Community Health Information Gathering and Tracking System

Gadade Aishwarya[1], Dudhale Archana[2], Patekar Bhushan[3], Anita Gunjal[4]

[1,2,3]*Student, Department of Computer Engineering, MIT College of Engineering, Pune, India*
[4]*Professor, Department of Computer Engineering, MIT College of Engineering, Pune, India*

Abstract: **The growing healthcare industry is generating a large volume of useful data on patient demographics, treatment plans, payment, and insurance coverage, attracting the attention of clinicians and scientists alike. In recent years, more research is done in health care and many dimensions of data mining application in healthcare are addressed. In healthcare system valuable knowledge can be discovered from application of different data mining techniques and methods. Data mining in healthcare medicine deals with learning models to predict patients' disease. Data mining applications can hugely benefit all parties involved in the healthcare industry. For example, data mining can help healthcare system or users to find effective treatments, medicines, doctors identify best & effective practices also detect fraud, also make customer relationship management related decisions and one of the important aspects is that patients get better and more affordable health related services and schemes. In this paper, system is proposed which will recommend health care services and schemes by analyzing health related data using data mining techniques and machine learning algorithms. This recommendation system is helpful in public sector to provide health care facilities by government and also for insurance companies to give Mediclaim Policies.**

Keywords: **Data mining, Healthcare Information, Physician Consultations.**

1. Introduction

Now a days, role of Computer Science is getting more and more involved in the medicine and health sciences. Healthcare is a booming sector of the economy in many countries. A large volume of data is collected through this system on a regular basis. Analytics provides tools and techniques to extract information from this complex and voluminous data and translate it into information to assist decision-making in healthcare. Analytics is the way of developing insights through the efficient use of data and application of quantitative and qualitative analysis. It can generate fact-based decisions for "planning, management, measurement, and learning" purposes Use of analytics, including data mining, text mining, and big data analytics is assisting healthcare professionals in disease prediction, diagnosis. One of the important aspects is that patients get better and more affordable health related services and schemes. The health information system suffers from several problems like Lack of data gathering, Data redundancy, Missing or poor report generation and compilation tools. Data mining is the core step, which results in the discovery of hidden and predictive information from large databases. Data mining technology provides a user oriented approach to novel and hidden information in the data. Data mining technology is comparatively mature, efficient in algorithm, and a wide range of application. Data mining techniques are applied for quality improvement; cost reduction; resource utilization; patient management; and other areas. Data mining was also applied to make decisions for administrative purposes in healthcare. The large amounts of data generated by healthcare transactions or healthcare industries are too much complex and voluminous to be processed and analyzed by using traditional methods and techniques. Data mining provides the methodology and technology to transform these large amounts of data into useful information for decision making and prediction about it. However primary focused is on physical health of society, collecting health related information. Today technology provide a platform to track any kind of information remotely and frequently, so gathering appropriate information about oneself which could not collected in depth during physician consultations.

In this paper, system is proposed which will recommend health care services and schemes by analyzing health related data using data mining techniques and machine learning algorithms. This recommendation system is helpful in public sector to make health planning and to provide health care facilities and also for insurance companies to give appropriate Mediclaim Policies. SVM algorithm is used to predict the diseases area wise so that recommendation can be done. System will be developed which will keep all the health-related information of the civilians and analyze it and use that information to help the government to make health planning and take health care decisions in an efficient manner. This can be used by insurance companies to announce suitable Mediclaim policies. Here, area wise analysis will be done so that government can provide different schemes in different areas as per diseases in that area.

2. Literature survey

Now-a-days most of the research is done in health care industry. This has different aspects like find effective treatments, medicines, doctors identify best & effective practices also detect fraud, also make customer relationship management related decisions. Health care research area also

International Journal of Research in Engineering, Science and Management
Volume-2, Issue-2, February-2019
www.ijresm.com | ISSN (Online): 2581-5792

555

Table 1
Literature survey

S. No.	Title	Author	Description	Pros	Cons
1.	Development of a Holistic Health Economic Evaluation Tool Leveraging Patient Self-Report (18 May 2017)	Faye Prior, Tom Dawson Reascon Ltd Hampshire, United Kingdom.	This paper discussed about the greater need to recognize the physical, mental and social determinants of health, whilst providing a platform for individuals to take greater ownership and control of their health care using tools.	1.Providing platform for individuals to take control of their health care. 2.Usage of tool provides easy control of health care 3.Health related information collected fastly.	1.Sensors get damaged then system get collapsed. 2.Required Internet connection
2.	The Design and Realization of Mongolian Medicine Prescription Data Mining System (03 November 2016)	Zhang Chunsheng ,Tu Ya.	In this paper, Mongolian medicine prescription data-mining system is designed, along with both Mongolian and Chinese language using different techniques.	1.The system takes use of pinyin-code query technology to achieve the fast query of information. 2. DataGridView to achieve the fast data maintenance on prescription class,drug information	1.Complex system because of many algorithm used.
3.	Patient-Centric Medical Information System Based on Web Services for Tuberculosis Control in India (29 September 2011)	Prof.Mr.S. A. Shinde , Prof.Mr.A.S.Ru male, Prof. Mrs. G. J. Chhajed, Prof. Ms. J. G. Borade, Prof. Ms. Pujashree Bura, Prof. Mr. K. S. Bhagwat , Prof. Mr. M. B. Rangdal.	Tuberculosis is a dreadful and an infectious disease with devastating social and economic costs and reduces the working capacity of infected persons. The prototype provides a central place for the patients over the internet to avail their medical information from these disparate healthcare providers using web services.	1.providing patient's a central point of access to their medical information from healthcare providers. 2.The prototype system is also scalable, extensible, secure and interoperable with disparate healthcare provider's information systems.	1.System utilized only text /numeric data. 2.wireless web services can be deployed over the mobile phones to the users to make their lives easier than what the current system offeres.
4.	chitSMS: Community Health Information Tracking System Using Short Message Service	Reynaldo Manguni Jr., Mel Leandro Navarro, Kathleen Rosario.	CHITS is an electronic patient record system that provides an efficient way of storing data and swift automation of the generation of reports. It is deployed at a local network where health workers can access the system through a web browser	1.System provide up-to-date health statistics that are very essential for health planning, disease mapping and allocating the proper budget for the public health sector. 2.It is cheap and efficient way of transferring data remotely.	1.The amount of data that an SMS can carry is limited. 2.Internet connection required.

includes quality improvement; cost reduction; resource utilization; patient management; and other areas.

Health Information Gathering and Tracking Systems are available in foreign countries which are used by government for health planning and health related decisions. The Community Health Information Gathering and Tracking System or CHIGTS is an extensible, modular, open source information system for rural health units (initially for the Philippines) [4]. It collects existing routine health data from vertical programs in the Field Health Service Information System (FHSIS) and integrates them into a unified, comprehensive computerized information system. Through CHIGTS, community-based health information is made available not only to public health agencies requiring community level information but also to the community itself which generates the information. It enables the community to use this information for local decision-making and health planning. In addition to software, CHIGTS also includes structured capability-building programs designed to improve the health information systems within local health centers, regardless of the level of automation.

Currently different Apps are used by many doctors during consultation in the clinic. This Apps store the information about patients. This information contains patient's personal information as well as patients disease history and drug prescription. Big Hospitals are also maintaining patient's data. Following are some Apps which are used by doctors. For proposed system, data is collected from some of these apps for analysis.
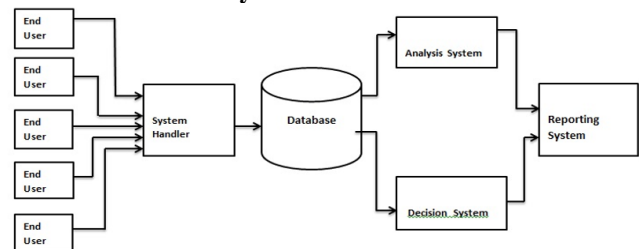
3. System architecture

Fig. 1. System architecture

Following algorithms can be used to develop such system:

- *Decision Tree:* Decision tree is supervised learning algorithm and mostly used for classification problems. Surprisingly, it works for both categorical and continuous dependent variables [2]. In this algorithm, population is split into two or more (same in size) sets.

International Journal of Research in Engineering, Science and Management
Volume-2, Issue-2, February-2019
www.ijresm.com | ISSN (Online): 2581-5792

556

This is done based on most significant attributes/ independent variables to make as distinct groups as possible

- *Support Vector Machine(SVM):* It is a classification method. In this algorithm, each data item plot as a point in n-dimensional space (where n is number of features you have) with the value of each feature being the value of a particular coordinate. The aim of SVM is to find the best classification function to distinguish between members of the two classes in the training data. The SVM insists on finding the maximum margin hyper planes is that it offers the best generalization ability. It allows not only the best classification performance (e.g. Accuracy) on the training data, but also leaves much room for the correct classification of the future data.

- *K-nearest neighbors(KNN):* KNN algorithm can be used for both classification and regression problems. However, it is more widely used in classification problems in the industry. K nearest neighbors is a simple algorithm that stores all available cases and classifies new cases by a majority vote of its k neighbors [2]. The case being assigned to the class is most common amongst its K nearest neighbors measured by a distance function. Distance function can be Euclidean, Manhattan, Murkowski (first three are used for continuous functions) and Hamming distance (used for categorical variables).

4. Conclusion and future scope

After studying various data mining algorithms, this paper found that the Support Vector Machine (SVM) has less complexity than other algorithms. Thus, Support Vector Machine algorithm is more efficient for implementation of the stated systems. It will help the system to predict more precise and accurate results. Further implementation of the stated systems can be done in Mobile application also.

References

[1] Md Saiful Islam, Md. Mahmudul Hasan, Xiaoyi Wang, Hayley D. Germack and Md Noor-E-Alam, "A Systematic Review on Healthcare Analytics: Application and Theoretical Perspective of Data Mining", Healthcare 2018, 6, 54.

[2] Mohammad Ahmad Alkhatib, Amir Talaei-Khoei, Amir Hossein Ghapanchi, "Analysis of Research in Healthcare Data Analytics", Australasian Conference on Information Systems 2015, Sydney.

[3] Monali Dey, Siddharth Swarup Rautaray "Study and Analysis of Data Mining Algorithms for Healthcare Decision Support System", (IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 5 (1), 2014, pp. 470-477.

[4] Art Ongkeko, Randy G Fernandez, Patrick Garcia Sylim, Jayne P Abegail, "Community Health Information and Tracking System (CHITS): Lessons from Eight Years Implementation of a Pioneer Electronic Medical Record System in the Philippines".

[5] Dong-Mei Pu, Da-Qi Gao, Yu-Bo Yuan "A Dynamic Data Correction Algorithm Based On Polynomial Smooth Support Vector Machine", 13 July 2016.

[6] Xindong Wu, Vipin Kumar, J. Ross Quinlan, Joydeep Ghosh, Qiang Yang, Hiroshi Motoda, Geoffrey J. McLachlan, Angus Ng, Bing Liu, Philip S. Yu, Zhi-Hua Zhou, Michael Steinbach, David J. Hand. Dan Steinberg "Top 10 algorithms in data mining", 8 October 2007.

[7] Sunil Ray "Essentials of Machine Learning Algorithms (with Python and R Codes)", September 9, 2017.