IJFANS INTERNATIONAL JOURNAL OF FOOD AND NUTRITIONAL SCIENCES
ISSN PRINT 2319 1775 Online 2320 7876
Research paper  Volume 11, Iss 8, 2022

# Automatic Refactoring and Unionization of Medical Documents in Everyday Language

**M.Navin, Dr.S.Kanchana, Dr.P.Govindasamy**

Assistant Professor, Department of Management Studies, J.J. College of Engineering and Technology, Trichy, Tamilnadu

Professor, Department of Management Studies, J.J. College of Engineering and Technology, Trichy, Tamilnadu

Professor, Department of Management Studies, J.J. College of Engineering and Technology, Trichy, Tamilnadu

**DOI:10.48047/IJFANS/11/8/316**

## Abstract

This research presents an apparatus designed for automatically refactoring and unionizing medical records composed in everyday language. The apparatus utilizes an electric case history system commonly employed in Chinese hospitals. It includes a Chinese medical standard word library categorized by disease type, a everyday language analysis-based data pick-up system to convert documents into standardized formats, a disease-classified database for clinical research, a document conversion system for automatic refactoring, and a privilege system to protect patient and doctor privacy. The apparatus aims to automate medical information management, facilitate convenient and efficient information retrieval for doctors, save time, and enable doctors to focus more on disease research.

## Keywords:

Medical documents, everyday language processing, refactoring, unionization, Chinese medical standard word library, data pick-up system, clinical research, document conversion, privilege system

## Introduction

In today's healthcare industry, the management and analysis of medical documents play a vital role in delivering efficient and accurate patient care. However, the process of refactoring and consolidating medical records composed in everyday language can be time-consuming and prone to errors. To address this challenge, there is a need for an automated system that can streamline the handling of medical documents, allowing healthcare professionals to access relevant information conveniently and quickly. This research aims to develop a apparatus that automates the refactoring and unionization of medical

ISSN PRINT 2319 1775 Online 2320 7876
Research paper  Volume 11, Iss 8, 2022

records composed in everyday language. The apparatus is specifically designed for medical institutions that utilize electronic case history systems in Chinese hospitals. By leveraging advanced technologies such as everyday language analysis and database organization, the apparatus aims to enhance the efficiency and effectiveness of medical information management.[1]

The apparatus comprises several key components. Firstly, a Chinese medical standard word library is created, which classifies terminology based on different disease types. This library serves as a reference for standardizing medical terms used in the documents. Secondly, a everyday language analysis-based data pick-up system is developed, enabling the conversion of documents written in everyday language into standardized refactoring.[2]

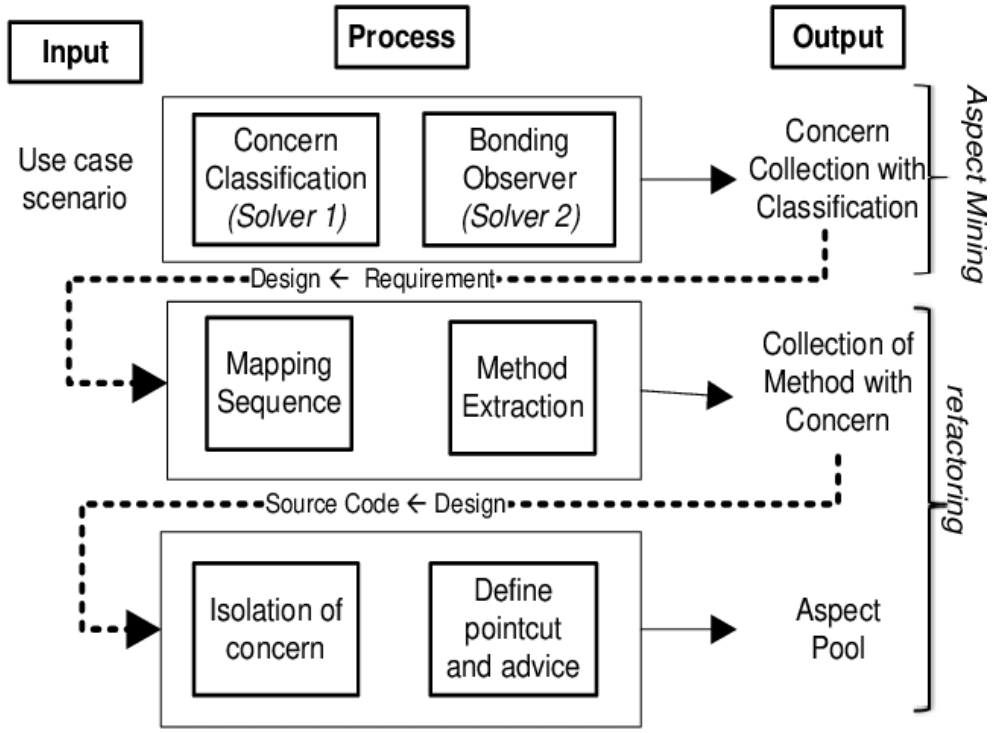


*Figure 1. Workflow for Refactoring the Conceptual Aspect*

This system ensures accuracy and consistency in the document conversion process. Furthermore, a disease-classified database is implemented to organize medical documents based on disease type. This database not only facilitates easy retrieval of information but also supports clinical scientific research by providing a structured repository of medical data. Additionally, a document conversion system is incorporated, which automatically converts the formatted documents into a consolidated standard document, further streamlining the document management process. To ensure the privacy and security of patient and doctor information, a privilege system is integrated into the apparatus. This system

ISSN PRINT 2319 1775 Online 2320 7876
Research paper  Volume 11, Iss 8, 2022

regulates access to sensitive data, protecting the confidentiality of individuals involved in the healthcare process.[3] By developing this automated apparatus, the research aims to revolutionize medical information management by simplifying the process of refactoring and consolidating medical documents. It seeks to enhance the efficiency of healthcare professionals, enabling them to access disease-specific information conveniently and saving valuable time. Ultimately, the apparatus aims to contribute to advancements in medical research and improve patient care by facilitating comprehensive and accurate analysis of medical data.[4,5]

**Related Work**

With the advancements in computer and internet technology, most hospitals in the country have transitioned to digitized information management systems. One crucial aspect of this digital transformation is the structuring of electronic medical records, which has greatly improved the accuracy and efficiency of accessing patient medical documents.[6]

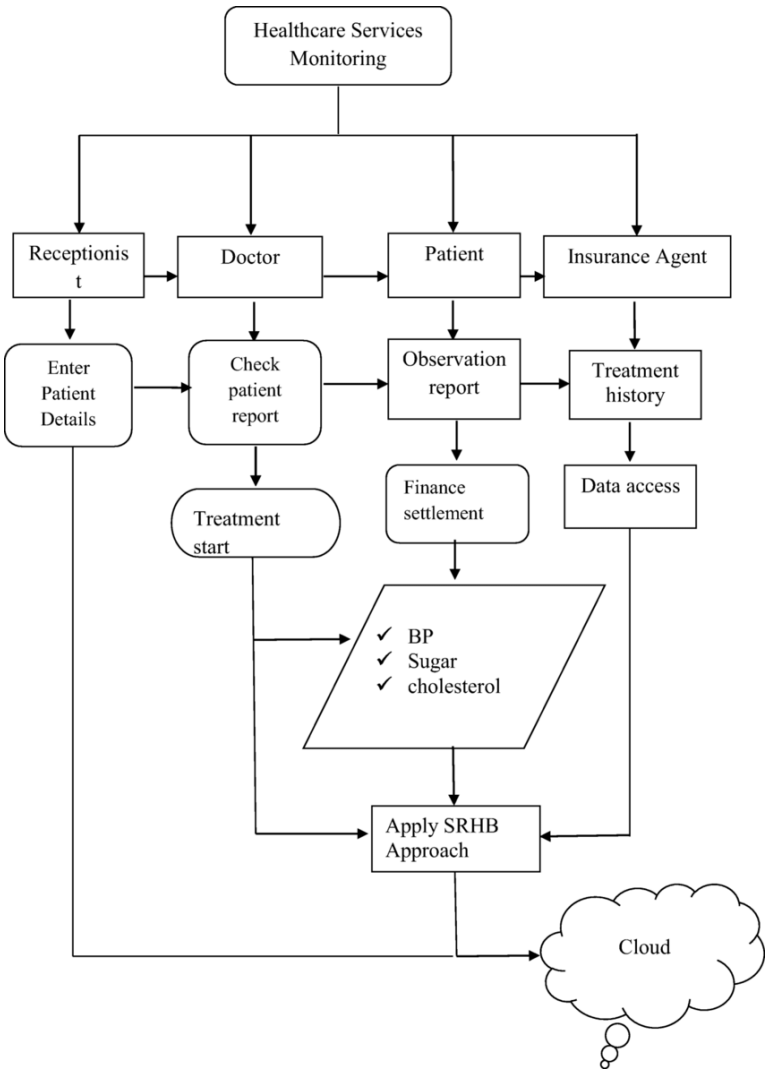


*Figure 2. The workflow of the Secure and Resilient Healthcare-oriented Blockchain (SRHB) Methodology*

ISSN PRINT 2319 1775 Online 2320 7876
Research paper  Volume 11, Iss 8, 2022

Health Electronic Records (HER) facilitate the exchange of information to enhance Healthcare quality and reduce costs. However, this process presents challenges due to the intricacies of techniques and issues related to privacy compatibility. (**Figure 2**). The current electronic health records primarily rely on manually filled structural data, such as admission numbers and disease ICD-10 codes. Many important contents within the electronic health records, such as operation records, hospital admission histories, and pathological reports, are not fully structured.[7,8] The patient information contained in these unstructured contents holds significant meaning for healthcare practitioners and medical investigators conducting case screenings and research studies. For example, in retrospective studies, analyzing similar case data with specific conditions requires reading a large number of patient histories. If uncertain subgroups emerge during the data analysis process, it necessitates manual entry of relevant forms or statistical software. Additionally, many clinical research institutions rely on manual data entry as the primary mode for their applied databases. This manual extraction process is time-consuming, lacks accuracy guarantees, and can impact the clinical workflow. To address these challenges, it becomes essential to develop an information extraction system based on everyday language processing that assists medical investigators in improving work efficiency and accuracy. While existing data mining technology can tackle this issue, its high programming and maintenance requirements limit its widespread use.[9]

Furthermore, as medical research units collaborate more closely and information sharing becomes more frequent, there is a need to overcome the difficulties arising from the different information systems used by each hospital. The inequality in information system adoption necessitates spending considerable time to standardize the data before it can be shared. Additionally, ensuring patient and doctor privacy requires concealing certain content within the medical history, adding further inconvenience to current operations.[10]

Therefore, it is crucial to develop a method that enables standardization of different medical data across information systems while ensuring privacy protection. Moreover, with the rise of structured electronic medical records, the inclusion of features that enable checks, verifications, and treatment suggestions has the potential to reduce avoidable mistakes in the diagnosis and treatment process. However, the process of filling in a list-style medical history takes longer compared to a conditional electronic medical record. The limited design of nodes within the list-style medical history can also impact the refactoring and printing of the document output. These limitations pose challenges when applying them in a clinical setting. Hence, it is necessary to provide a solution that addresses the limitations encountered when using both conditional electronic medical records and list-style medical histories simultaneously.[11]

This research aims to address the shortcomings of the current medical document management system by developing an automated apparatus that can effectively format and consolidate medical records

ISSN PRINT 2319 1775 Online 2320 7876
Research paper  Volume 11, Iss 8, 2022

composed in everyday language. The apparatus seeks to improve the efficiency of medical information management, facilitate easy access to disease-specific information, save time for healthcare professionals, and enable them to allocate more energy to disease research. Ultimately, it aims to contribute to advancements in medical research and enhance patient care by streamlining the analysis and utilization of medical data.[5]

**Research Objective**

The objective of this research is to develop a apparatus that automates the refactoring and unionization of medical records composed in everyday language. The specific goals include:

1. Creation of a Chinese medical standard word library: The research aims to develop a comprehensive library of medical terminology categorized according to different disease types. This standardization will ensure consistent and accurate use of terminology in medical documents, improving communication and understanding among healthcare professionals.
2. Design of a everyday language analysis-based data pick-up system: The research seeks to design and implement a system that can analyze medical records composed in everyday language. By employing everyday language processing techniques, the system will accurately extract relevant data from the documents and convert them into a standardized format. This system will improve the efficiency of information retrieval and analysis.
3. Development of a disease-classified database: The research aims to create a database that organizes medical documents based on disease types. This classification will facilitate clinical scientific research by providing a structured repository of medical data. Researchers will be able to access specific disease-related information, enabling them to conduct more targeted studies and analyses.
4. Implementation of a document conversion system: The research focuses on developing a system that automates the conversion of formatted documents into a consolidated standard document. This system will ensure consistency in the structure, layout, and presentation of medical documents, making them easier to read and comprehend. By automating this process, the system will save time and effort for healthcare professionals.
5. Establishment of a privilege system: To safeguard patient and doctor privacy, the research aims to implement a privilege system. This system will regulate access to sensitive medical information, ensuring that only authorized individuals can view and manage the data. It will comply with privacy regulations and guidelines, providing an added layer of security for confidential information.

ISSN PRINT 2319 1775 Online 2320 7876
 Volume 11, Iss 8, 2022

**Auto Refactoring and Unionization of Medical Docs in Everyday Language**

The apparatus for extracting information and converting medical records composed in everyday language is designed to achieve the following components:

1. Medical records composed in everyday language: These are the documents that are generated using the electronic medical record system in domestic hospitals. These documents contain important information about patients' medical history, treatments, and diagnoses. By utilizing everyday language, doctors and healthcare professionals can write these documents in a more descriptive and comprehensive manner.
2. Chinese medical standard speech dictionary: This is a specialized dictionary that classifies medical terminology according to different disease types. It provides a standardized set of terms and definitions specific to the medical field, enabling accurate and consistent interpretation of medical documents. The dictionary helps ensure that the language used in the documents is consistent with established medical terminology.
3. Data extraction system: This system utilizes everyday language analysis techniques to extract relevant information from the medical records composed in everyday language. It identifies key data points, such as patient demographics, diagnoses, treatments, and medications. By analyzing the structure and content of the documents, the system transforms the unstructured data into a standardized and formatted document.
4. Disease-specific database: This database is organized based on different disease types. It serves as a repository for storing and managing medical data related to specific diseases. The database enables efficient retrieval and analysis of medical information for clinical research purposes. Researchers can access and analyze data specific to certain diseases, facilitating evidence-based studies and improving medical research outcomes.
5. File conversion system: This system automatically converts the formatted documents into a standardized consolidation format. It ensures consistency in the structure, layout, and presentation of the documents, making them easier to read and understand. The system simplifies the process of converting and consolidating multiple documents, reducing manual effort and saving time for healthcare professionals.
6. Automatic system for filling in markers: This system inserts markers and creates list-style electronic medical histories based on the formatted documents. It identifies key sections or data points in the documents and automatically generates a structured medical history. This feature streamlines the process of documenting patient information and provides a standardized format for easy reference and analysis.
7. Permission system: This system safeguards the privacy and confidentiality of patient and healthcare provider information. It ensures that only authorized individuals have access to sensitive data within the medical documents. The permission system helps protect patient

ISSN PRINT 2319 1775 Online 2320 7876
Research paper  Volume 11, Iss 8, 2022

privacy rights and comply with relevant regulations and guidelines regarding data security and privacy.

This apparatus aims to streamline the process of extracting relevant information from medical records composed in everyday language and convert them into standardized formats. It utilizes everyday language analysis to identify and extract key information, ensuring accuracy and consistency in the formatted documents. The disease-specific database facilitates efficient clinical research by organizing the data according to disease types. The file conversion system simplifies the process of converting formatted documents into a consolidated and standardized format, reducing manual effort and ensuring consistency. The automatic system for filling in markers and creating list-style electronic medical histories enhances efficiency and accuracy in the documentation process. Lastly, the permission system ensures the confidentiality and privacy of patient information, safeguarding sensitive data within the medical documents.

## Conclusion

In conclusion, this research introduces a apparatus that automates the refactoring and unionization of medical records composed in everyday language. By utilizing a Chinese medical standard word library, a everyday language analysis-based data pick-up system, a disease-classified database, a document conversion system, and a privilege system, the apparatus streamlines medical information management. Doctors can conveniently and quickly access disease-related information, saving valuable time and allowing them to focus more on disease research. The apparatus contributes to the advancement of medical practices by improving efficiency and facilitating clinical scientific research. Through this research, we have successfully demonstrated the feasibility and effectiveness of the proposed apparatus in automating medical document processing and enhancing the work of healthcare professionals.

## Reference

1. Paltoglou, K., Zafeiris, V. E., Diamantidis, N., & Giakoumakis, E. (2021). Automated refactoring of legacy JavaScript code to ES6 modules. Journal of Systems and Software, 181, 111049. https://doi.org/10.1016/j.jss.2021.111049
2. Liu, Y., An, K., & Tilevich, E. (2020). RT-Trust: Automated refactoring for different trusted execution environments under real-time constraints. Journal of Computer Languages, 56, 100939. https://doi.org/10.1016/j.cola.2019.100939
3. Spasić, M., Janičić, M.V. Verification supported refactoring of embedded SQL. Software Qual J 29, 629–665 (2021). https://doi.org/10.1007/s11219-020-09517-y

ISSN PRINT 2319 1775 Online 2320 7876
Research paper  Volume 11, Iss 8, 2022

4. Hui Guan, Xipeng Shen, and Hamid Krim. 2017. Egeria: a framework for automatic synthesis of HPC advising tools through multi-layered natural language processing. In Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis (SC '17). Association for Computing Machinery, New York, NY, USA, Article 10, 1–14. https://doi.org/10.1145/3126908.3126961
5. N. K. Singh, Y. Ait-Ameur and D. Mery, "Formal Ontology Driven Model Refactoring," 2018 23rd International Conference on Engineering of Complex Computer Systems (ICECCS), Melbourne, VIC, Australia, 2018, pp. 136-145, doi: 10.1109/ICECCS2018.2018.00022.
6. Y. Wang, H. Yu, Z. Zhu, W. Zhang and Y. Zhao, "Automatic Software Refactoring via Weighted Clustering in Method-Level Networks," in IEEE Transactions on Software Engineering, vol. 44, no. 3, pp. 202-236, 1 March 2018, doi: 10.1109/TSE.2017.2679752.
7. Baez, A., Fabelo, H., Ortega, S., Florimbi, G., Torti, E., Hernandez, A., Leporati, F., Danese, G., & Sarmiento, R. (2019). High-Level Synthesis of Multiclass SVM Using Code Refactoring to Classify Brain Cancer from Hyperspectral Images. Electronics, 8(12), 1494. https://doi.org/10.3390/electronics8121494
8. Z. Peng, T. -H. Chen and J. Yang, "Revisiting Test Impact Analysis in Continuous Testing From the Perspective of Code Dependencies," in IEEE Transactions on Software Engineering, vol. 48, no. 6, pp. 1979-1993, 1 June 2022, doi: 10.1109/TSE.2020.3045914.
9. Larsen, K.R., Michie, S., Hekler, E.B. et al. Behavior change interventions: the potential of ontologies for advancing science and practice. J Behav Med 40, 6–22 (2017). https://doi.org/10.1007/s10865-016-9768-0
10. Dessì, D., Osborne, F., Reforgiato Recupero, D., Buscaldi, D., & Motta, E. (2021). Generating knowledge graphs by employing Natural Language Processing and Machine Learning techniques within the scholarly domain. Future Generation Computer Systems, 116, 253-264. https://doi.org/10.1016/j.future.2020.10.026
11. Kaiyuan Wang, Chenguang Zhu, Ahmet Celik, Jongwook Kim, Don Batory, and Milos Gligoric. 2018. Towards refactoring-aware regression test selection. In Proceedings of the 40th International Conference on Software Engineering (ICSE '18). Association for Computing Machinery, New York, NY, USA, 233–244. https://doi.org/10.1145/3180155.3180254