

How Artificial Intelligence is Employed in Business Managerial Decision

Naman Agarwal,
Mayo College Ajmer

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ABSTRACT: This article deals with the hot topic of research i.e. application of artificial intelligence in business management. As we know that novel generation of AI is rapidly growing and has conquered all walks of human life. An exclusive real world application of AI-human interaction will be elucidated specifically in the paper. The technologies revolutionizing the way we live and get things done. AI or artificial intelligence is the provocation of human intellect via machines, especially computer systems. Dramatically the business landscape is developing day by day due to optimistic use of AI. It has many practical applications like its incorporation into interfaces to understand the data, e-commerce approach, improving work place communication, human resource management, healthcare, cyber security, logistics and business empowerment, sports industry and many more. The business sphere is the most influenced zone where the mode of AI acts as a silver lining in the cloud. This programming gives an insight of victory of science and business globally. Machine Learning and computational intelligence is basically the reflection of AI that proposes an easy understanding for sorting an issue in a particular manner. Dynamic modification, prediction, insightful and generalization are few attributes which vaguely defines AI. A reliable outlook with a uniform pace is profiting business across the globe with a hope to bloom in the future.

I. INTRODUCTION

Nowadays, the usage of Artificial Intelligence (AI) is employed in almost every field. This modern approach of technology has influenced thoughts of many individuals be it a scientist or a businessman. AI is becoming more relevant in management. AI has varying definitions and is successful in impacting new generations. It seems as that as the future of work will be dependent on this pragmatic technology. Decision-making in this era via AI resolves many issues and challenges faced by humans[1], [2]. Executives in business organizations handles many decision

taking challenges based on processing of complex data that reflects their approach. Consequently, AI is becoming conventional in the business administration to decrease workload of the directors and additionally managing data integration with precision. Artificial Intelligence lies at the progression of futuristic technologies with the prospect to perform efficient communication among versatile stakeholders and employers[3], [4]. Possession of reliable knowledge of information and computational analysis, the chances of uncertainty & mistakes decreases. The swift impulse in the contemporary times varying from neural network, speech/ pattern identification to genetic algorithm to deep learning has relieved the mankind in a certain way.

This empowering technique supplements in decision-making in general together with particular issues. Attracting many entrepreneurs nowadays, its implication is promised in transforming business scenarios. As stated by Stephen Hawking, “the development of full artificial intelligence could spell the end of the human race”. This promising technology is a ray of hope for the corporate world as it enhances decision-making, remodel business designs and ecosystems. According to exploration in 2018, AI is ranking at first position for strategic technology. Although AI technology-human interaction is an interesting blend utilizing conceptual and theoretical outlook to find a distinct solution. The synergistic activity of compilation of mans intellect and machines employ a major asset in the context of organizational decision-making[3]. Predictive analytics besides adept systems are the basic AI tools providing interpreted estimations that compacts bulky data thus examining substitute decision choices. With the rapid consumption of the technology to follow high grade nexus verdict among varied industries. The harmonization of innovative and absolute decision-making by businessman using AI technology is necessary. The problems faced by them in the

institution for data refinement and rational decision-making are also presented in the paper. Applying AI to the business management is only possible by employing the theory and an experience i.e. a person needs to be skilled for utilizing AI[5]. Business logistics systems demand more Quality Management System (QMS) as well as collared employees. Taking an example of the game chess, we can definitely get a vision of appreciative tasks and co-ordination between human and AI; unique yet flattering abilities required for successful decision-making. By employing an analytical approach, algorithms and techniques the organizational scholars deliberate an understanding strategy to analyze three basic issues: uncertainty, intricacy & equivocality[5].



Figure 1: AI v/s human interaction

II. METHODOLOGIES TO BUILD AI SYSTEM

Several techniques have been used to design AI operators that we will discuss in this section. Modeling systems provides a promising path to acquaint with AI eliminating the obstacles to ensure an implemented success. Knowledge based system or machine learning is incomplete without these techniques. A detailed view of the working of AI is as follows.

2.1 Rule based interference

The very basic method on which the AI works, applying the rules elicited from human experts by a skilled operator. Today the relevant

difference lies in the choice of rules that have been developed using an automated method such as CART (classification and regression trees) or association rule mining[6]. Almost every AI system highlighted upto the year 2000 used the rule based interference as it is the most common technique till date.

2.2 Semantic Linguistic Analysis

It involves the method of understanding the natural dialect in which the humans communicate. This subject to the structural representation of sentences, phrases in a consistent manner. This analyzes the linguistic procedure in componential inspection of the elements like naming, paraphrasing, defining and classifying. The theory says that the machine is performing natural language processing (NLP). Semantic text analysis is also applicable version of Semantic technique. The versions of this approach are used for analyzing financial data and medical diagnosis[4], [7].

2.3 Bayesian Network

An intelligent tutoring system designed to evaluate information based on random interference. The conditional probabilities related to each path between nodes in the network adjusting in the light of new data, thus incorporating learning. The Bayes model is an acyclic graphical direction for understanding the conditional dependencies of the variables[8]. Its application in an array of tasks includes prediction, anomaly detection, diagnostics, automated insight, reasoning, time series prediction and decision-making under uncertainty. This useful tool is classically based on data learning.

2.4 Similarity measures

This is an area of supervised machine learning in Artificial Intelligence. The detection of measure of identity among the two data points is observed. CBR i.e. the Case-based reasoning is a method where the similarity measure is used to rectify the stored case/ similar to the query case. According to a study, k-means approach generated the finest result when similarity measure for textual analysis was done. The k-means approach works by splitting a set of observations into a pre-established number of clusters (k) by repeating the process. Initially a random set of k points are picked to be the focus of the clusters, then each annotation is assigned to its proximal centre[9]. After all readings have been collected, the mean point of every collection is re-estimated, and they become the new set of cluster centres. The

procedure goes on till no further change in seen reading cluster.

Another similarity measure approach is support vector machines that are classified by increasing the breadth of the gaps between the collections.

2.5 Neural Networks

Machine learning, deep learning being a part of artificial intelligence (AI) is included in the neural network which is a system that works similar to the tasks performed by the neurons of human brain. An artificial neural network mimics the human brain to recognize the underlying relationships in a set of data[6]. The statistical model partly based on biological neural network is capable of developing non-linear relationship between inputs and outputs in parallel[10].

Genetic algorithm is another technique inspired by biology which mimics the Darwinian natural selection, with a population of solutions undergoing procedure equivalent to inheritance, reproduction, mutation and cross-over, until the exquisite outcome is obtained.



Figure 2: Valuing business through different AI approach

III. AI RATIONAL IN DECISION-MAKING

How the use of machine learning is complementary in organizational decision-making? To answer this question, basic challenges faced by the organizational scholars should be kept in mind. The AI tools or the techniques specified provide an analytical approach to decision-making. The logic applied by the artificial intelligent machines is well versed with different aspect that

makes the thought of rationality stronger than the decree made by human. The creative modeling technique that identifies the problem offering a strategic decision to the solution benefits the most[11].

Immersion is the step in which the decision maker thinks about the issue consciously and collects the information. At the initial point of time, the brain is functional on the problem unconsciously. After a certain period instantly when a relevant solution seems to be correct then the verification and the aptness of the solution is checked. AI technique categorizes the functionality on the basis of knowledge, thought, and language involving human interpretation approach. Eliminating the irrelevant information from the data is the principal component[12]. “Data mining” or pattern recognition maps a set of significant propositions to formal symbols so that a valid information in the data is identified. The speech, text and language processing hold a major part in the intelligent language related technique.

Quality management in institutions is associated with particular process. Collection of data as well as assessment of customer satisfaction is done via personal interviews, phone interviews and mail surveys. However, several withdraws include the need for a large amount of manual work raises the research costs[12]. Although AI is a versatile approach where humans are benefited but it also poses difficulties while analyzing the data. The following section deals with the obstacles faced by executives while taking a decision.

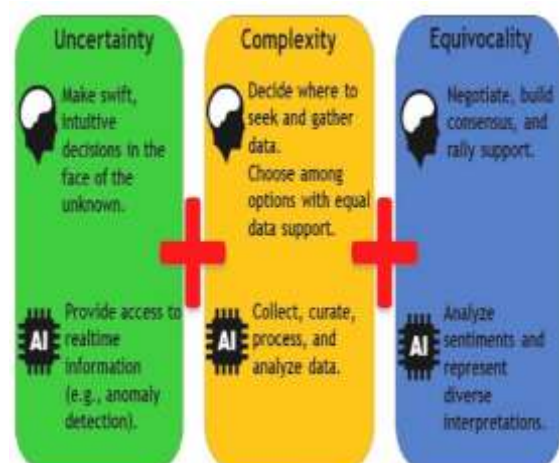


Figure 3: Contrasting individual-AI interaction, featured by uncertainty, complexity and equivocality

3.1 Unpredictability: a vague situation

The notion of unreliability is originated from the deficiency of info about both internal and external institutional environment including scarcity of manpower assets, exposure of interrupting technologies and new government policies. The rising sense of uncertainty demonstrates a differing surrounding that will influence the decision the organizers make. Finding and adjusting to these modifications gives the benefit to enhance the decisiveness. AI system assist managers spot anomalies by providing real-time view about initial probabilities of corrective actions[13]. Certain tools are designed which provide detecting and identification of organization's external environment, facilitating semi-automated strategy articulation.

3.1.1 In case uncertainty increases

The extent of uncertainty escorts a stress level among people which makes them tensed hence revealing some schemes to manage the problem. Here are some ideas to consider for times of high decision uncertainty:

1. **Minimize the time limit for determining a solution:** Take small steps wisely to build a ladder for success. Accustom yourself and get familiarized with each step to be on a safer side.
2. **Prevent unwanted risks:** It can create confusion, anxiety and makes it difficult to reach at a particular conclusion. Clutching multiple risks at a time can make a person puzzled leading to wrong decisions.
3. **Focus on your goals with a clear view:** Desires and needs should be clarified with knowledge of gains and losses. Dealing with uncertainty, evaluate the negative and positive consequence of the risks involved.

3.2 Directing complexities: the AI benefit

Many elements impart to a complex condition. In the modern times, AI has outshone the man brains with its supreme quantitative, computational and analytical proficiency. By analyzing the trouble and extracting a vigorous sum of data AI poses a merit. It offers myriad of contributions that need comprehensive and ingenious pondering for strategic outcome.

The synergistic human communication with AI involves a combined view of watching the intricate conditions that makes it easy processing. The organizational consequences of increasing complexities in managerial competency require an accepting of dynamic business environment. Managers must watch and reply to more sources of

change that are obstructing the decision-making process[14]. A study says that complexity can be modeled with chaos theory where little modification in one factor can bring a crucial transformation in another. Incomplete data management leads to a condition of instability that later becomes difficult to process. Therefore, inculcating AI with human experience becomes an important part[15].

3.3 Resolving equivocality in decision-making

Business aesthetics are sometime interrupted because of the clashing interest of stake holders, clients and policy-makers that directs to an unbalanced way in making decisions. The neutral view of machines can be at contrast with the indistinctive, dramatically stimulated and provisional delicacy of multiple involuntary decisions taken by organizations. The emotional and social intelligence also plays a crucial role in offering a vision and addressing a communal and diplomatic aggression priming equivocal decision-making situations, which is a human virtue that outperforms machines.

IV. ACKNOWLEDGING AI WITH DATA MINING

The evolutionary epoch of big data systems in business and management reveals a knowledge based learning:

- A good reputation and a skilled approach attract fame.
- The business expert should themselves realize that they system often serve to assist the human decision.
- The growing popularity of knowledge management increased when a sudden drift in the emphasis from the skilled to the comprehension took place.

The appropriate use of knowledge based system is essential along with the integration of machine learning to tackle the difficulties faced by businessmen.

Data mining involves the avails the use of refined data analytical tools to profit the decision makers. Models and algorithms designed for enhancing the quality of the extracted data predicts the upcoming trends and behavior allowing industries to make proactive, knowledge driven decisions. Based on the old knowledge driven decision, data mining in AI is more common today. The CART decision tree approach used to upgrade the business rule as a data mining technique is another approach.

V. IMPLICIT LEARNING FOR MANAGERS AND ORGANIZATION

Optimization of the predictive model and data analysis in order to minimize the error has enabled the businessman to invest in-cognitive technologies for long term partnership with distinct human capabilities.

The learning procedure outlines the socio-technical systems and technological breakthrough with AI. The efficiency of the organizational thinking is majorly contrasted by the algorithmic strategies as well as human minds[16]. Adaptive environment along with the interaction with smart technologies is recommended to foster analytical skills. The settlement needs complimentary actions of both AI knowledgeable workers to operate the working of business.

VI. DISCUSSION

The statistical approach and prediction modeling in tackling the obstacles faced by the businessman in managerial decision provides a way to excel. Business Intelligence (BI) insights drawn from the data gathered and manifesting organizational needs is the practical application of AI technology. From mining data to customer relationship management (CRM) and managing assets is basically what AI has taught. Here is an overview to implement success in organization by integrating AI:

- **Well versed with AI:** Acquaint with the diverse features that AI offers. Clarify the basic concepts of AI to increase your knowledge so that one can efficiently make use of it.
- **Determine the complication you want to get rid of via AI:** Exploring ideas is the primary step for any executive to start with. Recognizing the problem to get a considerable solution so that a valuable product is released.
- **Assign tactile value:** Prioritize the concrete values with a potential and feasible execution to determine AI implementation. The financial record must be mind to excel the working in an organization.
- **Know the gap:** There is always a void between what an entrepreneur wants and what he achieves in the given span of time. Familiarizing self with the internal capability gap will aid in better performance which is possible with an AI technology implementation.
- **Data Integration:** The most important step in business management is the need of cleaning data in order to clear the cache. ML provides

necessity to incorporate data analysis with the skilled working.

- **Begin wisely:** Start with a simple approach and focus to solve sample of your data using AI. Natural language understanding is applied to every field today irrespective of the problem. Smaller steps lead to wiser decisions.
- **Merging storage as a part:** While dealing with a voluminous dataset with an improved algorithm that help in building accurate models, this acquires the inclusion of fast, perfect storage as AI system design.
- **Make AI your daily routine:** This technology used by companies should be clearly experienced by the persons accounting for providing the solution. AI augmentation is something that workers should know.
- **Forge with stability:** Each aspect of developing AI system should be kept in mind while understanding the balance which is required. Sufficient bandwidth for storage, graphic processing unit (GPU) and networking are the three components a company should take care of. Comprehension of the sort of data used with their encryption is another task. Similarly, balance in an overall budget that is spent on the project is another attribute the company should work on.

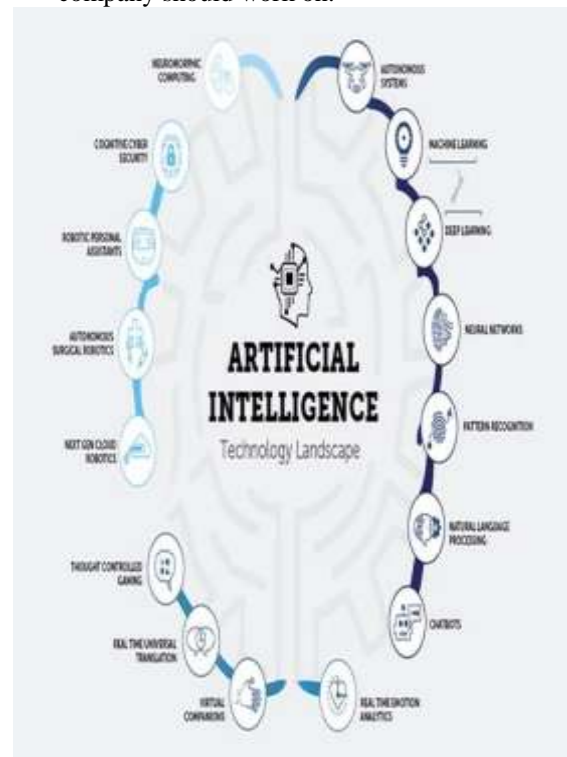


Figure 4: AI landscape attributes

VII. CONCLUSION

With an increasing demand of AI implementation in eliminating redundancy in voluminous data with advanced algorithms and enhanced computing power has influenced the decision-making. With a relevant direction of research and success of AI applications, it has achieved an elemental position in digital systems and human life. This vision of human-machine interaction is not a race against machines but is a race with machines. The creative interpretation based on AI tools for QMS also poses some challenges which need a wise guidance. Overall the enormous data stuff is very efficiently coded and analyzed by the machines providing the organization an insight towards the right way. The business companies are transforming at a greater pace with this artificial intelligence technology. The versatility of this outlook is appealing many minds in management as well as in other branches. The future seems bright with a better accomplishment of the AI in marketing, sales, R&D, automation and many more fields.

The impact of AI for decision-making is governed by theoretical and experimental development. The congruity of the human-machine will take the world an ultimate level reaching to a point where the machines may overtake the human minds to think rationally and efficiently that is required in decision-making. The upcoming advancement of AI promises a far better situation with elimination of challenges and accomplishment of goals.

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