Original Research Article

AN ANALYTICAL STUDY ON THE IMPORTANCE OF DATA MINING FOR DESIGNING A DECISION SUPPORT SYSTEM

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Abstract: Decision support system is fully computerized system that can be work with the help of data mining technology. In current scenario organizations use various types of decision support systems to improve their business activities. Data mining incorporates the possibilities for decision support by determining patterns and relationships in raw data and supporting the inductive approach of data analysis. A Decision Support System is a computerized information system that can be help of maintenances business or organizational decision-making activities. DSSs serve the administration, operations, and planning levels of an organization usually middle and upper management and help to make decisions, which may be quickly changing and not easily specified in. various cases online analytical processing based tools are used in the business area, which allow multiple views on data and through that a deductive approach to data analysis. Data mining encompasses the opportunities of decision support by discovering patterns and relationships concealed in data and therefore enabling the inductive approach of data analysis

Key words: k-means, data mining, decision support system etc.

Introduction*:* In case of development any type of decision support system, its working always based on analyzed data, researchers describe decision Supports Systems as a computer oriented information model including data analysis tools, designed in such a way that

support managers to select best solutions between one of the many alternative solutions to a problem. Great researcher Moore and Chang defined the Decision support system as " The DSS is an advanced completely computer oriented system, performing analytical and decision making activities, concentrated on future planning and used at unintended and uneven timestamps" [1]. Also Sprague and Carlson define decision support systems as " DSS is a collaborating systems that help decision makers to use specific data and models for solving different types economic problems"

A well designed DSS which is purify and analyze huge amount of information fast[2]. It helps organizations to proliferation their market share, reduce costs, increase throughput and improve quality. The nature of problem itself plays the key role in decision making process. There are so many data mining algorithms or techniques are being used for design of a decision support system[3]. We cannot imagine classify raw data without use data mining techniques or algorithms. In this paper we are presenting the importance of data mining for designing a decision support system. With the help of data mining models , its can be to facilitate decision support with only a basic level of knowledge of data mining. Data mining will enable managers to find valuable new patterns in data leading to potential enhancement of resource utilization.

Characteristic of a well decision support system:

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- The functionality of DSS to be fully user friendly, it will be able to solve undetermined and structured problem that can faced upper level managers.
- DSS will must be combination of models or advanced techniques with basic data access and retrieval functions;
- DSS particularly motivate on features which make it easy to use by non-computer people in an collaborating mode.
- DSS emphasizes adaptableness and flexibility in the changing situations and provide the decision making approach of decision takers.

DSSs include knowledge-based systems. Accurately designed DSS is an interactive software-based system projected to help decision makers accumulate useful information from a combination of basic data, personal knowledge and documents or other sources to classify and resolve problems, and doing help in right decisions.

Role of Data Mining Technique In Decision Support Systems: For make an appropriate decision, the managers require knowledge. For
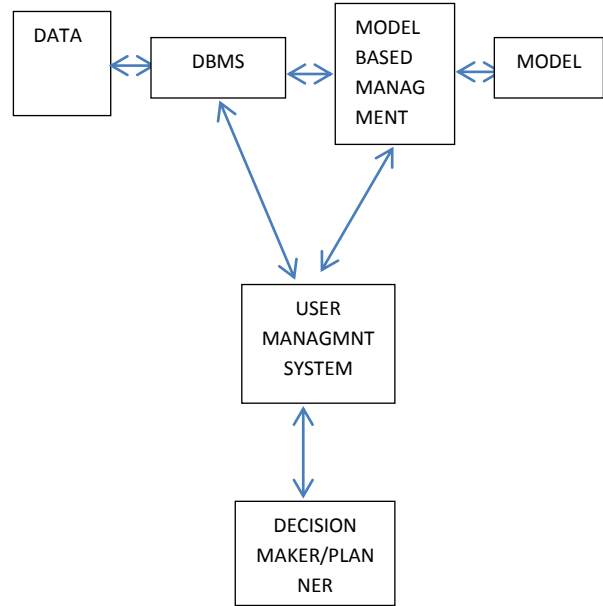

Figure 1: Basic architecture of decision support system

make an appropriate decision, the managers require knowledge. In case of enormous data quantities, problems may occur because of data analysis and essential knowledge extract. For analyzing the data we performed an automated procedure, known as Knowledge Discovery and whole process is called data mining technique. The researchers define data mining, it a process of discovering and analysis for huge amounts of data with a specific target on determining meaningfully important patterns or rules. With the help of data mining discovery knowledge from raw, unrefined data. The data mining techniques are very useful for extract knowledge from the data warehouse or data mart and other operational databases. So we can say that data mining play an significant role in helping organizations to recognize their customers behavior, care important clients, sale policies, stocks expectation[5,6].

The main purpose of da mining is to discover knowledge and relations that might lead to increase revenue. The main difference between the conventional database operation techniques and data mining techniques is that, the database becomes inactive and is only being used for large amounts of data, on the other hand data mining discover pattern in future finding of that specific

data. Data mining techniques deals with classic statistical calculation, from artificial intelligence and from database administration. They are not a substitute for old statistical techniques, but an addition of graphical and advanced statistical techniques[7,8]. Data mining uses various types of classification ,statistical algorithms, fuzzy logic ,shape recognition, machine learning, neural networks genetic algorithms, data viewing etc., from which we can mention some important decision algorithms ,regression algorithms, clustering analysis ,neural networks etc.
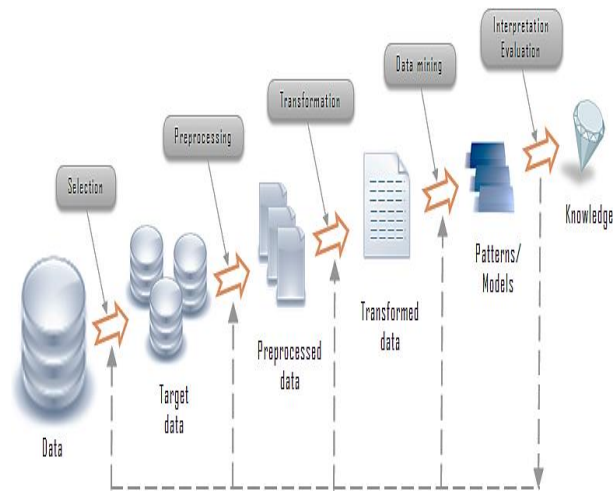

Figure 2: data mining process model [11]

Methodology: In last few years of business advancements, decisions made by an organization to improve its organizational effectiveness in running structured. We know that a well decision support system is very useful for achieving the targets or organizations growth. For development of a decision support system we need to work with various advanced data mining techniques and algorithms such as, machine learning, clustering and other algorithms simultaneously. Depending on the requirements identified in the analysis phase, with the help of all of these technologies, it can be very helpful for design reliable decision support system architecture. In this paper we have studied an integrated approach of decision support system and data mining. For generating decision tree, we have taken some data on SPSS sites, and with the help of decision tree we show the importance of data mining in decision support system.

Decisions, external or internal, supported by well analysis tools and advanced adaptive techniques, certainly destined to create a huge difference in coming. With such problem space business world will require latest adaptive, fast converging and predictive tools in decision making. One of sub-domain of next generation techniques which has already been contributing in data analysis is recognized as data mining world wide. However some pieces of work has already been done to enable DSS with data mining technologies, but those may be insufficient to cope with evolved IT face where virtualization, distributive computing would be frequently used terms[9].

For most businesses, there are a variety of requirements for information. Senior managers require information to increase their business activities. Middle management required detailed information for monitor and control business activities. The information help the employees to carry out their duties for performing their operational roles[10]. DSS provides support for making effective decisions in (semi)structured and unstructured situations at various managerial levels.

We know that a well decision support system is very useful for achieving the targets or organizations growth. For development of a decision support system we need to work with various data mining, machine learning, and artificial intelligence algorithms simultaneously. Depending on the requirements identified in the analysis phase, with the help of all of these technologies, design reliable decision support system architecture[11].

Advanced Decision Support System – Framework based on data mining techniques: Data mining encompasses statistical, pattern recognition, and machine learning tools to extend the possibilities of discovering information, trends and patterns by using richer model representations (e.g. decision rules, decision trees, ...) than the usual statistical methods, and are therefore well suited for making the results more comprehensible.
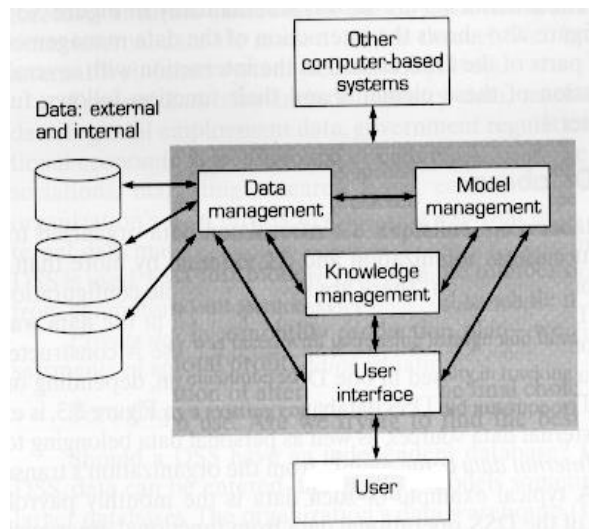
Figure 3: Modern DSS adopted framework [12]

Key business areas where data mining techniques can be potentially applied to include Business Profitability are, Customer Relationships, and Business Process Efficiency[13]. For example, discovering the best customers for selling products, most effective market segments for a business, how to increase market share of products, reducing costs without impacting production, and optimizing inventories, are typically instances of recent successful applications of data mining [14, 15].

The biggest challenge of a decision support system development consists of identifying essential data sets, analyzing its contents and the way it relates to other data sets. Data analysis is focused on business analysis rather than system analysis performed in traditional methodologies. It is lead to data cleaning activity[16].

Conclusion: The DSS includes expert systems and model management abilities to organize and analyze relevant data. A well-developed decision making system play a very important role of any organization's decision making process. SPSS Modeler and other data mining tools offers a variety of modeling methods taken from artificial intelligence, statistics and machine learning. The methods available on the modeling palette allow us to derive new information from our data and to develop analytical models. Each method has certain strengths and is best suited for particular types of problems.

The future of DSS therefore lies in the development of systems that can autonomously and continuously improve decision-making within a varying commercial environment, rather than tools that just produce reports based on current static standards of quality and performance.

In addition we have to develop solution based data mining components that are enhanced to the application and can be embedded into a vertically integrated application. Some important application areas that are driving this research include business processes such as solid waste management, education defense, risk management, targeted marketing, and portfolio management etc.

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