ISSN XXXX XXXX © 2017 IJESC

Research Article Volume 7 Issue No.6

A Study on Data Mining Techniques on Healthcare Issues and its uses and Application on Health Sector

Sangeeta Oswal[1], Gokul Shah[2]
Assistant Professor[1], PG Student[2]
Department of MCA
Vivekanand Education Society Institute of Technology, Chembur, Mumbai, India

Abstract:
Data mining is very famous research fields due to its number of algorithms to mine the data in an proper manner. This paper focused on Data mining techniques on healthcare issue, applications, benefits and uses on health care sector. In this paper two popular healthcare issues are coined that are data mining techniques for cancer disease and heart disease. Finally, the existing data mining techniques with data mining algorithms and its application tools which are more valuable for healthcare services are discussed in detail.

Keywords: DATA MINING, Knowledge Discovery Database,Computer Aided Diagnosis (CAD), Acute Lymphatic Leukemia(ALL),

1. INTRODUCTION

Data Mining is one of the most important and vital area of research with the objective of finding meaningful information from huge data sets. The purpose of data mining is to extract useful information from large databases or data warehouses. Data mining applications are used for commercial and scientific sides [1].Data mining refers to mining or extracting knowledge from large amounts of data or databases. The development of finding useful patterns or importance in raw data has been called KDD(knowledge discovery in databases)

2.1 Data mining:
Data mining is a stage knowledge discovery process. This stage is useful for extracting the useful patterns from data.

Evaluation:

The useful patterns which the system identified are interpreted into knowledge in this stage. This knowledge may be then useful for making meaningful decisions.
Not all analyses of large amounts of data constitute data mining. It generally categorize analytics as follows [8]:
Descriptive analytics:- Describing what has happened
Predictive analytics:-Predicting what will happen
Prescriptive analytics:-Determining what to do about it.

2.2 Data mining in heath care:

Nowadays all the healthcare organizations across the world stored the healthcare data in electronic format. There is an tremendous growth in the amount of electronic health records collected by healthcare facilities. It has been the norm for hospital to take responsibility in handling patient data input that was traditionally recorded in paper-based forms. Accuracy is extremely important when it comes to patient care and computerizing this massive amount of data. enhances the quality of the whole system.

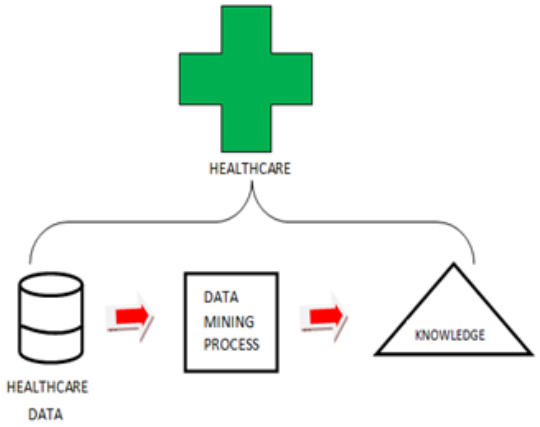

Figure.1. Data-mining on healthcare

Improving the patient care quality and reducing costs of healthcare are the ideal goals of many programs. Data mining has helped these programs succeed.

Benefits of Data Mining in the Healthcare:

I. Healthcare providers or insurance companies, data mining benefits everyone concerned, from healthcare organizations to insurers to patients[9].

II. Patients will receive more affordable and better healthcare services. This only happens when healthcare system initiator use data mining programs to identify and observe high risk patients and chronic diseases and design the right interventions needed. These programs also reduce the number of claims and hospital admissions.

III. Healthcare providers use data mining as well as data analysis to find best practices and the most effective treatments. These tools compare symptoms, causes, treatments and negative effects and then proceed to analyze which action will prove most effective for a group of patients.

IV. Healthcare data mainly contains all the information regarding patients as well as the parties involved in healthcare industries. The storage of such type of data is increased at a very rapidly rate.

2. LITERATURE STUDY

Data mining is known as one of the part of knowledge Database Discovery (KDD) process. And also you will find many data mining techniques but they all have origins based on science disciplines or machine learning [1]. Han et al.[2] defined the data mining as the process of discovering interesting knowledge from large amounts of data stored either in databases, data warehouses, or other information repositories. Witten et al.[3]defined data mining as the process of extracting implicit, previously unknown and potentially useful information from data. Data mining in early 90s, has been used to help with fraud detection, credit scoring and maintenance scheduling but it's finally being utilized in healthcare programs around the country. [5] Milan kumari find prediction in cardiovascular disease using four classification algorithms [6]Jyoti Soni find data Mining in the Heart Disease Prediction using artificial neural network and genetic algorithm.

3. RELATED WORK

3.1 DATA MININING TECHINQUE ON CANCER:

1.Data mining techniques for cancer diagnosis-

I. Bio medical data mining happens to be a long standing problem in scientific research where scientists are looking for innovative ideas methods to mine bio-medical data.

II. Data mining in **computer aided diagnosis (**CAD systems process digital images for typical appearances and to highlight conspicuous sections, such as possible diseases, in order to offer input to support a decision taken by the professional.

III.) helps doctors to make optimal decisions quickly and accurately.

IV. Data mining techniques allow the doctors to quickly categorize the difference between malignant and benign tumors.

V. Key factor analysis is done to find the difference between benign and tumor cells.

VI. Acute lymphatic leukemia (ALL) is a cancer of blood and bone marrow, It's most common in children and gets worse if not treated in early stages. Key data mining techniques used in ALL diagnosis are:

a. Neural networks.
b. Decision trees.
c. Cluster detection.
d. Genetic algorithms.

VII. Algorithms are used for clustering, classification, prediction or estimation.

3.2 DATA MININING TECHINQUE ON HEART DISEASE:

Data mining techniques can be helpful for medical analysis or practising for accurate heart disease diagnosis. Three popular algorithms can be used for predicting heart disease

- Desision tree
- Naive bayes
- Neural networks

Decision Tree is a popular classification algorithms .
Example : Decision tree algorithm for health insurance

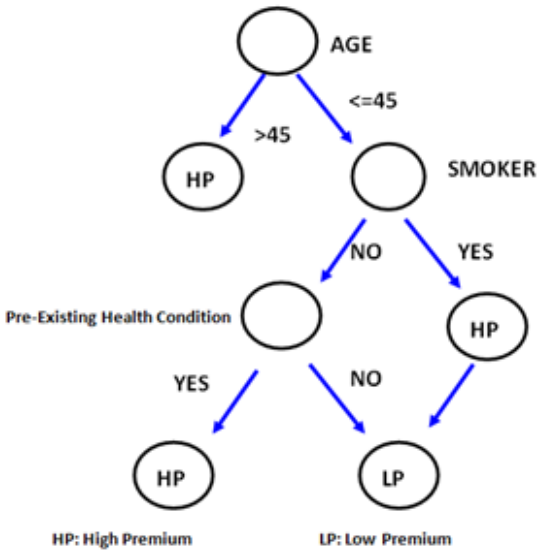

Figure.2. Decision tree algorithm

Decision Tree is simple and easy to implement. There is no requirement of domain knowledge or parameter setting and can high dimensional data can be handled. It produces results which are easier to read and interpret. Decision Tree is one of the successful data mining techniques used in the diagnosis of heart disease patients.

DATA SOURCE:

Data is most important aspect of data mining algorithms, The data which are used in Heart disease techniques should be accurate and genuine, medical profiles such as age, sex, blood pressure and blood sugar it can predict the likelihood of patients getting a heart disease. It enables significant knowledge, e.g. patterns, relationships between medical factors related to heart disease. **The publicly available heart disease database is used which can be used for determining various heart diseases**

4. APPLICATION OF DATA MINING TECHNIQUES ON HEALTHCARE

Application:

I. Diagnosis: Data mining can used in decision making with a large number of inputs. It can perform automated analysis of Pathological signals and Medical images

(X-ray, CT,MRI etc).Examples: Heart attacks, Tumor detection.

II. Treatment: Based on modeled historical performance, data mining can select best therapy plans.

III. Prediction / Prognosis: Accurate prognosis and risk assessment are essential for improved disease management and outcome.

IV. Biological Analysis: Data mining can automate analytical tasks for urine and blood analysis, tracking the level of glucose, determining level of ion in body fluids, pathological condition detection.

V. Hospital Management: Optimize allocation of resources and assist in future planning forimproved services.

VI. Fraud detection: Detect fraud detection establish standard and then identify uncommon patterns of claims by physicians, hospitals, or others attempt in data mining applications. Data mining applications fraud detection applications can spot unusual prescriptions and duplicitous, insurance and medical claims[7].

5. .USES OF DATA MINING TECHNIQUES ON HEALTHCARE

Uses:

Many have been initiated the research work in healthcare data mining. Some of the uses of health care mining are listed below

I. Safety issues and prevention of hospital errors: When health care industry apply data mining methods on their existing data bases, they can discover true, new, useful and life saving information. Data reprocessing can reveal unknown medical errors. Mining patient's records can be used for many safety issues and can be noticed and addressed by the hospital management.

II. Policy recommendations for public health: Data mining can result to policy making in public health. Data mining can find the cause of failing to implement severe sanitary and sterilization measures. It can also explore the advantages of implementing such policies.

III. Cost savings: Data mining allows health care management and other organizations to get more out of existing at minimal extra cost. For example data mining can be applied to discover fraud in credit cards and insurance claims.

IV. Early detection and prevention of diseases: Medical practitioners can identify patterns and outliers better by using data mining algorithms.

V. Cost effective and painless diagnosis: Some disease diagnosis methods and lab test procedures are painful, costly and invasive to the patients. For example conducting biopsy in women to detect cervical cancer is costly and painful procedure. Medical experts can first use data mining techniques to find whether or not to suggest a biopsy for a patient who is suspected to have cervical cancer.

- Drug side effects: Data mining can be used to discover knowledge data about drug side effects. **Some drugs that have been approved as non-harmful are later detected to have harmful side effects. Data mining techniques and algorithms can be used to detect the side effects caused by a drug well in advance.

6. CONCLUSION

The data mining has played in an important role in healthcare industry, especially in predicting various types of diseases. The diagnosis is widely being used in predicting diseases, they are extensively used in medical diagnosing. This study of data mining technique on health issues provided only an overview of current practises on diffrent aspect of data mining on healthcare. Today, there has been many efforts carried out on successful application of data mining in the healthcare sector. Primary potential of this technique lies in the possibility for research of hidden patterns in data sets in healthcare domain A lot of research need to be carried out to make data mining technique on healthcare issues more efficient and promising in the future. In order to achieve better accuracy in the prediction of disease, the proper data of patient's should be available accurately. Healthcare organization and researcher should look in the application to find more innovative ideas to improper data mining technique on health care.

7. REFERENCES

[1].https://www.tutorialspoint.com/data_mining

[2].Han, J., Kamber, M., 2001." Data Mining: Concepts and Techniques" , Morgan Kaufmann, San Fco., CA., USA

[3].Witten, I. H., Frank, E. "Data mining: Practical machine learning tools and techniques with Javaimplementations". Morgan Kaufmann, San Francisco, CA. USA, 371 pp, 2000

[4].Audain, C. "Florence Nightingale" 2007 Online: http://www.scottlan.edu/lriddle/women/nitegale.htm. (Accessed 30 November 2015)

[5].Milan kumari et al IJCST Vol. 2, Issue 2, June 2011 Comparative Study of Data Mining Classification Methodsin Cardiovascular Disease Prediction

[6]. Jyoti Soni, International Journal of Computer Applications (0975 – 8887), Volume 17– No.8, March 2011

[7].M. Durairaj, V. Ranjani, Heart Disease Prediction System Using Data Mining Techniques ISSN: 0974-6471 December 2013, Vol. 6, No. (4): Pgs. 457-466

[8].https://www.healthcatalyst.com/data-mining-in-healthcare

[9].https://the-modeling-agency.com/how-data-mining-is-helping-healthcare/