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Applications of Data Mining in Healthcare

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Abstract: **In present era various public and private healthcare institutes are producing enormous amounts of data which are difficult to handle. So, there is a need of powerful automated Data Mining tools for analysis and interpreting the useful information from this data. This information is very valuable for healthcare specialist to understand the cause of diseases and for providing better and cost effective treatment to patients.Healthcare industry today generates large amounts of complex data about patients, hospitals resources, disease diagnosis, electronic patient records, medical devices etc.The large amounts of data are a key resource to be processed and analyzed for knowledge extraction that enables support for cost-savings and decision making.Data mining brings a set of tools and techniques that can be applied to this processed data to discover hidden patternsthat provide healthcare professionals an additionalsource of knowledge for making decisions.This paper explores the application of data mining in healthcare, different techniques and the challenges, their future issues.**

INTRODUCTION:

Though data mining (DM) methods and tools have been applied in different domains already for many years, their applications in healthcare are relatively young.Data Mining offers novel information regarding healthcare which in turn helpful for making administrative as well as medical decision such as estimation of medical staff, decision regarding health insurance policy, selection of treatments, disease prediction etc. Data mining are also used for both analysis and prediction of various diseases Some research work proposed an enhancement in available Data Mining methodology in order to improve the result and some studies develop new methodology and framework for healthcare system It is also found that various Data Mining techniques such as classification, clustering and association are used by healthcare organization to increase their capability for making decision regarding patient health.

Data Mining provides several benefits

1. Detection of the fraud in health insurance,
2. Availability of medical solution to the patients at lower cost,
3. Detection of causes of diseases
4. Identification of medical treatment methods.
5. The healthcare researchers for making efficient healthcare policies, constructing drug recommendation systems, developing health profiles of individuals etc.
6. Provides benefit to all the people such as doctor, healthcare insurers, patients and organizations who are engaged in healthcare industry
7. Prediction of novel drug targets.

Application of Data Mining in Healthcare

Data mining provides several benefits to healthcare industry. Following are the several applications of Data Mining in healthcare:

*1. Effective management of Hospital resource***:** Data mining provides support for constructing a model for managing the hospital resources which is an important task in healthcare. Using data mining, it is possible to detect the chronic disease and based on the complication of the patient disease prioritize the patients so that they will get effective treatment in timely and accurate manner. Fitness report and demographic details of patients is also useful for utilizing the available hospital resources effectively.

2. Hospital Ranking: Different data mining approaches are used to analyze the various hospital details in order to determine their ranks . Ranking of the hospitals are done on the basis of their capability to handle the high risk patients. The hospital with higher rank handles the high risk patient on its top priority while the hospital with lower rank does not consider the risk factor.

3. Better Customer Relation: Data Mining helps the healthcare institute to understand the needs, preferences, behavior, patterns and quality of their customer in order to make better relation with them. Using Data Mining, Customer Potential Management Corp. develops an index represent the utilization of Consumer healthcare. This index helps to detect the influence of customer towards particular healthcare service.

4. Hospital Infection Control: A system for inspection is constructed using data mining techniques to discover unknown or irregular patterns in the infection control data . Using Data Mining, physicians and patients can easily compare among different treatments technique. They can analyze the effectiveness of available treatments and find out which technique is better and cost effective. Data Mining also helps them to identify the side effects of particular treatment, to make appropriate decision to reduce the hazard and to develop smart methodologies for treatment.

*5. Improved Patient care***:**Data mining helps the healthcare providers to identify the present and future requirements of patients and their preferences to enhance their satisfaction levels.Large amount of data is collected with the advancement in electronic health record. Patient data which is available in digitized form improve the healthcare system quality. In order to analyze this massive data, a predictive model is constructed using data mining that discover interesting information from this huge data and make decision regarding the improvement of healthcare quality.

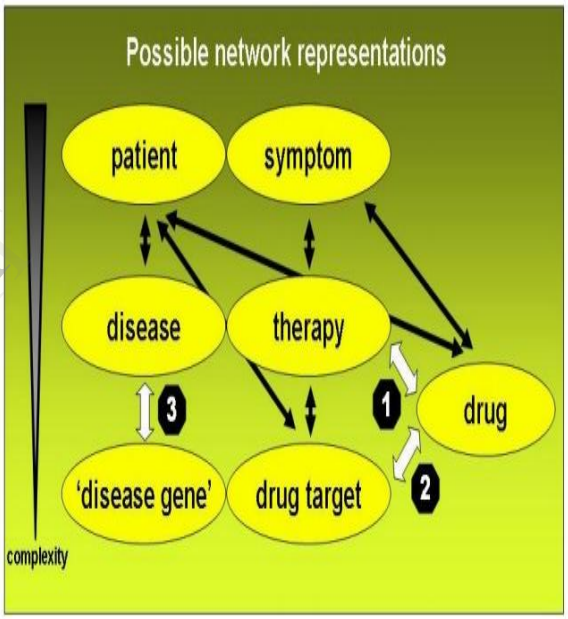
6. Decrease Insurance Fraud: Healthcare insurer develops a model to detect the fraud and abuse in the medical claims using data mining techniques. This model is helpful for identifying the improper prescriptions, irregular or fake patterns in medical claims made by physicians, patients, hospitals etc. Doctor's prescriptions and treatment materials are produced large amount of data.

*6. Health Policy Planning***:** Data mining play an important role for making effective policy of healthcare in order to improve the health quality as well as reducing the cost for health services. COREPLUS and SAFS models were developed using data mining techniques to analyze the results of medical care services provided by hospitals and treatment cost.

7. Prediction of novel drug targets

Existing segments of drug-target networks may have hidden information on additional drug targets, which are yet not included to the network. Extension of existing networks is a recent, exciting field of network studies. It may be worth to review these approaches in hope to suggest appropriate measures to predict future targets from the currently available targets and other data-sets.

Fig 1



Data Mining Challenges in Healthcare

One of the most significant challenges of the data mining in healthcare is to obtain thequality and relevant medical data. It is difficult to acquire the precise and complete healthcare data. Health data is complex and heterogeneous in nature because it is collected from various sources such as from the medical reports of laboratory, from the discussion with patient or from the review of physician. For healthcare provider, it is essential to maintain the quality of data because this data is useful to provide cost effective healthcare treatments to the patients.

CONCLUSION

With the rising need of biomedical data and information for various purposes from a variety of innovative

technologies,Data mining will play an increasingly significant part in healthcare institutes in future .

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