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Predictive Analysis of Healthcare with Machine Learning Approach

V. M. Prabhakaran[1], M. Ramesh[2], L. Jeevitha[3], A. Kowsalya[4], S. Maneesh Bala[5]
[1, 2] *Assistant Professor, Department of CSE, KIT-Coimbatore, Tamilnadu, India*
[3, 4, 5] *UG Student, Department of CSE, KIT-Coimbatore, Tamilnadu, India*

Abstract: Predictive Analysis hold within a variety of statistical techniques from data mining, predictive modeling, machine learning and statistical algorithms that analyses current and historical facts to make prediction about future. Predictive analysis involves extracting data from existing data sets with the goal of identifying trends and patterns which is used to predict future outcomes and trends. It provides companies with ability to reliably forecast future trends and behaviors. In this Paper we define how Predictive analysis holds a way in healthcare and the technologies incorporated with it.

Keywords: Predictive analysis, Healthcare, Machine learning, Statistical algorithm

I. PREDIVTIVE ANALYSIS PROCESS&TYPES

A. Data Collection, Project and Analysis

It is the process of prepares data from multiple sources for analysis. It helps us to collect data from the observations and the historical medical record for deciding the best diagnose. It defines the project outcomes, deliverable, identify the data sets that are going to be used. In healthcare, it defines the treatment outcomes, identifying the disease and the observations for the particular patient. Data analysis is the process of inspecting, cleaning and modeling data in focus of discovering useful information. In healthcare, data analysis is useful to find patient caused by which disease - by analyzing the data sets.

B. Statistics and Modeling

It enables to validate the assumptions, hypothesis and test them using standard statistical models. It is used for diagnosing the patient with the help of the existing statistical medical report. Predictive modeling provides the ability to automatically create accurate predictive models about future. It helps the physician or care providers to select the modeling for treatment.

C. Deployment and Model Monitoring

Deployment provides the option to deploy the analytical results into everyday decision making process to get results, reports and output by automating the decisions based on modeling. It is used to make the report or results of a patient everyday by automatically. Models are managed &monitored to review the model performance to ensure that it providing the results expected.

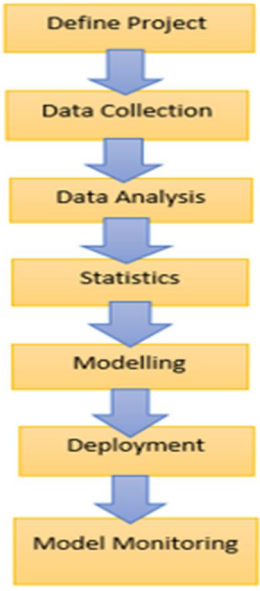

Fig. 1.1 Predictive analysis process

II. LITERATURE SURVEY

S.No	TITLE	AUTHOR NAME	PROPOSAL	YEAR
1.	The next generation of risk assessment and management: Introducing the eHARN.	Katelyn Mullally, Mini Mamak, et.al.,	It describes about the big data and analytics rapidly changes the healthcare field which uses limited number of quality indicators and improves the quality of care. The electronic Hamilton Anatomy of Risk Management aims to harness the capabilities afforded by data analytics.	2018
2.	Concurrence of big data analytics and healthcare: A systematic review.	Nishita Mehta, Anil Pandit.	It explains about the importance of big data analytics applications which improves the quality of care and it also explains about the rapid development and importance in the digitalization of healthcare records.	2018
3.	Exploring the potential of big data on the health care delivery value chain (CDCV): a preliminary literature and research agenda.	William J. Tibben, Samuel Fosso Wamba	It describes about the big data analytics which is a game changer in healthcare and offers many applications in predicting epidemics and preventing preventable deaths.	2018
4.	Predictive Healthcare Informatics using Deep learning-A big Data Approach.	Dr.K.PurnaAnand	It describes about the application of big data in healthcare field which will build a biomedical sub discipline.	2018
5.	Healthcare predictive analytics: An overview with a focus on Saudi Arabia.	Hana Alharthi	It explains about the health data analytics with an emphasis on predictive analysis in their improvements in quality of care.	2018
6.	Towards Practical Privacy-Preserving Analytics for IoT and Cloud-Based Healthcare Systems.	Sagar Sharma, KekeChen, et.al.,	It explains about the modern healthcare information system and also explains about the kHealth which is being developed and tested for disease monitoring.	2018
7.	Infrastructural Model for the Healthcare System Based on Emerging Technologies.	Aleksandra Vukmirovic, Zoltan Rajnai, et.al.,	It explains about the infrastructural model which represents the pillar for medical research and strongly implements about the future big data technologies and also briefly says about the structured and non- structured data format.	2018
8.	Leveraging Big Data Analytics to Improve Quality of Care in Healthcare: A fsQCA Approach.	Yichuan Wang	It explains about the big data analytics which shows tremendous benefit for healthcare industries and improves the quality of care at low cost and it also says how to achieve higher quality of care in big data analytics capabilities. The big data analytics identifies the higher performance solution by effective usage of big data analytics.	2018
9.	Predictive Analysis in Healthcare System using Data Mining Techniques.	BasmaBoukenze, HajarMousanni, et.al.,	lt explains how the predictive analytics is used in predicting medicine because predicting diseases and anticipating the cure become easy and explains the overview of evolution of healthcare system.	2016
10.	Big Data analytics: Understanding its capabilities and potential benefits for healthcare organizations.	YichuanWang, LeeAnn Kung, et.al.,	It describes about the consequences in healthcare and helps the healthcare organisations to understand about the data-driven analytics and recommend to adopt big data analytics.	2016
11.	Predictive Methodology for Diabetic Data Analysis in Big Data	Dr.Saravana Kumar N M, Eswari, et.al.,	It explains about the importance of data analytics in healthcare industry especially for non-communicable disease and also says how predictive analysis help in curing diabetes.	2015

12.	Data Flow Modelling for Effective Protection of Electronic Records (EHRs) in cloud:	V.M.Prabhakaran, Prof.S.Balamurugan, et.al.,	This explains about the personal healthcare data which will remain for long-term property of patients data.	2015
13.	The Legal And Ethical Concerns That Arise From Using Complex Predictive Analytics In Health Care	I. Glenn Cohen, Amarasingham, et.al.,	It explains about the forecasting future events of predictive analytics and the challenges of implementing the predictive analytics. New technologies will be available soon that can harness the power of large data sets.	2014
14.	BIG DATA AND PREDICTIVE ANALYTICS IN HEALYH CARE	VasantDhar	It explains about the predictive healthcare analytics which uses clinical arena and the usefulness of the output produced by the predictive systems were used in the prevention of diseases.	2014
15.	Big data analytics: promise and potential.	Wullianallur Raghupathi, Viju Raghupathi.	It explains about the promise and potential of big data analytics in healthcare and also describes about the bnascent field of big data analytics.	2014
16.	Strategies for Solving the NP-hard Workflow Scheduling Problems in Cloud Computing Environments.	S.Balamurugan, V.M.Prabhakaran, et.al.,	Cloud computing environment provide a detailed investigation on solving np-hard problems like scheduling and task allocation. The given application will be split into tasks which is done by deviation algorithm. The static scheduling algorithm is capable of managing and mapping tasks of work flow on resources will greatly aid in meeting the user specific information.	2014
17.	A Predictive analytics approach to reducing 30-day avoidable readmissions among patients with heart failures, acute myocardial infarction, pneumonia, or COPD.	Issac Shams, Saeede Ajorlou, et.al.,	It explains criticalness of hospital readmission within 30days of discharge. The effectiveness and sustainability of transition care management depends on how well they can identify patient high risk of rehospitalization. unnecessary readmission will increasingly perceived as a marker of the quality of care that patients receive during hospital admissions.	2014
18.	Predictive Analytics in Healthcare	Roger Higdon, Elizabeth Stewart, et.al.,	It explains about the complexity of patients on medications based on number and type and also says about the retrospective analysis of medication.	2013
19.	Data Science, Predictive Analytics, and Big Data: A Revolution That will Transport Supply chain Design and Management	Matthew A. Waller, Stanley E. Fawcett	It explains about Data Science and Predictive Analytics which is applied to Supply Chain Management and DPB.	2013

III. PREDICTIVE ANALYTICS IN HEALTHCARE

Big data terminologies and applications are widely used in healthcare for curing, discovering and studying about disease. Big data applications mainly use four disciplines which are bioinformatics, clinical informatics, imaging informatics and public health informatics. Predictive analytics is used widely to predict diseases and also uses various techniques from data mining, modeling, Machine learning, statistics and artificial intelligence to predict future. Big data analytics is used in discovering decisions which understands the data patterns with the help of machine learning algorithms. Deep learning approach is used for extracting meaningful representations in some particular domain. In health care large amount of data is maintained this data should be properly analyzed to improve the quality of healthcare, which is possible by using predictive analytics.

Data mining approach and applications are widely used in elicit knowledge, which is based on the interaction between measured parameters and patient survival. Big data is used for the explosion of digital data and the big data sets is the one in which the size, extent and growth of data increases it cannot be effectively managed. The cloud computing played major role in healthcare, which changed the concept of relocating the tests of care outside the four walls of hospital and made them available anywhere and at anytime. Predictive analytics in Google Trends which helps big data shows itself as a solution for many problems on medical sector.

IV. FIVE WAYS TO USE PREDICTIVE ANALYSIS IN HEALTHCARE

A. To quickly diagnose and treat aggressive, life-threatening disease:- Using bigdata, physicians are able to help diagnose, treat and cure patients faster than ever before. Predictive analysis is helpful when dealing with quickly advancing diseases, diseases with common, flu-like symptoms, disease that have mild, almost non-existent symptoms. In university of Pennsylvania ,predictive analysis were shown to be incredibly successful at treating severe sepsis before damage sets in. without predictive analytics, just 50 percentage of patients only get treatment on time. With predictive analytics, Penn can manage 80 percentages of sepsis cases within 30 hours.

B. To increase the accuracy of diagnosis: - It is difficult to hospitalize a patient if they're suffering from common symptoms. In example, if a patient has a chest pain which cause may be a heart attack, an early symptom of coronary artery disease, a pulled muscle, and an anxiety attack. A doctor may not think mild chest pain requires hospitalization, but it may be a larger problem. Predictive analytics helps doctors answer questions about the patient, which are then sent into a system and tested.

C. For more effective preventative treatment:-Predictive analytics in healthcare has been extremely successful is by identifying a patient's illness in the future. Doctors can collect treatment data in an Electronic Medical Record (EMR) for later use. Predictive analytics can scan a patient's genome to find whether the patient has gene marker for early onset Alzheimers disease. If the gene is found in the patient's family tree, preventative treatment can be taken immediately.

D. To predict insurance and product costs for employees :- Insurance is a huge expense for companies looking to provide health coverage to their employees. Predictive analytics can help employees to calculate future medical costs. Healthcare providers generating prediction algorithms based on their own database and employer data. Hospitals and insurance providers can synchronize their databases and actuarial tables to build specific, cost-effective health plans.

E. To help pharmaceutical companies better meet the needs of the public: - The pharmaceutical industry is a massive money-maker that focusses on bringing the largest amount of money with lowest amount of cost. If you use predictive analytics in healthcare, the benefits are extraordinary. They include wasting less money on ineffective medicine, finding markets for lesser-used, but effective, medication, evaluating the need for specific medications.

F.

V. CONCLUSION

Healthcare uses Predictive analysis to process the advanced strategic portfolio modeling. It involves in predicting high risk patients, leverages advanced analytics to reduce the hospital readmission. Quantify health costs & productivity of simulated workforce while recommending the most appropriate wellness inventions. It is more process with Fourier transform which is used to convert the images that are then converted into readable format.

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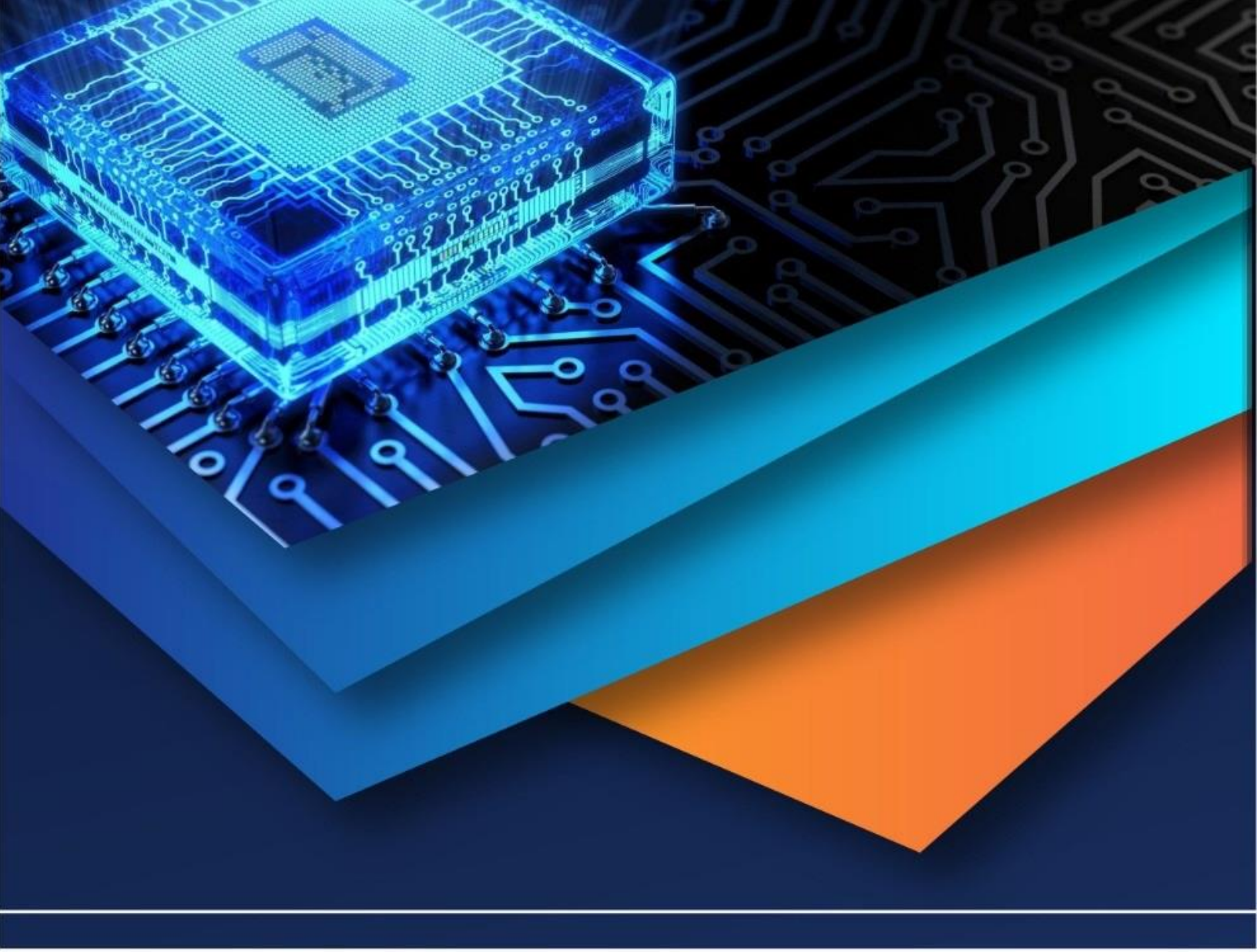

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