ISSN : 2455-9679
Impact Factor : 3.340

IJRTSM

INTERNATIONAL JOURNAL OF RECENT TECHNOLOGY SCIENCE & MANAGEMENT

"DISEASES PREDICTION AND ANALYSIS FOR HEALTHCARE COMMUNITIES USING OPTIMIZATION TECHNIQUES"

Sanjana Chakraborty [1], ***Dr. Sunil Phulre*** [2]

[1] *M. Tech. Scholar, Department of Computer Science Engineering, LNCTU, Bhopal (India)*

[2] *Associate Professor, Department of Computer Science Engineering, LNCTU, Bhopal (India)*

ABSTRACT

As the focus of healthcare industry shifts towards patient-centric model, healthcare is increasingly becoming data-driven in nature. In the recent years, healthcare has seen a transition in its landscape from "clinical centric" care model to more consumer-driven "patient-centric" care model. There has been a movement towards service line approach with the focus shifting from Provider-centric experience to patient-centric experience. In this paper we propose the enhanced data mining algorithm for healthcare application. This proposed method is a critical issue to predict the heart disease diagnosis of adult disease patients due to the possibility of spreading to high-risk symptoms in medical fields.

Keyword: *Health Care, Machine Learning, Neural Network, Genetic Algorithm, Electronic Health Record.*

I. INTRODUCTION

Healthcare systems are highly complex, fragmented and use multiple information technology systems. With vendors incorporating different standards for similar or same systems, it is little wonder that all-round inefficiency, waste and errors in healthcare information and delivery management are all too commonplace an occurrence.
Consequently, a patient's health records often get trapped in silos of legacy systems, unable to be shared with members of the healthcare community. These are some of the several motivations driving an effort to encourage standardization, integration and electronic information exchange amongst the various healthcare providers.

Medical imaging provides important information on anatomy and organ function in addition to detecting diseases states. Moreover, it is utilized for organ delineation, identifying tumors in lungs, spinal deformity diagnosis, artery stenosis detection, aneurysm detection, and so forth. In these applications, image processing techniques such as enhancement, segmentation, and denoising in addition to machine learning methods are employed. As the size and dimensionality of data increase, understanding the dependencies among the data and designing efficient, accurate, and computationally effective methods demand new computer-aided techniques and platforms.

The rapid growth in the number of healthcare organizations as well as the number of patients has resulted in the greater use of computer-aided medical diagnostics and decision support systems in clinical settings. Many areas in health care such as diagnosis, prognosis, and screening can be improved by utilizing computational intelligence. The integration of computer analysis with appropriate care has potential to help clinicians improve diagnostic accuracy. The integration of

ISSN : 2455-9679
Impact Factor : 3.340

medical images with other types of electronic health record (EHR) data and genomic data can also improve the accuracy and reduce the time taken for a diagnosis [6].

II. MACHINE LEARNING APPROACH IN HEALTHCARE

ML in healthcare services [25] assists with investigating a large number of various information focus and recommend results, give auspicious risk scores, exact asset allotment, and has numerous different applications. The attention on the best way to utilize ML to expand persistent consideration. For instance, on the off chance that specialists are testing a patient for cancer, at that point they need the most excellent biopsy results to determination. ML calculation [30] that can audit the pathology data and help the pathologist with a determination is important. In the event that specialists can get the outcomes in a small amount of the time with an indistinguishable level of precision, at that point, at last, this will improve tolerant consideration and fulfillment.

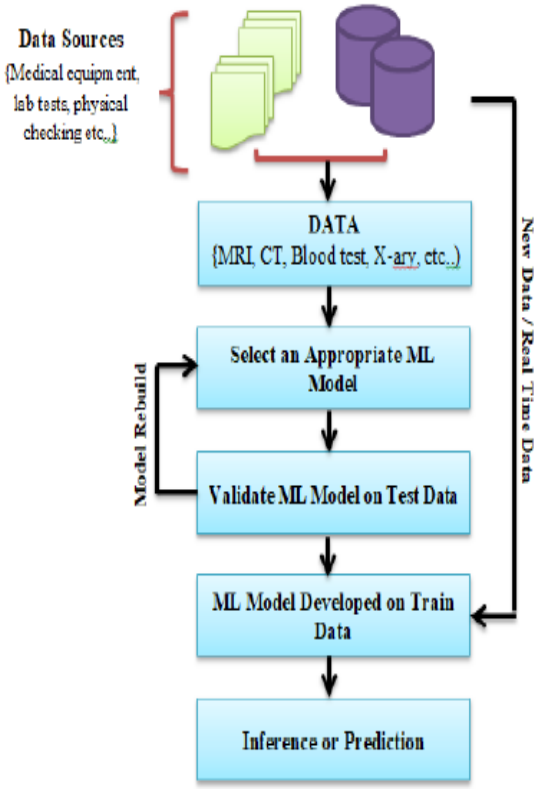

Fig 1: Block diagram of ML Model for Healthcare [25].

III. PROPOSED WORK

Machine learning is a general-purpose method of artificial intelligence that can learn relationships from the data without the need to define them a priori. The major appeal is the ability to derive predictive models without a need for strong assumptions about the underlying mechanisms, which are usually unknown or insufficiently defined. The typical machine learning workflow involves four steps: data harmonization, representation learning, model fitting and evaluation. For decades, constructing a machine learning system required careful engineering and domain expertise to transform the raw data into a suitable internal representation from which the learning subsystem, often a classifier, could detect patterns in the data set.

Heart is a significant and indispensable organ in person body. Its functioning is essential for the life of a person. However, it is sensitive to certain aspects. For instance, rise in fasting blood sugar, maximum heart rate and exercise induced angina to mention few. It is also affected by the life styles of people. There has been considerable research on

ISSN : 2455-9679
Impact Factor : 3.340

the protection of heart from diseases. When data related to different attributes of heart or associated with heart is available, it is possible to predict heart disease. This prediction process is carried out with a systematic approach. Such approach is known as machine learning method which is part of AI [4]. Prior to review various AI methods used in the research of heart disease prediction process. Since we have vast amounts of medical datasets, machine learning can help us discover patterns and beneficial information from them. Although it has many uses, machine learning is mostly used for disease prediction in the medical field. Many researchers became interested in using machine learning for diagnosing diseases because it helps to reduce diagnosing time and increases the accuracy and efficiency. Several diseases can be diagnosed using machine learning techniques, but the focus of this paper will be on heart disease diagnosis. Since heart disease is the primary cause of deaths in the world today, and the effective diagnosis of heart disease is immensely useful to save lives.

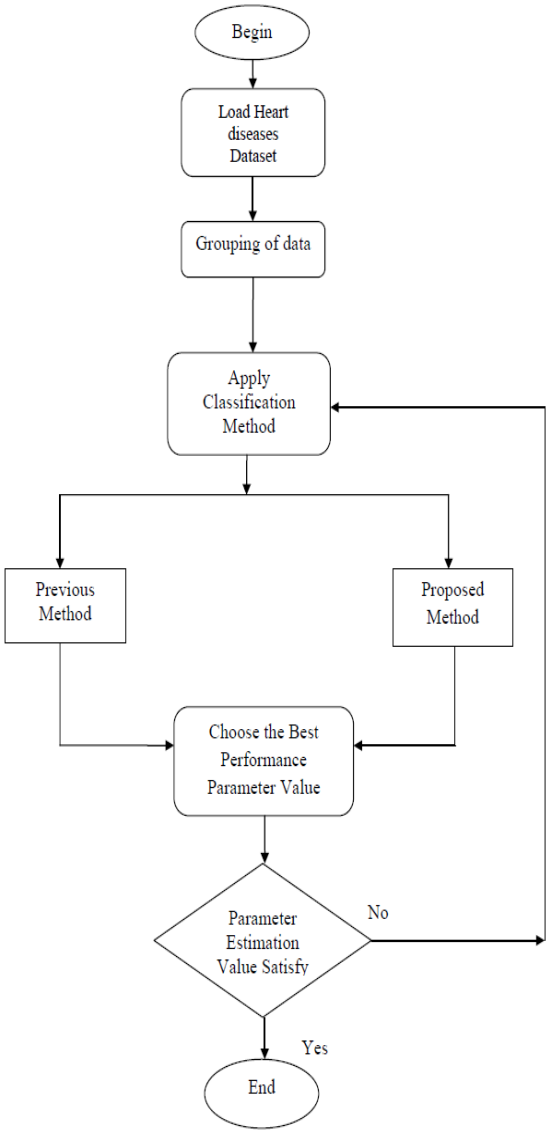

Fig 2: Proposed flow graph for heart diseases prediction.

IV. EXPERIMENTAL WORK ANALYSIS

In this section, experimental process of we show that the comparative result analysis study for the health care sector with disease diagnosis of various dataset such as cleveland heart datasets etc. are performed. This process of disease diagnosis of various dataset is done by using previous and proposed method. Here we used the dataset which used for the heart diseases detection in the field of health care. this dataset types will be fetched from the UCI machine learning repository for the research purpose.

ISSN : 2455-9679
Impact Factor : 3.340

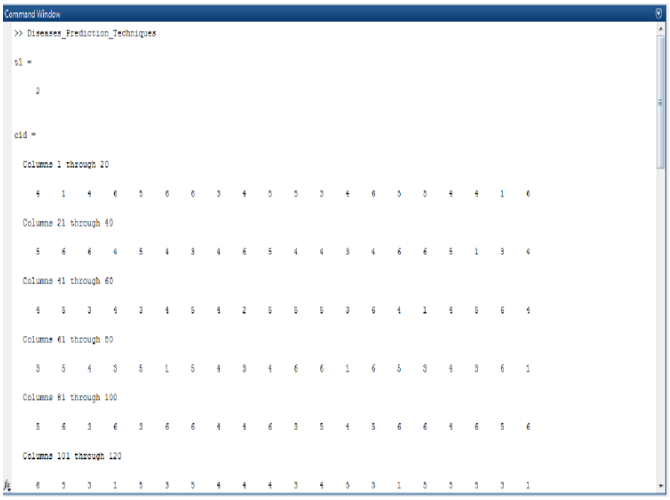

Fig 3: This windows show that the result of Decision Tree methods in the experimental process using Cleveland dataset.

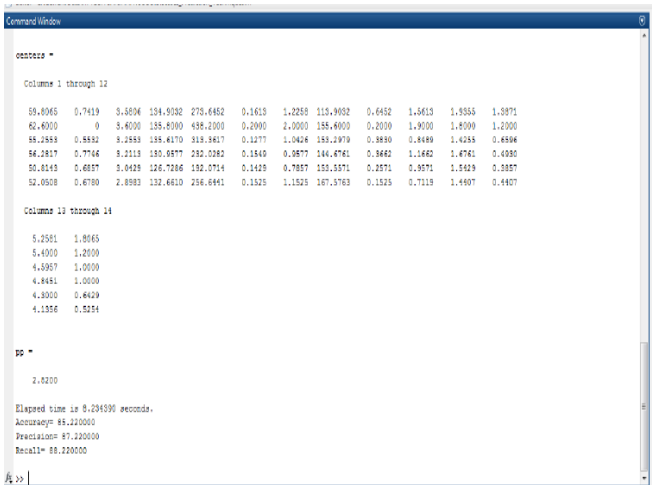

Fig 4: This windows show that the result of Decision Tree methods with accuracy in the experimental process using Cleveland dataset.

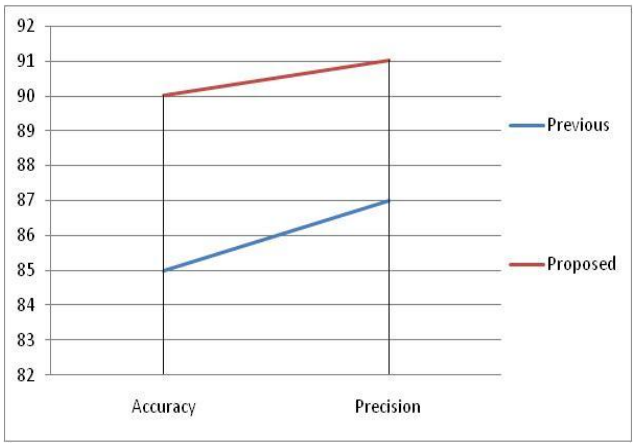

Fig 5: Show that the comparative result analysis for the Cleveland disease diagnosis using various classification techniques, our proposed method result shows better accuracy and precision than existing methods.

ISSN : 2455-9679
Impact Factor : 3.340

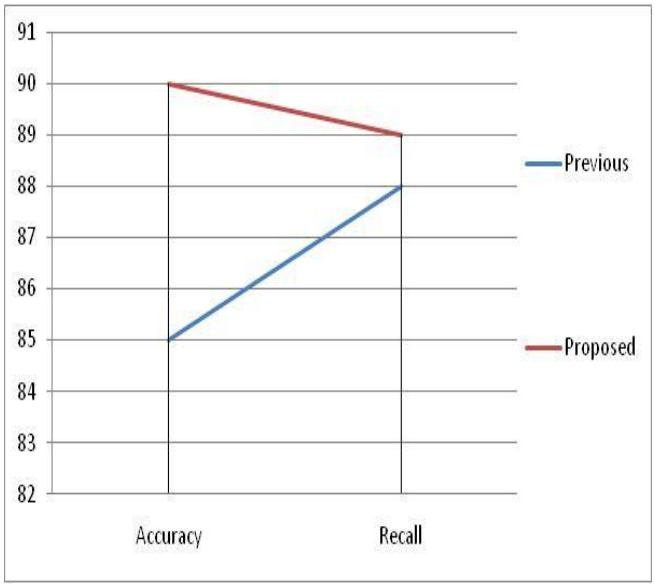

Fig 6: Show that the comparative result analysis for the diabetes disease diagnosis using various classification techniques, our proposed method result shows better accuracy and precision than existing methods.

V. CONCLUSION

Disease prediction has become an important research area owing to the availability of large electronic health datasets. The full-featured clinical datasets are restricted, with limited access due to privacy issues, whereas many large-scale administrative datasets have been made available by different healthcare stakeholders around the world. In this paper we present the comparative performance evaluation for the previous and proposed machine learning techniques and improve the performance than existing system.

REFERENCES

[1] MIN CHEN, YIXUE HAO, KAI HWANG, LU WANG, AND LIN WANG, "Disease Prediction by Machine Learning Over Big Data From Healthcare Communities" SPECIAL SECTION ON HEALTHCARE BIG DATA, Vol-5, IEEE, 2017. Pp 8869-8879.

[2] Gopi Battineni, Getu Gamo Sagaro, Nalini Chinatalapudi, Francesco Amenta, "Applications of Machine Learning Predictive Models in the Chronic Disease Diagnosis", J. Pers. Med. 2020, pp 1-11.

[3] Shivaganga S P, Hemashree H C, "DISEASE PREDICTION AND ANALYSIS FOR HEALTHCARE COMMUNITIES", International Journal of Advances in Engineering & Technology, June, 2019, pp 45-51.

[4] Pulugu Dileep, Kunjam Nageswara Rao, Prajna Bodapati, " A Review on Machine Learning Techniques for Data-Driven Heart Disease Prediction", 2019, pp 304-316.

[5] P. Sunanda, " MACHINE LEARNING FOR DISEASE PREDICTION BY USING NEURAL NETWORKS", IJRAR May 2019, pp 712-719.

[6] Ekta Maini, Bondu Venkateswarlu, Arbind Gupta, "Data Lake-An Optimum Solution for Storage and Analytics of Big Data in Cardiovascular Disease Prediction System", International Journal of Computational Engineering & Management, 2018, pp 33-39.

[7] N Satyanandam, Ch Satyanarayana, "Heart Disease Detection Using Predictive Optimization Techniques", I.J. Image, Graphics and Signal Processing, 2019, pp 18-24.

[8] Md Ekramul Hossain, Arif Khan, Mohammad Ali Moni, Shahadat Uddin, "Use of electronic health data for disease prediction: A comprehensive literature review", IEEE, 2019, pp 1-20.

[9] Jenna Wiens , Suchi Saria, Mark Sendak, Marzyeh Ghassemi, Vincent X. Liu Finale Doshi-Velez, Kenneth Jung, Katherine Heller, David Kale, Mohammed Saeed, Pilar N. Ossorio, Sonoo Thadaney-Israni, Anna Goldenberg, "Do no harm: a roadmap for responsible machine learning for health care", Nature Medicine, 2019, pp 1-4.

[10] Latha R, Vetrivelan P, "Blood Viscosity based Heart Disease Risk Prediction Model in Edge/Fog Computing", 2019, pp 833-837.

[11] Stephen Dankwa, Wenfeng Zheng, "Special Issue on Using Machine Learning Algorithms in the Prediction of Kyphosis Disease: A Comparative Study", Journal of Appl. Sci. 2019, pp 1-32.

[12] A. SUHASINI, A.Subitha, S.Midhun, "Investigation Study on Disease Prediction Techniques with Big Data", Studies in Indian Place Names, 2020, pp 99-106.

[13] NORMA LATIF FITRIYANI, MUHAMMAD SYAFRUDIN, GANJAR ALFIAN, JONGTAE RHEE, "Development of Disease Prediction Model Based on Ensemble Learning Approach for Diabetes and Hypertension", SPECIAL SECTION ON DATA-ENABLED INTELLIGENCE FOR DIGITAL HEALTH, IEEE 2019, pp 144777-144790.

[14] Thanh Hai Nguyen, Edi Prifti, Nataliya Sokolovska, Jean-Daniel Zucker, "Disease Prediction using Synthetic Image Representations of Metagenomic data and Convolutional Neural Networks", IEEE, 2019, pp 1-7.

[15] R. Ramani, K. Vimala Devi, K. Ruba Soundar, "MapReduce-based big data framework using modified artificial neural network classifier for diabetic chronic disease prediction", Soft Computing, 2020, pp 1-12.

[16] R. Venkatesh, C. Balasubramanian, M. Kaliappan, "Development of Big Data Predictive Analytics Model for Disease Prediction using Machine learning Technique", Journal of Medical Systems, 2019, pp 1-8.

[17] N. Sowri Raja Pillai, K.Kamurunnissa Bee, J.Kiruthika, " PREDICTION OF HEART DISEASE USING RNN ALGORITHM", International Research Journal of Engineering and Technology, 2019, pp 4452-4459.

[18] Noura E. Maghawry, Samy Ghoniem, "A Proposed Internet of Everything Framework for Disease Prediction", 2019, pp 20-27.

[19] Nishita Mehta, Anil Pandit, Meenal Kulkarni, "Elements of Healthcare Big Data Analytics", Springer 2020, pp 23-29.

[20] Lewlyn L. R. Rodrigues, Dasharathraj K Shetty, Nithesh Naik, Chetana Balakrishna Maddodi, Anuradha Rao, Ajith Kumar Shetty, Rama Bhat & B. M. Zeeshan Hameed, "Machine learning in coronary heart disease prediction: Structural equation modeling approach", Cogent Engineering, 2020, pp 1-15.

[21] Ayush Khaneja, Siddharth Srivastava, Astha Rai, A S Cheema, P K Srivastava, "Analysing Risk of Coronary Heart Disease through Discriminative Neural Networks", Conferences paper 2020, pp 2-8.

ISSN : 2455-9679
Impact Factor : 3.340

[22] Panagiota Galetsi, Korina Katsaliaki, Sameer Kumar, "Big data analytics in health sector: Theoretical framework, techniques and Prospects", International Journal of Information Management, Elsevier Ltd. 2020, pp 206-216.

[23] Shoayee Alotaibi, Rashid Mehmood, Iyad Katib, Omer Rana, Aiiad Albeshri, "Sehaa: A Big Data Analytics Tool for Healthcare Symptoms and Diseases Detection Using Twitter, Apache Spark, and Machine Learning", Appl. Sci. 2020, pp 1-29.

[24] Joseph Finkelstein, Frederick Zhang, Seth A. Levitin, David Cappelli, "Using big data to promote precision oral health in the context of a learning healthcare system", Journal of Public Health Dentistry, 2020, pp 43-58.

[25] Arjun K.P., K. Sampath Kumar, "Machine Learning - A Neoteric Medicine to Healthcare", International Journal on Emerging Technologies, 2020, pp 195-201.

[26] Smadar Shilo, Hagai Rossman, Eran Sega, "Axes of a revolution: challenges and promises of big data in healthcare", Nature Medicine, 2020, pp 29-38.

[27] Yanshan Wanga, Yiqing Zhao, Terry M. Therneau, Elizabeth J. Atkinson, Ahmad P. Tafti, Nan Zhang, Shreyasee Amin, Andrew H. Limper, Hongfang Liu, "Unsupervised Machine Learning for the Discovery of Latent Disease Clusters and Patient Subgroups Using Electronic Health Records", Elsevier ltd. 2019, pp 1-17.