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Comparison Analysis on Medical Data Mining for Drug Suggestion

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ABSTRACT

The drug back reaction measurement is the most important part of the drug safety assessment. In the early days, the measurement is made by trailing the impact after the course of many examples. In the pharmaceutical industries, the most interesting research topic is adverse drug detection which rules the world. In the 21century, the data available in the medical field gave an important development in motivating of an adverse event. Recently, many people put forward the statistical data and also the mining methods which are largely implemented to detect the drug adverse event. In the following paper, we explain more methods explained by expert's researchers in the dynamic domain of data.

Keywords : Medical Data Mining, Drug Safety Assessment, MGPS, FDA, FUZZY Logic

I. INTRODUCTION

In olden days people inhale medicine for their inability and illness with the help of doctors. They, of course, get well and continue their work without any doubt. In some condition, they got illness for a long period and took the medicine for their lifetime and even for years. Their data do not store properly and continuing the medicine also got confused. They stored them in hard copies and days passed away their data got lost. There are no central storing concepts and no proper system available in the market. Some doctors store the data in a stand-alone system and analysis the patient lifestyle with that minimum data. There are no ways to compare the data with world coordinates since they are all standalone systems.

They try the mining concept with the minimum dataset and applied the data on the algorithm. No way to collect large dataset since they are standalone systems. People can't able to continue their medicine properly and drug inhaling become doubtful. After treatment has become very serious side effects affected by drugs. Days are gone, the data collected from very large pollulated countries and culture with different food habits is stored in centralized systems. Now we go more numbers of the dataset and numerous algorithms are created to analysis.

Data mining is the process of analyzing data from different perspectives and summarizing it into useful information. This information can be used for a number of applications, for example to increase revenue, cut costs, or both. They gather the data from different location and different patients. That particular data may come from all parts of business, from the production to the management. Following figure 1 shows the Patient Electronic Details.

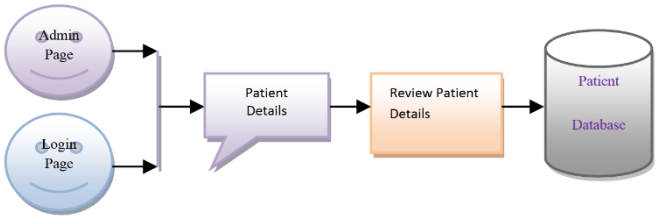

Figure 1. Patient Electronic Details

Ana Szarfman et al (2004) proposed an adverse-event report which generated by marketed drugs and devices argues in large number for the application of validated computerized algorithms which helps in detecting adverse-event signals. In spontaneous adverse-event databases, it is difficult to estimate patient exposure accurately and background rates for a given event in a specific population. Bayesian data mining system called Multi-item Gamma Poisson Shrinker (MGPS) evaluated by the United States Food and Drug Administration (FDA) to enhance the FDA's ability to monitor the safety of drugs, biologics, and vaccines after they have been approved for use.

They used MGPS to computes adjusted higher-than-expected reporting relationships between drugs and adverse events, also adjust for random noise by using a model derived from the data and corrects for temporal trends. The MGPS can also be confounding related to age, sex, and other variables by stratifying over 900 categories.

Robert T. O'Neill et al (2010) The FDA database of adverse event reports is a dynamic database that increases continually in size each year. The database example shows in the table 1.The first reports were entered in the late 1960s and the database continues to expand each year as reports are received for drugs that have been on the market for many years and new reports are added on newly approved and marketed products.

This is the most important drug safety surveillance database in the United States and it has helped detect many serious adverse events. FDA's database contains reports of suspected drug-adverse event associations identified by health practitioners and consumers and submitted voluntarily to FDA or by manufacturers under FDA regulations. The reports of the more serious and unexpected adverse events receive hands-on evaluation and the collective reports are used as a source of early warning of potential safety problems associated with any marketed drug.

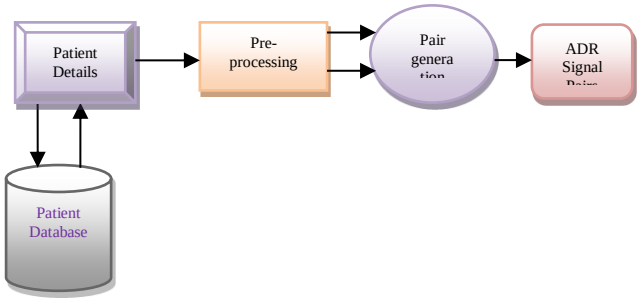

Figure 2. Searching For ADR Signal Pairs

The structure of the content of each report is conceptually the same in that information is requested on items such as: patient age and gender; the adverse event outcome (death, hospitalization, disability), a description of the ad-verse event, relevant lab test, and patient history; and identification of the suspect medications, including the manufacturer, the dose, frequency and route used, indication for use, start and stop dates and concomitant medical products, and dates of use .The quality and completeness of the information in a report are important considerations when interpreting the strength of any drug-event association. An event described in a report may be deemed serious and previously unknown, serious and known, non-serious and previously un-known, or non-serious and known. The first of these classifications, the serious and previously unknown events, are of the most public health interest in terms of the need for early alerts and corrective action, though increasing frequencies or the worsening of serious and known drug-event associations also signal concern.

Ying Ji et al (2010) proposed an unknown adverse drug reaction (ADRs) in postmarketing surveillance as early as possible is of great importance. With the spontaneous reporting, only the postmarketing surveillance survive. The present system is a passive surveillance system which is limited by gross underreporting which is <10% reporting rate, latency, and inconsistent reporting. He proposes a software system which uses electronic patient records for monitoring and detecting potential ADRs which is based on a novel team-based intelligent agent.

They designed a system which was named as ADR monitor mention in the above figure 2. There are intelligent agents assisting the human users by monitoring computers located in different places.

Christopher C. Yang et al (2012) Adverse drug reactions are causing a substantial amount of hospital admissions and deaths, which cannot be underestimated. During pharmaceutical product development, a great effort has been put on the pre-marketing review which cannot identify all possible adverse drug reactions. They form a volunteering reporting system, which conducts the post-marketing surveillance. They produce very low reporting rate, which makes difficult to detect the adverse drug reaction. Today many of the consumers are exchanging their knowledge related to health through the Web 2.0 technologies and social media. Those online discussion involve adverse drug reactions. In this work, they proposed to mine the associations between drugs and adverse reactions from the user-contributed content in social media. They have conducted an experiment using five drugs and five adverse drug reactions.

Table 1. Adverse Reactions Reported by FDA

Drug Name	Active Adverse Reactions	Number of Threads
Biaxin	Heart Disease	686
Lansoprazole	Diarrhea	592
Luvox	Heart Condition; Suicidal	570
Prozac	Suicidal; Depression	718
Tacrolimus	Cancer	583
Adenosine	None	567
Cialis	None	745
Elidel	None	619
Lantus	None	601
Vyvanse	None	563

G. Niklas Norén et al (2009) proposed a technology with the large collections of electronic patient records. They gave more information about the patient but still underutilized the use of medicines.

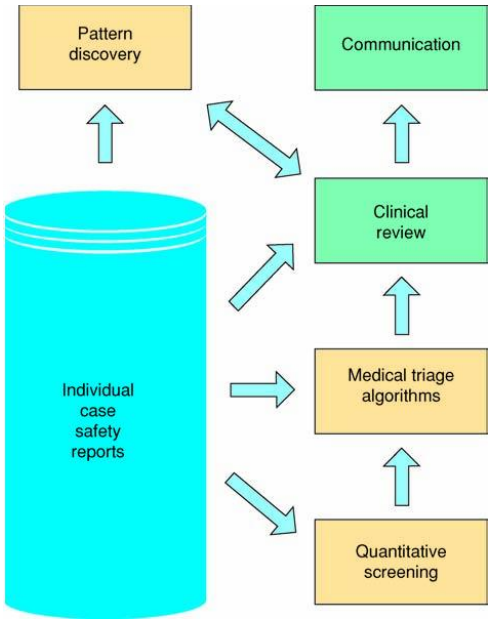

Figure 3. Schematic overview of the knowledge discovery process

The above figure 3 show the knowledge discovery proposed by the author to extract data from large set of clinical data. They are collected in different time period and maintained primarily for the purpose of patient administration. They introduce a new measure of temporal association, which contrasts the observed-to-expected ratio.

Laszlo Szathmary et al (2005) proposed mining techniques which is mainly deal with pattern mining

concept. Among them, frequent item sets they extract "regularities" in the data. They explain about the phenomena of recurrent and consistent in the expert's domain. In worst situations, they search for the rare items etc., He further explains contradicting beliefs and unexpected phenomena. In the biology or medicine world the rare itemsets and they term as "exceptions". Ralph Edwards et al (2000) explained about the WHO's definition. Where the definition of an adverse drug reaction, which has been in use for about 30 years.

II. CONCLUSION

Mining the causal association between two events is very important and useful in many real applications. It can help people to discover the causality of a type of events and avoid its potential adverse effects. Then that ADRS which are placed in the cloud database environment can be effectively used through entire global network. We plan to carry out the experiment with the help of FUZZY logic which trial many data to obtain the best results and we can suggest the best result.

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