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Applied Future of Big Data in Iraqi Healthcare Sector

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Abstract

Large data in the current period began to take up advanced space when they were generated regularly and when they increased their size in almost everything in addition, the human ability to understand, analyze and use technology has exacerbated the field of "large data." The proposed study aims to understand the issue of large data in the world of large data in the health sector in Iraq and to make a common thing between the world of health data and the world of health care and when combined together to form a wide health management application and has a wide area in health care and highlighting its benefits in terms of predicting epidemics, Health services in remote centers far from the center of the capital and improve the awareness of life and avoid the number of deaths and reduce the additional financial expenditures to reduce the burden on the Iraqi citizen. The aim of the study is to transform and adapt rapidly to provide treatment and medical service to the citizen and to study the decisions taken for these changes driven by data and strictly accurate and also aim to promote the issue of technology in the health care sector and emphasis on large data solutions seeking to harness this huge data to get more focused knowledge in the world of care and the overall goal is to respond to operational and clinical real-time to make informed and accurate decisions for the approach of medicine from descriptive and forecasting work to provide a health care service designed in Iraq.

Keywords: Healthcare system; Big Data; Iraqi Healthcare system.

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1. Introduction

The huge data at the time of the major focus of attention has been made as it has made significant progress in the amount of data that is generated regularly and how to memorize and this has become significant in the healthcare sector to contribute to the process of raising the efficiency of the health and medical sector.

This study investigates the use of large health data in the analysis and consolidation of digital medical technology in the health sector in order to discover important information and test predictions to make the quick and correct medical decision to provide the effort and time and provide the medical and health service to the Iraqi citizen in a way that satisfies him because more information gives more Accurate and correct diagnosis to create a chance to treat more accurately [3]. The system proposed in this study refers to the use of a health care database to take advantage of millions of important points in the health care database, helping doctors and medical personnel analyze data from the data from different sources through medical data repositories such as medical electronic records, scans in the Real time.

2. Data Science VS Big Data

When we want to look at the meaning of data science and large data, we see that the link between them is the decision that depends on the decision-making and the various stages including data capture, decision type, data storage process, data analysis process where we believe that the analysis depends on the type of data and the speed and size, The type of data analysis leads to reduced costs in any field. Data science depends on the type of algorithm used in the analysis, whether statistical or mathematical, and is also used in decision making. Data science deals with unstructured data, including data preparation and analysis [2]. Big data is a huge amount of data that cannot be processed by traditional applications, starting with the raw data that is collected and then classified and stored for the purpose of starting to address them. It is multi-disciplinary and can extract the knowledge and predictive analyzes.

3. Healthcare big data

The health sector can take advantage of the large data to achieve efficiency and success in the medical field, where the focus is on the management and industry of health care and the creation of the best competencies for the management of large medical data and this is useful in the conversion of health care and medical through the use of large data strategies to benefit from large data in the health care industry To be a guide and reference for managers in hospitals and health institutions by focusing on data storage, processing and analysis to benefit from the extraction of knowledge from medical data to improve the huge medical decisions This applies in the field of health information technology.

3.1. Strategies for healthcare venturing in to big data[5]

To demonstrate the large data strategy in the health sector by providing the following queries: What is the real catalyst for activating the huge health data in the health sector? What are the ways to prepare large data? It is possible to start working on the application of large medical data through the motivation and adventure in the

use of large medical data for the purpose of taking accurate decisions.

Data governance: For the huge in health care we must have a structured and focused data management.

Providers: Service providers have an important role in changing the traditional approach and trend towards a new approach to data collection and analysis.

Transparency: Pay attention to the spirit of transparency and competition in providing the best of analysis and selection of knowledge of the huge data for the purpose of winning patient satisfaction and improving performance among doctors.

Training: Focus on training physicians, nurses and health management personnel to understand and select tools for analyzing important, valuable data for the purpose of improving health care.

Flexibility: There is flexibility in transferring information for the purpose of presenting data in different ways based on the doctor's decision, style and method.

Choose solutions: Choose the appropriate and accurate solutions in some medical issues that are the reason for removing the obstacles of the huge data technology.

Simple tools: Health organizations and medical data updates, processes and capacity development to enable the use of an optimized tool and focus on real-time medical decision support.

Quality: The transform in health care is bringing about dramatic changes in the processes and structure of health care.

3.2. Big data path ways in healthcare systems

It is important to ensure that patients receive adequate treatment in terms of cost and time. This depends on the skill of health care providers. Physicians and health professionals must deal appropriately with patients to avoid duplication of efforts to achieve the best efficiency and quality improvement through treatments [7].

Data extraction and analysis enable health care to organize information for the purpose of using data and analyzes that improve health care, reduce wages and cost. In this study, health care and medical services are

Expected to be reduced by 60% of the total current situation in Iraq, Methods of appropriate data analysis and adoption of technology.

3.3. Big Data Analytics in Healthcare

Data mining has a very important role in most industries in terms of dealing with huge amounts of heterogeneous data. Automated learning processes and the most important data mining and analysis algorithms are very important for scientists and analysts. The need for data analysis algorithms and systems has emerged

since the beginning of data growth in size, complexity and speed. Algorithms in several applications this research focuses on their use in the field of health care because the heterogeneous medical data are available in different health and medical institutions. These data can be a source of improved Care and Health Services for Citizens the challenge of these huge health data is to be analyzed by artificial intelligence algorithms.

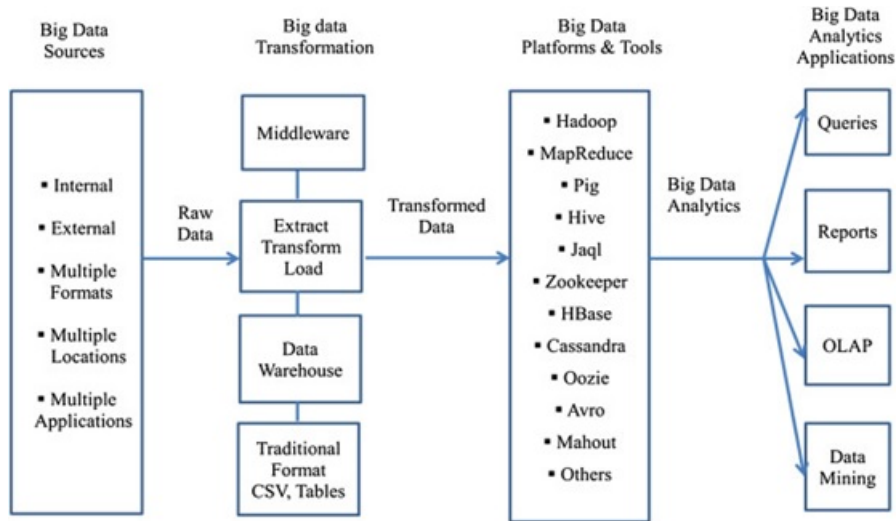


Figure 1: Big Data Analytics in Healthcare [3]

4. Big data predictive modeling

Predictive predictive modeling, such as crime forecasting, and health care. Predictability in the medical field is predictive to help identify patients at risk, for example, in the case of infectious diseases, scorpions, or harmful insects. The program may expand, for example, for diabetics or heart failure Pneumonia and outbreaks of infectious diseases in remote and rural areas of Iraq.

4.1. Limitation of predictive model

There are basic limitations that we may face in the system and model-based forecasting program

History: In terms of history, it is not always possible to predict the future, but the reliance is on historical data to predict the future. The problem is in special circumstances and unstable situations in complex systems.

Unknowns: In the data collection process, the variables in which data are collected must be collected by selecting important data from the large data and collecting it, but the problem is to enter new data that is not defined.

Power of algorithm: The algorithm chosen for large data analysis must be an accepted criterion in terms of the strength of analysis and confidentiality to preserve data from loss or penetration.

4.2. Dimensionality reduction and factorization [9]

The accumulation of medical information, especially patient records, is of great concern to system analysts in

terms of privacy, fear of confidentiality of patient data when analyzing large data, mining and classification processes, and complacency processes, causing a series of security problems including loss of privacy, The study is widely proposed to provide a complete encryption system for data to generate encrypted text and an encrypted result while maintaining the decryption to be identical with the result resulting from the implementation of the encryption process at the same time as data analysis for the output of knowledge and this is through buffers Its high dimension is used to encrypt and extract the value and important information, a new approach for the purpose of large data analysis process with medical data encryption to solve the security problem of the person.

For example, encryption is as follows:

Let

M1 and M2 tow elements in plaintext

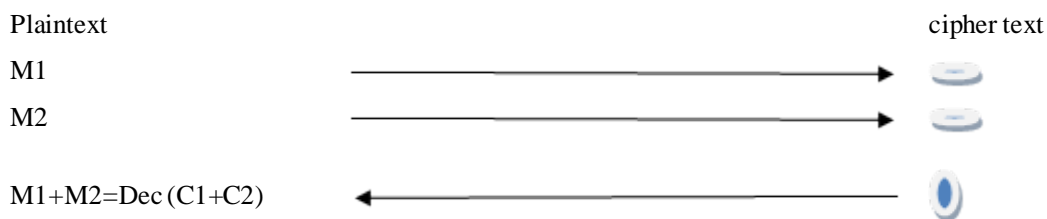
C1 and C2 tow elements in cipher text

Let

$C1 = \text{Enc}(m1)$

$C2 = \text{Enc}(m2)$

Then $m1 + m2 = \text{Dec}(\text{Enc}(m1) + \text{Enc}(m2))$



4.3. Using Graph analytics in big data for healthcare

Using the graph in large-scale health data analyzes where knowledge data is extracted from large health data using graph analyzes, where it organizes data and identifies relationships, interfaces, and meaningful associations.

Big data=transportation+retail+business intelligenace+communication

Healthcare+bigdata=medicine+genomics research+disease management

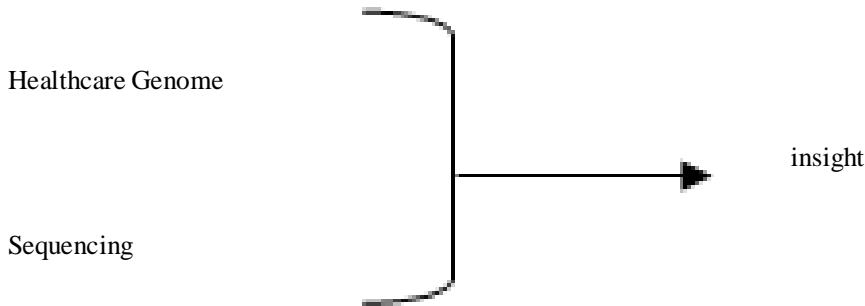
Then

Analytics:

Cleaning → Processing → analyzing → Visualizing → insight

Graph analyzing:

Biomedical Graph Analytics



Healthcare Genome Analytics

Ex: Data bases in healthcare (clinical data images from history of medicine digital collections) + application algorithm of analyzing= Mesh ontology, and finally we get the Bigger data for better healthcare.

For the purpose of preventing deficiencies and adapting workflows in clinics and health care centers to improve health care outcomes through end-to-end patient travel.

5. ontology healthcare

Is to support the integration of knowledge with medical data. In this study, the goal is to link patient data with Iraq's environmental system and information systems through data collected from some health care centers, medical centers and hospitals related to patient data and observed in most of Iraq's health centers. The medical data is kept in manual records and has not been followed by any specific standard coordination within the health standards of the medical records. Therefore, this study proposes to arrange a database within the electronic record of each patient with a record of observations about the patient and the environment in which he lives, the electronic record is a sophisticated concept of civilization, which is a systematic collection of electronic health information about every citizen where the form available to the computer can be stored and transferred in a confidential and safe and accessible. It is only authorized by the data so that the data is converted from a homogeneous format to a homogeneous form.

Data from healthcare → Extraction → Electronic record

The other stage is the reliability of these data so that data becomes reliable for large quantities of data available in various health centers and medical in different forms so data is analyzed and knowledge extracted to be organized into a solution of technical solutions in the management of large medical data within the algorithms of

science or artificial intelligence algorithms Build a central knowledge base and use a link to this data [8].

The database helps to draw conclusions and make the right decisions where the knowledge base becomes an effective source of decision-making, where the database is on two axes. The first axis is the integration and consolidation of data and the extraction of knowledge. The second is to find the relationship between the citizen and the place and environment in which he lives.

The analysis of large real health data with mining techniques is based on historical data to link patients to the database and the environment. Data mining leads to knowledge conclusions and important patterns, and data becomes coherent for decision-making, decision-support information systems, and results of the study in Iraq are promising, useful, and the effort relative to the patient and the doctor and workers in health centers in addition to it is a modern technological system and God reconcile.

6. Conclusion

In view of the current applications in the medical and health reality in Iraq in the field of health care, this study has been proposed to promote and accelerate the convergence of activities and decisions of doctors working health sector managers to save time and cost and improve the efficiency of service delivery to sick citizens and the ability to make more accurate decisions on their health and the role of Information technology in the health care and health sectors.

The potential of large data in the health sector in Iraq is not generally exploited. As technology develops and progresses rapidly, data can progress 60% of the data that is likely to be useful for us to extract, analyze and organize databases and groups within skills and regulatory organizations to benefit from the benefits large data.

This study provides the effort and cost to develop medical technology in Iraq at present, in addition to helping national policy makers and the general public, who always need to provide quick health services, providing a central knowledge base for the health care system in Iraq. Rural areas and contribute to helping the stakeholders of the health care system to take effective decisions and effective and accurate for the citizen and create a direct relationship between the citizen and the state through e-government, which leads to electronic health.

References

- [1] Colin, P., Karthik, G., Preteek, J. et al., 2011. Multiple Ontologies in Healthcare Information Technology: Motivations and Recommendation for Ontology Mapping and Alignment, In Proc: International conference on Biomedical Ontologies, NY, USA, pp. 367-369.
- [2] Craig, E., Kuziemy, F. L., 2010. A Four Stage Approach for Ontology-Based Health Information System Design, Artificial Intelligence in Medicine, pp: 33-148.
- [3] Daniel, F., Catia, P., Emanuel, S., Matteo, P., Isabel, F. C., Francisco, M. C., 2012. The AgreementMakerLight Ontology Matching System, Lecture Notes in Computer Science (LNCS), Springer, 8185, pp. 527-541.
- [4] Fayyad, U., and Uthurusamy, R., Eds. Proceedings of KDD-95: The First International Conference on

Knowledge Discovery and Data Mining. AAAI Press, Menlo Park, Calif., 1995.

- [5] Fayyad, U., Piatetsky-Shapiro, G., and Smyth, P. From data mining to knowledge discovery: An overview. In *Advances in Knowledge Discovery and Data Mining*, U. Fayyad, G. Piatetsky-Shapiro, P. Smyth, and R. Uthurusamy, Eds. AAAI/MIT Press, Cambridge, Mass., 1996.
- [6] Fayyad, U., Piatetsky-Shapiro, G., Smyth, P., and Uthurusamy, R., Eds. *Advances in Knowledge Discovery and Data Mining*, AAAI/MIT Press, Cambridge, Mass., 1996.
- [7] Matheus, C.; Piatetsky-Shapiro, G.; and McNeill, D. 1996. Selecting and Reporting What Is Interesting: The KEfIR Application to Healthcare Data. In *Advances in Knowledge Discovery and Data Mining 2011*.
- [8] Roberta Carroll, "RISK MANAGEMENT FOR HEALTHCARE ORGANIZATIONS", American Society for healthcare risk management, 2010.
- [9] Dennis Dijkzeul & Caroline Lynch, "SUPPORTING LOCAL HEALTHCARE IN CHRONIC CRISIS" Washington, 2009.



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