DATA WAREHOUSING APPLICATIONS IN AYURVEDA THERAPY

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ABSTRACT

Availability of timely and accurate data is essential for medical decision making. Ayurveda practitioner's face a perennial problem with the large amount of data they have on system. Ayurveda practitioner's occasionally fail to utilize the knowledge stored in different repositories unless integration of the information from disparate sources is done. This problem can be solved by Data warehousing technology. Data warehouse unifies the scattered data into a single centralized data structure. It is a repository of integrated information available for querying and analysis. Data warehousing techniques share a common set of tasks, include requirements analysis, data design, architectural design, and implementation, Development of a healthcare data warehouse is essential to deliver quality health services though it is a complex and time consuming process.

Ayurveda is an ancient system of health care. This traditional healthcare system is trying to prove its identity by searching newer remedies to overcome the diseases for which there is no answer in modern medical science. In order to promote ayurveda as a global medicinal therapy there is a need to modernize this ancient system

Objectives of this paper are:-

1. To provide an insight into the feasibility of application of data warehousing to the field of ayurveda therapy.

2. Developing a close relationship between valuable traditional ayurvedic medicine &users of contemporary medical therapy through data warehousing technology.

This paper also portrays on how data warehousing can be utilized advantageously in health care domain though a miniature proposed model.

Keywords: *Data Warehouse, Ayurveda classification, Ayurveda therapy, DW architecture, ETL process*

INTRODUCTION

Data Warehouse unifies the scattered data into a single centralized data structure. It is a repository of integrated information available for querying and analysis. Data Warehouse may be considered a proactive approach to information integration, as compared to the more traditional query driven approaches where processing and integration starts when a query arrives. A health data warehouse is a repository where healthcare providers can gain access to medical data gathered in the patient care process.

Extracting medical domain information to a data warehouse can facilitate efficient storage, enhances timely analysis and increases the quality of real time decision making processes. Today's healthcare organizations require not only the quality and effectiveness of their treatment, but also reduction in time required for diagnosis and unnecessary costs. In order to construct an operational and effective DataWarehouse it is essential to combine process work, domain expertise and high quality database design.

Ayurveda is the most suitable system of medicine in which Data warehousing can be applied, provided both the IT experts and ayurveda experts have very clear idea about the potentiality of both systems. The fear of ayurveda practitioners is that if we alter the traditionalism, the system will perish. So they are reluctant to apply new technologies in the ayurvedic system. To change their mindset, they must realize that ayurveda has global chance in this century as the most useful alternate system of medicine with vast opportunities. The adoption of Data warehousing in ayurveda will enhance the interactions between ayurveda and modern medicine. So the need for modernization of ayurveda with the application of Data warehousing is essential to meet the challenges of future healthcare needs of a cyber society.

AYURVEDIC CLASSIFICATION OF INDIVIDUALS

Ayurvedic medicine has a very strong bearing on the concept of Prakruti, which means nature (natural form) of the build and constitution of the human body. According to Ayurveda the path to optimal health is different for people depending on their Prakruti. For individuals, the Prakruti is defined as a combination of Vatha, Pittha and Kapha which are called as Tridoshas. A balanced state of the Tridoshasmakes a healthy and balanced person (Physically and mentally). Since we allhave different combinations of the Tridoshas, The diagnosis of Prakruti offers unique insights into understanding andassessing one's health.It assesses the, dominance of Tridoshas and gives advice for preventive and primitive health care.

WHY THE NEED OF DATA WAREHOUSE?

Most of modern enterprises, institutions, and health care organizations rely on knowledge-based management systems. In these systems, knowledge is gained from data analysis. Nowadays, knowledge-based management systems include data warehouses as their core components. The purpose of building a data warehouse is twofold. Firstly, to integrate multiple heterogeneous, autonomous, and distributed data sources within an enterprise. Secondly, to provide a platform for advanced complex and efficient data analysis. Data integrated in a data warehouse are analyzed by the so-called On-Line Analytical Processing (OLAP) applications designed among others for discovering trends, patterns of behavior, and anomalies as well as for finding dependencies between data. The data warehouse's greatest benefit lies in its ability to support tactical as well as strategic decisions. The key difference between a data warehouse and day-to-day transactional systems is that a data warehouse captures historically consistent snapshots from multiple systems and integrates these snapshots into a single database supporting longitudinal analysis and reporting.

BUILDING DATA WAREHOUSE FOR AYURVEDA THERAPY

According to ayurveda, diseases are due to a imbalance in Tridosha. Determining the patient's dosha, and then identifying the root cause of a disease, requires precise training. Ayurveda emphasizes balance in all areas of your life, a trained practitioner will not only examine your body, but will take an extensive personal and medical history, including questions about daily diet, profession and working conditions, exercise routines, relationships, and mental health. This thorough data intake process helps the practitioner identify key symptoms and potential causes of imbalance and determine suitable treatment options.

Ayurveda data warehouse use case diagram in figure 1 depicts an overview of system functionality. There are two actors in the process; Patient and ayurveda practitioner. The interactions between the actors and cases are demonstrated in the following paragraphs

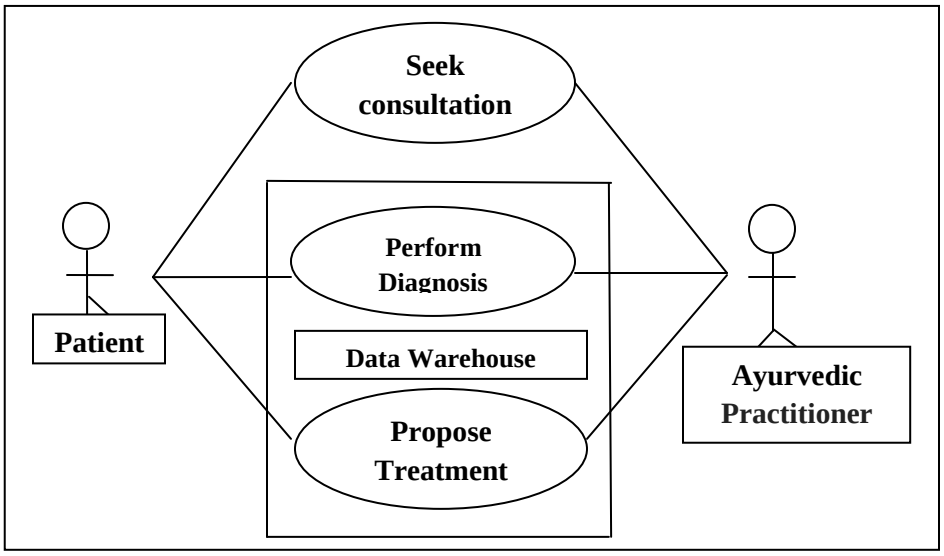

Figure 1: Ayurveda data warehouse use case diagram

Case 1: Seek consultation

Patient goes to Ayurvedic practitioner for consultation when certain symptoms are noticed.

Case 2: Perform diagnosis

The practitioner will perform a diagnosis to identify patient's prakruti.

Case 3: Propose treatment

When the diagnosis of prakruti is completed, Practitioners may include a variety of treatments in an individual's **Dincharya** (Daily recommended routine) and **Ritucharya**(Seasonal routine) as shown in figure 2.

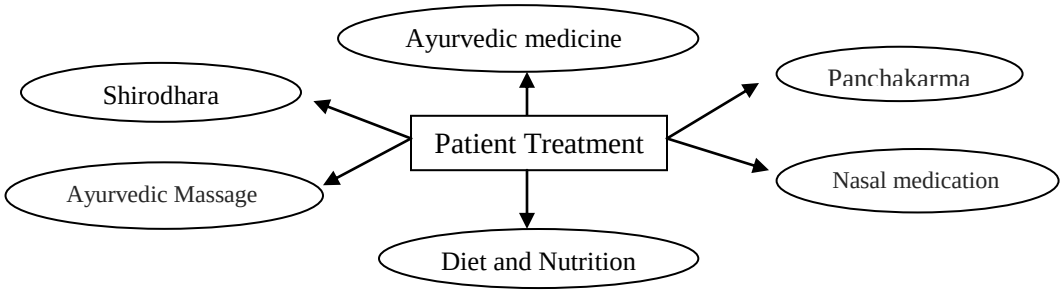

Figure 2: Treatments in Ayurveda

Data Warehouse

Data warehouse mention in figure 1 enables the ayurveda practitioner's with benefits listed below.

1) Phenomenal improvements in turnaround time for data access and reporting.
2) Standardizing data across the variety of treatment so that there will be one view of information.
3) Merging data from various source systems to create more comprehensive information source.
4) Encouraging and improving fact-based decision making

DATA WAREHOUSE ARCHITECTURE DESIGN

The Figure 3 illustrates the overall architecture of the proposed ayurveda data warehouse. Data is imported from several sources (therapies/treatments) as shown in figure 2 and transformed within a staging area before it is integrated and stored in the production data warehouse for further analysis.

Data Acquisition

This covers the entire process of extracting data from the operational database, medical files such as (patient medical records) then moving all the extracted data to the staging area and preparing the extracted data for loading into data warehouse repository. In this stage there are a set of functions and services such as:

• **Data Extraction:** Select data from databases and Medical files and determine the types of filters to be applied to data warehouse.

• **Data Transformation:** Map extracted data for data warehouse repository. Clean data, de-duplicate, and merge data from database and medical files.

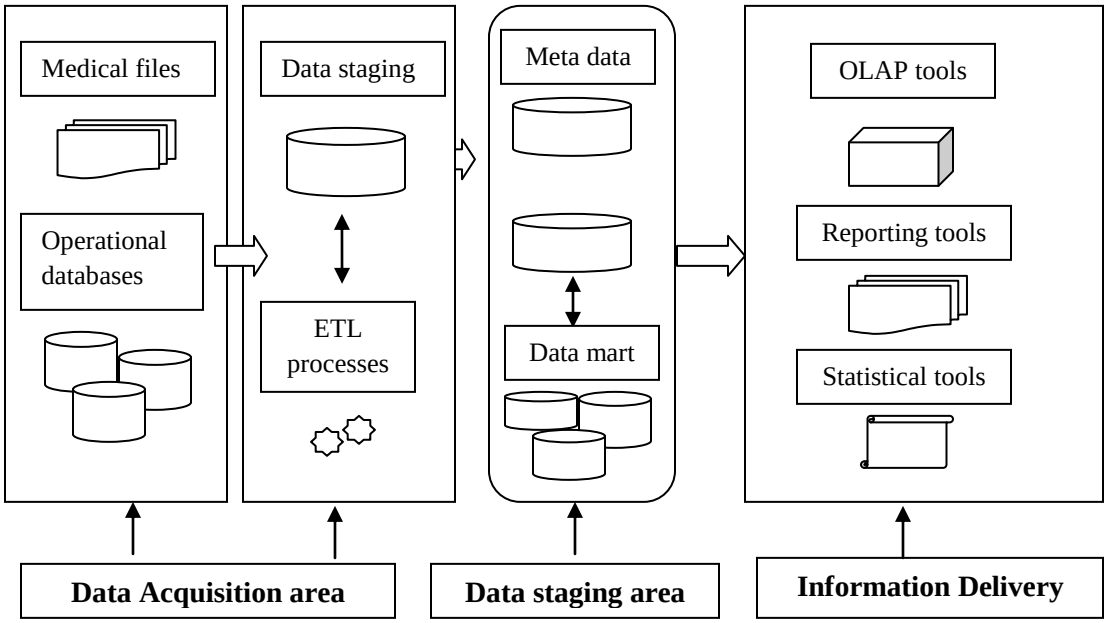

Figure 3:Ayurveda Data Warehouse Architecture

Data storage:

This covers the process of loading the transformed data from the staging area into the data warehouse repository. All functions for transforming and integrating between the database and

medical files are completed in the data staging area.In this stage there are a set of functions and services such as:

- Load a health care data into data warehouse tables.
- Optimize the loading process.
- Support loading integrated data into multiple tables.

Meta data: Metadata can be described as being "information about information." Meta data must be managed when data is acquired or analyzed. Meta data will be held in a repository, and can give you important information about many of the data warehouse tools.

Data Mart: Data marts are the partitions of the overall data warehouse.

Information delivery:
The information delivery component makes it easy for the ayurveda practitioners to access the information directly from the data warehouse. The practitioners perform analysis using the information cubes in the database.

In this stage there are a set of functions and services such as:

- Allow practitioners to browse data warehouse content.
- Provide multiple levels of data granularity.
- Monitor practitioners for decision making to improve service for future enhancements.

CONCLUSION

Ayurveda has long successful historical background. Today we find that 'ayurveda', the ancient Indian Medicinal therapy and its wisdom is getting famous worldwide.
The healthcare industry of Ayurveda is one of the largest, fastest-developing and most information-rich industries for take advantage from this proposed Ayurveda data warehouse to integrate between the operational data base and medical files (different Ayurveda treatment) and therefore the analysis on data makes easy by viewing multilevel of details from the data. Then we can analyses the diseases, the cost of treatment for these diseases.
This research work is an attempt to explore possibility of implementation of the concept of data warehousing to the domain of ayurvedic treatment. Creating and managing a warehousing system is hard.The Data warehousing concept will definitely yield fruitful results provided it executed in a systematic manner it will surely support in reducing the time of medical treatment in the near future.

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