TEACHING APPLICATION OF MEDICAL DATA IN SMART HOSPITAL INFORMATION SYSTEM

Xiong Jian[1*], Dr. Rajamohan Parthasarathy[2], XiaoQing Yang[3] , YinQing Tang[4] Rong Zhou[5] , TingTing Liu[6]

Abstract —
In the process of teaching practice in medical colleges and universities, the teaching cases in schools are usually not the latest cases. How to make the cases in hospital be used for teaching activities in time. This paper has targeted the electronic medical record of the unit. By desensitization, cleaning and sorting out the electronic case data, the collated data is introduced into the hospital information system used for teaching in the school, so as to realize the electronic medical record data of the affiliated hospital is used in the teaching activities of medical schools. The integration and optimization of medical data are realized, and the teaching efficiency and teaching quality for medical students are improved.[1]

Key words—medical big data; electronic medical record; big data;

[1*]PhD Research Scholar, Faculty of Engineering, Built Environment and Information Technology, SEGi University, Kota Damansara, jianx@hainmc.edu.cn
[2]Assoc. Prof. PhD Research Supervisor, Faculty of Engineering, Built Environment and Information Technology, SEGi University Kota Damansara, Malaysia, prajamohan@segi.edu.my
[3]PhD Research Scholar, Faculty of Engineering, Built Environment and Information Technology, SEGi University Kota Damansara, Malaysia yangyxqcsy@163.com
[4]PhD. College of Biomedical Information and Engineering Hainan Medical University Hai Kou, China, tangyinqing@hainmc.edu.cn
[5]Master.College of Biomedical, Information and Engineering, Hainan Medical University, Hai Kou, China zhourong198619@126.com
[6]PhD Research Scholar, Faculty of Graduate school of Business, the philosophy of management SEGi University, Kota Damansara, Malaysia, ttliuchocolate@sina.com

***Corresponding Author:** Xiong Jian
*****PhD Research Scholar, Faculty of Engineering, Built Environment and Information Technology, SEGi University, Kota Damansara, jianx@hainmc.edu.cn

DOI: - 10.48047/ecb/2023.12.si5a.0147

[1] This research was financially supported by The Hainan Province
Science and Technology Special Fund (No. ZDKJ2021029), Industry-university cooperation coordination education project of the Ministry of Education in 2022 (No.220604719293004), Hainan Provincial Higher Education Education and Teaching
Reform Research Project in 2019(No.Hnjg2019-53)

I. INTRODUCTION

As an extremely important part of the big data category, medical data is not only applied in medical and information data, but also includes the massive digital data [1] of health, life and health. Morgan Stanley research said the healthcare sector was considered the fastest growing area in 2013. Medical big data is the massive medical data generated in the process of clinical outpatient service, mainly from electronic medical records, hospital and medical insurance cost data, biomedical research data, emergency disease monitoring, public health management, health data management and social network [2].

In 2013, the United States, which is medically developed, determined the research and development plan of big data. The US government plans to create welfare [3] for academic research, teaching research, biomedicine, environmental protection, engineering technology, homeland security and other fields through the application of big data. In the same year, European and American countries invested 189 million pounds to build the British National Medical Service Information System, which has a very large and complete British medical data and is strongly supported by the British government [4]. In 2014, the United States further released the policy report "Big Data: Seizing Opportunities, Maintaining Value", launched the "Data Opening Action", successively disclosed the government data of 50 categories, and encouraged the business sector to develop and innovate. The EU is promoting the Data Value Chain Strategic Plan; the UK issued the UK Data Capacity Development Strategic Plan; Canada issued the White Paper on Health Big Data Analysis; Australia issued the Big Data Strategy for Public Service; Japan issued the Declaration on Creating the Top IT Country; Korea proposed the Data ecosystem and Excellent Data Science Research Strategy [5].

In 2015, China issued the action plan for promoting the development of big data [6], put forward to build including electronic health records, electronic medical records health care service data, construction of public health, medical services, medical care, drug supply, family planning and comprehensive management business health care management and service data application system, to carry out health care big data innovation application research.

In June 2016, the Guiding Opinions on Promoting and Standardizing the Application and Development of Health and Medical Big Data [7] has deployed 14 major tasks and projects of health and medical big data from four aspects: consolidating the application foundation, deepening the application, standardizing and promoting the "Internet + health care" service, and strengthening the construction of the security system. On April 14,2017, the China Health and Medical Big Data Conference was held in Beijing. Experts from the Chinese Academy of Sciences comprehensively expounded the application of big data in the medical industry from three aspects of genome, big data and precision medicine. In 2018, on the 30th anniversary of the construction of Hainan province in 2018, it also emphasized the active development of the new-generation information technology industry and digital economy, the deep integration of the Internet, the Internet of Things, big data, satellite navigation and artificial intelligence with the real economy, and enhance Hainan's overall competitiveness.

At present the situation of China Hainan province is eight hospital access to the hierarchical diagnosis and treatment system, realize data sharing, but due to data barriers or historical reasons, in the process of project a YiFuYuan originally unstructured electronic medical record data have now become a structured data, research behind us provides a good way.

Pablo In 2020, medical education may be the area we need to focus on [8]. How to use the data and cases of multiple hospitals for the teaching and scientific research activities of medical schools? Cultivate a data sharing culture [9], This paper takes the smart hospital information system for teaching as an example, After importing real medical data, Alenable students to learn medical knowledge in real case learning, Practice skills from the latest cases, Thoughtful analyses of these data can ultimately help health professionals make timely decisions in their clinical practice regarding patient care [10]. In addition to allowing medical students to see real cases, it can also enable the hospital information system process of medical information college students to lay a good foundation for entering the hospital for information work.

II.THE TEACHING APPLICATION OF MEDICAL DATA IN THE SMART HOSPITAL INFORMATION SYSTEM

Taking the hospital electronic medical records as the research goal, some electronic medical records of the affiliated hospitals were used as the data source, through the desensitization, cleaning and analysis of the electronic medical record data. Finally, the collated data is applied to the medical virtual simulation system to realize the resource integration and optimization and improve the teaching efficiency. Lay a research foundation for

the construction of medical big data of Hainan Medical University.

2.1 Current status of medical information professional courses

There are more than 60 universities across the country have medical information professional (including medical information engineering and medical informatics), specialized for medical information field training specialization, standardized talents of the hospital information system course is a collection of medicine, information science and management science is equal to one of the emerging comprehensive applied courses, is one of the core course of medical information professional [11]. With the continuous progress of medical informatization level in China, Medical Informatics is not only studied by students majoring in biomedicine and information engineering, but also studied as a compulsory course for all medical students. In the era of medical big data, in the face of huge amounts of medical data and massive information data, applied, compound and innovative medical information personnel training is the goal of modern biomedical information professional training talents, medical data in wisdom hospital information system teaching research, to improve the medical information teaching content, rich teaching methods, optimize the curriculum architecture, improve the quality of teaching and learning, and cultivate post competence and innovative medical informatics professionals is of great significance.

2.2 Medical informatization personnel training

In the process of medical informatization personnel training, firmly set up the big health, health, general medicine training concept, facing the country put forward the construction of "healthy China" strategic requirements, deepening the reform of the medical health system across age requirements, facing the reality of the era of big data development, comprehensively promote biomedical knowledge, management discipline knowledge and the depth of the modern information science knowledge, pay attention to cultivate biomedical and information engineering students multidisciplinary knowledge financing and practice ability, stimulate the students' lifelong learning ability. Biomedical information engineering graduates can quickly after graduation in the health management departments at all levels, medical information system software company, medical and health service agencies, all kinds of medical enterprises, medical and health scientific research institutions departments competent hospital information system resources management and hospital information system design, implementation, maintenance, etc., including medical data collection, analysis and mining and related work.

III.MEDICAL DATA SHARING TO THE SMART HOSPITAL INFORMATION SYSTEM

The data is shared to the smart hospital information system, collecting multiple hospital electronic medical records data [12], and data desensitization hides key privacy information. With the acceleration of hospital informatization, the original unstructured electronic medical record data has now become the structured data, which provides a good way for our future research.

Data cleaning, cleaning out useless, repetitive, incomplete abnormal data, and processing unstructured data.

Data collation, data sharing to the smart hospital information system.Used for teaching and scientific research in medical schools。

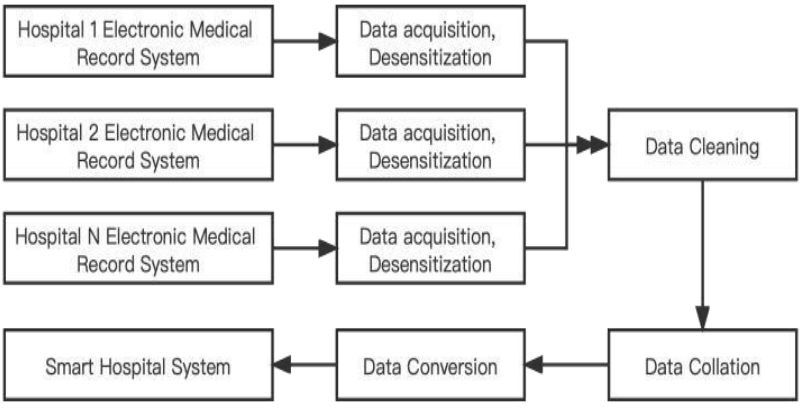

Figure 1 Data Sharing to the smart hospital information system

IV. TEACHING ACTIVITIES OF MEDICAL DATA IN THE SMART HOSPITAL INFORMATION SYSTEM

Students through medical data in wisdom hospital information system for the whole process of hospital business operation, through the real patient outpatient service and hospital cases, familiar with the business process of hospital information system, understand the structure of the database, the data type and field structure, for future development of hospital information system, also before entering the hospital for the hospital information system, for medical students into the hospital can use such system, patients from the moment of admission, medical data with patients for life.

In the smart hospital information system, medical cards are first issued to patients, a set of personal files are established for each patient admitted to hospital, and basic information is added, so that the patient does not need to show personal data in the process of medical treatment or payment. After the patient completes the filing, the outpatient registration according to the personal medical card. In the process of registration, according to the patient's own situation, select the corresponding department and doctor to register, and then pay the corresponding registration fee to complete the registration. Next patients, outpatient doctor according to the receiving patients, record patient information on the system, start disease diagnosis, writing, writing diagnosis plan, diagnosis and treatment plan generally include prescription, testing, examination, prescription in the design of the drug information can be directly extracted from the medical data of drug data table, inspection, inspection design to the project from the medical data inspection, check item list data table.

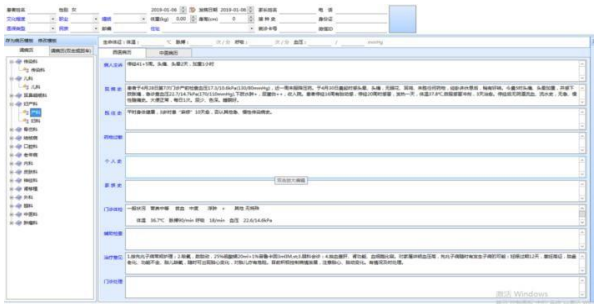

Fig2: Case of gynecological electronic medical record

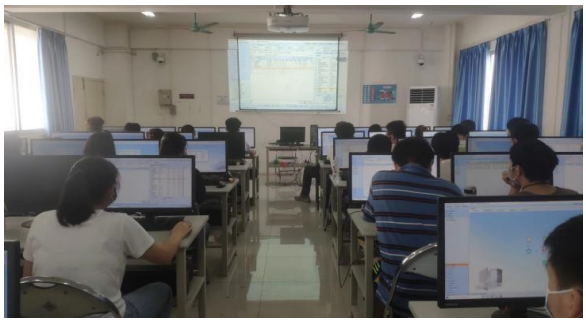

Fig 3: Students are using the system for case teaching

Students of different majors and departments can learn the business operation process of different departments from the cases, and they can also strengthen their professional knowledge through some classic cases.

This time, we collected a total of more than 20,000 case data of orthopedics, obstetrics and gynecology, and neurology. After screening and cleaning, we finally imported more than 200 typical cases after research and judgment by professional doctors. Through the accumulation of cases, indepth data mining can be carried out for different diseases. Both teachers and students can use this system to analyze, utilize, and mine electronic medical records to give full play to its role.

V. CONCLUSION

Through the teaching application of medical data in the smart hospital information system, many medical students can become familiar with the standardized information process of the hospital before entering the hospital environment. Of course, many problems were also found in the process of importing hospital medical record data. Since the data structure of electronic medical records in each hospital is different, and the data volume is huge, the data processing process is very time-consuming. In the smart hospital information management system, the amount of data for different majors and departments are relatively small. This time, only three departments of orthopedics, obstetrics and gynecology, and neurology were imported. Since only part of the data was imported, some departments had too little data and could not be done. With full coverage of majors, I hope that more typical cases from departments can be imported into the system for teaching next time. This project provides a typical demonstration for the use of medical data cases in teaching, and the results can be extended to the sharing, analysis, utilization, and mining of hospital data.

ACKNOWLEDGMENT

We would like to thank Facult of Engineering, Built Environment and Information Technology SEGi University for their cooperation in implementing this project.

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