

A Recent Survey on Knowledge Based Decision Support System

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Abstract— A DSS (Decision Support System) is an interactive computer – based system or subsystem meaning to help decision makers to convey knowledge and models to identify the focused problem within the organization. Based on the recent survey the current paper focuses and directs to recommend knowledge-Based activities, particularly where knowledge is consumed more. The KB-DSS has become important in decision making because of speed, accuracy and consistency. This research work surveys and analyses various research works carried out by different researchers and finds that incorporating the semantic improves the overall performance.

Index Terms— DSS, Knowledge Based, Domain Knowledge, Accuracy, Consistency

I. INTRODUCTION

Decision Support Systems (DSS) are developed to support decision makers. The concept of DSS went off around 1980's to include knowledge management as role and the system was named as Knowledge Base Decision Support System [1]. The concepts of Executive Information System (EIS), Group Decision Support System (GDSS) and Organizational Decision Support System (ODSS) evoked from the model tailored DSS. This research work surveys and focuses on the various research works done by having KB-DSS as a prime factor to improve the overall performance.

The organization this research paper follows like this: After this introduction, in the second section taxonomies of DSS is presented; in the third section, various research works carried out on KB DSS are projected. In the fourth section, issues and challenges of KBDSS are given and the final section concludes the research work.

II. TAXONOMIES OF DECISION SUPPORT SYSTEM

There are various types of DSS available based on different parameters as follows [14]:

- Communication – Driven DSS
- Data - Driven DSS
- Document - Driven DSS
- Knowledge - Driven DSS
- Model - Driven DSS

III. KNOWLEDGE BASED DSS

The reason to choose knowledge driven is that to answer the problem of DSS, according to Davi's law "For every tool there is a task perfectly suited to it". But hoping that to be in correct form, it would be too optimistic to answer that for every task there is tool perfectly suited to it. The need to go for knowledge base is that it has been recognized that the right decision depends on the decision maker's good judgment and this good judgment is based on good knowledge [2]. So ultimately the best decision under some bad situations is made by domain knowledge and makes expertise to decision maker.

It is hard to maintain all the data that is required to make decisions without the help from any outside resources. So ultimately it is all important that all the knowledge gained cannot be accessed by the user at the same time, instead a repository is needed to acquire whenever we look for the needed information. The data taken from the repository can be reused, creative knowledge can be provided by the user who extracts information to the problem [3].

DSS had a specialized problem solving expertise relevant to specific narrow task. KBDSS focuses on a particular domain; it deals with the real problem available in that particular domain. The knowledge provided by the KBDSS is more effective than the knowledge provided by human experts. The knowledge Base is designed to ensure more precious decision making by effectively using timely appropriate data. The ultimate goal of having the KBDSS in decision making is to act as a substantive factor connecting the task with human interface. The artificial intelligence (AI) is associated with KBDSS to build knowledge base. The developing platform may be rule based, heuristic, object based, logic-based or induction based.

The rest of this section deals with the recent research works carried out in different areas and industries.

Lee et al. [4] addressed the users of Social Networking Service (SNS) and tried to find out the SNS users' value perception of social knowledge that has a great impact on the decision of the Word-Of-Mouth (WOM), and information sharing of the corporate post. They proposed a research model on the social knowledge value perception and social knowledge through emotional and personal factors and WOM decisions. Knowledge plays as a key factor. Several literature

reviews has been constructed for emotional attachment and personal factors (Self esteem and self exposure). Here emotional values are concerned with aesthetic values (relating to beauty). So knowledge is here compared with personal factors of emotional attachments, self esteem and self exposure. SNS is developed through Interpersonal relationship and knowledge reactions. It is developed through the individual information and knowledge. The survey evidences, individual's personality and social knowledge value perceptions increase the satisfaction of SNS user [13].

Yang et al. [5] placed a clinical DSS in medical knowledge by reviewing literatures. They proposed a method called Clinical Decision Support System (CDSS). The aim is to enhance the performance and efficiency in a CDSS for best health management among physicians and patients by referring several data and by making a comparison study. Most of their research works were concentrated on different dimension of development analysis. The comparisons are made of with related studies having high impact factor. The improvement in taxonomic performance, accuracy and reliability has been measured by DSS.

Jung et al. [6] stated about the knowledge based dietary nutrition recommendation system for obese management. The study advises youth regarding obese management by personalized recipes and menus anytime anywhere. It is made effective by knowledge-based context aware modeling. Previous problems are solved by user menu by making a comparative study. The knowledge-based dietary nutrition encourages not only the inactive details of the nutritional facts but also with personalized diet-menu applied through knowledge-Based context data through filtrating technique. They developed knowledge-based dietary nutritional recommendation for obese management is expected to be effective in preventing obesity, rather than protecting in advance. The food consumption controls the calories consumption in menu management as provided by the knowledge based dietary facts.

Choi et al. [7] laid out the mutual data model for a DSS on Adverse Drug Reaction (ADRs) to express knowledge from a multi-center database. They also suggested that transmutes data from an Electronic Medical Record (EMR)-based ADR Common Data Model (EADR CDM) is facilitative in realizing prescription formulas and for searching a viable medication list for adverse drug signal detection. The accumulation of various data utilizing a common data model is an efficient method for early decisions on adverse drug reactions

Another research work done by Lim et al. [8] presented a study on factor analysis to support knowledge-based decisions for a smart class. They proposed to expose significant components that provide a smart class to achieve positive effects in education. The factors (ITLA system playfulness, perceived usefulness, perceived ease of use,

attitude toward the class) that must be considered in the design and application of an effective smart class can be suggested to educators, researchers, developers, and education policy decision makers to support effective decisions.

According to research work done by Chung et al. [9] Knowledge-based health service considers user gadget using hybrid Wi-Fi peer-to-peer networking. The aim is to prevent from obesity by providing knowledge-based health service. With the cross Wi-Fi, Peer 2 peer (P2P) architecture, users can enjoy and enable efficient health care, bio-signals. Users can view the details through mobile by M2M smart services. A knowledge-based health service requires communication among cross Wi-Fi, P2P and wireless by establishing M2M based smart services. The building of network is by cross layer optimization algorithm that makes equal use of TCP/IP bunch in order to amend energy efficiency of U-health sensor network and system reliability. They projected a knowledge-Based health service conceiving user comfort station using a hybrid wireless fidelity, peer to peer architecture.

A research work by Han et al. [10] proposed the problem of spam and content pollutant faced by today's networking services such as Facebook and twitter, by erasing the spam messages that have been shared by many users unnecessarily. It can bring down the work of service providers. The solution can be identified by the technique of Artificial Intelligence, for detecting the content pollutants on social networks. To build an assortment example with high accuracy mechanically from the training data set, it is crucial to discover a set of useful lineaments that can assort polluters and non – polluters. They proposed a set of characteristics that can be easily elicited from the messages and behaviors of Twitter users, and build a new breed of classifiers based on these features.

Knowledge management had an acknowledgement for its contribution in decision-making in an organization [11]. With knowledge management strategic management also plays an important role in business field. Knowledge management gains advantage in business through environmental factors

Shao et al. expressed that KBDSS can be classified into two types of technologies: Technologies for Modeling and reasoning. They also reviewed the main application and domain of KBDSS. Their work is based on the technologies used for knowledge modeling and individual reasoning implementations such as "rule-based reasoning, case-based reasoning, narrative-based reasoning and ontology-based reasoning, then based on survey on applications and domains of KBDSS" [12]. The application focuses on Medicine, Manufacturing production scheduling and process optimization, environmental management and other domains where KBDSS are scattered around various interesting domains.

IV. ISSUES AND CHALLENGES

Through the review of literature some of the major issues and challenges are identified and given below. Based on the literature survey several criteria are defined on how knowledge base is used in different collected literatures.

Lee et.al [4] suggested the research models on social knowledge value perception, “to deal with importance of emotional perception, social knowledge, value perception and WOM decisions”. Several literature reviews have been constructed for emotional attachment, personal factors i.e. self esteem and self exposure. SNS is developed through individual information and knowledge. From their work, they tried to validate the research model on the assumption that personal factors as a social knowledge value perception.

While in knowledge value perception factor, it shows the adult group was high level and the difference was statistically significant. Adult user group have been used frequently as part of business and social activities. The issue here is we cannot fix the knowledge source to only one group because as a human knowledge outstands at different level. Certain persons are good in taking decisions before the adult stage; their knowledge can be taken for business activities.

Yang et.al [5] proved that academic quality and accuracy can also be maintained. Pattern technique is followed to find the related terms. Semantic technique is seems to be the efficient search to identify the basic signs and relationship. Articles having the highest impact factors containing the main cited keywords were reviewed. The most common words and terms used in research papers are taken into consideration in order to make decision making effectively. Frequency of keywords is used as a comparing factor for making decision.

The challenge is that knowledge is not only dealt with the repeated words from different articles, but, the term may differ from paper to paper. It leads to confusion when the terms are compared with the most frequent used terms. After separating the terms, semantic techniques can be used in order to review the terms before implementing.

The knowledge based dietary nutrition recommendation system for obese management proposed by Chung et al. [6], shows that the knowledge management has a continued process by comparing the older reviews and making an abstract over the real world information, it is a time consuming process. To collect the abstract in the real world happenings, it takes an enormous time. Strategic management is also apt to this concept. It is a cost effective too. The challenges in their research paper is instead ontology as a tool, for example, Obesity is likely to harm ones health by leading to heart disease, stroke, diabetes etc. It requires continued chain management, when we use ontology the whole study has to be given as a framework with context. It can be achieved by semantic for the development of the mobile application and it is useful process.

Shao et.al [12] presented that in knowledge modeling, two

kinds of knowledge representations are used: Clustering and ontology. Integration is still a challenging in KBDSS. It seems to be a time consuming because of building a moderately sized ontology. Ontology learning is still in an initial stage in KBDSS. Another challenge is incorporating of uncertainty of knowledge in KBDSS.

Here the clustering is of dividing the knowledge according to the best cap it can hold or different knowledge classification. Cluster is made of several rules, the probability of getting correct rule is two, and partial is made whole. To make this partial as a relevant one, instead ontology, it is possible by semantic web. Semantic is not alone to share as a whole but to work as a group that group responsibility get increased instead a individual human effort.

V. CONCLUSION

The recent survey of this paper focuses and directs to recommend knowledge-based activities with semantic techniques that support to improve various situations arises within the organization and different working field, particularly where knowledge is consumed more. From earlier stages Knowledge management has been playing an important role in the new generation of DSS known as KB-DSS because in the speedily changing environment of business world, organization following different methodologies like agile need their employees to often change their workflows. Hence, KB-DSS with domain knowledge with semantic technique can furnish better affirm for decision in general and specifically through helping integration of decision models and decision process.

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