AN OUTLINE OF KNOWLEDGE MINING MULTI-TIER ARCHITECTURE FOR DECISION MAKING

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ABSTRACT

Nobody in this technological era will deny that we are living in Multi facet smart working environment. To cope up with such type of environment we need to perform task smartly, in am improved manner. Smart system can be generated only by using smart framework. That is the reason why knowledge Management is gaining popularity among the experts. All of us will agree that the process of decision making is toughest job and success of every organization majorly depends upon the decisions taken by managers from time to time to achieve the desired goal. The result is the outcome of the decision taken, which everybody expects to be positive. In order to support this most critical process we are proposing a theoretical architecture of our Knowledge Mining tool. For every manager and organization knowledge management become part and parcel. It is a boon to this world and is going to reap the benefits in long run. Our proposed archiecture for knowledge mining is applicable to all the organizations who want a separate and effective system for decision making as the impact of effective decision is directly related to profitability and existence of the organization. Knowledge mining is critical and costly matter and it can be implemented more effectively in the process of new product development, research and design, software development, setting up educational policies, new land acquisition, goal setting, forecasting etc. the purpose of our paper writing is to provide a framework of our proposed study for the organizations interested to deploy and manage knowledge generated in the organization and effective use of the same in the process of decision making. The process of decision making still needs human intervention, our proposed architecture will give you the best suitable options available and matching to user’s need.

Keywords: Data Mining, Decision Making Process, Fuzzy Logic, Knowledge Management, Selection Process.
I. INTRODUCTION

Now the optimal moment has arrived to consider the improvement in the process of human decision making process. It is the best time to focus on the search of innovative tool that will improve bounded judgments. Decision making errors are costly. Experts failure to make optimal choices can be extremely costly.

Our study revolves around Decision Making Process, Knowledge Management System, and Knowledge Mining architecture. Let’s take a brief look on each topic.

1. Decision Making Process

In business management the decision making process is considered as a cognitive process. It is a process of selection of one alternative from several. Every decision making process produces final choice. Decision making includes the study of identifying and choosing alternatives depending upon the information available and according to the condition. Decision making is one of the central activities of business management and is an important function of every manager.

1.1 Types of decision making [1]

1.1.1 Structured Decisions

Structure Decisions are those where the aim is clear i.e. the purpose of the decision making is unambiguous easily defined and understood.

1.1.2 Unstructured Decisions

Decisions which are unclear, ambiguous and poorly understood by participants. Such types of decisions it is very difficult to compare outcomes and their benefit for individuals, the value of required information to resolve the problem or opportunity, may be difficult to access.

1.1.3 Programmable Decisions

This type of decisions follows clear delineated steps and procedures. They can be repetitive and routine.

1.1.4 Non-Programmable Decisions

This type of decision can be said to occur where there are no existing procedures or practices in place to resolve the problem.

1.1.5 Process of Decision Making

Steps in decision making process [2]
1.2 Knowledge Management System

This is, as the word implies, the ability to manage "knowledge". We are all familiar with the term Information Management. This term came about when people realized that information is a resource that can and needs to be managed to be useful in an organization. From this, the ideas of Information Analysis and Information Planning came about. Organizations are now starting to look at "knowledge" as a resource as well. This means that we need ways for managing the knowledge in an organization. The main part of this process is “knowledge”. This knowledge is with all the experienced and senior people. They have the vast storage of knowledge within themselves. The most disappointing thing is that this knowledge is not documented anywhere. It is kept with the owner itself. When people grow rich in experiences, experiences then transform into knowledge. Now it’s the real time to use all these knowledge from the experienced person to make the things better. [3]
Knowledge Management System is one that provides the user with the explicit information required, exactly in the form you required. When we started our research we came across various definitions of Knowledge Management. After studying all those definitions we came to the conclusion that accept and adopt the definition which suits best to your need. We will stick to the oldest knowledge management definition which is – “A Knowledge Management System is one that converts data to information and then facilitates the conversion of information to knowledge.”

The Process is

![Diagram](image)

When this knowledge from previous experience matching to the present situation is available at a click apart the decision making becomes more convenient. Experts can club it with their wisdom and apply the best suited action.

Our earlier published research work describes the process of managing knowledge in any organization in detail along with the challenges with huge data. In this paper we are giving a detailed outline of our proposed Knowledge Mining Tool.

II. KNOWLEDGE MINING ARCHITECTURE

2.1 Basic requirement of mining architecture

Fully automated knowledge discovery system is difficult to obtain and in last years many researcher focused on the way of manually applying traditional machine learning and discovery
methods to data stored in databases. The Knowledge Discovery in Database (KDD) Model proposed by Piatetsky-Shapiro, Matheus and Chan [4] represents a starting point for our solution. Their system contains the following components:

- Database Interface, to manage database queries,
- Controller, to control the invocation and parameterization of other components,
- Knowledge base, to contain domain specific information,
- Focus, to determine portions of data to analyze,
- Pattern Extraction, to collect pattern-extraction algorithms,
- Evaluation, to evaluate the interestingness and utility of extracted patterns.

Their model represents an abstraction of what usually occurs in KDD systems. In this paper we will start from the solution that Knowledge repository i.e. Knowledge Base is ready to use. We will continue our study from the stage of extracting knowledge.

2.2 General Outline of the proposed architecture

There are two types or users one is normal data users we will call them knowledge operators or data operators and the other one is knowledge workers. Knowledge operators can access normal database as a conventional users through user friendly Graphical User Interface (GUI), to a certain extend they can READ the data from knowledge base but cannot have WRITE or EXECUTE permission.

Knowledge workers are the experts who not only access both databases but his main contribution is in maintaining the Knowledge base and update it at regular interval.
2.3 Proposed three-tier Knowledge mining architecture

![Knowledge Mining architecture diagram]

Figure 3: Knowledge Mining architecture

The knowledge mining process works as follows in this architecture –

User defines the parameters for knowledge mining using graphical user interface. The knowledge mining services on the client perform some pre-processing prior to calling the knowledge mining services on the middle tier. The first task on the middle-tier is authentication and authorization of the users. Then the data mining services queue and execute the tasks of several clients and send back the results. These are used in the post-processing of the client, which computes the final outcome and presents it to the user. A client may start several knowledge mining tasks in one session. Each of them includes a number of calls to the middle tier. Knowledge mining services use the knowledge access services on the middle tier in order to read from different types of data sources.

This three-tier approach has several advantages compared to the two-tier architecture. First, the knowledge mining services can fully control bandwidth and CPU cycles for each user because there is a centralized service that manages users’ tasks and resources. This enables the system to guarantee a maximum usage of system resources for knowledge mining purposes. Second, the system can service users according to their priority and to their membership in user groups. This includes restricted access to knowledge mining tables as well as user specific response behavior. Third, a wide range of optimization strategies can be realized. The tasks of the knowledge mining services can be distributed over the client and the middle tier. The middle tier can exploit parallelism by parallel processing on the middle tier hardware and parallel connections to the database layer. Additionally, the knowledge mining services can reuse the outcome of knowledge mining sessions and pre-compute common intermediate results.
The system then clubbed with conventional Data mining system as follows

![Clubbed architecture](image)

**Figure 4: Clubbed architecture**

### III. CONCLUSION

In this paper we have presented an architecture which is able to provide and manage knowledge. Knowledge mining multi-tier architecture is convenient and easy to implement in any language. The process of decision making is easy for the knowledge workers as well as the updated knowledge repository developed by these knowledge workers is assets for the organization. A right person can take right decision at the right time using this system.

### REFERENCES


