

Steer the AI Frontier: A Panoramic inquiry of Expert Systems in Artificial Intelligence

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Abstract:

Today the need of Expert systems is much important for identify the behavior pattern or perception of domain experts. To accomplished best result, we use machine learning and artificial intelligence concept. This by acquiring appropriate information from its knowledge base and analysis it according to the user’s problem. While interpret the data added by humans in the knowledge base and software is used by a non-expert user to acquire some information. At present the expert systems is much needed in the area of medical diagnosis, accounting, coding, games etc.

Keywords —Artificial Intelligence, Expert Systems. Knowledge Base, Machine Learning, Knowledge Representation, Inference Mechanisms.

I. INTRODUCTION

A. Expert System

Expert System is an interactive and trustworthy computer-based opinion-making concept to achieve to solve complex decision-making problems by using both facts and analytical data. This expert system also acknowledge the human Sense, Knowledge, Perception and Skills. The intent of an expert system is to find the solution to the most complicated effects in a distinct field. Artificial Intelligence and Expert Systems have the potential of exhibit the domain knowledge by thinking rationally. We can say that, the expert systems were the forerunner of the present concepts Artificial Intelligence, Deep Learning and Machine Learning systems.

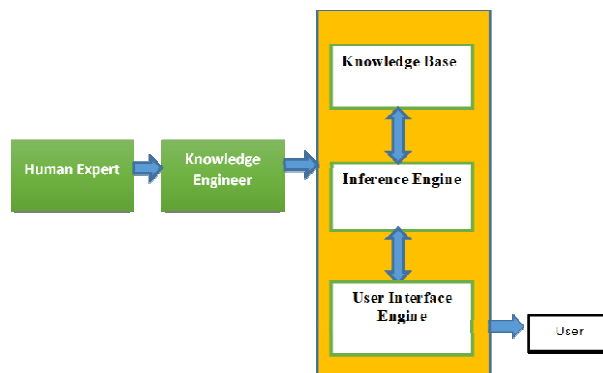
B. Example Scenario:

A Person is searching in mobile browser about an electronic product overview. The next day, he searched about the product price and related product items. The third day he receives advertisement SMS from specific electronic showroom regarding details about what the person searched. The Electronic Showroom also offers discounts on what the person searched? Here, the Question is how particular electronic showroom

know about what the person going to buy and offers given to them as SMS communication. This can be possible by AI Expert System. When we use apps and browsers, the searching data can be stored as cookies in browser itself. Later using AI Expert system programming tools and concepts are used to analyze, predict the customer types, business forecast and etc. By this process, we can predict or judge the next move of the target through this expert analyze.

II. COMPONENTS OF EXPERT SYSTEM

The Expert System with AI consists of the following given components:



II. 1. User Interface

The pivotal section of the expert system concept is user interface. This Interface component is responsible for user interrogation in a readable form and passes it to the inference engine. After that, it displays the results to the user. In other words, it's an interface that helps the user communicate with the expert system.

II. 2. Inference Engine

The inference engine is the intermediary between user interface and knowledge engine which is also called as brain of the expert system. Inference engine has specific regulations rules to solve a particular problem which indicate the facts from the Knowledge Base. It choose various details and procedures to utilize when trying to answer the user's query. It provides rational data about the information in the knowledge base. This component is also helpful for composing conclusions for predicting the solution to the concern problem. The Inference Engine generally uses two strategies for acquiring knowledge from the Knowledge Base, known as data driven concept such as

- A. Forward Chaining
- B. Backward Chaining

2. A. Forward Chaining

This Forward Chaining is a tactical process used by the Expert System to find the solution to the queries – What will happen next. This strategy is mostly used for managing tasks like creating a conclusion, result or effect. Example – prediction or share market movement status.

2. B. Backward Chaining

Backward Chaining is a container used by the Expert System to answer the questions – Why this has happened and what has happened. This strategy is mostly used to find out the root cause or reason behind it, considering what has already circumstance. Example – diagnosis of stomach pain, blood cancer or dengue, etc.

II. 3. Knowledge Base

The knowledge base is a library of information's. It stores all the facts about the problem domain. It is like a large warehouse of knowledge which is

obtained from different experts of a specific field. Thus we can say that the success of the Expert System Software mainly depends on the highly accurate and precise knowledge.

III. APPLICATIONS OF EXPERT SYSTEMS

III. A. In Health care Field:

The Expert system used in Medical field such as to process like human decision making and provide digitalized clinical decision support for fast and effective forecasting, report generations (especially graphically, chart based) with suitable information and knowledge at appropriate times to improve the quality and safety of health care. We use expert system to explore X-rays, Retina and Scans through Expert System Image Analysis.

Expert System is also mainly used in distant Healthcare surveillance concept. After Covid-19, many people in the world much like distant surveillance the health conditions and should get treatment for small issues through that and if the problem is big then they are thinking about hospitals. Healthcare aid assistance tools such as Mobile Health Apps, Wearable tools (Smart Watch in our health monitoring) use AI Expert Systems.

III. B. Expert Systems in E-Learning

AI plays an vital role in e-learning. Artificial intelligence is becoming most predicting of what users think and do, it is able to analyze what kind of content users prefer and consume. Moreover, today, it is able to process data and provide tailored-made solutions. For example, right now some AI-powered LMS platforms advise users what course to take to fill in the knowledge gap, providing needed content on the given topic. During Covid-19 & after LMS (Learning Management System) has emerged among both academicians and students as a solution for “enhanced documentation management, improved administration processes, results tracking”, as well as advanced reporting. Here in LMS AI Expert System make possible of Personalize Learning, Solve problems with content language, Provides Employee with real time assistance, Smart hints and Automatic Task Check.

III. C. Expert Systems in Information Management System.

Artificial intelligence (AI) is complete guidance for the organizations do success business in the digital world. The various risk understood by the organizations and using expert systems to identify the hazards in computer to process large sets of unorganized data. So they recreate their algorithms to stimulate human learning and decision-making. Artificial intelligence (AI) finds trends, patterns and structures in new data to redeveloped programs based on realistic data models.

IV. FINDINGS

In healthcare, expert systems assistance in recognize, treatment planning, and patient management, enhancing clinical decision-making. Finance and economics benefit from expert systems for risk assessment, portfolio optimization, fraud detection, and market analysis. Engineering and manufacturing sector utilize expert systems for fault diagnosis, process optimization, quality control, and predictive maintenance. Customer support and service influence fields, the expert systems to deliver personalized assistance, troubleshoot issues, and enhance user experience. In the field of Education and training harness expert systems for adaptive learning, personalized tutoring, and knowledge spread, promote lifelong learning.

V. CONCLUSION

As knowledge is a valuable wealth to an organization, retaining the expert's knowledge is crucial for the future of the organization. The AI Expert System can play a vital role in storing and retaining the knowledge. AI is used in healthcare, finance, automotive, data security to analyze complex data. Expert System is used to provide expert advice and guidance for various activities. As today AI based Chat Bots are evolved to have Human – Machine Interaction for the digital devices and services.

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