electronic resources with more openness, timeliness, stability, standardization, intelligence, and other characteristics, as well as use multi-source data and accurate analysis to study and reduce the uncertainty of dealing with various emergency

problems [7]. Only in this way can we adapt to the new characteristics of emergency management modernization and the new technical process of electronic resource intelligent management.

4. Improving technical support

During the crisis period, only through reform and innovation can we rise from adversity. In dealing with emergencies such as COVID-19, all libraries should take advantage of various emerging technologies to promote the infrastructure support of electronic resources, enhance the technical support capability of remote services, as well as expand the mode and content of remote services. Libraries should realize the integration of remote services and library intelligent services as well as apply information technologies and methods, such as big data, artificial intelligence, virtual reality technology, knowledge discovery, digital humanities, and knowledge atlas, to create an intelligent service platform as well as enhance service innovation and ability extension. In the pandemic era, grid services and precision services are needed by readers [8], so more emphasis should be on user demand mining and root tracing as well as mine knowledge context; in addition, new social tools should be introduced to enable users to obtain the best experience. The library should also become an example of resource sharing, fully absorb the available resources from the outside with an open and innovative attitude, share cloud technology, create seamless connection between institutions, open related data, strengthen data management and monitoring, as well as improve the technical application and function of the library.

Many libraries have launched mobile library applications, and some libraries are actively using social media channels to create interactive and social spaces with service characteristics. More and more flexible and secure products (including cloud-based products), which attract users, are being developed. In order to give better play to their own advantages, libraries need to integrate the open environment and surpass the open environment under the new technology environment. They also need to have close contact with institutions and communities, assume the role of a hub and intermediary of digital skills and information retrieval services, as well as maintain the mainstream status of cultural information in the whole society.

5. Promoting collaborative integration and sharing of resources

Under the background of big data and intelligent emergency, the collaborative integration and sharing of resources is an important content of the library emergency support system. Libraries play an important role in the existing information resource sharing system. Regional document information resource sharing and joint service is an important aspect of China's information service [9]. It mainly takes the lead in cross system and cross regional sharing with the document guarantee system of provincial university libraries or carries out collaborative services based on the large database platform to obtain literature contents that have not been ordered by libraries, so as to achieve "openness" and sharing of literature resources to the public. However, the cooperative service mechanism of library information resource sharing is flawed. A wide range of services, such as interlibrary loan and electronic resource sharing, have not been implemented by university libraries across the country [10].

In the post-pandemic era, it is also necessary to establish a system platform for collaborative integration and sharing of information resources based on the electronic resource supply chain, take user needs as the starting point, and establish a multi-party collaborative mechanism, in which libraries, enterprises, institutions, users, and other subjects become a community of interests, constantly carry out technological innovation, and promote the optimization as well as the upgrading of resources. This kind of resource co-construction and sharing service system, which is highly shared and responsive, gives full play to the advantages of all parties and realizes the integration of resource collection, storage, integration, retrieval, service, supervision, as well as management, can promote the improvement of the overall value of the system.

6. Strengthening community integration

In the face of public health emergencies, libraries should have a sense of social responsibility to provide services for social stability and development. Libraries must strengthen the capacity-building of social linkage and community integration. On the one hand, based on cloud computing, the data resources, platforms, technologies, services, and even the interests and cultures of different libraries and scientific research institutions are integrated to form collaborative governance decentralization. Through cloud services, they can integrate with social knowledge networks and public information platforms, integrate public data with government open data, as well as realize the comprehensive upgrading of the information system ecological chain. On the other hand, libraries should actively meet the diversified needs of the society, support the reading needs of the public, and provide access to public information as well as emergency psychological counseling. The library can provide competitive intelligence service for the scientific and technological innovation of small and medium-sized enterprises as well as provide online learning for residents, job training, information tools, and technology training. By actively participating in the government's information engineering and infrastructure construction, libraries can vigorously popularize information connectivity and digitization. Libraries should also use social media channels to build a virtual community service network and platform, enhance community communication and cooperation, give full play to the role of virtual community in emergency management, as well as mobilize the backbone of the community to participate in resource construction and consulting services.

7. Providing intelligent management and services

According to a survey, from the pandemic outbreak in early 2020 to the current pandemic prevention and control stage, various libraries across the country have made efforts to offer several emergency support services, as shown in **Table 1**.

Table 1. Emergency support services offered by the library

"Cloud loan and purchase" as well as other intelligent services	Electronic resources remote services to support teaching and research
Online lectures and training	Provide information reference for government decision-making and think tanks
Shuxiang anti-epidemic online reading service	Thematic information collection, integration, and push
Emergency service product development and service	Build virtual communities and carry out social services

In the post-pandemic era, anyone can be a library user. Libraries should establish contact and cooperation with everyone. Intelligent management is to manage resources, data, and users through cloud infrastructure. It uses big data to drive the ecological interaction between all parties [11], realize more accurate knowledge analysis and organization, accurately match resources and knowledge services, establish users' action preference and prediction by using the geographic information system (GIS) and user data mining, as well as carry out hierarchical services according to the specific conditions of users. It actively and pertinently pushes information and knowledge services, such as medical treatment as well as learning and scientific research.

The intelligent management and service of the library depends on the ability of librarians. In emergency conditions, libraries should quickly establish a professional online service team, shift from collecting resources to compiling resources, and then to promoting services [12]. In emergencies, librarians of library electronic resources should have the ability to effectively communicate with internal and external audiences

and help users solve practical problems. Therefore, they should pay more attention to the application of internet technology as well as master the theoretical and practical knowledge of electronic resource access, hardware, and software. They should be familiar with relevant laws, digital tools, digital standards, and relevant initiatives [13]. They should master more cutting-edge discipline knowledge, develop skills to solve professional and complex problems, and meet the personalized needs of users.

Disclosure statement

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References

[1] Yan P, et al., 2011, Research on Connotation and Evaluation Index System of Traffic Emergency Support Capacity. Logistics Technology, 30(6): 19-21.

[2] Zhao F, Analysis Framework and Action Paradigm of Library Public Crisis Governance. Library Development, 1: 1-15.

[3] Wei D, et al., 2020, An Expert's Talk on Library Emergency Service in Major Public Security Emergencies. Library Journal, 39(3): 4-18.

[4] Yuan Q, Chen X, 2020, COVID-19 Response Strategy for "Double First-Class" Construction University Libraries in Wuhan. Library and Information Service, 64(15): 4-11.

[5] Li C, Xin X, 2019, Research on Establishment of Ecosystem Model for Optimal Deployment of Electronic Resources. Library Work and Study, 2019(6): 86-92.

[6] Guo L, Liu C, 2016, Research on Government Emergency Information Resource Planning Based on EA in big Data Environment. Journal of Information, 2016(06): 171-176.

[7] Jiang X, Zhu X, 2020, Think Tank Emergency Intelligence Service Based on Government's Big Data Capabilities: A Case Study of COVID-19 Prevention and Control. Library & Information, 2020(3): 64-74.

[8] Lv C, 2020, Analysis on the Construction of University Library Emergency Service System under Emergencies – A Case Study of "Double First-Class" University Libraries Responding to COVID-19 Outbreak. Library Work and Study, 2020(12): 116-122.

[9] Song J, Shao F, 2020, Investigation and Analysis of Public Library Emergency Services under Major Security Emergencies. Journal of Academic Library and Information Science, 38(05): 13-20, 37.

[10] Liu P, Tian Z, 2021, Analysis on Intelligent Service Strategies of University Libraries in the Post-Epidemic Era. Library Work and Study, 2021(10): 105-109.

[11] Wang J, et al., 2020, Research on Intelligent Technology Fusion Mechanism of Collaborative Governance of Intelligent Libraries in the Era of Algorithms. Library, 2020(1): 53-58, 87.

[12] Cai Y, Wu Z, 2020, Emergency Guarantee System of University Library Information Resources. Library Journal, 39(05): 43-54.

[13] Fu R, 2020, Application and Analysis of the American Standard of "Core Competence of Electronic Resource Librarians". Library Development, 2020(3): 131-136.

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Security Application of 5G Technology in Industrial Internet

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Abstract: The application of internet in the industrial field has become an inevitable trend in modern society. In the actual operation, there are possible safety risks. To ensure the system's proper operation, technicians are required to resolve the issues. In this context, the author thoroughly integrated with the present industrial development situation, examined the use of 5G technology in industrial internet security, and desired to leverage the advantageous benefits of 5G technology to boost industrial development. Due to the numerous benefits of 5G technology in security applications, we conducted an in-depth investigation and described it from the perspectives of relevant concepts, security, and security application guarantee measures, with the goal of achieving the goal of safe industrial internet operation.

Keywords: 5G technology; Industrial internet; Safety; Application measures

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1. Introduction

The rapid development of communication technology, which has pushed the application of 5G technology to the forefront of society and is increasingly replacing 4G communication technology, has resulted in an indissoluble tie between China's diverse areas and information technology. In reality, the benefits of 5G technology in several industries exceed the downsides, therefore researchers are expanding research and development of this technology, and various fields are also attempting to integrate or improve 5G technology in order to fully use the technology's capabilities. The combination of 5G technology and this industry is even more inevitable from the perspective of industrial development. Relevant personnel should improve safety management and gradually enhance the use of this technology to ensure not only that the speed of industrial development does not stall, but also that the whole industrial field develops.

2. 5G technology and industrial internet

In the modern era, 5G technology is also known as the fifth-generation mobile communication network. It is not only important for national economic development and cultural success, but it is also one of the future trends in information technology development. The use of this technology in a variety of sectors can help to eliminate data transmission problems and irrational system planning. Furthermore, the use of 5G technology may enhance wireless transmission and network efficiency to the fullest extent possible, as well as fix problems in the industrial internet quickly and without disrupting work flow.

3. Security analysis of 5G application in industrial internet

3.1. Equipment

Sensors, instruments, and radio frequency identification, as well as other devices, are all used in the operation of the industrial internet. In comparison to typical industrial equipment, industrial internet terminal equipment has intelligent characteristics, and certain equipment can recognize different operating states and perform logical operations. The networked operation of industrial equipment is more comfortable, and equipment networking has grown more versatile, thanks to the present 5G backdrop. With the "intelligence and flattening" growth trend, the 5G technology of the industrial Internet should perform a good job in access authentication management in the future to prevent network intrusion in advance [1].

3.2. Data aspect

Due to the incredible pace with which information technology is developing, the data created will increasingly transition from a limited amount of single data to a large number of multi-dimensional data information. At the same time, essential data information will flow in both directions, within and outside the plant, between the Information Technology (IT) layer and the Operational Technology (OT) layer. In the industrial field, business applications are more sophisticated, data kinds and protection needs are more diverse, and data flow direction and course are more complicated. Not only does the network need to be reliable and fast, but the complexity of protecting industrial data and users will also rise dramatically. Based on the current 5G environment, internet applications in the industrial field can minimize data transmission delays by placing MEC nodes at the factory's edge, therefore enhancing the security of internet data. As MEC nodes are located near the factory's edge deployment, the capital investment in protection capacity is smaller than in traditional computer room protection, posing a danger to data security and increasing risk. Furthermore, network slicing may be utilized to provide data isolation in the present 5G environment, which will improve the security of various forms of data information, and slicing security will have a big influence on data security [2].

4. Security application guarantee measures of 5G in industrial internet

4.1. Clarify application requirements

Before applying 5G technology to internet security management in the industrial field, relevant personnel must be able to comprehend the industrial field's development and security demands, and plan work around what they've learnt. When the industrial internet's security requirements are demonstrated, they may improve the internet's security management efficiency and control relevant operations. There are various needs for industrial internet security in the new era, which are most commonly expressed in the building of cloud or service-oriented infrastructure, security context management solutions, and security anchor separation. At this time, internet security management must be carried out in accordance with the appropriate regulations. Relevant employees must examine diverse security demands and optimize various measures under various situations to guarantee that internet security needs in the industrial field are more acceptable, and that industrial internet security management is stronger.

4.2. Organizational safety framework

Before conducting internet security management, relevant personnel of the enterprise need to consider the actual operation of 5G technology, do a good job in the security architecture of the industrial internet in advance, play a systematic role, better apply the industrial internet, carry out security work, summarize the problems in the practical application of the industrial internet and solve the problems as soon as possible, so that the security of industrial internet can be controlled. In order to further improve the level of internet security architecture in the industrial field, we need to strengthen 5G technology to ensure the security

service effect of the industrial internet, so that the management and control can be practical, and the industrial internet can be safely managed under the security requirements of operators, so that the staff can meet the basic conditions, it can realize the repeated authentication of industrial internet to ensure the safety problems in work. Under the application of the internet security architecture in the industrial field, it can also provide multiple guarantees for different work businesses, and appropriately increase the supervision of comprehensive operation. If internet security problems occur from time to time in the industrial field, based on this support, the problems can also be solved at the first time.

4.3. Take dynamic monitoring

When monitoring the safe operation of the internet in the industrial field, staff need to ensure that relevant personnel have a sufficient understanding of security procedures and specific needs. In order to further improve the application efficiency of internet security, it is necessary to strengthen the application of 5G technology so that it can play a role in security monitoring, which will effectively reduce the difficulty of security monitoring and ensure that operators and managers can have a deeper understanding of the performance and causes of security problems in a short time. Then, we can solve different problems with the transmission function of 5G technology, optimize various problems, minimize the probability of security problems, and ensure that the scope of 5G technology in Internet security application can be expanded. The application of network technology and related systems to monitor the application of the internet in the industrial field can also more clearly display the relevant information of the monitoring results. At the same time, it can also strengthen the operation of the industrial internet, moderately increase the transmission of information, and enable different departments to further optimize the security problems under the condition of fully mastering the basic requirements through guidance

4.4. Strengthen control

Since there are many factors to be considered during the application of internet security management in the industrial field, the relevant personnel of the enterprise should pay attention to controlling the possible problems during management. In this context, enterprise managers or relevant personnel can control the security application of the internet in combination with the actual application of 5G technology to minimize the risk, so as to ensure the security management of the internet in the industrial field and improve the level of comprehensive development. In the process of applying 5G technology to control the security of industrial internet, the staff should first understand and be familiar with the principle and application of 5G technology, be able to solve the problems in practical work, realize efficient control, and eliminate the possible security problems. Ensure the security of industrial internet and the transmission effect of different types of information data within our ability [3]. Generally speaking, different types of obstacles may be encountered in the practical application of industrial Internet for security control. At this time, it is necessary to give full play to the advantages of 5G technology and reasonably control the strength of industrial Internet security control, so that the security and stability of the internet can be maintained and guaranteed, promote work progress and continuously improve the development level of the industrial field, and enhance the information supervision effect of industrial products.

4.5. Maintain safe operation

The industrial field covers a wide array of project content, which raises the probability of issues in the process, which will have a greater direct influence on the industrial field's development level and social standing. As a result, with the help of 5G technology, the enterprise's staff can maintain the operation of the industrial internet, enhancing the effect of the internet system in the basic information of each work in the industrial field, preventing various problems caused by insufficient basic information in the process of

work development, and providing a more substantial basis for the industrial field's subsequent development. Of course, using 5G mode in the industrial internet can help to avoid common security issues, ensure the security and stability of various basic information transmissions, and manage industrial internet security with the help of various data, highlighting the safe use of 5G in the industrial internet. At the same time, the 5G network should be used to ensure the safety of industrial internet operations. At the same time, 5G should increase its practical function, ensuring the safety effect of industrial internet and reducing the difficulty of safety management in the operation of industrial internet, taking into account the current state of industrial development [4].

5. Conclusion

The development and implementation of 5G technology is now the prevailing trend. To ensure deep integration of this technology with the operation of the industrial internet and to further ensure safety and stability, we must not only realize efficient management of the industrial internet, but also strengthen the application of 5G technology to ensure the safety of the industrial field under the application of 5G technology, and control faults with problems within the minimum range. Simultaneously, relevant professionals should continue to research the integration of 5G technology and industrial internet in order to increase internet security and innovation, as well as encourage the better growth of China's industrial sector. In short, staff and managers should improve the existing problems of the industrial internet, further improve the security management level of the industrial internet, and promote the sound and rapid development of the industrial field.

Disclosure statement

The author declares no conflict of interest.

References

[1] Bei H, 2021, 5G World Within Reach - 20000 Square Meters Exhibition Hall Comprehensively Presents the Technological Progress and Product Innovation of 5G Whole Industry Chain. China Convention and Exhibition, (17): 42-45.

[2] Cheng W, 2021, China Unicom: Powering "5G + Industrial Internet" to Enable Industrial Transformation and Upgrading. People's Posts and Telecommunications, (001).

[3] Song X, 2021, Security Analysis of industrial Internet platform Based on 5G Technology. Jiangsu Communication, 37(04): 117-118.

[4] Wang Y, Xu L, Zhang M, Ge R, 2021, Security Capability and Scenario Solution of "5G + Industrial Internet". Communication World, (16): 45-48.

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Cognitive Analysis of Auditory Temporal Sequence Information Difference Based on Network Switching

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Abstract: Auditory sense is an important way for people to receive and interact with foreign information. In different environment, the auditory sense changes. Therefore, it is necessary to find a detection method that can detect hearing in a timely manner. In this paper, EEG experiments were used to construct and compare brain functional networks in different states, and auditory state models were constructed with different auditory input signals. Secondly, the cross-correlation method is used to slice the signal and construct the adjacency matrix. Louvain community detection algorithm is used to process the data and calculate the network conversion rate under different parameters. It is concluded that the network conversion rate can be used to analyze the temporal variation of auditory information under the condition of controlled parameters. This indicates that the network conversion rate can also be used as a method to analyze auditory signals in the future.

Keywords: Brain functional networks, EEG, Network switching, Auditory signals

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1. Introduction

The human brain is an extremely complex system. For any task, multiple functional brain regions need to coordinate and work together to achieve it. At the end of the 19th century, the scientists of the day theorized that each brain region (composed of neurons) has only a specific function. On this basis, the brain is regarded as a network, the structural or functional regions of the brain are taken as nodes, and the correlation characteristics between nodes are taken as edges to analyze the behavioral performance of the human brain through the features of this brain network. People divide the brain into multiple regions according to their functions. However, human behaviors and conscious behaviors are not determined by a single region but rather, realized by the cooperation of multiple regions of the whole brain. The brain also realizes information interaction through the interconnection between various regions and clusters of work. Therefore, the analysis of the human brain network can provide a new method for research work to better understand the multi-region cluster working mode of the brain from a global perspective. In some clinical trials on neurological diseases, the brain network analysis method showed good performance in the diagnosis and treatment of diseases. Progress has been made in the early detection and diagnosis of epilepsy, schizophrenia, depression, and Alzheimer's disease. Through the analysis of the brain network map, the abnormal state of neurological diseases in the brain network is explored, and abnormal network topological indicators in the disease state are sought for diagnosis and intervention.

In 1978, Naatanen and other researchers proposed and confirmed that an auditory evoked potential component induced by a "deviation" stimulus randomly appearing in a repeated "standard" stimulus sequence is a differential wave between two stimulus responses induced by auditory changes of 100 ~ 250 ms, which is known as a mismatched negative wave (MMN) [1]. MMN can objectively reflect the brain's automatic processing of sensory information, especially auditory information. As an electrophysiological indicator of the brain's sensory information processing, MMN has great application potential in cognitive neuroscience and clinical diagnosis. At present, it is difficult for most of the auditory information detection to detect in a timely and effective manner, so a real-time detection method is needed. Since auditory feedback will appear in the brain, it is possible to conduct differential research on auditory temporal information by collecting changes in the brain information characteristics.

Multilayer network analysis is a new graph theory model. In this model, network nodes are connected in time and space [2]. Previous studies on cognitive tasks have shown that multilayer modularization and network switching have inherent neurobiological basis in multilayer network analysis, but the dynamic relationship between network switching and functional connection time series, as well as the relationship between network switching time series and network connections and complexity remain unknown.

The audio clips used in this paper are comprised of 333 Hz sinusoidal waves modulated by different signal amplitudes. The frequency of the periodic signal is used to imitate different music speeds. The frequency range of the modulated signal is from 2.3 Hz to 2.9 Hz, and the music speed range covers from 123 BPM to 164 BPM. There are altogether 14 types of audio clips. The beat consists of an envelope of asynchronous Hanning window functions in the modulating signal. After the audio clips were made, two were selected as audio stimuli for an experiment. There are two types of audio stimuli, one that has constant music speed and the other with varying music speed. A total of 21 audio stimuli were used twice per clip.

In this paper, based on the collected audio clips, EEGLAB was used for independent component analysis to separate the blind source signals and complete the pre-processing of the collected data. Then the brain networks in both states were studied. The two kinds of data were analyzed from the time domain. Based on existing studies, the important parameter module degree in Louvain algorithm was taken as the characteristic parameter of the brain network to explore the objective test index for effectively judging different audio signals.

2. Methods

2.1. ICA data preprocessing

Independent component analysis (ICA) was performed on the collected data using EEG to remove the artifact. The purpose of ICA is to find out the independent parts that constitute the signal and correspond to the analysis of higher-order statistics. Based on the "virtual channel" of spatial transformation, it analyzes the linear changes of data in a single-channel scalp [3]. In EEGLAB, ICA is mainly used to separate blind source signals. Blind source separation is the separation of the source signal from the noise when the source signal and the noise are mixed or unknown. The ICA algorithm is as shown in **Table 1**.

Table 1. ICA algorithm

Input: Observational data X
Output: Independent component Y
1: Centralize the observed data X
2: Whiten the observed data X
3: Initial unmixable matrix W
4: While W does not converge to do
5: $Y \Leftarrow WX$
6: $\Delta W \Leftarrow \eta(I - \Psi(Y)Y^T)W$
7: $W \Leftarrow W + \Delta W$
8: end while
9: $Y \Leftarrow WX$
10: return Y;

2.2. Pearson correlation coefficient matrix

Cross-correlation can measure the linear correlation between any two different time values of signals. From the perspective of time domain, this paper chose the cross-correlation method, namely sliding time window analysis based on Pearson correlation coefficient. The time window size is set as T, and s as the time point. The Pearson correlation coefficient of electrode X and Y is as follows:

$$r_{XY,s} = \frac{\sum_{t=1}^{T}(X_s[t] - \overline{X_s})(Y_s[t] - \overline{Y_s})}{\sqrt{\sum_{t=1}^{T}(X_s[t] - \overline{X_s})^2}\sqrt{\sum_{t=1}^{T}(Y_s[t] - \overline{Y_s})^2}} \tag{1}$$

$Xs[t]$ represents the EEG signal of the t node in the time window of electrode X at time node s. $\overline{x_s}$ represents the mean of all EEG signals in the time window of electrode X at time node s. For each time point, an adjacency matrix with weighted undirected network can be obtained. If the total number of time nodes is set as N, a multi-layer adjacency matrix with weighted undirected network $W = (W_1, W_2, \ldots, W_n)$ can be obtained.

2.3. Louvain community detection algorithm

Louvain community detection algorithm is a graph algorithm model based on turn-by-turn heuristic iteration optimization of module degree, which detects the best community by maximizing the module degree Q of each layer [4]. This algorithm can quickly and effectively divide large networks into communities and has high precision. It can identify hierarchical community structures more effectively. Louvain algorithm is divided into two steps (**Figure 1**).

Step 1 is the maximum modularity division. Through each node as a community, calculate the node at the same time from the node to join other communities after the change of the degree of module Q, and record the biggest ΔQ; if $max\Delta Q > 0$, the biggest distributing the node ΔQ the neighbor nodes in the community, otherwise remain unchanged. This is repeated until the community to which all nodes belong to is no longer changing.

The second step is community consolidation. All nodes in the same community are compressed into a new node. The weight of edges between nodes in the community is converted into the weight of rings of new nodes, and the weight of edges between communities is converted into the weight of edges between new nodes. Step 1 is then repeated until the entire module degree does not change.

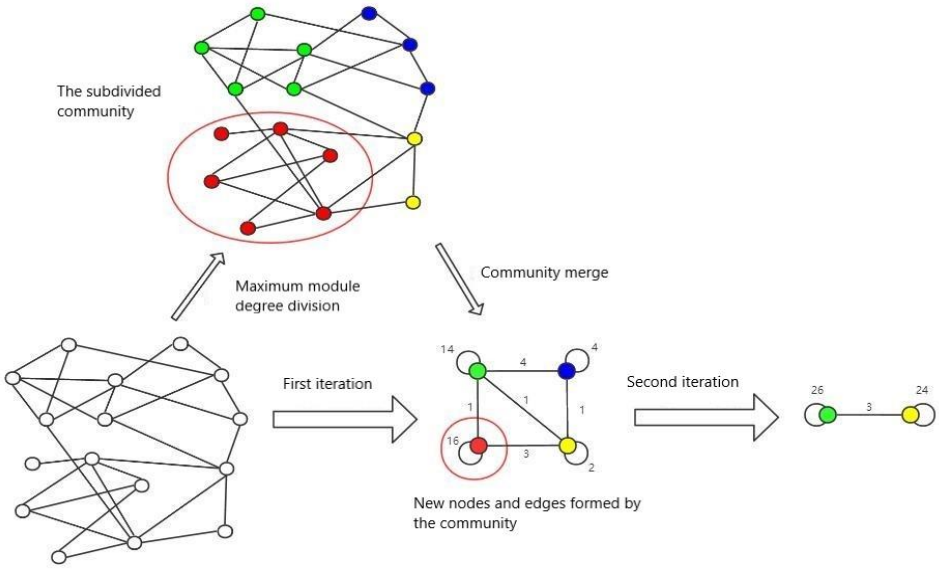


Figure 1. Schematic diagram of Louvain community detection algorithm

2.4. Network conversion rate

The conversion rate of brain networks is defined as the maximum degree of modularity when the community detection algorithm converges after many iterations. Modularity, whose physical meaning is the difference between the number of edges of nodes in the community and the number of edges in random cases, is a commonly used method to measure the strength of network community structure. As proposed by Mark Newman, it is defined as follows:

$$Q = \frac{1}{2m} * \sum_{ij} \left[A_i j - \frac{k_i * k_j}{2m} \right] \delta(C_i, C_j) \tag{2}$$

A good community is closely connected internally, but sparsely connected externally. The larger the module degree, the better the corresponding community division. The value range of modularity is set between 0 and 1, controlled by the parameters γ and ω. Among them γ refers to the network topology strength, while ω refers to the multilayer network connection strength between each layer [3]. The calculation formula of multilayer module degree Q is as follows:

$$Q(\gamma, \omega) = \frac{1}{2\mu} \sum_{ijsr} [(A_{ijs} - \gamma_s \frac{k_{is} k_{js}}{2m_s}) \delta(M_{is}, M_{js}) + \delta(i, j) \omega_{jrs}] \, \delta(M_{is}, M_{js}) \tag{3}$$

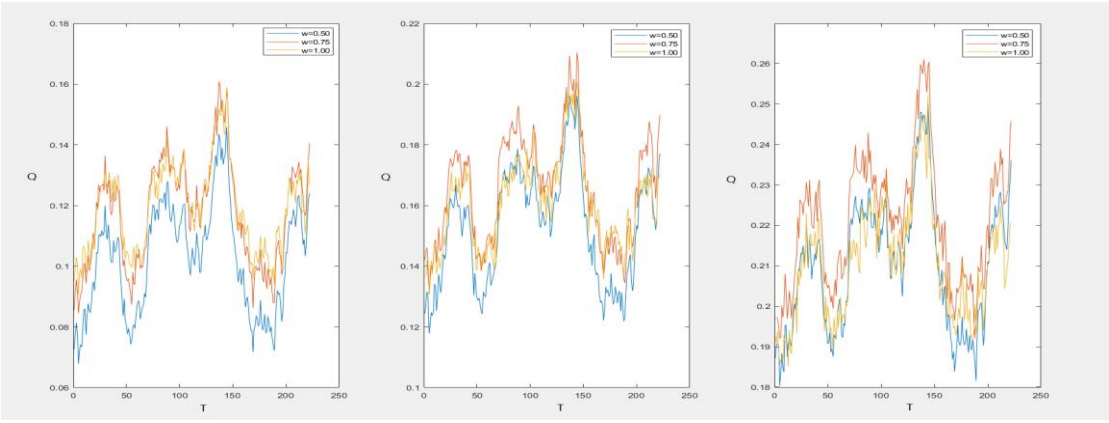
In formula (3), A_{ijs} represents the edge weight between node i and node j in the brain network at time node S. k_{is} represents the weights and of all edges connected to node i in the brain network at time node S. m_s represents the k value and of all nodes in the brain network at time node S; M_{is} represents the community to which node i belongs in the brain network at time node s; $\delta(M_i, M_j)$ and $\delta(i, j)$ are used to determine whether M_i and M_j, as well as i and j belong to the same community, if 1, or 0. As the multilayer network used in this experiment belongs to the time series network, the values of all time nodes and network nodes y and w are the same.

Take a time window and set its size as I. At time point S, for multilayer network A, there is its multilayer network $SubAs = (A_s, A_{s+1}, \ldots, A_{s+I-1})$ in the time window, and substitute $SubAs$ into A in the above formula to obtain the module degree Q_s of the sub-network, namely the conversion rate Q_s of multilayer network A at time point S. Sliding the time window, the time-based conversion rate vector $Q = (Q_1, Q_2, \ldots, Q_n)$ of the

multi-layer network A can be obtained.

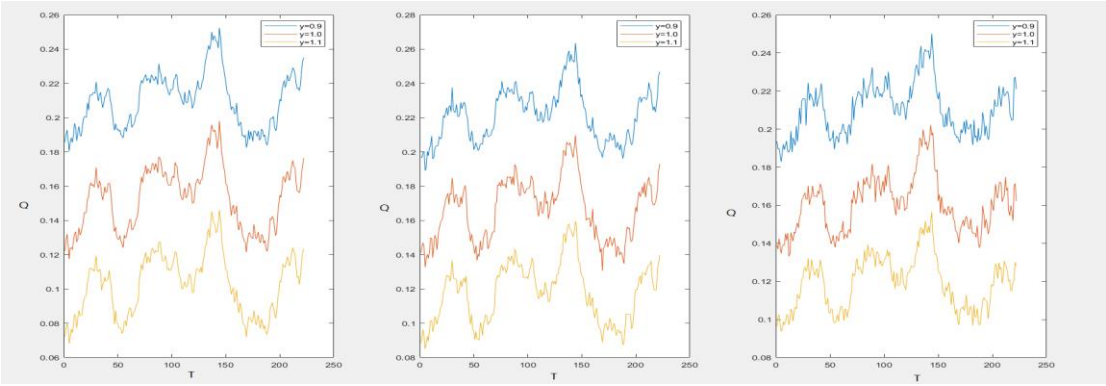
3. Results and analysis

Based on the results of Pedersen and other researchers [5], the data time length selected in this experiment was 1000 ms, with a total of 250 nodes at a sampling rate of 250 Hz. After pre-processing, the data were averaged by stacking, and then calculated by using the cross-correlation method based on Pearson correlation coefficient. The sliding time window was set as 5 (20 ms) to generate the correlation coefficient matrix. The value in the matrix was an absolute value, and thresholding operation was carried out by using ozu threshold. The network window size was set to 25 (100 ms), and according to the combination of different control parameters y and w, network conversion rate Q of all normal music speed audio and music speed varying audio was calculated according to the method described above. Among them, $y \in \{0.9,1,1.1\}$, $\omega \in \{0.5,0.75,1\}$.



(a) $y = 1.1$ (b) $y = 1$ (c) $y = 0.9$

Figure 2. Same y, different w at the same time, conversion rate curve contrast



(a) $w = 0.9$ (b) $w = 1$ (c) $w = 1.1$

Figure 3. Same w, different y at the same time, conversion rate curve contrast

Figure 2 and **Figure 3** will be the conversion rate vector in time order to curve out, from which it can be seen that the main effect of the parameters y and w on the conversion rate is the value taken, in the same multilayer network, the conversion rate and y value as a whole is negatively correlated, while w value as a whole is positively correlated. The overall trend of the conversion rate curve is less influenced by y and w.

4. Conclusion

Cognitive computing research provides an important reference for the construction of brain-like artificial intelligence technologies and methods. Using cognitive computing methods to improve existing artificial intelligence technologies and differentiated analysis from auditory cognition can broaden the direction of emotion recognition. With auditory attention and psychological mood as the main research subjects, through the Pearson correlation-based brain network, using the Louvain algorithm, the proposed network conversion rate as a new feature for emotion recognition, and the proof that this method exhibits better universality, the emphasis can be on people's psychological mood for effective identification. In addition, other features such as node degree, clustering coefficient, and centrality are combined to classify, which can better identify the difference in the impact of music with different rhythms on people's emotions.

Disclosure statement

The authors declare no conflict of interest.

References

[1] Naatanen R, Gaillard AW, Mantysalo S, 1978, Early Selective-Attention Effect on Evoked Potential Reinterpreted. Acta Psychol (Amst), 42(4): 313-329.

[2] Bassett DS, Porter MA, Wymbs NF, et al., 2013, Robust Detection of Dynamic Community Structure in Networks. Chaos: An Interdisciplinary Journal of Nonlinear Science, 23(1): 013142.

[3] Yang F, Hong B, Tang Q, 2000, Independent Component Analysis and Its Application in Biomedical Engineering. International Journal of Biomedical Engineering, 2000(3): 129-134.

[4] Blondel VD, Guillaume JL, Lambiotte R, et al., 2008, Fast Unfolding of Communities in Large Networks. Journal of Statistical Mechanics: Theory and Experiment, 2008(10): P10008.

[5] Pedersen M, Zalesky A, Omidvarnia A, et al., 2018, Multilayer Network Switching Rate Predicts Brain Performance. Proceedings of the National Academy of Sciences, 115(52): 13376-13381.

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Reference citations in the text should be numbered consecutively in superscript square brackets. Some examples:

1. Negotiation research spans many disciplines [3, 4].
2. This result was later contradicted by Becker and Seligman [5].
3. This effect has been widely studied [1–3, 7].

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Journal

Journal article (print) with one to three authors

[1] Yao Y., Xia B. Application of Phase Frequency Feature Group Delay Algorithm in Database Differential Access. Computer Simulation, 2014, 31(12): 238-241.

Journal article (print) with more than three authors

[2] Gamelin F.X., Baquet G., Berthoin S., et al. Effect of high intensity intermittent training on heart rate variability in prepubescent children. European Journal of Applied Physiology, 2009, 105: 731–738.

Journal article (online) with one to three authors

[3] Jackson D., Firtko A., Edenborough M. Personal resilience as a strategy for surviving and thriving in the face of workplace adversity: a literature review. Journal of Advanced Nursing, 2009, 60(1): 1–9,

Journal article (online) with more than three authors

[4] Hargreave M., Jensen A., Nielsen T.S.S., et al. Maternal use of fertility drugs and risk of cancer in children—A nationwide population-based cohort study in Denmark. International Journal of Cancer, 2015, 136(8): 1931–1939.

Book

Book with one to three authors

[5] Schneider Z., Whitehead D., Elliott D. Nursing and midwifery research: methods and appraisal for evidence-based practice. 3rd edn. 2009, Elsevier Australia, Marrickville, NSW.

Book with more than three authors

[6] Davis M., Charles L., Curry M.J., et al. Challenging spatial norms. 2013, Routledge, London.

Chapter or Article in Book

[7] Knowles M.S. Independent study. In Using learning contracts. 1986, Jossey-Bass, San Francisco, 89–96.

Others

Proceedings of meetings and symposiums, conference papers

[8] Chang S.S., Liaw L. and Ruppenhofer J. (eds). Proceedings of the twenty-fifth annual meeting of the Berkeley Linguistics Society, February 12–15, 1999: general session and parasession on loan word phenomena. 2000, Berkeley Linguistics Society, Berkeley.

Conference proceedings (from electronic database)

[9] Bukowski R.M. Prognostic factors for survival in metastatic renal cell carcinoma: update 2008. Innovations and challenges in renal cancer: proceedings of the third Cambridge conference. Cancer, 2009, 115 (10): 2273, viewed 19 May 2009, Academic OneFile database.

Online Document with author names

[10] Este J., Warren C., Connor L., et al. Life in the clickstream: the future of journalism, Media Entertainment and Arts Alliance, 2008. viewed 27 May 2009, http://www.alliance.org.au/documents/foj_report_final.pdf

Online Document without author name

[11] Developing an argument n.d., viewed March 30 2009, http://web.princeton.edu/sites/writing

/Writing_Center/WCWritingResources.htm

Thesis/Dissertation

[12] Gale L. The relationship between leadership and employee empowerment for successful total quality management. 2000, University of Western Sydney.

Standard

[13] Standards Australia Online. Glass in buildings: selection and installation. AS 1288–2006. 2006, SAI Global database.

Government Report

[14] National Commission of Audit. Report to the Commonwealth Government, Australian Government Publishing Service, 1996, Canberra.

Government report (online)

[15] Department of Health and Ageing. Ageing and aged care in Australia, 2008, viewed 10 November 2008, http://www.health.gov.au/internet/main/publishing.nsf/Content/ageing

No author

[16] Guide to agricultural meteorological practices. 2nd edn, Secretariat of the World Meteorological Organization, 2010, Geneva.

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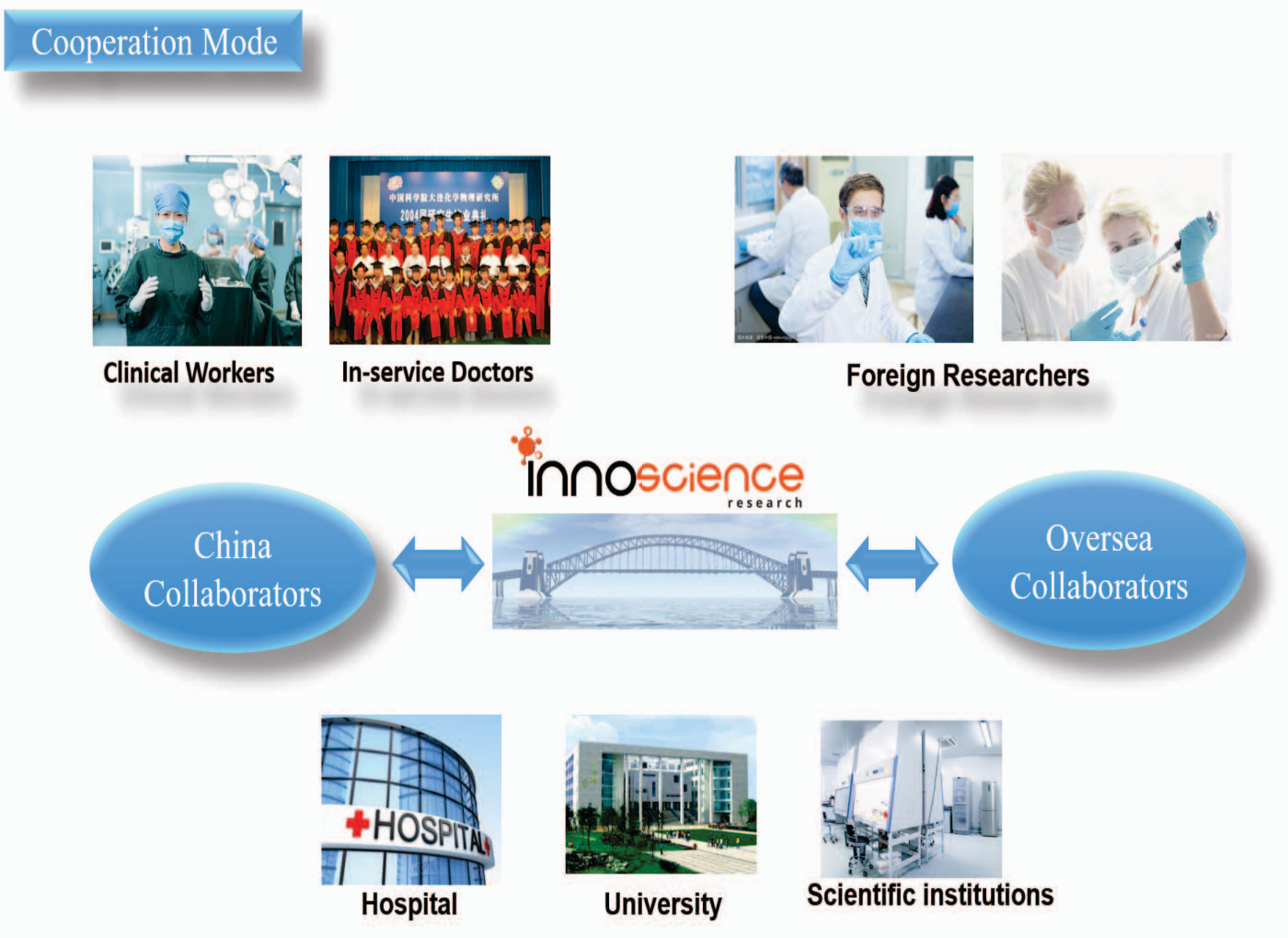

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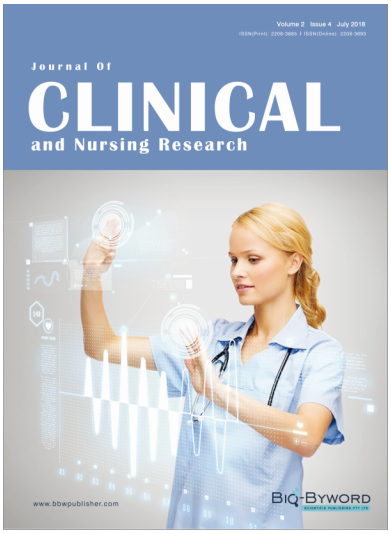

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