IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

A FRAMEWORK DESIGN FOR AN EFFICIENT CENTRALISED PATIENT DATABASE SYSTEMFOR HEALTHY MONITORING OF DISEASE DIAGNOSIS IMPROVEMENT

Prof. S. T. Sawale[1], Mansi Rajesh Sardar[2], Vishakha Sanjay patil[3], Shraddha Sunil Thorhate[4], Mrunal Kishor Kanadje[5]

Asst. Prof[1], Student[2,3,4] [5]IT, AEC, Chikhli, SGBAU, Amravati

Abstract: Systems for recommending healthcare have drawn a lot of interest recently due to their potential to enhance patient outcomes and treatment. By analyzing pertinent studies, approaches, and findings, this review of the literature aims to analyze the current condition of patient health care referral systems. In the area of patient-based health recommendation systems, the study emphasizes major research areas, obstacles, and potential approaches for the future. These days, healthcare administration is highly sought after because it is so beneficial to running a hospital or a doctor's office. The globe is being impacted by the expansion of health management systems on a daily basis. The increasing demand for healthcare is caused by a number of factors, including healthcare solutions. The health prediction system is a project for online user assistance and consulting. In this study, we suggest a solution that enables users to get prompt online health advice from a smart health system. The system contains numerous ailments and symptoms linked to various systems. Using data mining tools, the most likely disease linked to a patient's symptoms can be identified. A doctor can access his patient's information and report in the doctor's module by logging into the system. Doctors can examine the patient's search history and the information the patient is seeking for based on their prognosis. His data is available to the doctor. The database's administrator can add new disease details, including the disease's kind and symptoms. Based on the name and symptoms of the condition, the data mining system operates. The database of ailments and symptoms is accessible to the administrator. In a variety of fields of application, such as the healthcare recommendation system (HRS), recommender systems use various machine learning (ML) approaches to user suggestion and recommend services or entities. The HRS and many application areas are now using ML techniques from the field of artificial intelligence because to the enormous number of algorithms shown in the literature. However, it appears to take a lot of time to choose a suitable ML algorithm for a health recommender system.

Keywords:- Artificial Intelligence, Machine Learning, Recommendation System, Algorithm, Data Mining

1. Introduction

Medical services nowadays, there are really a colossal necessity of our period, as will truly assist with overseeing clinics or clinical workplaces. How much medical care framework builds every day and applies to the world. Medical care arrangements are at least one of the variables that add to the expansion sought after for wellbeing areas. A portion of these choices raise medical care, strategy and wellbeing strategies on interest for worldwide level medical care. In these medical services, the patient diagnosis is the most important aspect to design any framework for better therapy. These framework decreases manual assignments to keep up with the section in the document and also utilizes a straightforward cycle to be upheld in the data set and to get information updates, and without much time the history and diagnose procedure with recommended doctors can be achieved with the framework design.

Currently, when someone has a specific illness, they must make an expensive and time-consuming doctor visit. Additionally, if the user is far from a doctor or hospital, it could be challenging for them to diagnose their illness. Therefore, if the aforementioned procedure can be carried out by an automated program that may save time and money, it could make the process easier for the patient. A web-based tool called Healthcare Management System makes disease predictions for users based on their reported symptoms. Healthcare Management System comprises data sets that have been gathered from various websites that are relevant to health, as well as diagnoses that doctors have processed on a patient. The user will be able to identify the likely ailment from the listed symptoms with the use of this approach. People are always interested in learning new things as internet usage increases daily. Since they have no quick options when they are afflicted with a certain sickness, people always try to turn to the internet for answers to their problems because they can access it more easily than hospitals and doctors. Because the public has access to the system's health records and historical diagnosis process, it can therefore be useful.

These days, healthcare management is in extremely high demand because it is so helpful in running a hospital or a doctor's office. Worldwide, the application of healthcare management systems is expanding on a daily basis. A few of the benefits of this system include increased knowledge of healthcare management services, health policies, and the desire for top-notch medical facilities. Healthcare management is crucial to competing in the market and offering patients better care in a constantly changing world. Healthcare management systems, sometimes referred to as healthcare information management systems, are created to aid healthcare practitioners in more effectively gathering, storing, retrieving, and exchanging patient healthcare information. These systems lessen the amount of human work required to maintain records in files. Data is also saved in databases, making it simple to retrieve and update data. These systems also put a lot of effort into creating a framework that would aid in better self-management.

2. Existing system

Due to their sedentary lives, people are dealing with more severe or many medical conditions in the contemporary digital age. A significant amount of medical data describing health status in relation to patient medical reports, lab test results, and disease treatment plans has been gathered in recent years. Various websites frequently have access to this digital health information. Thanks to the growth of web services over the last few years, a lot of information is now available to everyone[1]. It is now challenging for consumers to find useful information about medical difficulties because of the extent to which online information has grown. Users find it difficult to sort through all the available data and extract the necessary information due to the growing volume of information available online [2]. By providing reliable, individualized recommendations to patients in accordance with their health conditions, healthcare recommendation systems seek to address the issue of the overabundance of medical information while customizing the user experience. As more people are impacted by a wide range of health conditions, it is now vital to pay close attention to providing appropriate treatment for serious diseases. Online healthcare service-based solutions have drawn a lot of interest from the scientific community in recent pandemic scenarios. However, this goal won't be fully realized without the adoption of data-focused mechanisms (including machine learning and big data analytics), which can work as enablers for enabling early detection and treatment of patients without admission to the hospitals [3]. There are various kinds of frameworks of recommender systems are available. A few of them are content-based recommender systems, context-based and hybrid recommender systems, etc. These different recommender systems have various problems like dependability and reliability issues. There are various proposed methods for the improvement of existing issues in their recommender system. Among all existing algorithms, deep learning is

seen as a promising algorithm [4]. It involves analysing data dimensions where a higher level of ideas is characterized from lower level ideas. In this proposed study, to solve the major issues that occur in the existing healthcare recommender system, an intelligent recommender system is proposed by using a deep learning-based algorithm for disease classification to analyze patient data. A fuzzy inference system is designed to calculate the level of risk for patients. This proposed intelligent recommender system provides suggestions based on the risk predicted by the fuzzy inference system to the patients.

Nowadays, consumers struggle to locate useful information for enhancing their well-being because of the large volume of healthcare data that is dispersed throughout numerous websites on the Internet. In addition, medical practitioners have a tough time making decisions that are patient-focused due to the abundance of medical information (such as information on pharmaceuticals, medical tests, and suggested treatments). These problems highlight the necessity for recommender systems to be used in the healthcare industry to aid in the efficient and accurate decision-making of both end users and healthcare professionals. We give a thorough overview of the literature on healthcare recommender systems in this post. In contrast to previous relevant overview studies, our study offers insights into scenarios and methods for recommendations. Food recommendations, prescription recommendations, health status predictions, healthcare service recommendations, and recommendations from healthcare professionals are a few examples of this. In order to provide a thorough grasp of recommendation systems, we also create working examples. Finally, we talk about the difficulties in creating future healthcare recommender systems.

3. Literature Survey

Harms, J. G [2019] explained a procedure for carrying out word segmentation. He suggested calculating the character spaces in the sentences in his algorithm. All different kinds of character gaps should be present in the character spaces. They consist of word gaps, punctuation, and letter gaps. The method is based on the quantity of blank space or characters between each sentence unit. The character spaces in the sentence are first identified, and then the gaps are averaged to obtain the mean average between the characters. The sentence that needs to be divided into segments is then subjected to this average gap distance. Points of tokenization are defined as locations where the character space exceeds the average character space. Since there is typically a larger space between words than the average, tokenization occurs in the spaces in between words in sentences. [1]

Nurgalieva, L. [2019] proposed utilizing NLTK to implement word segmentation. A Python library called Natural Language ToolKit (NLTK) is designed to offer NLP services. It has tokenizers built in. Users must import the package in order to utilize the appropriate tokenizer, which is available as a set of functions. The NLTK contains many tokenizers, such as standard, letter, word, classic, lowercase, N-gram, pattern, keyword, path, etc. The most used tokenizer is the word-punkt tokenizer, which punctuates phrases at empty spaces. The NLTK tokenizers' precision, quickness, and efficiency are impressive. Additionally, since the package already runs the algorithms at the backend, no implementation is necessary. [2]

Amershi, S. [2019] demonstrates how to segment words using the CRF (Conditional Random Fields) algorithm. The system is trained by this approach to account for character spacing. The algorithm recognizes the character gap in the test sentence using the training it received. The system maintains a gap distance threshold value. The test text divides at specific spots if the amount of gaps exceeds the predetermined threshold. CRF makes the procedure time-consuming because the system needs a lot of training. [3]

Holzinger, A.,Jerome [2017] presented a technique for POS Tagging termed latent analogy. The latent semantic mapping (LSM) approach is employed in this algorithm. Training with the available corpus is necessary. The trained corpus's tagged features are maintained by the LSM. Now, new phrases are given to the LSM for tagging, and analysis is done to find the training data sentences that are most similar to the test sentence. The term "sentence neighborhood" refers to this. If two sentences have the same subject matter, sentence neighbourhood holds true for both of them. The POS tags associated with those sentences are then mapped to the test sentences after the intended matching sentences have been identified from the trained data. [4]

Clark, L., et. al [2019] present a method for POS tagger implementation utilizing neural networks. There are "n" hidden layers in this algorithm. These layers are based on how many iterations or combinations are necessary to accurately tag the desired sentence. Each word in the phrase is given the proper POS tag at each layer of the algorithm before being passed on to the subsequent layer for tag accuracy verification. Unless the following layer supplies the same tags as the preceding layer, this keeps occuring. The standard method of

storing a dictionary of tags for the target language is another way to construct the POS tagger. The NLTK tagger shows to be quick and resource-effective when compared to the aforementioned three algorithms. The neural network technique, however, delivers the maximum accuracy because it goes through numerous iterations. [5]

4. Proposed system

For better and quicker treatment, it is still difficult to accurately forecast human diseases. Everywhere in the world, a multimodal diabetes condition poses a serious threat to life. It has an impact on several significant physiological organs, such as the Heart, Neuropathy, Retinopathy, and Nephropathy. A smart healthcare recommendation system correctly predicts and suggests the diabetes sickness using the top machine learning models and the data fusion technique on healthcare information. Recently, a number of machine learning models and techniques have been presented to forecast the development of diabetic disease. However, these algorithms are unable to adequately handle the enormous volume of multifeatured datasets on the diabetic illness. For the treatment of diabetes, a smart healthcare recommendation system based on deep machine learning and data fusion is presented. perspectives. Using data fusion, we can reduce the unnecessary strain on the system's computational resources and improve the efficiency of the suggested system, allowing us to anticipate and recommend this fatal disease with greater accuracy. The ensemble machine learning model is then trained to predict diabetes. Based on a well-known diabetic dataset, this intelligent recommendation system is assessed, and the results are compared to the most recent advancements in the literature. Comparing the proposed system's accuracy to existing deep machine learning techniques, it achieved 99.6%. As a result, our suggested system is more effective in predicting and recommending multimodal diabetes disease. The increased disease diagnosis performance of our suggested method argues in favour of its use in automated diagnostic and recommendation systems for diabetic patients.

- A recommendation system employs deep learning principles and algorithms to propose potential diagnosis based on past preferences or additional filtering.
- The underlying idea of these algorithms revolves around identifying patterns in patient data behavior, whether it's an individual regarding a particular service or diagnosis.
- The data collection methods vary significantly depending on the nature of the disease or recommendations being proposed.

5. Research Methodology

Many healthcare systems, hospitals, health insurers, academics, governmental organizations, etc. share a substantial amount of data. Prescriptions, clinical information, medical records, patient information, vital signs, X-rays, CT scans, and biometric fingerprints are just a few examples of the various data sources. A subset of computational intelligence known as healthcare automation systems uses reasoning techniques and domain-specific information to make suggestions similar to those made by human specialists.

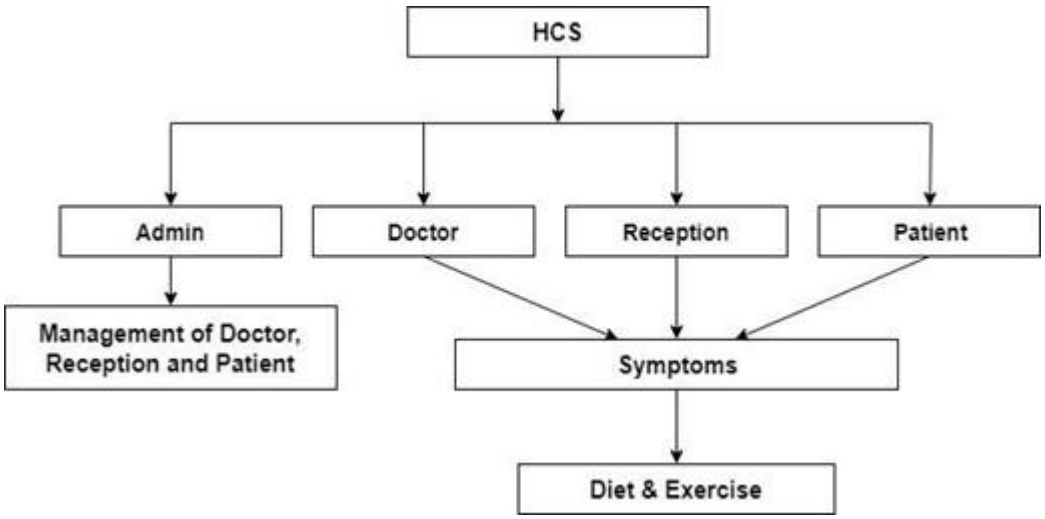

Fig.1 Overall main structure of project

Similar to any other recommender domain, we first need to comprehend the various. The various groups include:

- Nutritional information: developing suggestions to improve nutrition. The doctor may recommend dietary changes to help patients recover from illness or disease by ensuring that they receive the right nourishment. Recommendations could include balanced foods, food swaps, less spicy meals, or dietary changes.
- Physical activity: Depending on the needs of the patient, recommending the type of yoga and exercise the patient should engage in to recover quickly. Location, sickness, weather, and other factors may be required of the patient.
- Diagnosis: Using symptoms displayed in similar cases, a doctor can prescribe a diagnosis for a patient.
- Therapy/pharmaceutical: developing suggestions for various pharmaceutical regimens for a certain condition or patient-specific therapy.
- The process of data analysis makes up the second component of the framework. Health-related suggestions may be produced as a result of the data analysis process. The patients who will be using this domain should be discussed beforehand. Medical researchers, practitioners, and patients are the system's final patients.
- In addition to these end users, the health recommender system (HRS) can also be advantageous to researchers, physicians, and pharmacists. The ultimate goal of these recommender systems should be to reduce healthcare costs.

6. Implementation and Result

Machine learning techniques are employed to glean insights from data, enabling the analysis of trends and the creation of predictive models. The application of these techniques in the healthcare sector offers several advantages, including the ability to process vast amounts of data that exceed human capacity, the generation of accurate predictions through machine learning models, and valuable diagnostic support for clinicians. These labor-intensive and time-consuming tasks can be accelerated, saving both time and effort. Our research project, known as 'The Health Prediction System,' aims to identify potential signs of illness. Nevertheless, certain challenges remain unresolved. Machine learning models are susceptible to overfitting, which can lead to inaccurate predictions. Diagnosis cannot rely solely on symptoms, as various patient factors, such as lifestyle, gender, and ancestry, may contribute to illness.

A patient's medical history is preserved digitally in an electronic health record (EHR). It is a longitudinal record of patient health data produced by one or more contacts in any environment where healthcare is provided. The words "term" and "Computer-based Patient Record" (CPR) are frequently used interchangeably. It includes all important patient information, including demographics, issues, medications, doctor's observations, vital signs, immunization records, medical history, laboratory results, radiological reports, personal statistics, progress notes, and billing information. The EHR system has the potential to improve clinician productivity by automating the data management process in complex clinical situations. It can produce an exhaustive record of a patient's clinical contact and assist with other care-related tasks like quality control, outcomes reporting, and evidence-based decision making. Data is integrated by an EHR system for a variety of uses. It enables the nurse to report dangerous circumstances, the doctor to evaluate patient diagnostic data and treatment effectiveness, the administrator to use the data for billing purposes, and the researcher to learn new things. EHR's primary functions are to support clinical treatment and billing. This also includes other features like raising patient satisfaction and convenience levels, raising diagnostic precision and health outcomes, raising patient involvement and care coordination levels, raising cost-saving levels, and raising population health levels overall. The majority of contemporary EHR systems are made to integrate data from several sources, including administrative, nursing, pharmacy, laboratory, radiology, and physician records, among others. Any department may produce electronic documents.

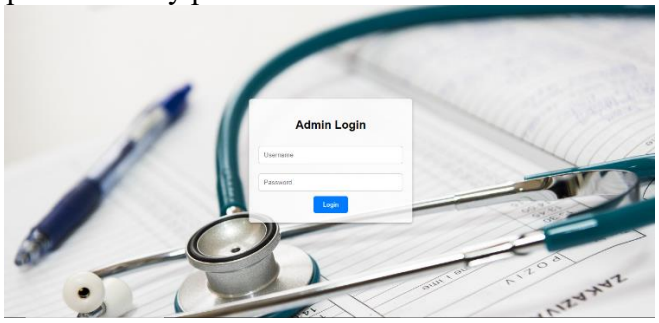

Fig. 2 Admin Login

Above shows how the user text with the system and the accurate result will be shown to the user at the end of symptom clarification. and the user have been consulted to a doctor.

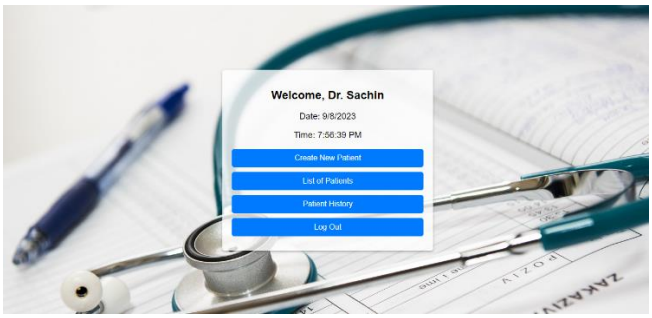

Fig. 3 Doctor's dashboard

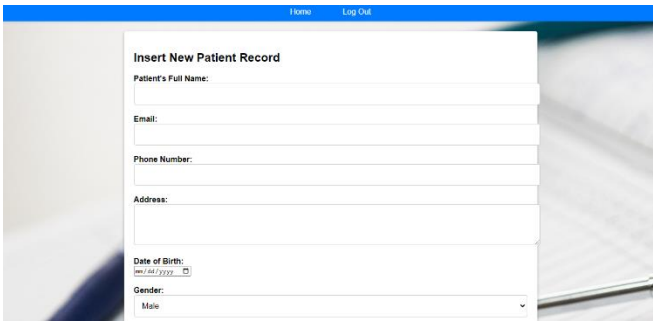

Fig. 4 Form for creation of patient profile

It shows patient sign up form for hospital patient registration form is used by medical practitioners to collect patient details before their stay in the hospital. Patient registration form is helpful in medical clinics for online registration of patients. It means it is used to collect personal patient information

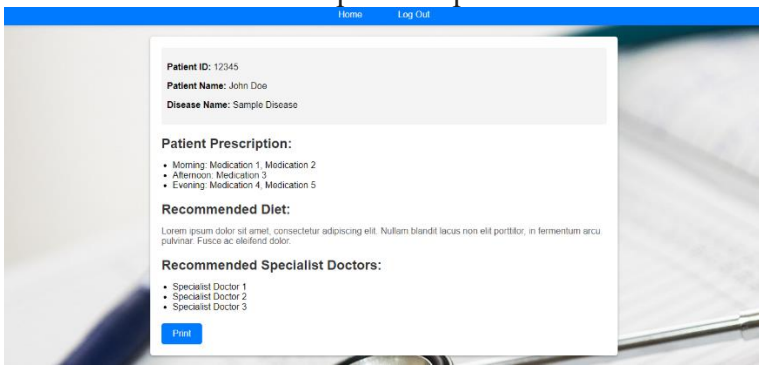

Fig. 5 Display of patient prescription and recommended list of doctor and diet

Above figure shows patient record is the repository of information about a single patient. This information is generated by health care professionals as a direct result.

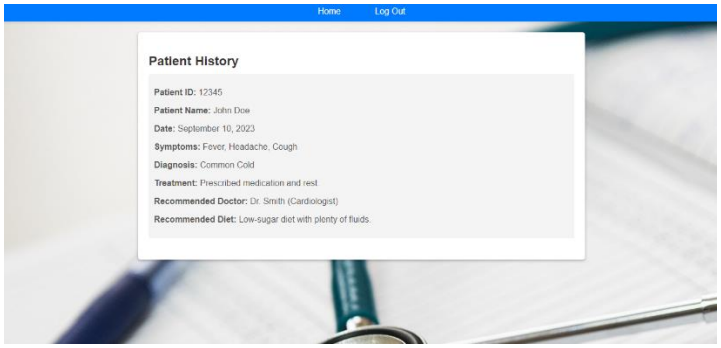

Fig. 6 Display of patient detail

Above figure shows patient profile for the doctor to form a picture of the patient's present lifestyle: home, work, and recreational activities to see if anything therein may be the cause of or contributing to the patient's health status.

7. Conclusion

As a result, the history and diagnosis process with suggested doctors can be completed quickly thanks to the framework design. Medical services today are actually a huge necessity of our time because they help with managing clinics or clinical offices. The amount of medical care framework that is developed daily and applied globally. At least one factor in the expansion desired for wellness areas is the availability of medical treatment. Some of these options increase interest in medical treatment, strategy, and welfare at the global level. The patient's diagnosis is the most crucial consideration in these medical services when creating any framework for improved treatment. Also, the goal of this project is for creating an intelligent recommendation system was achieved that can give patients the best advice regarding the necessity to have a medical body test the following day. The suggested approach intends to lower patient financial and time expenditures while improving the standard of healthcare evidence-based judgments. In order to offer helpful recommendations to patients with chronic diseases in the telehealth setting, this research creates an intelligent recommendations system that makes use of a cutting-edge time series prediction model. Both patients and medical professionals can use the system to enhance their decision-making processes and lessen the workload resulting from patient needless tests. It also provides a powerful means of lowering the possibility of bad advice.

References

1. Harms, J. G., Kucherbaev, P., Bozzon, A., and Houben, G. J., "Approaches for Dialog Management in Conversational Agents" in IEEE Internet Computing, vol 23, no. 2, pp. 13-22, 2019.
2. Nurgalieva, L., Baez, M., Adamo, G., Casati, F., and Marchese, M., "Designing interactive systems to mediate communication between formal and informal caregivers in aged care" in IEEE Access, 7, 171173-171194, 2019
3. Amershi, S., et al. "Guidelines for human-ai interaction" In Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems, pp. 1-13.
4. Holzinger, A., Biemann, C., Pattichis, C. S., and Kell, D. B., "What do we need to build explainable AI systems for the medical domain?" arXiv:1712.09923, 2017.
5. Clark, L., et. al., "What Makes a Good Conversation?: Challenges in Designing Truly Conversational Agents" In Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems, p. 475, ACM.
6. Jain, M., Kumar, P., Kota, R., and Patel, S. N., "Evaluating and informing the design of systems" In Proceedings of the 2018 Designing Interactive Systems Conference, pp. 895-906.
7. Nicolas D .Hasanagas, CharalambosBratsas, Ioannis Antoniou, Panagiotis D. Bamidis, ”Conditional Entropy Based Retrieval Model in Patient-Care Conversational Cases”,2017 IEEE 30th International conference on Computer-Based Medical System.
8. Divya Madhu, Neeraj Jain C. J, ElmySebastain, ShinoyShaji,AnandhuAjayakumar,” A Novel Approach for Medical Assistance Using Trained System”, International Conference 2016.
9. Fitzpatrick, K. K., Darcy, A., and Vierhile, M., "Delivering cognitive behavior therapy to young adults with symptoms of depression and anxiety using a fully automated conversational agent (Woebot): a randomized controlled trial" in Journal of Medical Internet Research Mental Health, vol. 4, no. 2, 2017.
10. Hwang, I., Lee, Y., Yoo, C., Min, C., Yim, D., and Kim, J., "Towards Interpersonal Assistants: Next-Generation Conversational Agents" in IEEE Pervasive Computing, vol. 18, no. 2, pp. 21-31, 2019.
11. Malik Junaid Jami Gul, Anand Paul, Seungmin Rho, Mucheol Kim, “Blockchain based healthcare system with Artificial Intelligence”, 2020 International Conference on Computational Science and Computational Intelligence (CSCI)
12. Sabyasachi Dash, Sushil Kumar Shakyawar, Mohit Sharma, and Sandeep Kaushik, “Big data in healthcare: management, analysis and future prospects”, (2019) 6:54, https://doi.org/10.1186/s40537-019-0217-0 Springer Open
13. Faiza Hashim, Khaled Shuaib and Farag Sallabi, “MedShard: Electronic Health Record Sharing Using Blockchain Sharding”, Sustainability 2021, 13, 5889. https://doi.org/10.3390/su13115889
14. Mrs.Arthi, Mrs.Priya, “Exclusive E Health Care using Centralized Health Management System”, International Journal of Computer & Organization Trends (IJCOT) –Volume 6 Issue 2– March to April 2016
15. Mylaine Bretona, Mélanie Ann Smithmanb, Martin Sassevillec, Sara A. Kreindlerd,Jason M. Sutherlande, Marie Beauséjourf, Michael Greeng, Emily Gard Marshallh,Jalila Jbiloui, Jay Shawj, Astrid Broussellek,

Damien Contandriopoulosl,Valorie A. Crooksm, Sabrina T. Wong, "How the design and implementation of centralized waiting listsinfluence their use and effect on access to healthcare - A realist review", 0168-8510/Crown, 2020 Published by Elsevier

16. Inas S. Khayal, "Designing Technology and Healthcare Delivery Systems to Support Clinician and Patient Care Experiences: A Multi-Stakeholder Systems Engineering Co-Design Methodology", 2019 IEEE International Symposium on Technology in Society (ISTAS) Proceedings Miriam Cunningham and Paul Cunningham (Eds) ISBN: 978-1-7281-5480-0
17. Edgars Sultanovs, Andrejs Romanovs, "Centralized Healthcare Cyber-Physical System's Data Analysis Module Development", 978-1-5090-4473-3/16, 2016 IEEE
18. Muizz M. Mahdy, "Semi-Centralized Blockchain Based Distributed System for Secure and Private Sharing of Electronic Health Records", 2020 International Conference on Computer, Control, Electrical, and Electronics Engineering (ICCCEEE)