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Electronic Health Record Systems For Healthcare Providers

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Abstract
All healthcare organizations, clinics and hospitals need their own information system to maintain patient data. So standards have to be provided for data exchange. Electronic health records therefore have to be standardized, with semantic interoperability. EHRs would need to be designed to capture useful clinical data using standardized data definitions and standardized measures of quality. These will assist in enhancing preventive care and physician efficiency. These kinds of inaccuracies in the attribute values of patient records make it hard to locate certain patient records. Information gathered in different systems may be non-coherent or may contain conflicting information. The desired information may be entirely absent. For instance, the unit for temperature may not be input definitely as degree Celsius or degree Fahrenheit, or may be beyond the allowable range. Thus, there is a requirement for a communication format and protocol for standardization purposes, as a patient's health data is exchanged in a multi-disciplinary setting. There is a need to enable interoperability between vendors' software. Standardization will improve the quality of EHR.
Keywords: *Healthcare Providers, technology, medical big data*

1. INTRODUCTION

Healthcare integrates computing fields such as pattern recognition, machine learning, artificial intelligence, and data science [1]. Prior to the emergence of these technological terms, healthcare data was stored in devices that combined electrical, electronic, and mechanical principles. These devices were utilized for capturing images and monitoring patients' clinical readings. Healthcare technology encompasses IT tools and software designed for hospitals to manage patient records, obtain images of various organs through X-rays, CT scans, etc., extract features from images, conduct sample testing, automatically forward information to stakeholders within the hospital, and connect with external agencies such as insurance providers, blood banks, and organ donation services, all aimed at benefiting society [9]. Health institutions, including hospitals and general practitioners, are not excused from the need to install health-care systems [2]. It is feasible to retain health information about an individual in an electronic health record, a database with information about the health of the individual. Examples of health-related data include diseases, drugs, medical imaging, and Personal data in an electronic health record may include details such as an individual's name, age, gender, weight, and billing details. Such data is usually sensitive, and it has to be safeguarded against unauthorised access at all times. Thus, one of the most difficult challenges confronting health systems now is to make medical information conveyed in a secure manner without bringing about the release of patient data. In the proposed research, medical data is exchanged between participants with the use of MedPix images from the EHR.

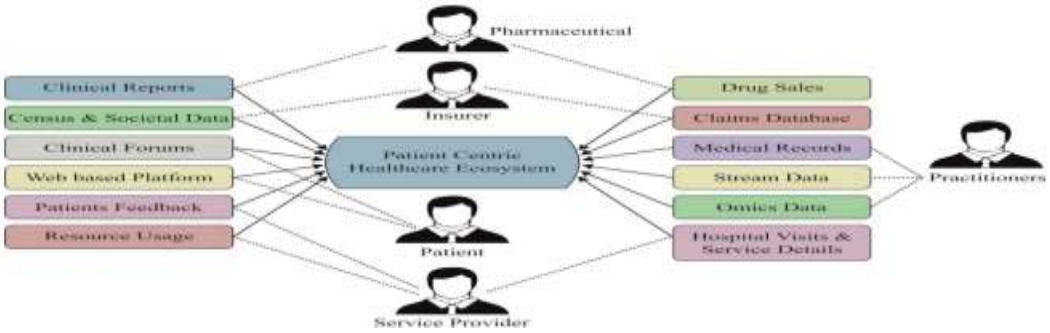

Figure 1: Sources in health care

However, the availability of these facilities cannot address all needs; they must be customized according to specific requirements, which may vary based on whether the model is hospital-centric, doctor-centric, or patient-centric [3]. This customization influences the development of health records in various formats, including Electronic Health Records (EHR) and Electronic Medical Records (EMR).

2. REVIEW OF LITERATURE

To achieve a balance between supply and demand, mass production relies on technologies such as automation, the Internet of Things (IoT), advanced communication systems, and computer mechanisms. The continuous generation of data by healthcare systems over time leads to an increase in data repositories, which acquire significant volume and diversity, playing a crucial role in meeting integration demands [5]. This data can be categorized as structured, unstructured, or semi-structured [4]. Processing such extensive data presents considerable challenges; storing and analyzing it on a single machine is often impractical due to its potentially massive size, which can reach megabytes or even petabytes. The ability of traditional file systems, such as Unix or NTFS, to manage large volumes of data is diminishing, and even standard relational database management systems (DBMS) have proven inadequate for handling such diverse and extensive datasets [13]. There is a pressing need for new technologies and tools to support current data analysis and management practices, enabling the effective handling of big data characteristics [10]. Nevertheless, the rapid growth and widespread availability of healthcare data have led to an increase in research activities within the realm of digital healthcare, with a noticeable shift in medicine towards preventive measures rather than solely therapeutic ones[6]. Through medical imaging, sensors, and patient records, healthcare institutions generate a substantial amount of varied clinical data, which represents a valuable source of big data that can be leveraged to enhance medical systems[11].

3. MATERIALS AND METHODS

Establishing a cloud-based cluster is becoming increasingly prevalent. An essential aspect of the information discovery model in digital health records is addressing heterogeneity, as these records encompass unstructured, semi-structured, and structured data, including radiological images, textual records, and other sensory information. These variances in medical data are associated with another significant characteristic of big data known as diversity. Currently, there are several challenges associated with healthcare big data analytics.

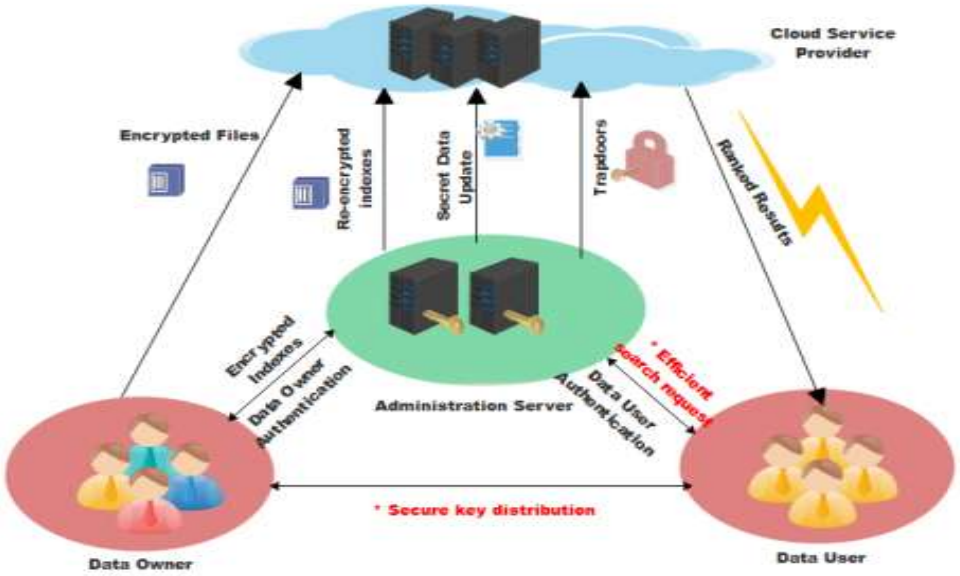

Figure 2: proposed framework

The combination of these characteristics inevitably results in uncertainty, giving rise to distinct features of Healthcare Big Data, such as accuracy. Clinical big data, as a subject for analysis, possesses specific traits that differentiate it from big data in other fields, as well as from traditional medical epidemiology.

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4. RESULT AND DISCUSSION

Most recent gadgets such as mobile phones with intruder's domains such as Apple, Amazon and numerous other websites. Smart watches and Google Glasses are produced with sensors in medical field[14]. Since the human beings have utmost concern for their health on a regular basis, Observation of Daily Living (ODL) play significant role in saving daily data and behaviors, symptoms, and signs of patient. Additionally, the data regarding sports and the nature of food for people adds to BD in public health and behavior to the highest extent[8]. Over the past decades, it is researched that more people have downloaded these healthcare apps[12]. As for diseases in public health, Google have successfully identified the time and magnitude of a disease through search engines [15].

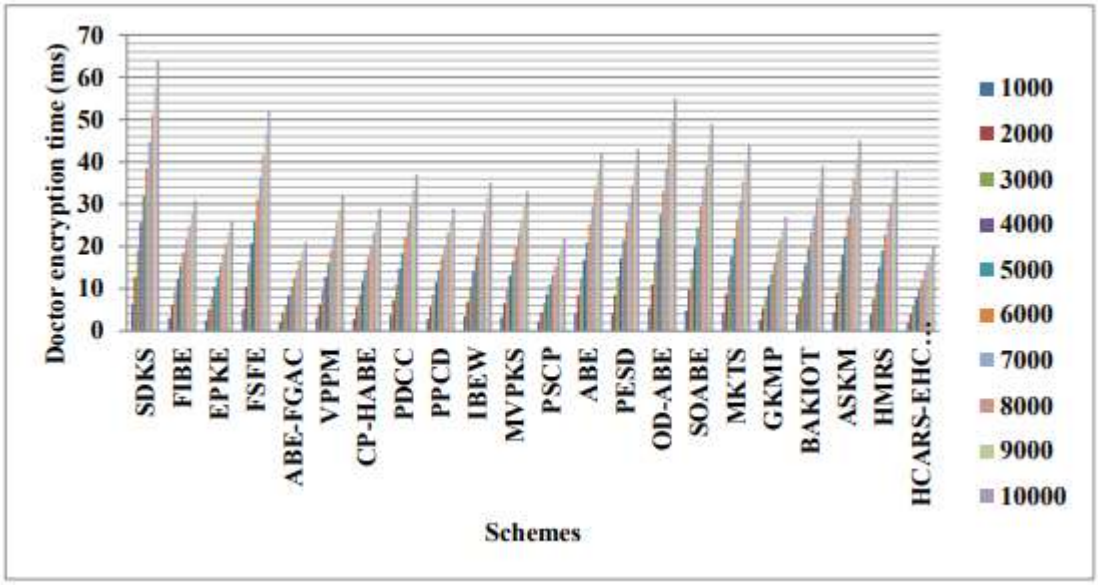

Figure 3: Encryption time

The mobile phone apps in healthcare such as Google Health, assures the users a "total control over your data," which refers that, the private data would not be shared or provided to other with no legal authorization. Many countries have two kinds of procedures and strategies for securing the data about medical sector. Initially, it is based on elementary privacy laws, governments permit extra laws, regulations and policy for protecting healthcare data. In second plan, collecting individual healthcare data is a part of sensitive information, government's permits laws for protecting personal details.

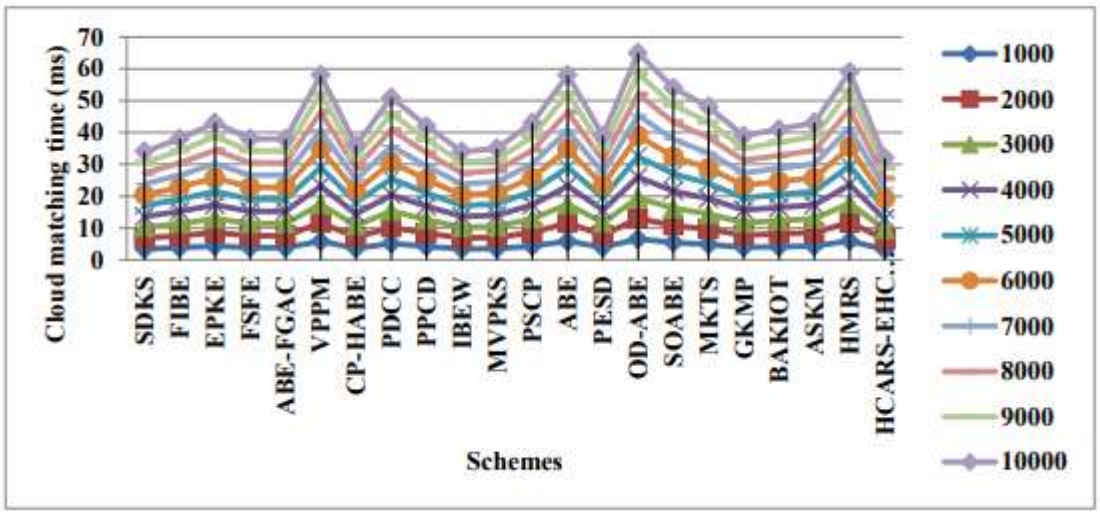

Figure 4: Cloud matching time

The model's accuracy is evaluated through deep learning techniques, achieving a classification accuracy rate of 85 to 90% for distinguishing between normal and irregular heartbeats.

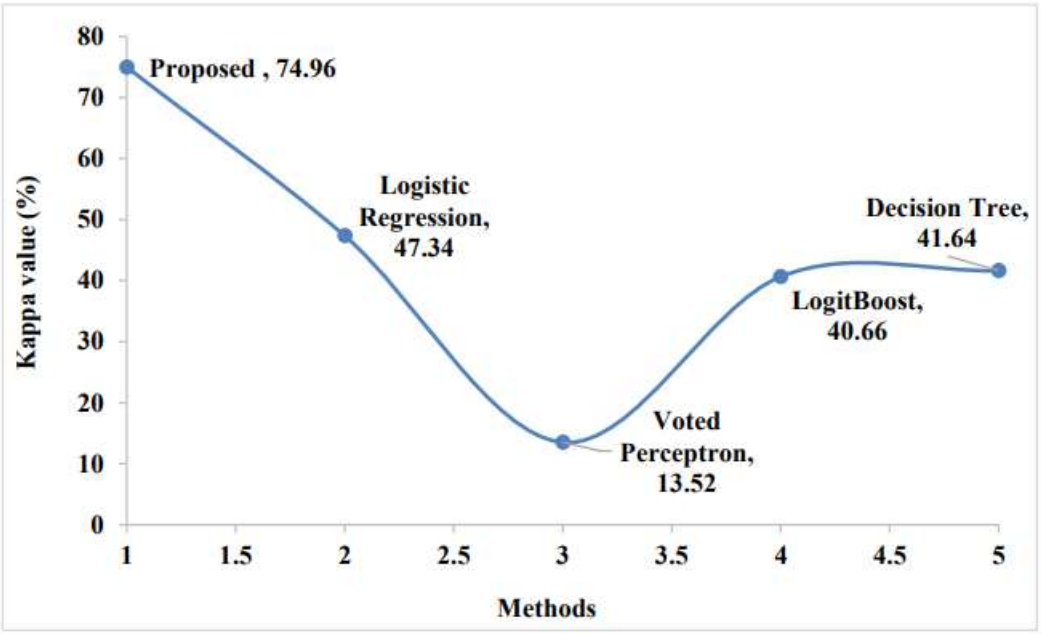

Figure 5: Analysis of kappa value

Furthermore, a range of data mining techniques has been proposed to analyze and predict cardiac diseases, with the accuracy of these methods—namely Naive Bayes (NB), Decision Trees (DT), and Artificial Neural Networks (ANN)—being assessed at 86.53%, 89%, and 85.53%, respectively.

5. CONCLUSION

Personal health systems (PHS) are designed to provide tailored treatment to individuals while enabling the healthcare system to deliver high-quality care to large populations in a financially sustainable manner. Electronic Health Record (EHR)-based solutions that incorporate predictive models for disease onset and progression empower healthcare providers to more effectively identify and manage chronic disease patients, as well as offer personalized preventive care. These technologies are favored by physicians due to their demonstrated ability to improve health outcomes and reduce costs. This research includes a comprehensive survey aimed at understanding PHS. Additionally, while big data analytics offers numerous advantages for the healthcare and medical sectors, it also raises significant concerns regarding patient privacy and organizational confidentiality. Consequently, a robust security framework is essential to safeguard the confidentiality and privacy of the big data medical support system. Extensive medical data holds substantial potential for enhancing patient outcomes, predicting epidemic outbreaks, gaining new insights, preventing avoidable illnesses, reducing healthcare expenses, and improving overall quality of life. However, determining acceptable data usage while maintaining patient privacy and security rights presents a complex challenge. This study thoroughly examines the issue of patient privacy within the healthcare system.

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