

**PREDICTIVE ANALYSIS SYSTEM FOR DISEASE USING DATAMINING**

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Abstract—People care deeply about their health and want to be, now more than ever, in charge of their health and healthcare. The medicine that is practiced today is an EBM in which medical expertise is not only based on years of practice but on the latest discoveries as well. EHR are becoming the standard in the healthcare domain. People want fast access to reliable information and in a manner that is suitable to their habits and workflow. Studies reveal that people are searching the web and read medical related information in order to be informed about their health. This proposed system is to identify reliable information in the medical domain stand as building blocks for a healthcare system. By using the tools such as Neuro Linguistic Programming, Machine Learning techniques. In this research, mainly spotlight on diseases and treatment information, and the relation that exists between these two. The objective of this system is to identify the disease name with the symptoms specified and extract the patterns from the article and get the Relation that exists between Disease-Treatment and classify the information into Severity, cure to the user. This information is perceived by user to take the further measures.

Keywords:Data mining, EBM (Evidence Based Medicine), EHR (Electronic Health Records), Neuro Linguistic Programming, Machine Learning.

1. INTRODUCTION

Medical Informatics is the applied science at the junction of the disciplines of medicine and information technology, which provides measurable improvements in both quality of care and effectiveness. Information technologies are playing a crucial role in advancing the science of quality measurement but more can be done to apply it to quality improvement. The Health care provides various services which are used to: (1) improve quality and efficiency; (2) engage patients and families; improve care coordination, and population and public health; and (3) Maintain privacy and security of patient health information.

People care deeply about their health and want to be, now more than ever, in charge of their health and healthcare. Life is becoming more hectic than compared to good old days. EBM is the medicine that is being practiced today, in which medical treatment is not only based on years of practice but on the latest discoveries as well. Many tools available to manage and keep track of our health such as Google Health and Microsoft HealthVault are reasons and facts which make people more powerful when it comes to healthcare knowledge and management. EHR are becoming the standard in the healthcare domain. Researches and studies show that Decision support—the ability to capture and use quality medical data for decisions in the workflow of healthcare; and Obtain treatments that are tailored to specific health needs—rapid access to information that is focused on certain topics.

One of the rapid growing fields is health care industries. The medical industries have great amount of data set collections about diagnosis, patient details and medications. To turns these data is into useful pattern and to predicting forthcoming trends data mining approaches are used in health care industries. The medical industries come across with new treatments and medicine every day. The healthcare industries should provide better diagnosis and therapy to the patients to attaining good quality of service.

Data mining is the methodology for finding hidden values from enormous amount of data. As the patients population increases the medical databases also growing every day. The transactions and analysis of these medical data is complex without the computer based analysis system. The computer based analysis system indicates the automated medical diagnosis system. This automated diagnosis system support the medical practitioner to make good decision in treatment and disease. Data mining is the massive areas for the doctors to handling the huge amount of patient's data sets in many ways such as make sense of complex diagnostic tests, interpreting previous results, and combining the different data together. Traditionally Infirmary decision is shaped by the medical practitioner's observations and fore knowledge rather than the knowledge which obtain from the large amount of data. This automated diagnosis system leads to increases the quality of service provided to the patients and decreases the medical expenditure

People want fast access to reliable information and in a manner that is suitable to their habits and workflow. Medical care related information (e.g., published articles, clinical trials, news, etc.) is a source of power for both healthcare providers

and laypeople. Studies reveal that people are searching the web and read medical related information in order to be informed about their health. Healthcare providers need to be up-to-date with all new discoveries about a certain treatment, in order to identify if it might have side effects for certain types of patients. We envision the potential and value of the findings of our work as guidelines for the performance of a framework that is capable to find relevant information about diseases and treatments in a medical domain repository. The results that is expected to obtain shows that it is a realistic scenario to use Neuro Linguistic Programming and Machine Learning techniques to build a tool, similar to an RSS feed, capable to identify and disseminate textual information related to diseases and treatments. Therefore, this study is aimed at designing and examining various representation techniques in combination with various learning methods to identify and extract biomedical relations from literature. It is better to identify and eliminate first the sentences that do not contain relevant information, and then classify the rest of the sentences by the relations of interest, instead of doing everything in one step by classifying sentences into one of the relations of interest plus the extra class of uninformative sentences.

1.1 DATA MINING

Data mining is the process of combining the different data source and derives the new pattern from that data collection. The following diagram represents different stages of data mining process

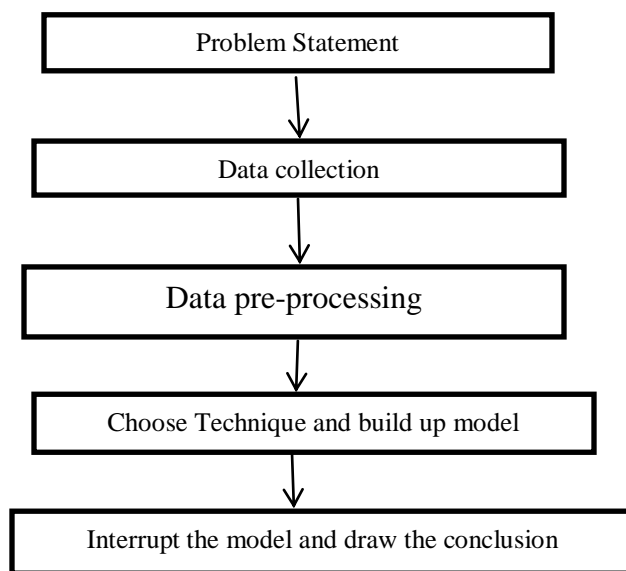


Figure 1 Data Mining process

2. RELATED WORK

In order to embrace the views that the EHR system has, the potential benefits of having an EHR system are: Health information recording and clinical data repositories immediate access to patient diagnoses, allergies, and lab test results that enable better and time-efficient medical decisions; Medication management—rapid access to information regarding potential adverse drug reactions, immunizations, supplies and so on.

World need better, faster, and more reliable access to information. In the medical domain, the richest and most used source of information is Medline database of extensive life science published articles. All research discoveries come and enter the repository at high rate, making the process of identifying and disseminating reliable information a very difficult task. One task is automatically identifying sentences published in [3] medical abstracts (Medline) as containing or not information about diseases and Treatments and automatically identifying semantic relations that exist between diseases and treatments.

Regrettably all doctors do not possess expertise in every sub specialty and moreover there is a shortage of resource persons at certain places. Therefor an automatic medical diagnosis system would probably be exceedingly beneficial for bringing the efficient and accurate result. Appropriate computer - based information and decision support systems can aid in achieving clinical tests at a reduced cost.

Bunescu R, Mooney R et. Al [5] proposed supervised machine learning methods have been used with great success in this task but they tend to suffer from data sparseness because of their restriction to obtain knowledge from limited amount of labeled data. We use feature coupling generalization (FCG) – a recently proposed semi- supervised learning strategy – to

learn an enriched representation of local contexts in sentences from 47 million unlabeled examples and investigate the performance of the new features on AIMED corpus. The approach provides theoretically well-founded solutions to the problems of under- and over fitting. Secondly it allows learning from structured data, and has been empirically demonstrated to yield high predictive performance on a wide range of application domains. However, this approach is critical & challenging problem to develop user friendly natural language to computer interface.

M. Craven [7] examined the problem of distinguishing among seven relation types that can occur between the entities "treatment" and "disease" in bioscience text, and the problem of identifying such entities. They compare five generative graphical models and a neural network using lexical, syntactic, and semantic features, finding that the latter help achieve high classification accuracy. However this task involves the manual tuning of domain-dependent linguistic knowledge such as terminological dictionaries, domain specific lexico-semantics, and extraction patterns, and so on.

Razvan C et. al says that a new method for joint entity and relation extraction using a graph we call a "card-pyramid." This graph compactly encodes all possible entities and relations in a sentence, reducing the task of their joint extraction to jointly labeling its nodes. We give an efficient labeling algorithm that is analogous to parsing using dynamic programming. These approaches assume that relations only exist within document, and classify them independently without considering dependencies between entities. However, this assumption does not hold in practice, and ignoring dependencies between entities may lead to reduced performance. Implicit relations can hardly be discovered in these models since they generally exist in cross document and they are only implied by the text. The task of relation extraction or relation identification is previously tackled in the medical literature, but with a focus on biomedical tasks: subcellular location (Craven, [7]), gene-disorder association (Ray and Craven, [8]), and diseases and drugs (Srinivasan and Rindfleisch, [9]). In these works, tasks often entail identification of relations between entities that co-occur in the same sentence.

Heart disease is the leading cause of death all over the world. They have identified gaps in the research on heart disease diagnosis and treatment and proposes a model to systematically close those gaps to discover if applying data mining techniques to heart disease treatment data can provide as reliable performances that achieved in diagnosing heart disease [14]. Various learning algorithms have been used for the statistical learning approach with kernel methods being the popular ones applied to Medline abstracts (Li et al. [13]). There are three major approaches used to extract relations between entities: co-occurrences analysis, rule based approaches, and statistical methods. The co-occurrences methods are mostly based only on lexical knowledge and words in context, and even though they tend to obtain good levels of recall, their precision is low. Good representative examples of work on Medline abstracts include Jenssen et al. [10] and Stapley and Benoit [11]. Syntactic rule-based relation extraction systems are complex systems based on additional tools used to assign part of speech tags or to extract syntactic parse trees. It is known that in the biomedical literature such tools are not yet at the State-of-the-art level as they are for general English texts, and therefore their performance on sentences is not always the best in Bunescu et al. [12]. Even though the syntactic information is the result of tools that are not 100 percent accurate, success stories with these types of systems have been encountered in the biomedical domain.

From the literature point of view drawbacks of existing systems are: people cannot get the direct information about the disease because it displays history of disease at first. There is no reliable information.

3. METHODOLOGY

Proposed system consists of the Client Interface, Identify the Disease, Sentence Extraction and Classification. The tasks which are available in the proposed system:

1. First task is automatically identifying sentences published in medical abstracts.
2. The second task is focused on three semantic relations: Cure, Prevent, and Side effect.

Client Interface: In this Module, develop a user page using Graphical User Interface which will be a media to connect User and Media Database and login screen where user can input his/her user name, password and password will check in database, if that will be a valid username and password then he/she can access the database\.

Identify the Disease: In this module user is going to give the symptoms as an input and get the desired disease name. In this it will search as semantic word and give the output to the user.

Sentence Splitting: In this stage user has to enter the symptom in a short text. Then taking out the human errors from the sentence typed by the user like comma, dot with space and without space.

Semantic Extraction: After removing the Human errors from the sentence we have to get the semantic words it means if user typed some wrong words then it will correct it with semantic words that is maintained in the database.

Removing unwanted words: In this module we are concentrating on the unwanted words from the sentence typed by the user. It will be very tough task to implement with the sentence that talked about disease treatment relation.

Disease identification: After eliminating words we are going to find the correct disease with High Priority and Low Priority.

Sentence Extraction: In this module user to provide input as a disease. That means relevant to our article and extract the informative sentence from database.

Classification: After extracting Sentence from the database we have to classify the relation for the Severity and Cure. For classification naive baysean algorithms are used.

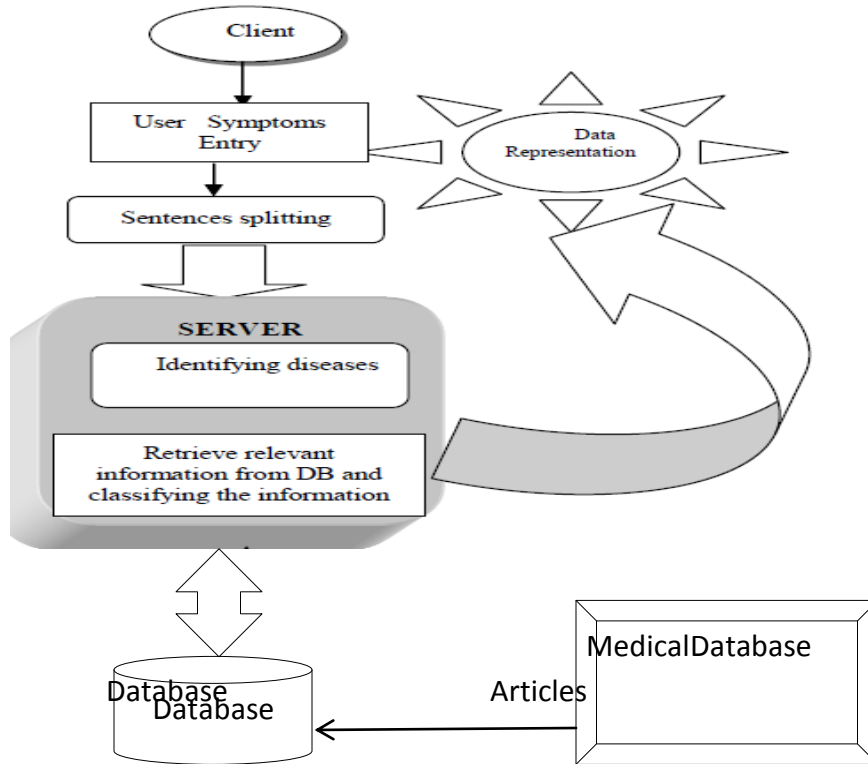


Figure 2 Intelligent medical system for online patient information interaction.

4. RESULT AND DISCUSSION

For example user can enter the symptoms like “I have a head ache stomach pain”. In this sentences splitting module splitting the sentences with the space and removable of the human errors. Example of the input system and output of the splitting task is shown in Table 1. In table 2 interprets the semantic extraction of sentence. Table3 shows the removing unwanted word in the symptoms. Table 4 presents user Symptoms after Removing human errors and semantic extraction.

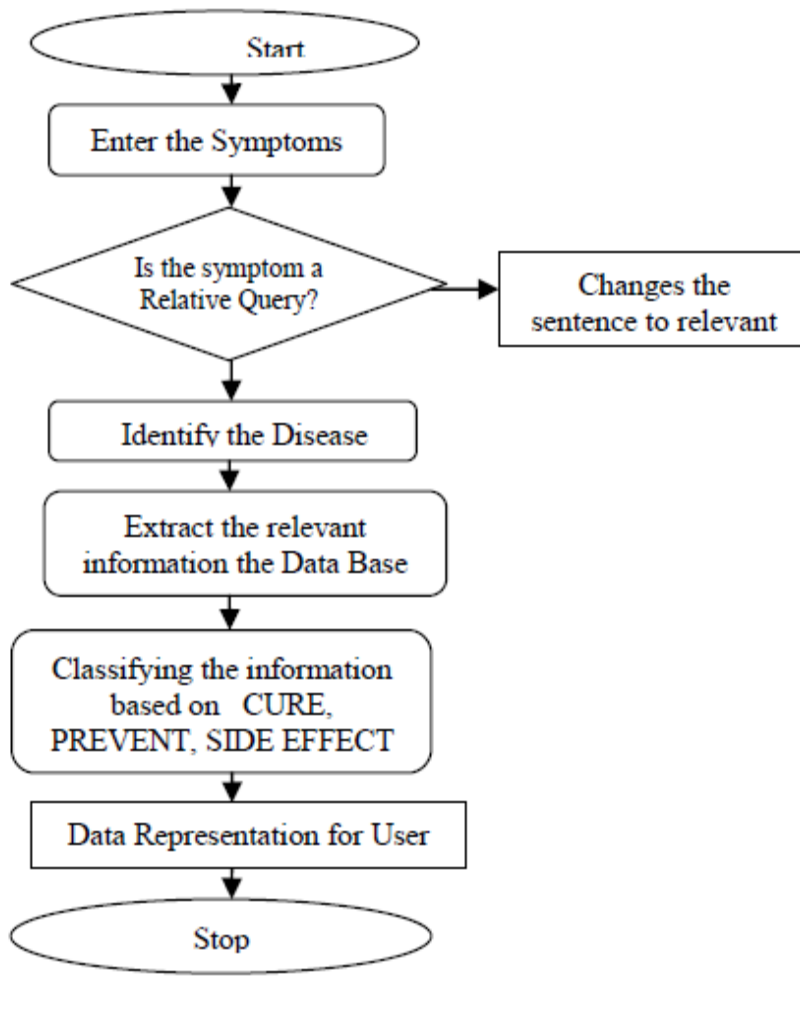


Figure 3 Flow chart for medical disease classification

Table 1 Input of the medical system and splitting sentence output

	Input of the Symptoms	Output of the Splitting sentence
1	I have headache and stomach pain	I Have Headache And Stomach pain
2	I have chest pain	I Have Chest pain
3	I have fever	I Have Fever

Table 3 Removing unwanted words

	Sentence with unwanted words	Output of removing unwanted words
1	I Have Fever	Fever
2	I Have Chest pain	Chest pain
3	I Have High Fever	High Fever

Table 4 User Symptoms after Removing human errors and semantic extraction

	User Symptoms after Removing human errors and semantic extraction	Output of the Removing unwanted words
1	Chest pain	High Priority: Heart attack Low Priority: Myo Cardial Infraction
2	Headache	High Priority: Brain Tumer Low Priority: Fever

5. CONCLUSION AND FUTURE ENHANCEMENT

The conclusions of our study suggest that domain specific knowledge improves the results. Probabilistic models are stable and reliable for tasks performed on short texts in the medical domain. The representation techniques influence the results of the ML algorithms, but more informative representations are the ones that consistently obtain the best results. The source data is from the web and identifying then classifying the data on the web is a challenge but bringing valuable information in future it has the capability in framework model.

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