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Expert system: Overview

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Abstract
This paper introduce the basic concept of expert system. even before the world was aware of the importance of the computers, work by Alan Turing in the 1930s, and by john von Neumann the 1950s gave rise to captivating notion of Artificial intelligence. Clearly expert systems are more mature and widely used commercial application coming out of artificial intelligence in an expert system, the computer applies heuristics and rules in a knowledge specific domain to render advice or make recommendations, much like a human expert would expert systems are knowledge intensive programs that solve problem in a domain that require considerable amount of technical expert. This paper focus on expert systems, architecture of an expert system, advantages of an expert system.

Keywords: knowledge base, inference engine, communication interface

Introduction

An area of AI that can claim a large measure of responsibility for the current heightened AI awareness is expert systems. Computer program that embody human expertise as one of the first AI technologies to help people solve important problems. The expert system field has become prominent. As of today quite a happy investment is done in this area.

According to the paulharmon "expert systems" can helpmeet the following needs:

1. New approaches to business organization and productivity.
2. Knowledge
3. Competence
4. Smart automated equipment

"an expert system is a computer program designed to act as an expert system in a particular domain". The existence of human expert system is a perquisite for building an expert system. Expert systems are about capitalizing on hindsight, or past experience. If the experience does not exist or is not willingly available to the development team then an expert system cannot be built. it is also true that if the expert system does not perform well then the expert system will not perform well either. This means that expert system is not substitutes for having expertise in the first place. They are a means of exploiting what already exist in at least person.

"Purpose" of an expert system: for the purpose of an expert system, an expert is someone who is effective at solving the given problem or making the required decision on a day-to-day basis. Human experts have three particular qualities, which are a part of their being recognized as experts:

1. They make good decisions.
2. They make those decisions quickly.
3. They are to cope with a wide range of problems.

Expert system can make good decision too. This is probably the least difficult aspect to achieve. However, human experts apply highly flexible strategies to getting a solution quickly. These include jumping to the solution, recognizing familiar and taking all manner of short cuts. This skillful behavior is harder to achieve in an expert system, and the developers have to make a particular effort to include such knowledge in the system.

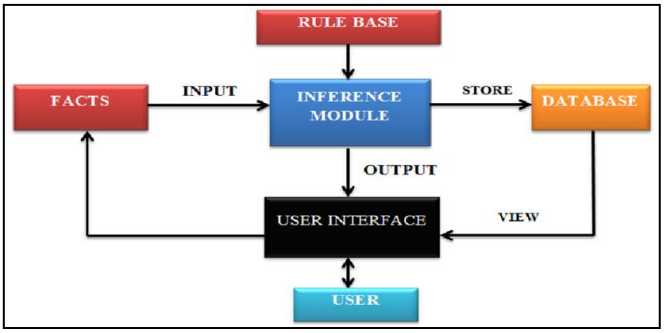

Fig 1

Architecture of an Expert System

1. The knowledge base
2. Inference engine
3. Databases
4. User interface
5. External interfaces

The Knowledge Base

The knowledge base is the heart of the system. Since it contains the detailed knowledge supplied by an expert. It is usually in the form of rules. Expressed in whatever language is provided by software tool being used. In practice knowledge bases also contains facts, questions and Other items needed to make system work as required- but the rules express the expertise. A knowledge base contains just a few rules, or thousands, depending on its scope. The core module

of any expert system is its knowledge base (KB). It is a ware house of the domain specific knowledge captured from the human expert.

Characteristics of Knowledge Base

1. Contains much of the problem solving knowledge.
2. Rules are of the form IF condition THEN action.
3. Action portion of the rule can include.
4. Condition portion of the rule is usually a fact.
5. Actions that affect the outside world.
6. Add a new fact to the database.
7. Rules can be chained together.

Inference Engine

The inference engine attempts to match the antecedent clauses of the rules with the data stored in the database. When all the antecedent of the clauses of the rules is available in the database the rule is fired resulting in new inference. The resulting inference is added to the database.for activating the resulting subsequent firing of the other rules.

Characteristic of Inference Engine

1. General problem solving knowledge.
2. Interpreter analyzes and processes the rules.
3. Takes advantage of heuristic information.
4. Otherwise time to solve a problem could become prohibitively long.
5. Scheduler determines which rule to look at next.
6. This problem is called combinatorial explosion.

User Interface

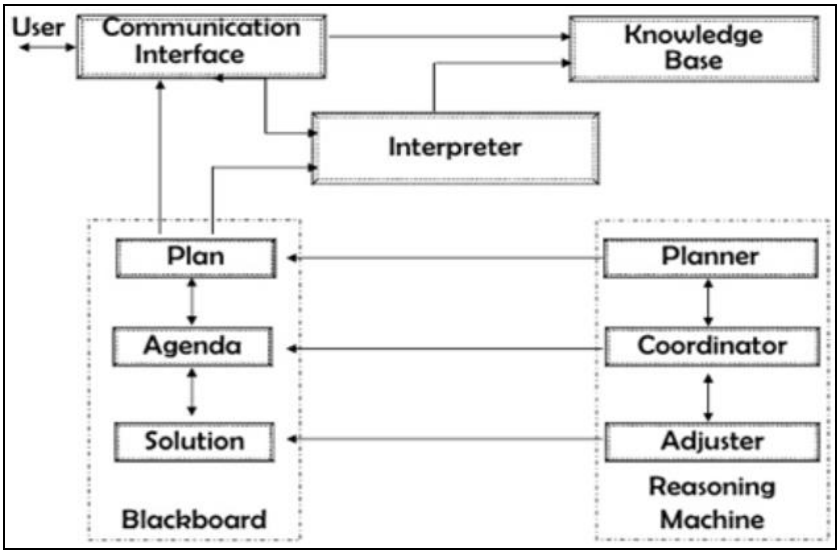

Fig 2

The initial development of an expert system is performed by an expert and knowledge engineer. Unlike most conventional program, in which only programmer can make design program decision the design of an large expert system is implemented through a team effort. A consideration of an end users very important in designing the contents and user Interface of an expert system. The user interacts with the system through a user interface which may use menus, natural language or any other style of interaction. Then an inference engine is used to reason with both the expert knowledge and data specific to the particular problem being solved.

"Note": one important feature of expert system is the way they separate domain specific knowledge from more general purpose reasoning and representation techniques. General purpose bit is referred to as an expert system shell.

"Expert system shell": a shell is a complete development environment for building and maintaining the knowledge based application. It provides step-by-step methodology and ideally a user friendly interface for knowledge engineer that allows the domain expert to be directly involved in structuring and encoding the knowledge.

Applications of an expert system

Fig 3

of sales-guide to selling product, sales support, sales Expert systems are designed and created to facilitate tasks in the fields of accounting, medicine, process control, financial service, production and human resources etc. "education" in education field, many of the expert System's are embedded

inside the intelligent tutoring system (ITS) by using techniques from adaptive hypertext and hypermedia. Most of the system usually will assist student. In their learning by using adaption techniques to personalize with environment, prior knowledge of student and students' ability to learn. "Application of an expert system-expert general library reference, student behavior consultant, textbook selection advisor". "sales" an expert system can include complex knowledge of product application that a sales person could spend years accumulating." Features of expert system in the field Commission and bonus ".manufacturing" expert systems are finding an increasing no. of application in manufacturing environment. They may be applied to almost any manufacturing area, including design, system configuration, vision. "Features of expert system in the field of manufacturing are-chemical material selection, optimum solution, troubleshooting circuits.

Already existing expert system

Table 1

Already existing expert systems	Description
Mycin-	Mycin was an early expert system developed over five or six years in the early" 1970s" at Stanford university. It was written in LISP as the doctoral dissertion of Edward shortliffe under the direction of "brucebuchana, Stanley N. cohen". It was designed to diagnose and recommend treatment for certain blood Infections. The name derived from antibiotics Themselves, as many antibiotics have suffix " –mycin"
Dendral	Dendral was an influential pioneer project in AI of the 1960s, and computer software expert system that it produces. its primary aim was to help organic chemists in identifying unknown Organic molecules, by analyzing their mass spectra and using knowledge of chemistry. It consist of two subprogram:-heuristic dendral, metadendral.
Other existing expert systems-molgen, macsyma, xcon and steamer.	"Xcon" it was a production-rule-based system written in ops5 by "john Mcdermott of CMU in 1978.

Advantages

Increase the probability, consistency of making decision. Help distribute human expertise. Facilitate real-time, low cost expert level decision by the non-expert. Encourage investigations into subtle areas of the problem. Free up the mind and time of the human expert to enable him /her to concentrate on more creative avtivities.

Recent Invention

In AI there are manyrecent inventions have been developed turkey has developed a car named as transformer this car can be transformed into robot. it has a sense of taking decisions.

Conclusion

After getting knowledge of an expert system it's architecture, advantages, applications in sales, education, engineering we conclude that expert systems plays an important role in haman's life. They have the ability to take decision on the basis of data provided to it. Todays they are performing very well eg: = it defeated champion of chinese "goe" game. Trans former car etc. but they are developed to assist the human beings not to replace them.

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