Role of Artificial Intelligence & Expert System in:
Business Competitiveness

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Abstract

Today's global economy requires increased attention to the issue of business competitiveness. Business information system or Artificial Intelligence and expert system raise the competitiveness of enterprises in the global market. 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. Competency Based Management (CBM) has become vital to any firm's strategic position and organizational decision making. The role of Artificial intelligence & Expert System (ES) is to provide a knowledge based information system that is expected to have human attributes in order to replicate human capacity in ethical decision making. In this paper a holistic 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. It is based on the psychological conceptions of human competence and performance in the workplace. Using an ES approach to Educational Institute with CBM will be able to more effectively use their limited resources to reap the more benefits from their investments in both people and technology. The idea of robotic domestic workers is still farfetched but companies are making progress even here. There is already a Robot Vacuum Cleaner marketed by Electrolux and doubtless improved systems with better functionality.

Key words: AI; Artificial Intelligence, ES; Expert System, CBM Competency Based Management, SCM; Strategic Competency Management. KDD; Knowledge discovery in database, KM; Knowledge management, ANN; Artificial Neural Network.

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Introduction

Business applications utilize the specific technologies mentioned earlier to try and make better sense of potentially enormous variability (for example, unknown patterns/relationships in sales data, customer buying habits, and so on). However, within the corporate world, AI is widely used for complex problem-solving and decision-support techniques in real-time business applications. The business applicability of AI techniques is spread across functions ranging from finance management to forecasting and production. In the intensely competitive and dynamic market scenario, decision-making has become fairly complex and latency is inherent in many processes. Fraud is a million dollar business and it is increasing every year. The PwC global economic crime survey of 2009 suggests that close to 30% of companies worldwide reported fallen victim to fraud in the past years. In addition, the amount of data to be analyzed has increased substantially. AI technologies help enterprises reduce latency in making business decisions, minimize fraud and enhance revenue opportunities.

AI & Importance of AI in Business Competitiveness:

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.

Real life applications of AI

The tasks to which artificial Intelligence or 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, innovation detection and sequential decision making.

- Data processing, including filtering, clustering, blind source separation and compression.

- Application areas also include system identification and control (vehicle control, process control), game-playing and decision making (chess, racing), pattern recognition (radar systems, face identification, object recognition and more), sequence recognition (gesture, speech, handwritten text recognition), medical diagnosis, financial applications, data mining (or knowledge discovery in databases, "KDD"), visualization and e-mail spam filtering.

- The proven success of Artificial Neural Networks (ANN) and expert systems has helped AI to gain widespread adoption in enterprise business applications. In some instances, such as fraud detection, the use of AI has already become the most preferred method. Fraud management is a knowledge-intensive activity. The main AI techniques used for fraud management include, Data mining to classify, cluster, and segment the data and automatically find associations and rules in the data that may signify interesting patterns, including those related to fraud.

- Expert systems to encode expertise for detecting fraud in the form of rules.

- Machine learning techniques to automatically identify characteristics of fraud.

- Other techniques such as link analysis, Bayesian networks, decision theory, land sequence matching are also used for fraud detection (Palshikar 2002).

- In addition, artificial intelligence or neural networks have become a well-established technique for pattern recognition, particularly of images, data streams and complex data sources and, in turn, have emerged as a modeling backbone for a majority of data-mining tools available in the market.

- A majority of the enterprises adopt horizontal or vertical solutions that embed neural networks such as insurance risk assessment or fraud-detection tools, or data-mining tools that

include artificial intelligence (for instance, from SAS, IBM and SPSS) as one of the modeling options.

Artificial Intelligence in Manufacturing

As the manufacturing industry becomes ever more competitive, sophisticated technology has emerged to improve productivity. Artificial Intelligence in manufacturing can be applied to a variety of systems. AI is involved in many areas of the automotive industry. Robots have been enhanced by the advancements in AI allowing for improved production. Although intelligent assist devices are more expensive, they greatly increase production. It can recognize patterns, time consuming and mentally challenging tasks. Artificial Intelligence can optimize the production schedule and production runs. For businesses, being capable of delivering high quality goods at low costs and short delivery times is similar to operating in a current environment like the Devil's Triangle, and this is not a easy task for any organization. Managing so that production takes place at the right time, on the right equipment, and using the right tools will minimize any deviations in delivery dates promised to the customer. Utilizing equipment, personnel and tools to their maximal efficiency will no doubt improve any organization's competitive strength. In return, proper utilization of these capabilities will result in lower costs for the organization Optimal scheduling of jobs on equipment, without the use of computer software, is a truly difficult undertaking. Performing planning using the "Deterministic Simulation Method" will provide you with schedules that will indicate job loads per equipment. Even in the case limited to a single piece of equipment, as the number of jobs to schedule on that equipment increases, finding the right solution in the "Possible Solutions Set" become next to impossible. And in the real world, the difficulties arising from the large size of the solutions set due to the recipes formed by jobs, equipment and products, and shaped by the technological restrictions, as well as the complexity in finding a close to ideal solution, are readily apparent. Research and studies are being conducted worldwide on the subject of scheduling. Software vendors working in this area follow developments closely, and they are coming out with new products to better meet demands. "Genetic Algorithms", "Artificial Intelligence", and "Neural Networks" are some of the technologies being used for scheduling.

Advantages

- 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.

Artificial Intelligence in Financial services

AI has found a home in financial services and is recognized as a valuable addition to numerous business applications. Sophisticated technologies encompassing neural networks and business rules along with AI-based techniques are compliant positive results in transaction-oriented scenarios for financial services. AI has been widely adopted in such areas of risk management, compliance, and securities trading and monitoring, with an extension into customer relationship management (CRM).Warren Buffet is known as the ultimate investor in this age. So good is he, in fact, that artificial intelligence software developed in Carnegie Mellon that predicts stock movements was named after him by. But can machines really take the place of human traders, much less surpass them? When Deep Blue defeated Chess Grandmaster Kasparov in 1997, AI was propelled into the limelight. Indeed, if a machine can whiz through the intricacies of the ultimate game of strategy, why not beat man in other fields as well – thereby facilitating work, decreasing costs and errors and increasing productivity and quality. This study focuses on applying AI in Finance, particularly in stock trading. 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.

Artificial intelligence types used in finance include neural networks, fuzzy logic, genetic algorithms, expert systems and intelligent agents. They are often used in combination with each other. One such case is Fidelity Investments. In this paper, I set the stage by describing how traditional stock trading differs from AI-powered stock trading. We define the various AI systems available and also explore the various solutions available in the market, their IT foundations and how salient they are. Then, we move into how AI systems for stock trading will affect traders, companies and individuals. Benefits, risks and competitive strategy will be defined and real-world examples cited, as grounding for our recommendations in the end. Recommendations include getting management buy-in, implementing the system and managing the whole structure to succeed.

Artificial Intelligence in Marketing

Advances in artificial intelligence (AI) eventually could turbo-boost customer analytics to give companies speedier insights into individual buying patterns and a host of other consumer habits. Artificial intelligence functions are made possible by computerized neural networks that simulate the same types of connections that are made in the human brain to generate thought. Currently, the technology is used mostly to analyze data for genetics, pharmaceutical and other scientific research. It's seeing little use in CRM right now, though it has tremendous potential in the future AI-enhanced analytics programs also provide survival modeling capabilities suggesting changes to products based on use. For example, customer patterns are analyzed to learn ways to extend the life of light bulbs or to help decide the correct dosage for medications. High-tech data mining can give companies a precise view of how particular segments of the customer base react to a product or service and propose changes consistent with those findings. In addition to further exploring customers" buying patterns, analytics could help companies react much more quickly to the marketplace. According to Meta Group vice president Liz Shahnam, intelligent agents could let companies make real-time changes to marketing campaigns. "New technologies would have the model refreshed on the fly based on each new incoming piece of customer information -- reaction to the campaign for a more targeted offer,"

Artificial Intelligence in HR

It is widely believed that the role of managers is becoming a key determinant for enterprises' competitiveness in today's knowledge economy era. Owing to fast development of information technologies (ITs), corporations are employed to enhance the capability of human resource management, which is called human resource information system (HRIS). Recently, due to promising results of artificial neural networks (ANNs) and fuzzy theory in engineering, they have also become candidates for HRIS. The artificial intelligence (AT) field can play a role in this, especially; in assuring that the fuzzy neural network has the characteristics and functions of training, learning, and simulation to make an optimal and accurate judgment according to the human thinking model. The main purposes of the study are to discuss the appointment of managers in enterprises through 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. Therefore, the research methods of reviewing literature, in-depth interview, questionnaire survey, and fuzzy neural network are used in the study. The fuzzy neural network is used to train the concrete database, based on 191 questionnaires from experts, for getting the best network model in different training conditions. In order to let decision-makers adjust weighted values and obtain decisive results of each phase's scores, we adopted the simple additive weighting (SAW) and fuzzy analytic hierarchy process (FAHP) methods in the study. Finally, the human resource selection system of Java user interface has been constructed by FNN in the study.

Conclusion

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 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 farfetched 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.

I would like to close by quoting from Tom Peters, a leading management guru: "When you think you've reached the top, tear down everything and do it all over again. If you don't, your competitor will." To this, I would like to add my own: "If your competitor won't, new investors will enter the market segment who will do the same job better."

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