Received November 14, 2019, accepted November 27, 2019, date of publication December 4, 2019,
date of current version December 23, 2019.

Digital Object Identifier 10.1109/ACCESS.2019.2957579

Research on Data Mining Application of Orthopedic Rehabilitation Information for Smart Medical

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ABSTRACT Due to the small scale, low technical level, and limited scope of application of artificial intelligence in the field of traditional Chinese medicine orthopedics, there are many problems in the development of this area. Driven by precise and minimally invasive medical concepts, the integration of artificial intelligence and data mining technologies (such as the Internet, cloud computing, and big data) will further profoundly change the face of smart healthcare in the future, which will bring great challenges to traditional Chinese medicine orthopedics, and Change opportunities for your own development. In order for artificial intelligence to provide good diagnosis and treatment services for a large number of patients with orthopaedic diseases, progress still needs to be made with the technology and joint efforts of many orthopaedic experts and scholars. This article uses data mining techniques to optimize orthopedic rehabilitation information. Test results show that the system is faster and more convenient. Artificial intelligence technology will be used for intelligent medical treatment of orthopedic diseases in the future. It will become an essential assistant for clinicians and make a significant contribution to the diagnosis of various orthopedic diseases.

INDEX TERMS Artificial intelligence, TCM, orthopedics, smart medical care, data mining.

I. INTRODUCTION

The rigid demand for medical services in China is constantly expanding, and the medical resources are relatively insufficient [1]. To this end, various government departments have actively studied and introduced relevant policies to promote the development of Internet medical care. In recent years, a number of regions have emerged in the country to provide online services such as online appointments, waiting for reminders, price-based payment, medical report inquiry, and drug distribution, and actively explore Internet-based medical services such as medical extensions and electronic prescriptions [2]. Based on the Internet, providing patients with one-stop health management services will optimize the traditional diagnosis and treatment model [3]. With the further development of medical standards, people have put forward higher requirements for medical and health care, but due to the deterioration of the ecological environment, people's health has seriously damaged. Especially children, because of their lack of self-protection awareness, the incidence of illness is high [4]. Under this circumstance, the growth rate of medical diagnostic data has increased significantly, resulting in a serious shortage of medical resources. The diagnostic data formed during the diagnosis of the doctor and the patient's request for medical services also recorded, and the internal correlation between the data is tight. Medical data is the value obtained by doctors' diagnosis, records, statistics, etc. These data can be used in medical research, auxiliary diagnosis, verification, decision-making and other processes. Medical data is also expressed in a variety of forms, including symbols, languages, and images. For these large and complex data, we must pass data analysis to get useful information. Data analysis is the process of finding information from data, that is, the process of extracting information from data. In this process, we can use mathematical methods or non-mathematical methods to establish data-to-information mining conversion.

China's medical and health system is moving from clinical informationization to regional medical and health informationization [5]. The emergence of Smart medical technology has met the needs of the people concerned about their own health. The potential application of Smart medical can help hospitals realize intelligent medical management of objects [6], [7]. The need for monitoring and other aspects solve the problems of weak medical platform. China's artificial

The associate editor coordinating the review of this manuscript and approving it for publication was Yongtao Hao.

intelligence industry, which has developed rapidly in recent decades, has ushered in a comprehensive planning and comprehensive guidance at the national level, and artificial intelligence technology has applied to various industries [8]. So, what is the development prospect of artificial intelligence technology in China's medical industry? How is it applied in the field of orthopedics? What kind of challenges will it bring to Chinese medicine orthopedics? This article intends to explore these issues. Because of the formation of the concept of health service system, data information can obtain information content with useful value, and provide necessary protection for the development of medical work. With the goal of ''Internet + Smart Health'', the construction of a regional health information platform will comprehensively strengthen based on the health information network and the health information network [9], [10]. The aim is to improve the level of information application, serve the people, and strengthen the integration of medical and health data, which create a smart medical system with a focus on ''medical and healthy peers and benefiting people's services'' [11].

Smart health care reflects the ''patient-centered'', ''resident-based,'' and ''administrative-supported'' medical and health concepts, and realizes residents through deeper intelligence, more comprehensive interoperability and more thorough perception. Building a national health system based on ubiquitous life-cycle medical services and public health services [12]. This paper proposes the application research of orthopedic rehabilitation information data mining for smart medical treatment. By constructing a regional medical information platform based on the resident orthopedic rehabilitation archives, the most advanced Smart medical is used to integrate existing health information resources [13]. Orthopedic rehabilitation information is a highly integrated medical supervision. Most of the current research results on the evaluation of doctors' treatment records rely on manual statistics. This method is not only inefficient, but also error-prone. The doctor's preoperative and postoperative diagnostic results are extracted from a large number of diagnostic results, and the consistency of the diagnostic results before and after the doctor's operation is analyzed and verified by the intelligent matching algorithm.

Specifically, this article contributes to the following innovations. In the first part of this paper, the research status of orthopedic rehabilitation information and data mining are introduced. Smart health care is discussed. The application of Smart medical can help hospitals realize intelligent medical management of objects.

In the second part of this paper, a commonly used method for IOT is proposed. The Smart medical architecture is given below.

The rest part organized as follows. Section III described the data mining application of orthopedic rehabilitation information for smart medical care. Section IV shows the test results and test GUI. Finally, the application prospects of smart medical and data mining are summarized in Section V.

II. RELATED RESEARCH AND THEORETICAL BASIS

A. MEDICAL INTERNET OF THINGS

In recent years, with the new medical reform's key investment in information technology and the gradual development of regional medical systems, medical informationization has attracted a large number of domestic enterprises to participate in competition, especially large software enterprises with comprehensive brand advantages in the IT industry. In addition to the advantages of traditional medical informationization such as Donghua Software, Neusoft Group and Weining Software, UFIDA Software and other companies have also established subsidiaries to increase their access to the medical information market. At the same time, the M&A pages in the industry have increased accordingly. According to the service type and node of the Smart medical, Smart medical architecture is given as below [14]. The perception layer is the skin and facial features of the Smart medical. Access layer incomes users mainly include health administrative personnel, health business personnel and the public. From the way of access, it can meet the health network, Internet access, etc. When users use the functions provided by the platform, they can use motion detection sensors, medical equipment, PCs, mobile terminals, PDAs, cards, cameras, electronic tags, and barcodes. Network layer realizes the full coverage of all hospitals, community health service and rural service stations, deep extension, support multiple ways to query the end. They transfer all business with subordinate medical and health units to medical care The health private network is placed on the external network for external use through border access. It mainly adopts three access modes: operator coordination, private line access, and Internet access via VPN (Virtual Private Network).

The application of cloud computing technology in hospital information system, the application of desktop cloud terminal mode, and the advantage of cloud platform to solve the problem of information island in hospital information system, thereby improving the utilization rate of information hardware equipment, reducing costs and realizing sufficient resources.

The Wisdom Medical Application Service Platform is mainly composed of the Wisdom Medical Public Access Platform. It builds a user-centered integrated resident health service system through the resident health self-service portal, and monitors the whole process of residents' health status, disease development, and rehabilitation. Personal electronic health records/electronic medical records can also be obtained through mobile terminal devices such as mobile phones, to achieve daily medical consultation and health and medication reminders. The service platform layer mainly includes a smart cloud service platform and a smart cloud data center. The smart cloud service platform is an integrated platform for the medical industry. It completes the data collection, exchange and integration and health institutions by means of services. By providing a unified basic service, the ''health records are the core, based on electronic medical records,

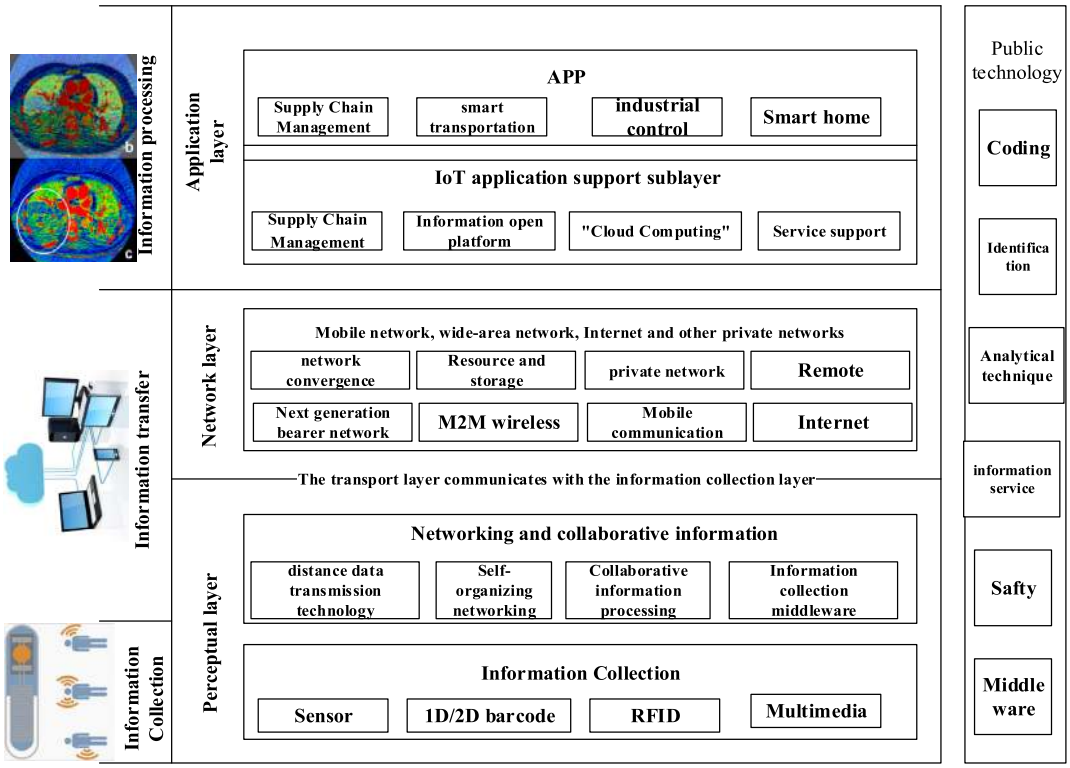

FIGURE 1. The architecture of IoT.

chronic diseases''. Smart Cloud Data Center is built on the premise of the establishment of a unified core data framework based on national standards. It can complete the convergence and integration of relevant information of medical institutions and support the sharing of residents' health information. At the same time, through the mining and analysis of massive medical data, assist managers to make effective decisions.

The basic support system is mainly composed of an operation support platform and basic equipment. The operation support platform is in the position of connecting and supporting. It consists of two parts: one is the basic middleware, which provides resource virtualization middleware, application service middleware, database middleware, and the other is the running support service, which realizes the Orthopedic rehabilitation through downwards. Organic integration, providing cloud computing and cloud storage functions, solving centralized management of distributed resources and decentralized service of centralized resources, effectively supporting various types of perceived resources and data to achieve service-oriented on-demand aggregation applications, supporting the analysis and processing of high-performance massive data. The basic device layer mainly includes servers, storage devices, switches, and the like.

The Orthopedic rehabilitation platform is mainly composed of a smart sensing layer and a medical private network. Among them, the smart medical sensing layer involves different kinds of sensors and sensing gateways to realize the identification of medical objects and the collection of medical resources. The medical network mainly adopts three access modes: operator coordination, private line access, and Internet access via VPN. At the same time, the transmission and unified management of the entire smart city network is realized while fully considering the issues of integration, sharing, and security with other areas of the smart city.

The application layer is on the system framework and is customized for different application levels and occasions according to actual needs to form different modules or systems. It mainly includes health record management, telemedicine services, health service portal, public health service, operation management, comprehensive inquiry, basic medical services, supervision and management, report analysis and so on. The IoT hierarchy is shown in Figure 1.

B. SMART MEDICAL

To achieve six synergies among doctors and patients, doctors and nurses, large hospitals and community hospitals, medical and insurance, medical institutions and health management departments, medical institutions and drug management, and gradually build a smart medical service system [14]. The application of smart medical care in China is mainly reflected in medical and health services, medical product management, medical device management, telemedicine and distance education. Most of them are in the pilot and initial stage. In terms of remote intelligent medical care, domestic development is relatively fast. For example, real-time recording, transmission, and processing of medical record information, patient

information, and medical information can be realized [17]. In general, China is in the stage of the first and second stages of development to the third stage, and has not yet established a true clinical application system CPOE. The development of smart medical care and big data in various regions has presented a multi-level systematic development pattern, and initially formed four categories: application first zone, characteristic application zone, preliminary application zone, and development start zone.

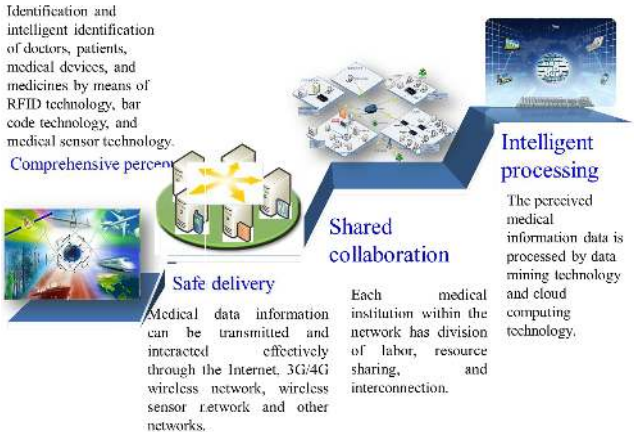

FIGURE 2. The development direction of smart medical care.

Medical big data can improve the efficiency of medical services. China's medical data is fragmented. The integration and management of medical data is a trend. Medical data is accelerating and accumulating, and higher requirements are placed on storage and management. Figure 2 shows the development direction of smart healthcare. The medical cloud platforms of various types in China are comprehensive in layout and rich in layers. In the main body and operation mode, a good situation of government-enterprise cooperation and market operation has also formed. The construction of China's smart medical cloud platform is mainly supported by three major databases. The six major business applications are gradually forming a four-level regional population health information for the country, province, prefecture, and city.

C. MEDICAL DATA MINING

The difference between medical data mining and other mining areas is partly due to the different characteristics of the original data. Medical data is obtained in the diagnosis and treatment of patients, including conversations with patients, pictures taken with various medical instruments, and doctor's observations. Human beings are the most concerned species on Earth, and some aspects of their observations are difficult to obtain in other animal studies, such as vision, hearing, perception of pain, discomfort, and hallucinations [18], [19]. Medical data mining is the most rewarding but difficult in all bioinformatics data mining. Animal experiments are generally short-term, so it is not possible to follow-up observation of long-term effects, such as the efficacy of atherosclerosis, the direct use of human medical data does not use animal

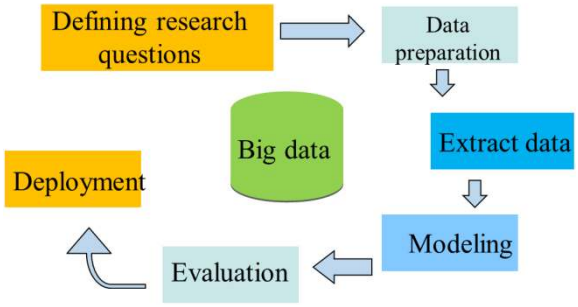

FIGURE 3. The DM hierarchical application of big data.

experiments to speculate on the problems caused by human medical treatment [20]. Data mining is one of the effective ways to organize and store data today, but in the face of ever-expanding data, database query technology shows its limitations. Facing the massive data in computers, the lack of means is a communicational knowledge about objective facts. Knowledge is a concept, a rule, a pattern, a law, etc., not as specific as data or information, but people have been relentlessly pursuing goals. Figure 3 shows the DM hierarchical application of big data.

Data mining technology is well suited for use in the medical field. The data patterns that can be mined are concept description, frequent patterns, classification/ prediction, cluster analysis, outlier analysis, and evolution analysis. Artificial neural network artificial neural network algorithm is an algorithm that imitates biological neural network [21]. The model is based on artificial neurons as the basic unit of computation, and the network is formed by the interconnection of neurons. Typical neural network models are mainly divided into three categories, which include perceptron, BP (Back Propagation) model, and functional network [22]. Medical data is incomplete, uncertain, and inaccurate. The neural network is an intelligent computing method that imitates human neurons. It can intelligently process nonlinear, incomplete, indeterminate, and inaccurate data. Therefore, the neural network has good fault tolerance, robustness, and high precision in processing medical data, and can meet the accuracy requirements of medical data mining models.

III. DATA MINING APPLICATION OF ORTHOPEDIC REHABILITATION INFORMATION FOR SMART MEDICAL

A. OVERALL FRAMEWORK

According to the overall framework of population health information, this paper designs the ''health cloud platform'' architecture. Build a ''medical cloud'' to cover all community health service in the new district. The construction of ''public health cloud'' to complete the integration of basic public health services, including disease control, health supervision, maternal and child, dental defense, eye defense and so on [23]. ''Cloud Application'' integrates with the regional health information platform to achieve a balanced integration of health and health big data, providing residents with full

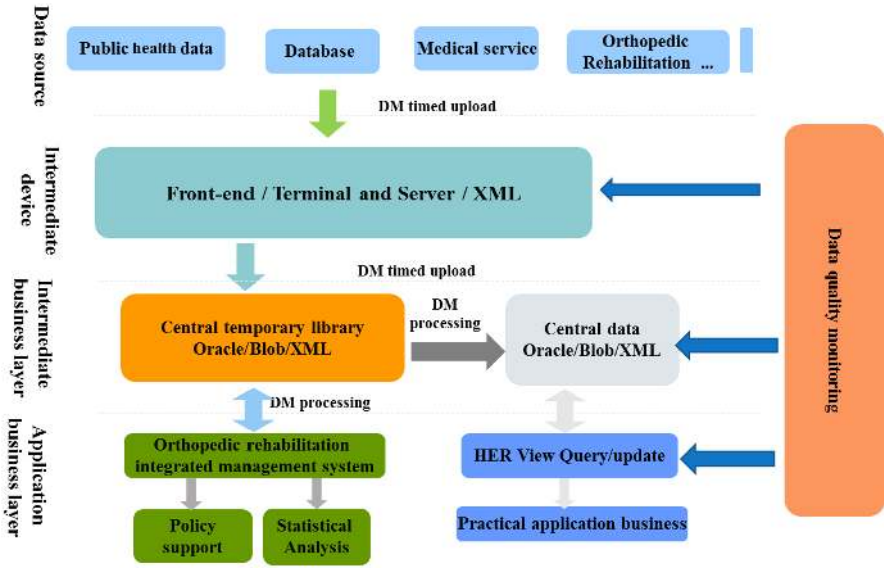

FIGURE 4. The traditional orthopedic rehabilitation platform system architecture.

life cycle prevention, treatment, rehabilitation, and health care. Traditional orthopedic rehabilitation platform system architecture and Integrated service is shown in Figure 4.

At the same time, in order to realize ''Internet + smart medical care'', the medical care of residents improved in the new district. The platform not only realizes the standardization construction of ''Internet + smart medical care'' in the whole district, but also reduces the cost of independent construction of medical and health institutions. It is also conducive to the supervision of health administrative departments. In the future, based on the medical health cloud platform, a health care big data mining application cloud platform will be established, and big data and artificial intelligence technologies will be used to study health medical big data in assisted clinical diagnosis, intelligent guided medical guidance, image-assisted diagnosis, preventive health care, and health.

B. APPLICATION OF MEDICINE ORTHOPEDICS

Data mining with orthopedics aims to mine hidden and useful undiscovered knowledge from a large amount of raw data., models, etc., to help decision-makers find potential connections between data and identify factors that are difficult to artificially discover [24]. Data mining includes descriptive and predictive data mining, both based on attributes or dimension generalization. Chinese medicine data mining is an important part of modern Chinese medicine digital engineering. As a part of traditional Chinese medicine, TCM orthopedics contains a large number of traditional Chinese medicine practitioners who have internal and external use. In traditional Chinese medicine orthopedics research, prescription is the basic prescription of traditional Chinese medicine [25]. Each Chinese medicine prescription is directed to a certain type of orthopedic disease and is treated with a specific therapeutic mechanism. The traditional Chinese medicine orthopedics prescription contains tens of thousands, using data mining technology to extract the commonality and characteristics of prescription data through artificial intelligence.

It can store classic prescriptions, and can excavate new practical prescriptions that conform to the role of traditional Chinese medicine, and promote the development of traditional orthopedic prescriptions. Image processing and pattern recognition technology are important components of artificial intelligence. Image processing is to convert specific image information into a specific digital matrix and store it in a computer system. Certain intelligent algorithm transforms the image transformed into a suitable machine. Image recognition is the study of the computer to process a large amount of physical information, thus replacing part of the human brainwork. At present, there are many kinds of image processing and recognition systems, but the specific operation process can be summarized as: information acquisition → image processing → data extraction → pattern recognition. In clinical practice, clinical image information can be obtained in a variety of ways, such as direct image capture, optical microscopy, or electron microscope zooming, etc., and then the image information is digitized by computer and then transmitted to the image data processing [26]. The system applies computer data processing capabilities to analyze images and pattern recognition, and finally outputs various indicators to assist clinical diagnosis and treatment according to requirements.

Traditional Chinese medicine emphasizes hope, smell, question, and cut. Among them, the clinician uses the vision of the clinician to conduct a purposeful observation of the human body, color, shape, state, facial features, tongue image. As part of traditional Chinese medicine, orthopedics also emphasizes the importance of information collection such as

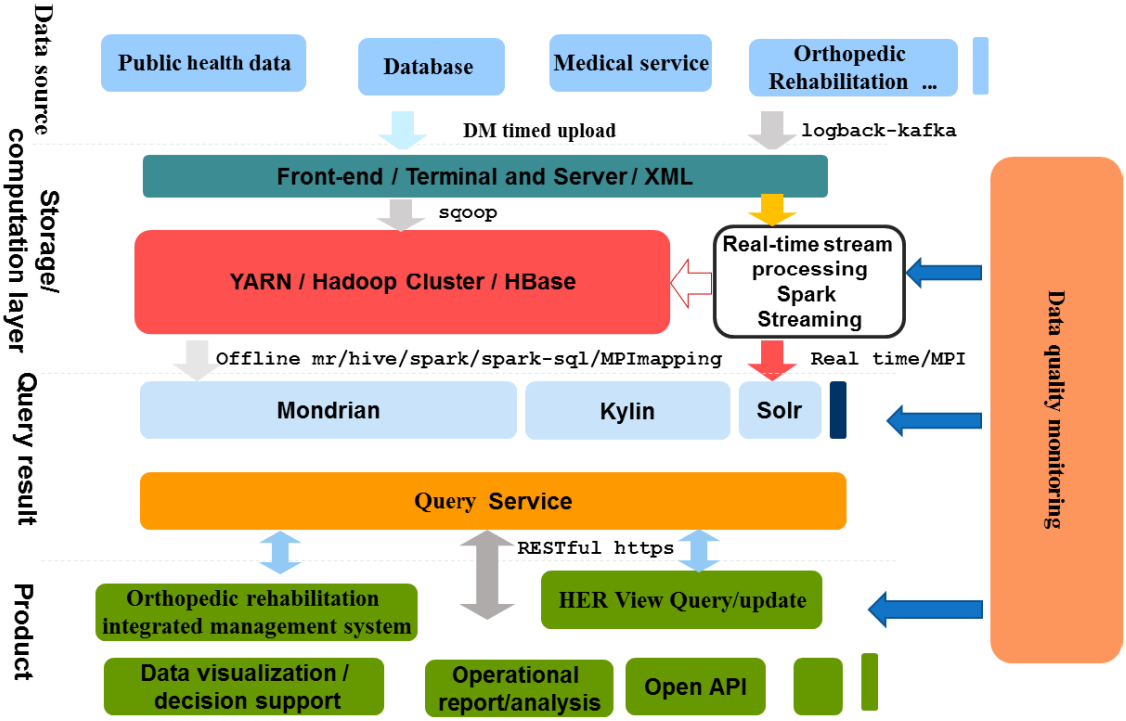

FIGURE 5. The orthopedic rehabilitation platform technical architecture by DM.

clinical symptoms and signs. Guided by the theory of TCM clinical syndrome differentiation and treatment, combined with image processing and pattern recognition technology, the patient's general appearance, lesion location and nature can be understood through the holographic imaging of the patient or the information required by the expert to obtain the "expectation" through remote imaging. The degree of injury, the rise and fall of the five internal organs, and the severity of the disease. Medical imaging has become a relatively new branch in the digital medical field. 90% of medical data comes from medical imaging, while orthopedic diseases are mainly diseases of the sports system. At present, the main clinical diagnostic methods mainly rely on medical imaging technology [27]. Common medical imaging examinations include X-ray, CT, PET-CT, MRI, IRT, etc. By mining and analyzing a large number of orthopedic disease image data, artificial intelligence can automatically learn the inherent "features" and "patterns" of the disease. Orthopedic artificial intelligence medical imaging diagnosis can be used for intelligent diagnosis of radiology and pathology images. Radiological intelligent diagnosis is based on massive radiological image big data and artificial intelligence deep learning, data mining technology and image segmentation, feature extraction technology, accurate identification of disease lesions and quantification, for clinical orthopedic surgeons in fractures, joint damage degeneration, soft tissue contusions, etc. The aspect provides the most professional diagnostic basis [24], [28], [29]. Based on pathological imaging data, artificial intelligence can use stained pathology smear image, combined with deep learning artificial neural network, cluster analysis, multi-resolution, fuzzy logic algorithm and boundary recognition to segment cell image and extract image features under pathological conditions. In addition, multi-level classification processing used to identify the number and grade of pathological cells, providing accurate basis for early diagnosis of orthopedic tumor diseases in figure 5. The orthopedic rehabilitation platform technical architecture by big data area is shown as follows.

C. SYSTEM DATA EXCHANGE PROCESS

The data retrieval system for children's rehabilitation diagnosis information for intelligent treatment mainly covers different hospital management information systems, electronic medical record systems and clinical information systems, and the data sources of each source have complex characteristics, in terms of structure and organization. The difference is obvious and even contains noise and inconsistent data information. Based on this, the data source data should have converted, and then entered into the database of the diagnostic information analysis system. Combined with the system analysis data, the XML format can be used to recommend drugs for the doctor's prescribing system in the management information system [30]. In the process of applying the Child Rehabilitation Information Data Mining System, doctors' medical data will have recorded. Through the application of medical data mining tools, data can have effectively analyzed and information content with certain value can be obtained.

In the medical field, the types of diseases are mainly classified according to internationally accepted standard codes. In general, there are more than a few kinds of common diseases. If the assessment of doctor's diagnostic ability according to this standard classification does not have practical value. Combined with the specific needs of hospital data analysis, the disease should be re-stated according to the probability of misdiagnosis of the disease [31]. Among them, the use of clustering methods can refine the disease into three types: high misdiagnosis rate, medium misdiagnosis rate and low misdiagnosis rate. The results of the division can be used as an auxiliary weight to assess the doctor's diagnostic ability.

In the medical field, many diseases have a close relationship, and whether they are diseases or complications, they can have effectively linked. In the process of actual diagnosis, it is easy for a doctor to diagnose a disease as another disease. Based on this, it is necessary to conduct correlation analysis for the diagnosis results, obtain the misdiagnosis correlation map, further analyze the main reasons for misdiagnosis, and provide a strong guarantee for hospital medical research analysis.

In the children's rehabilitation information data mining system, the doctor prescribes the prescription, and in the process of digging into the matching pattern of the prescription, it can provide necessary help for doctors to prescribe drugs and match the drugs [32]. Based on the comprehensive exploration algorithm, the system chooses to use the improved algorithm with matrix operation as the core, which can improve the efficiency of algorithm execution and the actual performance is ideal. The frequent matching pattern of drugs obtained through systematic mining analysis can provide a valuable reference for the prescription of doctors. The middleware of the orthopedic rehabilitation service platform has the characteristics of data collection, filtering, integration and transmission, so as to transmit the correct object information to the application system of the enterprise back end. The system middleware uses program logic and storage and transfer functions to provide sequential message flows with the ability to design and manage data streams in figure 6.

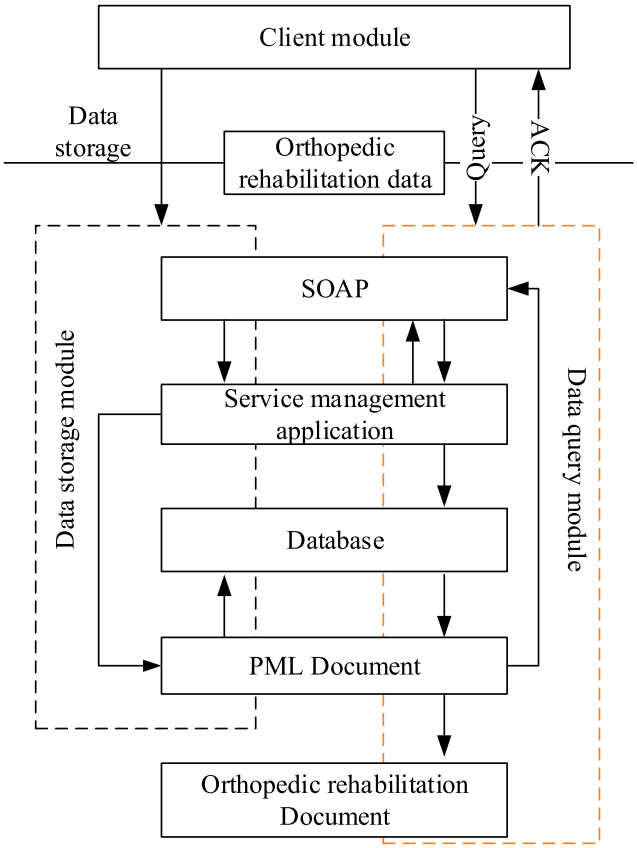

FIGURE 6. The workflow of orthopedic rehabilitation platform technical architecture.

IV. EXPERIMENTS AND RESULTS

A. FUNCTION TEST

First, the management center functional test. The main task of the System Health Service Management Center is to manage the information of children and doctors. For this reason, in the actual test process, the functions of patients, doctors, and departments should have tested, as well as manual assistance. Judging function, the actual test results are compatible with the system design requirements. In the case that the artificial judgment expert finds that the record analysis of the diagnostic information is incorrect, the analysis and correction can be performed, and the system will use it as an important basis to form a new diagnostic information similarity analysis model [34]. At the same time, in the expert-assisted judgment, the keywords of the disease can have input into it, and recorded in the medical vocabulary to help the analysis and use of disease participle and diagnostic information. Through long-term use, the probability of success of the system's own analysis can have improved, and the dependence on expert manual judgment is reduced.

Second, the doctor's end function test. The doctor can view the patient's patient information and medical information, as well as his or her own diagnostic ability and assessment, and analyze the cause of the misdiagnosis. By clicking on the personal *ID* number, you can enter the personal physician analysis page, and all the diagnostic records will be arranged according to the disease name, combined with the misdiagnosis rate. When the doctor understands that the probability of personal misdiagnosis is too high, the patient can comprehensively summarize and analyze the cause of the misdiagnosis [35], [36]. In addition, the system will automatically enter the database in the background, as a misdiagnosis analysis of the alternate data information.

B. APPLICATION OF SUPPORT VECTOR MACHINE IN TIME SERIES OF ORTHOPAEDICS

The key point of the orthopedic rehabilitation service platform lies in the diagnosis of the information analysis model. Based on comparing a large number of texts, the text information content with inconsistent description of the rehabilitation diagnosis is found out, and the corresponding reference result

FIGURE 7. The function test of data mining and reconstruction.

can be provided under the action of the algorithm. In addition, the system is not fixed and closed, but can present some of the data that cannot be discerned to the hospital experts, and the experts with professional knowledge can make a diagnosis of the accuracy of the decision. Among them, the system can continuously learn through manual judgment to ensure judgment that is more accurate in the future. In this way, it is possible to reduce the dependence on manual judgment in the process of practical application. All hospital diagnostic records can be entered into the system under the health service application interface. Orthopedic rehabilitation service has nothing to do with the dimensions of the sample. There is such a capability because of the introduction of a kernel function.

Machine learning is essentially an approximation of the real model of the problem. There is a big gap between the model we choose and the real solution of the problem.

In the process of applying the orthopedic rehabilitation information data mining system, the doctor's medical treatment data will be recorded. Through the application of medical data mining tools, data can be effectively analyzed and information content with certain value can be obtained. The classification of disease types is mainly based on internationally accepted standard coding. In general, there are more than a few common diseases. If the assessment of doctor's diagnostic ability according to this standard classification does not have practical value. Combined with the specific needs of hospital data analysis, the disease should be re-stated according to the probability of misdiagnosis of the disease [2]. Among them, the use of clustering methods can refine the disease into three types: high misdiagnosis rate, medium misdiagnosis rate and low misdiagnosis rate. The results of the division can be used as an auxiliary weight to assess the doctor's diagnostic ability.

Correlation analysis of orthopedic diseases. In the field of orthopedics, many diseases have a close relationship, whether it is a disease or a complication, can be effectively linked. In the process of actual diagnosis, it is easy for a doctor to mistakenly diagnose a disease as another disease. Based on this, it is necessary to conduct correlation analysis for the diagnosis results, obtain the misdiagnosis correlation map,

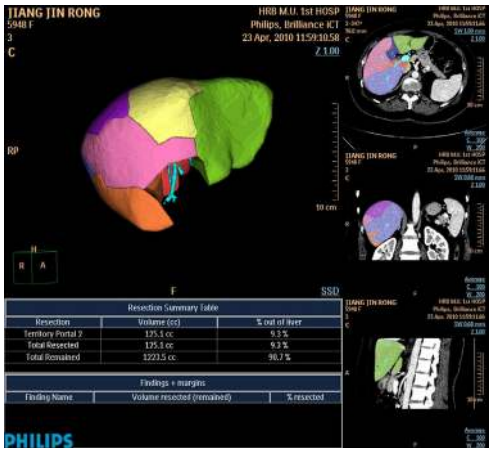

FIGURE 8. The GUI of orthopedic rehabilitation platform.

further analyze the main reasons for misdiagnosis, and provide a strong guarantee for hospital medical research analysis. Correlation analysis of prescriptions for discharge of orthopedic patients with medication. In the orthopedic rehabilitation information data mining system, the prescriptions prescribed by doctors were recorded. In the process of digging into the matching pattern of prescriptions, it can provide necessary help for doctors to prescribe drugs and match drugs. Based on the comprehensive exploration algorithm, the system chooses to use the improved algorithm with matrix operation as the core, which can improve the efficiency of algorithm execution and the actual performance is ideal. The frequent matching pattern of drugs obtained through systematic mining analysis can provide a valuable reference for the prescription of doctors. Spinal orthopedic disease is an example for test in Figure 9. Orthopedic hyperplasia can be found in patients with hyperosteogeny by taking X-ray films or CT or nuclear magnetic resonance. This paper uses data mining technology, parameter screening. The platform quickly detects compensatory calcification of muscles or tendons to form orthopedic hyperplasia.

To predict the trend of the orthopedic rehabilitation index, we chose to apply 50 rehabilitation periods to predict the five rehabilitation periods for the training set, and draw the

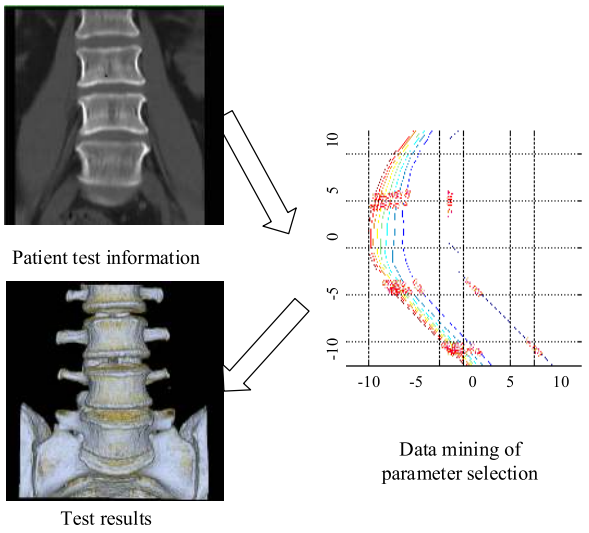

FIGURE 9. The testing process of spinal orthopedic disease.

following forecast pattern for the next year. Through repeated observations, we find that the predicted trend has a phenomenon that lags behind the real trend, and the correlation coefficient between the two is 99.88%.

C. ORTHOPEDIC REHABILITATION INFORMATION APPLICATION

In the field of orthopedics, the earliest established orthopaedic specialist system was the Lin Rugao high-injury computer diagnosis and treatment system (September 1980). Subsequently, the number of different medical expert systems is increasing, mainly for the assistance of Chinese medicine diseases. The doctor can view the patient's orthopedic rehabilitation information and medical information, and understand their own diagnostic ability and assessment, and analyze the cause of the misdiagnosis. You can access your personal physician analysis page by clicking on your personal ID number, and all diagnostic records will have sorted by disease name.

FIGURE 10. The GUI of right axillary region.

Figure 10 is for the right axillary region with a rounded ossifying mass, uneven density, cauliflower-like, with a narrow base connected to the medial orthopedic of the tibia, only a thin layer of soft tissue shadow can be seen at the leading edge. Through the platform, the iliopsoas muscle can be quickly detected to move forward, the humerus orthopedic destruction, and the shape remains.

For the test situation shown in Figure 10, the paper deals with its infected tissue, necrotic tissue, and diseased tissue of iliopsoas muscle. The specific algorithms are data mining processing, traditional algorithm processing, and raw data, in which the recognition efficiency of traditional algorithms and original data. However, the DM method can quickly identify diseased tissue, necrotic tissue, and infected tissue. In particular, the recognition rate of necrotic tissue is as high as 95%. As shown is in figure 11.

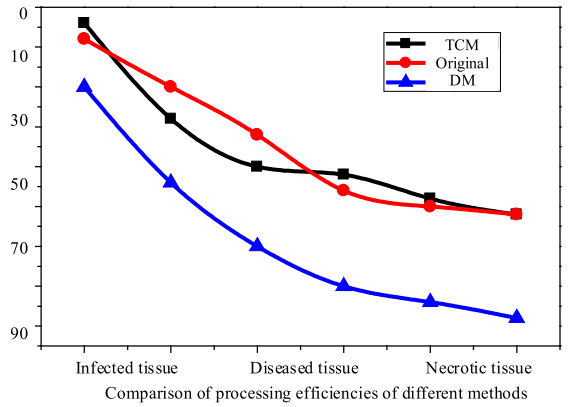

FIGURE 11. The recognition rate of different tissue among three methods.

A true orthopaedic specialist is a person with extensive knowledge and clinical experience in the field of orthopedics. He can use his unique and unique way of thinking to solve clinical problems in the field of orthopedics. The intelligent Chinese medicine diagnosis system can diagnose the disease like a real expert, and its knowledge and experience are much larger than the value of a single expert. As a medical expert system, intelligent Chinese medicine can diagnose patients' diseases, judge the severity of the disease, and give corresponding prescriptions and treatment recommendations.

D. OPPORTUNITIES AND CHALLENGES

With the rise of artificial intelligence technology and its application in orthopedics, artificial intelligence can mine rules from massive ancient books and clinical medical diagnosis data, and artificial intelligence diagnosis technology that learns and imitates clinician diagnosis will achieve unprecedented precision. It followed by intelligent medical treatment technology that will gradually become an indispensable medical component in most hospitals. A large number of medical workers will have liberated from the heavy medical treatment business and further move to more complex and more meticulous positions. At the same time, artificial intelligence can accelerate the accurate clinical drug screening and analysis of drug composition, efficient, accurate, minimally invasive assisted orthopedic surgery. The development and application of the intelligent assistant diagnosis, the combination of the wisdom of diagnosis and treatment of the masters of traditional Chinese medicine and the modern detection

technology, which standardizes the academic thoughts and clinical experience of the masters of Chinese medicine to promote the balance of medical resources in different regions. However, due to various factors, there are still many shortcomings in the application of artificial intelligence technology in orthopedics [38]. First, because the traditional Chinese medicine ''looking, smelling, asking, cutting'' diagnosis and treatment model has been ingrained, doctors and patients are skeptical about the instinct of artificial intelligence diagnosis and treatment mode.

Medical health will realize the cloud computing construction goal of the orthopedic rehabilitation information of business, service, and management except the second- and third-level hospitals. It not only conforms to the development trend of information technology, but also innovates the mode of information construction, use and operation and maintenance. In this paper, the security network of the private network, the government external network, and the Internet nodes have aggregated to establish the boundary security control of the network and communication. The data disaster recovery and the unified identity authentication technology are used to establish a security mechanism for data application security classification, application authorization, privacy security, and data desensitization, thereby realizing data security application. The combination of online and offline services, orthopedic rehabilitation medical and health services, unified payment, electronic certification and other features in line with ''Internet + smart medical''. At the same time, through the integration of business systems such as public health, medical services, and integrated management, the health information platform optimizes business processes, improves work efficiency, service capabilities, and service levels, facilitates patient visits, and improves access to orthopedic rehabilitation services.

In addition, although artificial intelligence has developed in the medical field, there are still many technical shortcomings. Artificial intelligence needs to face huge data, complex computing methods, and the integration of multidisciplinary technologies, and needs to have further improved in terms of independent R&D and innovation capabilities. At present, artificial intelligence still lacks a safety assessment and supervision system. The clinical medical data privacy protection is not enough. The ethical issues involved in artificial intelligence in the medical field are still to discuss. These problems still need to solve in the future.

V. CONCLUSION

China's medical and health system is moving from clinical informationization to regional medical and health informationization. At present, many hospitals have introduced Smart medical technology and established a hospital network information, which can realize functions such as outpatient information management, drug information management, and inpatient system information. Medical orthopedic rehabilitation data mining, due to the complexity of its data, in addition to the traditional technology, it is also necessary to develop multi-source heterogeneous data collection processing with clinical diagnosis and treatment business as the core, and data intelligent recognition technology based on medical natural language processing. In this paper, the diagnostic data formed during the diagnosis of the doctor and the patient's seeking medical services are also recorded, and the internal correlation between the data is close. Because of the formation of the concept of health service system, in-depth mining, and analysis of data information, can obtain information content with useful value, and provide necessary protection for the development of medical work. In the model evaluation, the model needs to have explained by the effective orthopedic rehabilitation data, then the result data has mined and compared, and after many tests and evaluations, the credibility and effectiveness of the orthopedic rehabilitation information can have obtained. The application of medical health in orthopedics is still in the exploratory stage, combined with the establishment of data mining technology, image processing and pattern recognition technology, intelligent medical imaging diagnosis, orthopedic surgery robots and orthopedic specialist systems. It is also an important direction for the future development of traditional orthopedics. In further research, it is necessary to analyze the quantitative relationship between drugs to find out more accurate and valuable association patterns. The application of medical data mining technology is a complex system engineering, which requires the coordinated work of patients, data analysts, doctors, medical experts, and other aspects. The application of data mining technology can not only rely on a large number of data sets, but also needs relevant background knowledge to assist mining, so that the mining results are more meaningful.

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