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Artificial Intelligence in Business

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Abstract: **Artificial Intelligence (A.I) is a term that is gaining popularity in nowadays. In recent years many companies have developed as well as implemented so many artificial systems such as business intelligence, expert systems, voice-recognition systems, natural language processing systems etc. But majority of the organization as well as managers are not properly aware about this potential concept.AI is something that give a system the ability to think itself as well as to make decisions which give every organizations a competitive edge. But the lack of awareness or the fear to adapt to changes make may organizations against these new emerging concepts. The aim of this paper is to determine whether AI had noteworthy impact on business as well as to discover which types of AI methods are used today, and what they are capable of doing.**

Keywords: **AI, Biological Intelligence, Turing Test, Expert System, Neural Network, Genetic Algorithm, Data Mining, Behavior Analysis, Advice System, Customer Relationship Management, Stock Portfolio Prediction**

I. INTRODUCTION

Artificial Intelligence is a term that covering a wide area. Simply it is the intelligence capability that is exhibited by computing systems which enable them to make decisions and provide solutions in the real world scenario. An A.I machine perceives its environment and takes action that is suitable for that particular situation. A.I is a wide area which is highly technical and specialized. Current A.I research include reasoning, planning, learning etc..Nowadays A.I is not only using for research purpose but also for business purposes. A recent study indicates that large numbers of companies have A.I applications in the last decades and the growth is continuing today also. Many of the applications are standalone but some other are integrated with Management Information Systems, Knowledge based Expert systems etc..But there are emerging trends in A.I that are being used in business such as

Neural networks, knowledge-based planning and scheduling systems, speech-synthesis systems and voice-recognition systems etc, Despite of the development of A.I in ever faster range most of the organizations and managers are less aware and do not have sufficient knowledge regarding the emerging trends of A.I in business. The main reason is that relative to traditional Information Systems (IS) is an A.I application are new; limiting the collective knowledge regarding the topic is relatively low. This lack of relevant data makes them resistant to the change towards intelligent systems. But the important fact is that as the technology progresses more and more organizations are adapting to A.I enabled systems in order to gain a competitive edge over others, which increases the relevance of A.I day by day.

II. ARTIFICIAL INTELLIGENCE VS BIOLOGICAL INTELLIGENCE

Can A.I overpower Biological Intelligence (intelligence that human possesses)? If the question asked 80 years ago the answer will be no, but if the question asks now we can't give a proper answer, some could have say yes and some could have say no.

(i) Turing Test

In 1950, the British mathematician Alan Turing declared, in a paper, that one day there would be a machine that would have intelligence equal to human intelligence in every way. And he formulated a test to see if a computer could manage it. In his test, a computer and a woman are placed in two separate rooms. The only communication is though an interrogator that is placed in a third room, who asks identical questions to the computer and the woman in the other two rooms. The test is successful if the interrogator is unable to distinguish the machine from the women by his questions. If that were the case then, according to Alan Turing, it would be unreasonable not to call the computer intelligent (HODGES, 2001).

(ii) Panczyk (1999), in her article "A smart choice for collectors?" in "Credit Card Management" explains that it is only possible to outperform the capacity of the human in some cases. She further explains that the more variables that are added to a problem, the harder it becomes for humans, and at a certain point the computer starts to outperform them. she also believes that, moreover, that computers have the advantage because: their performance never deteriorates due

to fatigue, their attention is never lost, and they never ever get emotionally entangled like humans are.

So by considering this two opinions what we can say that computer can become intelligent and outperform biological intelligence in some cases where complexity is high and need for large amount of calculations, in all other scenarios it is human intelligence or biological intelligence that is till outperforming A.I.

iii. History of A.I in Business

1) The first commercial A.I based system XCON was developed in the late 1970s.
2) In 1980's Japan used fuzzy based logic systems in subway trains.
3) By the end of 1980's expert systems are widely used in business industry.
4) In early 1990's Automatic Scheduling software is being used.
5) In the late 1990s that the applications such as data mining tools, e-mail filters, and web crawlers were developed and generally accepted.

III. A.I METHODS IN BUSINESS

1) Expert System

Expert system is a piece of software which uses databases of expert knowledge to offer advice or make decisions in business operations. While the Expert System concept may sound futuristic, one of the first commercial Expert Systems, called Mycin, was already in business use 1974 (MIT, Applications of AI, 2001). Mycin, which was created by Edward H. Shortliffe at Stanford University, is one of the most famous Expert Systems. Mycin was designed as a medical diagnosis tool. Given information concerning a patient's symptoms and test results, Mycin attempted to identify the cause of the patient's infection and suggested treatments.

Expert systems have developed for several reasons: including: the archiving of rare skills, preserving the knowledge of retiring personnel, and to aggregate all of the available knowledge in a specific domain from several experts, (when no single expert has complete knowledge of that domain). The Expert System can train new employees or eliminate large amounts of the monotonous work humans do, thereby saving the expert's time for situations requiring his or her expertise

2) Artificial Neural Network.

Artificial neural network (ANN) is a software based structure which has been developed by the inspiration from neural connection in human brain. In human brain there are 10 million neurons each are interconnected with other neurons. As a Neural Network (NN) is designed, rather than being programmed, the systems learn to recognize patterns. Learning is achieved through repeated minor modifications to selected neuron weights (The weight is equal to the importance of the neuron).NN starts with random weights which means that they do not know anything and after they have been trained correctly they will be able to find desired output from given input. There are two types of learning they are supervised learning and unsupervised learning. In supervised methods a target will be tried to achieve from given inputs and in unsupervised learning method the cells organize themselves by learning input pattern.

ANN is used for forecasting in business operations advantages of ANN over traditional statistical forecasting methods are that ANN do not have to fulfil any statistical assumptions and the ability to handle non-linearity, which are common in business. And other advantage is that ANN learns through input so that it requires less data preparation.

3) Genetic Algorithm

"Genetic algorithms are inspired by Darwin's theory about evolution. Solution to a problem solved by genetic algorithms is evolved. Algorithm is started with a set of solutions (represented by chromosomes) called population. Solutions from one population are taken and used to form a new population. This is motivated by a hope, that the new population will be better than the old one. Solutions are selected to form new solutions (offspring) are selected according to their fitness - the more suitable they are the more chances they have to reproduce. This is repeated until some condition (for example number of populations or improvement of the best solution) is satisfied."
(OBITKO, 1998).

Genetic algorithms are used in genetic programming techniques which can be useful for time tabling and job shop scheduling problem (JSSP), for finding most beneficial allocations for officers.

4) Data Mining

Data mining also known as knowledge mining is a technique to collect relevant information that is useful for a particular purpose from large amount of raw data.
Port (2001) defines Data Mining in his article "Virtual prospecting from oil exploration to neurosurgery…" in "Business Week":

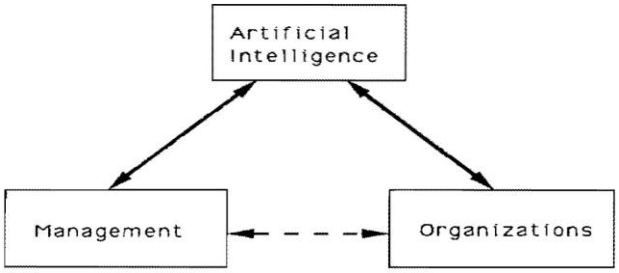
"Data Mining harnesses Artificial Intelligence and slick statistical tricks to unearth insights hiding inside

mountains of data. The software is so thorough, and so clever at spotting subtle relationships and associations, that it regularly makes fresh discoveries."
(PORT, 2001)

Data mining is very much important to every organizations that from the large amount of available data company need to assess particular information in order to make strategic decisions regarding every functional areas in the business.

IV. A.I AND ORGANIZATIONS

An organization has different dimensions. Each of these dimensions are characterized by their structure, climate, culture, institutional properties etc..These factors provide various contexts for development of A.I in that particular organization. Management plays a crucial role in this approach.



a. Impact Of A.I On Organizations

Some of the effects of A.I in an organization are:

1) Power Shifts: Due to the implementation of A.I in an organization there may be a chance to change ownership and control of knowledge from human worker to expert systems.

2) Reassignment of Responsibility: AI has the ability to change the ownership and responsibility for decision making. example of this is American Express's Authorizers Assistant, an ES that handles the vast majority of requests for expenditure authorization made with the American Express card.

3) Cost Reduction: Implementation of A.I reduces cost, as well as enhances the service provided by the organizations in addition to assist for decision making.

4) Personal shifts and Downsizing: A.I can contribute to an organization's technical maintenance thereby reduce the staff requirement for performing particular maintenance function.

b. Impact of A.I on Management

Implementation of A.I in an organization have a direct impact upon management strategies which give a competitive advantage for the organization.

1) Products: Introduction of A.I in manufacturing sector enhances the performance of machines, increases the quality of product, reduce cost as well as decreases the rate of fault products or decrease the error rate in production. Having A.I in the production sector improves efficiency in every operations.

2) Workforce: For many service organizations, maintaining and effectively using a skilled workforce is crucial to profitability. A.I in various functional areas like Human resource, Financial Management improves the maintenance of records regarding employee details as well as A.I system help to keep up to date information regarding overall financial performance of an organization which reduced the additional effort that needed to given by the experts.

V. A.I APPLICATIONS IN BUSINESS

Now let us examine some application of A.I in business

1) Information Overload

An excess of Information is an essential to business in order to make important decisions. Due to the advancement of internet technology, large databases containing huge amount of data can be accessible through various networks. But the availability of large volume of information leads to an impossible situation to locate information on time. In order to analyze this data and to get useful information on time data mining can be used as an efficient solution. AI techniques, like data mining can give a company more useful information instead of huge volumes of raw data.

2) Customer Relationship Management-Behaviour Analysis

Customer Relationship Management (CRM) is the coordination between sales, marketing, Customer service, field support and other customer contact functions (TREJECTA, FAQ, 2001).Several E-commerce web sites use this mechanism in order to store the taste and customers which helps the company to maintain good products and services suitable for each individual thereby they can maintain a good customer relationship. If information is gathered about customers, and the appropriate tools to analyse the data are used, it will then be able to understand what triggers someone to become a customer or not. With these tools companies will be able to categorize customers as either non-profitable, or highly profitable. Analysing customer behaviour could also allow a company to identify which customers are open to changes. In other words, the

company that can focus on the most profitable customer target group, and reshape customer behaviour to be more cost effective, will have a considerable economic advantage over the competition.

3) Credit Card Issuers and Collectors

Expert systems are used by the credit card issuers in order to help them to determine whether to accept the purchase or postpone the purchase. Credit card issuers like MasterCard and Visa uses Artificial Neural Networks (ANN) in order to identify the deviations in the buying behaviour of customers as well as spending habits in order to identify fraud activities.

4) Company Management

IT managers had continuous problems regarding employee abuse of web. But nowadays there are ANN enabled tools are available in order to check the contents of web sites thereby blocking employees to access certain inappropriate contents as weapons, pornography, drugs, gambling etc..

5) *Marketing*

Dr. Martin explains, in the article ”Alien Intelligence “ in “Journal of Business Strategy”, that AI techniques can be used to find patterns that indicate which customers with certain characteristics should be targeted for highly focused marketing. There are hybrid systems as well as ANN systems that analyse data as well as messages based on the rules set by marketing managers and filtered through multiple messages to select the most appropriate customer segment.

6) production management

Rich set of choices sometimes cause headaches in manufacturing. In manufacturing scenario there is a chance of pile up of works in half assembled machines while other workstation stay idle. This is not just a scenario but majority of the organizations are facing this problem. But this problem can be solved using A.I. company, which found it difficult to control their inventory, was able to solve their problem by employing Genetic Algorithm (GA) technique that learned to ‘breed’ factory schedules far better than those humans could.

7) Finance Management-Predicting Stock Portfolios

Majority of the organizations have adopted A.I in order to predict stocks efficiently and effectively. Computers with Neural Networks are better at selecting stocks than people are. Andre Archambault states, in William’s (2001) article, that "because humans often fall in love with stocks, Neural Networks usually outperforms analysts. Even if these AI systems were only a few percentage points more accurate than their predecessors, because of the amounts of money involved, they would be very profitable. It is, therefore, reasonable to assume that if a company has discovered a method that gives it an important advantage over its competitors, it is locked in the safe as a company secret".

VI. FUTURE OF A.I IN BUSINESS

A.I is a trend that has emerged in last 80 years and it is under ever fast growing rate now. A.I is something that gained popularity recently and the potential growth of A.I in business is still waiting ahead of us.

1) Customer Relationship Management

Soon, instead of using our hands to operate computers, People will be able to communicate with computers in a much more civilized manner, namely with normal speech. With advances in language processing, computers will have a superior way of acquiring knowledge and exchanging information with humans. In the near future voice recognition and natural language understanding will be a reality. Natural language processing will provide important services for people who do not speak different languages. If a computer is able to understand natural languages, it will also be able to translate from one language to another. language processing will permit presentation of Web sites and news in any one of hundreds of languages, and provide instantaneous translation and publicity on several web sites in several other languages, Another possibility is that a person could have a real-time conversation with another person, who speaks a different language, using a real-time translating computer. Such a useful tool might even be built in our mobile phones in the future. Possible applications for such a device seem limitless.

In the near future there would be robots and machines to provide real time support, guidance as well as to help human beings. Increasing rate of growth in A.I will replace humans in the working sectors where high efficiency ,concentration are required..potential jobs that having less security will be handling by robots. Humans will only acts as facilitators and guidance providers to robots and intelligence machines where A.I will be the one who performs the job.

2) Company Management

In the near future manager will be replaced by a group of software's who will collect analyze, evaluate, interpret the information and make necessary decisions which is beneficial to an organization. In the near future there would be software systems who manage workload, evaluate entire operations in an organization, make decisions, and provide solutions accurately on time.

VII. CONCLUSION

Artificial Intelligence (A.I) is a modern trend that has been developed in about 80 years ago. It is under a rapid growth. In the earlier days it was just a topic of research only, but nowadays it has gained its popularity so that A.I is being used in various sectors all around the world. A.I has gained it's trust among business organizations in a very short period of time. A.I is now used in business for decision making purpose. A large problem of today's decision makers is that availability of large amount of data in order to make decisions in a short span of time. AI is used successfully today as a tool to refine, derive and analyse vast amounts of information in our society. Some industries, such as the "collections business" have adopted AI in their support systems. These AI techniques can automatically learn about customers and their behaviour using Neural-Network software. Maintenance industries breed efficient maintenance schedules with Genetic Algorithms and use Neural-Network software to try to anticipate problems before they happen. Managers need to focus their attention on A.I as well as A.I developments. Business should consider A.I trends as well as emerging technology in order to decide whether they need to use these technologies to gain competitive advantage .Today A.I is not important and necessary for the success of business, yet A.I can eliminate certain repetitive tasks. It also helps to detect repetitive patterns which may not be able to find out through human intelligence. Through this paper our opinion is that A.I is a sector that is having a huge potential for growth in near future and it will become a part of every organizations which will be essential for the successful operations of every industry.

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