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DIGITAL BASED SYSTEM DESIGN METHODOLOGY AND IMPLEMENTATION

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Abstract:- A knowledge-based system (KBS) is a type of artificial intelligence (AI) that tries to collect human specialists' knowledge to aid decision-making. Expert systems, which are named from their reliance on human expertise, are examples of knowledge-based systems. A knowledge-based system's conventional design, which influences its problem-solving strategy, contains a knowledge base and an inference engine. A knowledge base is a repository of information in a certain topic, such as medical diagnosis. The knowledge base's information is used by the inference engine to derive insights. Knowledge-based systems also have a user interface that allows people to query and interact with the system.

The word"digital system" relates to hardware, software, and networks, as well as how they are used. One system can include several separate components; for example, a computer has a central processing unit, a hard disc, a keyboard, a mouse, and a screen.

Keywords:- Digital System, Artificial Intelligence, Knowledge based

I. INTRODUCTION

A domain expert (also known as a subject matter expert or SME) and a knowledge engineer are often in charge of a knowledge-based system. The domain expert is an expert on a specific topic or concept who can supply the essential information. The information from the domain expert is subsequently translated by a knowledge engineer into sophisticated logic for the computer system. The knowledge engineer tries to create computer knowledge in such a way that it mimics human decision-making. However, because a KBS will eventually be driven by artificial intelligence, it will be unable to completely "think" and form connections like a person.

The wumpus world is a cave with pathways connecting the rooms. The wumpus, a beast that consumes anyone who enters its room, lurks somewhere in the cave. An agent can shoot the wumpus, however the agent only has one arrow. There are several rooms with bottomless holes that will capture anyone who enters them (except for the wumpus, which is too big to fall in). The sole benefi t of living in this area is the prospect of discovering a gold dump. Although the

wumpus universe is tame by today's computer gaming standards, it serves as an ideal test bed for intelligent agents. This was first suggested by Michael. In this paper, we took into account the following factors.

Methodology and Implementation

The complexity of the logic gates that implement a Boolean function is directly related to the complexity of the algebraic expression from which the function is implemented. Although the truth table representation of a function is unique, expressed algebraically, it can appear in many different forms. Boolean functions may be simplified by algebraic method. This procedure of minimization is awkward because it lacks specific rules to predict each succeeding step in the manipulative process. The map method provides a simple straightforward procedure for minimizing Boolean function. This method may be regarded either as a pictorial form of truth table or as an extension of the Venn diagram. The map method first proposed by veitch and slightly modified by karnaugh map [1, 7, 8]. The problem with truth table is that they can get very large, very quickly. You will have noticed that a table involving two propositional variable say A and B has four rows and that a table involving tluee propositi onal variables has eight rows and similarly when four variables are involved, the truth table has sixteen rows. As it seems as if the number of rows of a truth table doubles every time a new propositional variable is added. Therefore; a truth table with just ten variables would have 1024 rows. In general, a truth table with n propositional variables has 2" rows. When we keep doubling the number, the answer gets awfully fast. Whenever a function grows in size in accordance with a positive power of a number greater than 1, it is said to grow exponentially. 2]

The technology has already undergone an adoption-rejection cycle, fed by initially unrealistic expectations and hype. A number of early adopting companies witnessed largescale KBSs disasters, most of which occurred precisely because of the companies' overly ambitious faith in the concept of Artificial Intelligence rather than in the reality of KBS technology.

Success stories are still largely in the shadow of early disappointments, but the list of systems with impressive return-on-investment numbers is growing. The point seems to be selecting the right technologies for solving specific problems, paying attention to parameters such as the problem's scale, the risks involved, the objectivity degree of the involved knowledge.

Attempting to build a methodology for KM tools selection, we picked up the “regions of KM practices” model (Desires and Chauvel, 1999) and tried to map the different types of KBS technologies and applications on it.

The original model contained a third dimension, separating tacit and explicit knowledge, but we decided to give it up as being irrelevant for this particular case, because by focusing on KBSs, we implicitly take into account explicit knowledge only.

While attempting to map the different techniques and applications resulted from the preliminary study and connected to KBSs on this model, we realised that it is very difficult to locate the phase in the knowledge lifecycle and the level where they would fit. For example, Decision Support Systems (DSS) seem appropriate to be used on the individual level and during the scan/map and capture/create phases, but, depending on the implementation, they could as well support teams for making decisions and could contribute to knowledge transformation by proposing an alternative nobody thought of. Planning and workflow systems (PWS) are useful at all three levels and throughout the capture/create, package/store and share/apply phases. But what can we do about generic titles -such as Experi Systems or Document Management? They are too general for finding their place in that

table. Certain techniques are never visible to the users, as they are embedded in search engines remembering our preferences, in automated translation tools we access on the Net or in educational software or computer games.

KNOWLEDGE BASED SYSTEM DESIGN

Knowledge-based systems are systems based on the methods and techniques of Artificial Intelligence. Their core components are the knowledge base and the inference mechanisms. Another problem with the truth table we have used in accessing the validity of argument is that we have looked at all possible values of the propositional variable involved, whether or not those values are relevant to or possible in the particular circumstance . In this paper we have considered the wumpus world problem in order to shown that time complexity to solve any logic expression of wuinpus world problem using resolution by refutation strategy, semantic tableaux approach, is less than O(2"), where n is the number of variables.

The future appears to be bright for hybrid systems that derive their “expertise” by combining automated extraction of knowledge from data with human experts in specific knowledge domains. These hybrid systems will become increasingly popular as the increasingly digital world gives rise to massive amounts of data that require analysis and as people turn to experts to help them deal with greater complexity and uncertainty (SRI Consulting Business Intelligence, 2003). The signs show that the traditional marketplace for KBSS vanished. Nowadays, they are intrinsically integrated in various Knowledge Management tools, and there is a strong tendency of seeing them as accessories of knowledge workers, rather than a possible substitute for their role.

According to SRI Consulting Business Intelligence, some of the trends of the moment involving KBS deployment are: distributed Artificial Intelligence; KBS; visualization software; standards development; the semantic web; open knowledge bases (SRI Consulting Business Intelligence, 2003).

Knowledge has to be usually captured shortly after the experience occurrence, as close to the source as possible and in a structured way. This operation requires dedicated time and skills, and many users are reluctant to invest in it. Imposing a structure enhances retrieval, but hinders users in contributing experiences, as contributing is perceived as complicated and time-consuming. If the content of a knowledge base isn’ t properly filled and updated, there is a high risk of hampering its use after few unsuccessful attempts of getting advantage of it.

The interesting part is that using the same name of knowledge-based systems, different research entities focus on very diverse subdoinains and applications. The name of KBS seems to be a sort of general umbrella covering both particular types of KBSs - such as Case-Based Reasoning Systems- and very general KBSS named “Intelligent Systems” and that could, in fact, be based on any other Artificial Intelligence technology. We tried to catalogue the research sub-domains addressed by these organisations in 2 different categories (KBSs and Applications of Artificial Intelligence). The numbers in brackets indicate the frequency of appearance of these subdomains in the list of research topics of the selected organisations.

PROBLEM DESCRIPTION

The wuinpus world is a cave consisting of rooms connected by passageways. Lurking somewhere in the cave is the wumpus, a beast that eats anyone who enters its room. The wumpus can be shot by an agent, but the agent has only one arrow. Some rooms contain bottomless pits that will trap anyone who wanders into these rooms (except for the wumpus, which is too big to fall in). The only mitigating feature of living in this environment is the possibility of finding a heap of gold. Although the wiimpus world is rather tame by modern computer game standards, it makes an excellent testbed environment for intelligent agents. Michael Genesereth was the first to suggest this. A simple wuinpus world is shown in fig 01. We have considered the following parameters in this paper.

Research done in companies under this title was much more difficult to identify; probably due to the influence of market trends on the product names, "knowledge-based systems" was replaced with something trendier in most of the cases. Meanwhile, we are pretty confident that KBS research and development are currently entrenched in a lot of software products on the market, and there are a lot of software companies doing research and development related to this field.

A KHS is nowadays developed using knowledge engineering techniques (Studer et al 1995). These are similar to software engineering techniques, but the emphasis is on knowledge rather than on data or information processing. The central theme in knowledge engineering techniques is the conceptual modelling of the system in the analysis and design stages of the development process.

Many of the knowledge engineering methodologies developed emphasise the use of models (Common KADS, MIKE, Protege). In the early stages, systems were built using the knowledge of one or more experts — essentially, a process of knowledge transfer (Studer et al 1995). Nowadays, a KBS involves "methods and techniques for knowledge acquisition, modelling, representation and use of knowledge" (Schreiber at al, 1999). The shift towards the modelling approach has also enabled knowledge to be re-used in different areas of one domain (Studer et al 1995). Ontologies and Problem-Solving Methods enable the construction of KBSS from components reusable across domains and tasks.

The development process of a KBS is similar to the development of any other software system; phases such as requirements elicitation, system analysis, system design, system development and implementation are common activities. The stages in KBS development are: business modelling, conceptual modelling, knowledge acquisition, knowledge system design.

II. CONCLUSION

As a consequence of the research, we can infer that KBSs have not faded off the research agenda, but have instead become a fundamental approach in a variety of current research areas, including ambient intelligence, artificial vision, pattern recognition, and so on. The study found that while interest in KJ3Ss as a research issue has not waned, the topic has transitioned to a more secondary position, with KBSs now being embedded in a variety of different systems. They're undoubtedly here to stay, but they're no longer centre stage, as evidenced by the list of selected research entities and their connected themes.

We submitted our shortlist of research entities concentrating on this field, as well as the most notable journals dedicated to the topic, in W ikipedia's article on KBS, as a beginning point for a consolidated repository of information on KHSS.

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