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Expert Systems in Real world Business

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Abstract: ***Nowadays firms are required to reach high levels of specialization in order to increase their competitiveness in complex markets. Expert Systems play a fundamental role in this process as the correct implementation of strategies is determined by the information transfer and dissemination within the organization. In this paper, expert system focused on increasing accuracy and quality of the knowledge for decision making is designed. Business intelligence as the basis for the development and application in business information is becoming an important information technology framework that can help organization to manage, develop and communicate their intangible assets, such as information and knowledge based economy. Particularly in this paper a technical framework is proposed to review the ES approach that will be practically feasible for organizational settings. It will also provide executives and scholars with pragmatic understanding about integrating knowledge management strategy and technologies in business processes for successful performance. The purpose of this paper is to review the use of experts systems and artificial intelligence (AI) in business and examines domain applications, the use of different knowledge representations, unique contributions for knowledge acquisition from the development of systems for business applications, and models of explanation for systems developed for business. Using an ES approach to Business Systems will be able to more effectively use their limited resources to reap the more benefits from their investments in both people and technology.***

Keywords: Artificial Intelligence; Expert Systems, Business environment; business economic; knowledge base systems.

I. INTRODUCTION

These information systems draw upon several areas of artificial intelligence to perform their operations. Developing an expert system requires an understanding of knowledge representation. In other words, Business Intelligence can be a weapon that allows a company to identify threats and opportunities, to establish defensive strategies, and to conquer market shares. He created theories based upon observations and knowledge about the real world. Knowledge can be characterized in terms of the "strength" of the knowledge. The Expert Systems that companies are starting to use, and the AI groups in many large companies, were formed on the mid-1990s. Expert Systems started to show limits on the amount of rules they can work with, and 1996 sales of AI-based hardware and software were $825 million (WFMO, 2002). Likewise, interest in using Neural Nets in business applications developed. By the end of 1980s, Expert Systems were increasingly used in industry, and other AI techniques were being implemented, often unnoticed but with beneficial effect (WFMO, 2001). AI revenues reach $1 billion (MIT, Timeline of AI, 2002).

Some examples of real-world systems based on artificial intelligence are:

- Google

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- Intelligence Distribution Agent (IDA), developed for the U.S. Navy, helps assign sailors new jobs at the end of their tours of duty by negotiating with them via email.
- Systems that trade stocks and commodities without human intervention.
- Banking software for approving bank loans and detecting credit card fraud (developed by Fair Isaac Corp.).
- Search engines such as Brain Boost (or even Google.)
- Intelligent robots, such as ASIMO, QRIO, AIBO.
- Intelligent help systems capable of providing context sensitive help to software system users. These systems are able to infer the correct level of help needed to provide because they can a) make inferences about the level of skill of the user and b) utilize deep knowledge about the software application itself. Using these areas of knowledge it is possible to identify the types of mistakes that users of varying skill levels are likely to make. Novice users who have no conceptual insight into an application tend to make syntactic and semantic mistakes, naive users tend to make more semantic mistakes whereas expert users tend to make thematic mistakes - i.e. inferring incorrectly that one way of assembling commands to solve a particular problem can be generalized to solve another problem using a comparable sequence of commands.
- Intelligent help to operators of complex and potentially dangerous industrial process such as nuclear power plants. Human operators of high risk industrial processes have limited attention span and typically perform poorly in situations where cascades of sequential problem sets can result in an inappropriate remedy.
- "Common sense" reasoning. An ongoing example is the project called [CYC]. CYC attempts to capture and use knowledge about the world to performing reasoning about specific topics. CYC drives it's inference capability by using an encyclopedic amount of knowledge about the world. Its current knowledge base consists of 300,000 concepts, 3,000,000 assertions, and 26,000 relations (07/2008). CYC can further be trained by interaction with humans in the outside world. CYC's ability to reason can be characterized by taking for instance, a picture of a group of people. This group of people can be occupationally characterized by their attire. Among the people is an athlete who very evidently has just run a foot race for an extended period of time. CYC can be queried as to which one is wet. CYC can correctly infer that people who physically exert themselves perspire. From that CYC can infer that people who perspire will momentarily be wet. CYC can therefore conclude that it is the athlete who is wet.

II. AI IN BUSINESS

AI has a broad discipline in today's world that promises to simulate numerous inherent human skills such as automatic programming, case-based reasoning, neural networks, decision-making, expert systems, natural language processing, pattern recognition, speech recognition and market competition due to technological advancement etc. AI technologies bring more complex data analysis features to existing applications. I think of AI as a science that investigates knowledge and intelligence, possibly the intelligent application of knowledge. Knowledge and Intelligence are as fundamental as the universe within which they exist, it may turn out that they are more fundamental. Enterprises that utilize AI-enhanced applications are expected to become more diverse, as the needs for the ability to analyze data across multiple variables, fraud detection and customer relationship management emerge as key business drivers to gain competitive advantage. Artificial Intelligence is a branch of Science which deals with helping machines, finds solutions to complex problems in a more human-like fashion. This generally involves borrowing characteristics from human intelligence, and applying them as algorithms in a computer friendly way. A more or less flexible or efficient approach can be taken depending on the requirements established, which influences how artificial the intelligent behavior appears.

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III. Real Life Applications of AI

AI has a broad discipline in today's world that promises to simulate numerous inherent human skills such as automatic programming, case-based reasoning, neural networks, decision-making, expert systems, natural language processing, pattern recognition, speech recognition and market competition due to technological advancement etc. AI technologies bring more complex data analysis features to existing applications. I think of AI as a science that investigates knowledge and intelligence, possibly the intelligent application of knowledge. Knowledge and Intelligence are as fundamental as the universe within which they exist, it may turn out that they are more fundamental. Enterprises that utilize AI-enhanced applications are expected to become more diverse, as the needs for the ability to analyze data across multiple variables, fraud detection and customer relationship management emerge as key business drivers to gain competitive advantage. Artificial Intelligence is a branch of Science which deals with helping machines, finds solutions to complex problems in a more human-like fashion. This generally involves borrowing characteristics from human intelligence, and applying them as algorithms in a computer friendly way. A more or less flexible or efficient approach can be taken depending on the requirements established, which influences how artificial the intelligent behavior appears.

A. Artificial intelligence can be implemented in business to improve work processes and add to the functionality of business systems. AI in the business context can refer either to specific software programs or to the ways in which those programs are actually used to help companies and organizations carry out a variety of operations and transactions.

B. When business AI refers to actual software programs, generally the specific function of an individual program is the focus. For example, if a business uses translation software programs to help handle brief translations; this is an application of artificial intelligence in business. By executing a task that requires a significant degree of evaluation or higher-order analysis, the translation software is acting as an artificial intelligence.

C. Another acceptable definition of artificial intelligence in business is the simulation of skills that are considered innate in people. Those skills include the use of reason and logic to make simple and complicated decisions. They also include the capability to recognize speech, speak and understand natural language, respond to verbal and written messages and recognize patterns. Artificial intelligence can even be said to be at work when an application "remembers" information and reuses it in other transactions. Some or all of these skills and capabilities are programmed into many applications of artificial intelligence in business; they automate or "computerize" tasks that were once handled exclusively by people.

D. There are many real-world applications for artificial intelligence in business. Electronic commerce, better known as e-commerce, is the use of software and machines that have been made to behave like intelligent sales clerks in a store and even like a cashier. When a person purchases merchandise or services on-line, he or she never has to interact with another person. Via this technology, he or she can enter a virtual store, shop and even pay for products. Artificially intelligent software totals a bill, and knows when to add tax, how to process payment and even whether a credit card number is valid.

E. Customers in cyberspace routinely receive receipts after payment is made, and virtual store owners can keep track of inventory without ever manually counting stock. Many businesses use highly sophisticated software to act as virtual customer service representatives and front-desk receptionists. Speech recognition software is one aspect that allows customers to receive some form of customer service by phone without ever talking to a person.

F. Customers can benefit greatly from applications of artificial intelligence in business. For instance, many people are able to check the activity of their bank and credit card accounts by phone without ever talking to anyone or even having to physically press a button on a phone. They simply speak to the artificially intelligent computer on the other end that "understands" their words. This can backfire, though; some customers feel that there is no substitute for the assistance of a real person, and business applications of AI can be frustrating to them.

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- Is the intelligence of machines and the branch of computer science that aims to create it. It is the study and design of intelligent agents. AI is a broad discipline that promises to simulate numerous innate human skills such as automatic programming, case-based reasoning, neural networks, decision-making, expert systems, natural language processing, pattern recognition and speech recognition etc.
- Enterprises that utilize AI-enhanced applications are expected to become more diverse, as the needs for the ability to analyze data across:- Multiple variables Fraud detection Customer relationship management.
- Artificial Intelligence aims to improve machine behavior in tackling complex tasks. Humans have an interesting approach to problem-solving, based on abstract thought, high-level deliberative reasoning and pattern recognition. Artificial Intelligence can help us understand this process by recreating it, then potentially enabling us to enhance it beyond our current capabilities.
- Business applications such as:- Unknown patterns/relationships in sales data Customer buying habits Complex problem-solving and decision- support techniques in real-time business applications. AI techniques are spread across functions ranging from finance management to forecasting and product.
- An artificial neural network (ANN) is a mathematical model or computational model based on biological neural networks. It consists of an interconnected group of artificial neurons and processes information using a connectionist approach to computation. In practical terms neural networks are non-linear statistical data modeling tools. They can be used to model complex relationships between inputs and outputs or to find patterns in data.
- The tasks to which artificial neural networks are applied tend to fall within the following broad categories: Function approximation, or regression analysis, including time series prediction and modeling. Classification, including pattern and sequence recognition, novelty detection and sequential decision making. Data processing, including filtering, clustering, blind source separation and compression.
- View your best product runs and the corresponding settings. Increase efficiency and quality by using optimal settings from past production. Artificial Intelligence can optimize your schedule beyond normal human capabilities. Increase productivity by eliminating downtime due to unpredictable changes in the schedule.
- In the field of Finance, artificial intelligence has long been used. Some applications of Artificial Intelligence are:- Credit authorization screening Mortgage risk assessment Project management and bidding strategy Financial and economic forecasting Risk rating of exchange-traded, fixed income investments Detection of regularities in security price movements Prediction of default and bankruptcy Security/and or Asset Portfolio Management.
- In Marketing, Some applications of Artificial Intelligence are: - Computerized neural networks Customer relationship management (CRM). High-tech data mining can give companies a precise view of how particular segments of the customer base react to a product or service Buying patterns, analytics could help companies react much more quickly to the marketplace.
- Some applications of AI in HR are: - Use of neural networks and fuzzy logic in human resource information system (HRIS). Fuzzy neural network, to construct a new model for evaluation of managerial talent, and accordingly to develop a decision support system in human resource selection.
- It is difficult for business to see general relevance from AI. AI can have a positive effect for business benefit and has lead to some very useful systems that have found their way into the heart of business activity. Business should not lose sight of where AI could go because there are many potential benefits to current and new businesses of future research. The idea of robotic domestic workers is still far-fetched but companies are making progress even here. There is already a Robot Vacuum Cleaner marketed by Electrolux and doubtless improved systems with better functionality will follow.

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IV. Future Impact of Artificial Intelligence for Business

Is AI Abstract To The Business World?

My answer is YES. AI is very applicable in businesses today and will be so intertwined with business operations in the future that it may be impossible to do without it. The following are some ways AI will impact businesses now and more so in the future.

- Change in knowledge management in the workplace as AI will be used to develop more sensitive and interactive, virtual learning and working environment. Here the use of telepresence will be further employed.
- AI will be more widely used for complex problem-solving and decision-support techniques especially in real-time business applications. More applicability of AI techniques will be spread across business areas ranging from smart finance management to increased accuracy of weather predictions.
- Tasks too dangerous for humans like as mining, firefighting and even bomb disarming will be carried out by special artificial intelligence aided machines.
- Imagine a chauffeur driven Car Company in operation when AI is employed to make driverless transport available to consumers, such a business will need to under a total overhaul and restructuring to retain its customers. See the Palm Monorail in Dubai, a fully automatic driverless train that can shuttle up to 6,000 passengers an hour.
- Analyzing huge amount of data that complement traditional statistical methods will be done by AI through database mining which will help companies realize value from data assets.
- Artificial intelligence software may soon be able to protect consumers from fraud by spotting changes in spending or credit card use. If cards are lost or accounts are breached, the program can shut down the account and alert the holder of a potential problem to help limit losses. Such software can detect patterns in the stock market, which can be beneficial to investors. This will change the way banks and the stock market operates.
- The above are a few ways that the use of Artificial intelligence can impact businesses now and in the future thus the need for each business or organization to keep abreast on technological trends and its potential threats or profits to its business venture. The following figure **Fig.1** shows example of social business development.

Fig 1. Social business development

V. CONCLUSION

If AI can find practical use in a wide range of applications, what about automating some of the decisions that we do manually in our businesses today? Or what about using AI to provide a better alternative to rule based processing which we use so much of in our business applications? Unfortunately there are not many industries or product categories where this data is as readily available. There are other potential applications, for example in manufacturing when allocating resources during production line planning, AI could aid in selecting the best resource for a particular job. This can be done based on various features, such as availability, reliability, production speed, deadlines and other requirements. Do I think it could work? Yes I do. Do I know in what business process, and for what decisions, it would be truly useful in real life? We might just go ahead and try it. It is difficult for business to see general relevance of AI. This is probably one of the reasons for the compartmentalization of AI into things like Knowledge Based Systems, Neural Networks, and Genetic Algorithms etc. Some of these separate sub topics have been shown to be very useful in solving certain difficult business and industrial problems and consequently funding bodies influence research directions by encouraging work on these more application based areas. This can have a positive effect for business benefit and has lead to some very useful systems. The Expert System is an AI application that makes decisions based on knowledge and inference (the ability to react on the knowledge), as defined by experts in a certain domain and to solve problems in that domain. The Expert System normally falls under the definition of Weak AI. One advantage of an Expert System is that it can explain the logic behind a particular decision.

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