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Artificial Intelligence in Business – A Narrative Literature Review

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ABSTRACT

Artificial intelligence is the scientific and technical knowledge that is used to develop smart computer programs. It has a plethora of uses including monitoring, discovering, predicting, and interpreting. The long developmental process of artificial intelligence has spanned more than 70 years in history with three steps in its development, namely, the initial phase (1956–1980), the industrialization phase of AI (1980–2000), and the explosion phase (2000). This paper deals with the application of artificial intelligence in the field of business.

KEYWORDS: artificial intelligence, business, machine learning, artificial intelligence algorithms

INTRODUCTION

Artificial intelligence (AI) usually refers to the artificial production of the human mind to learn, plan, perceive, or process natural language. It is an Information Technology (IT) industry that runs primarily on machines built to act like humans. AI is a combination of computer technologies and techniques used to work out complex problems by emulating the brain's ability to learn. (Harikumar Pallathadka, et. al., 2021) John McCarthy, the father of AI, described AI as "scientific and technical knowledge, especially regarding the development of intelligent computer programs." (Ravi Manne, et. al., 2021)

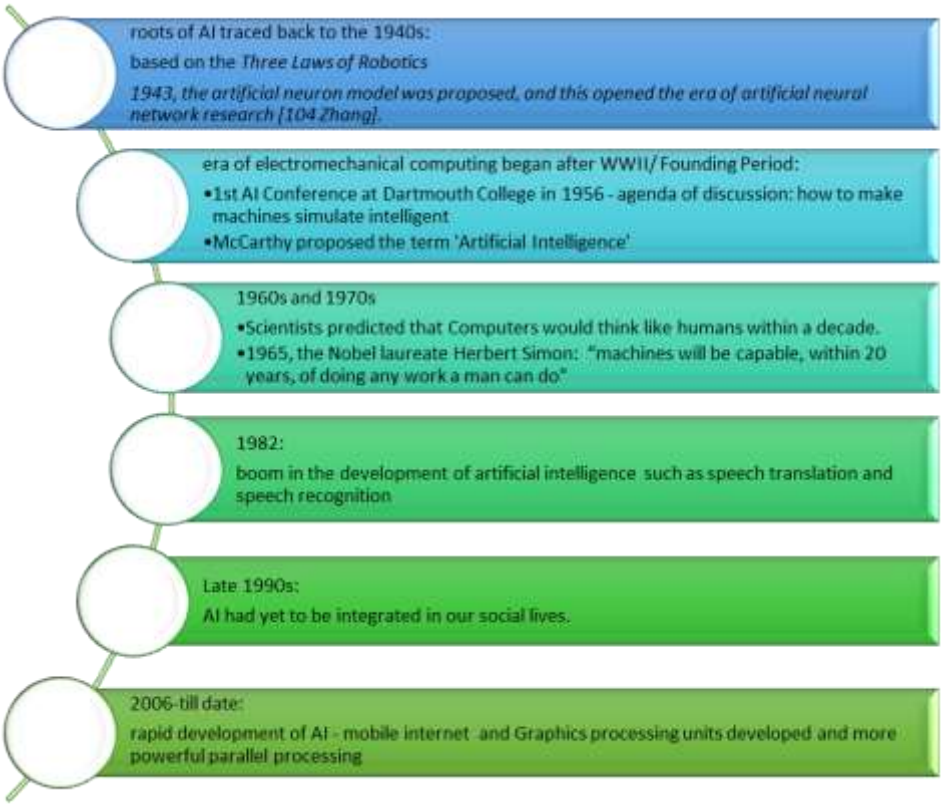
Artificial Intelligence, as explained by the Association for the Advancement of Artificial Intelligence is "the scientific understanding of the mechanisms underlying thought and intelligent behaviour and their embodiment in machines." (http://aitopics.org) It is the field of making machines intelligent and making informed decisions. This field also uses the data for machine learning (ML). (Rajendra Akerkar, 2019)

ML, a subcategory of AI, is a series of activities that are constructed to solve a problem optimised mechanically through experience and may or may not require human participation (S.R. Sandeep, et. al., 2022). ML is an offshoot of AI techniques that assist us in learning more quickly and accurately. Empowered by ML and natural language processing, technologies of AI serve to accomplish increasingly complex tasks that require higher interaction, dialogue, reasoning, prediction, accuracy, and emotional expression. (Ann Giesel, 2018)

A multidisciplinary technology, AI has the capability of integrating cognition, machine learning, emotion recognition, human-computer interaction, data storage, and decision-making. (Lu, 2019) Deep learning plays a critical role in the development of ML. Statistical techniques are employed in the algorithms of deep learning to create a model for problem-solving large, complex datasets with very little governance from programmers. Automatic generation of multiple layers of abstractions that are then used to identify patterns has contributed to the term 'deep'. (Daniel Castro, et.al., 2016)

MODERN HISTORY AND BACKGROUND OF ARTIFICIAL INTELLIGENCE (AI)

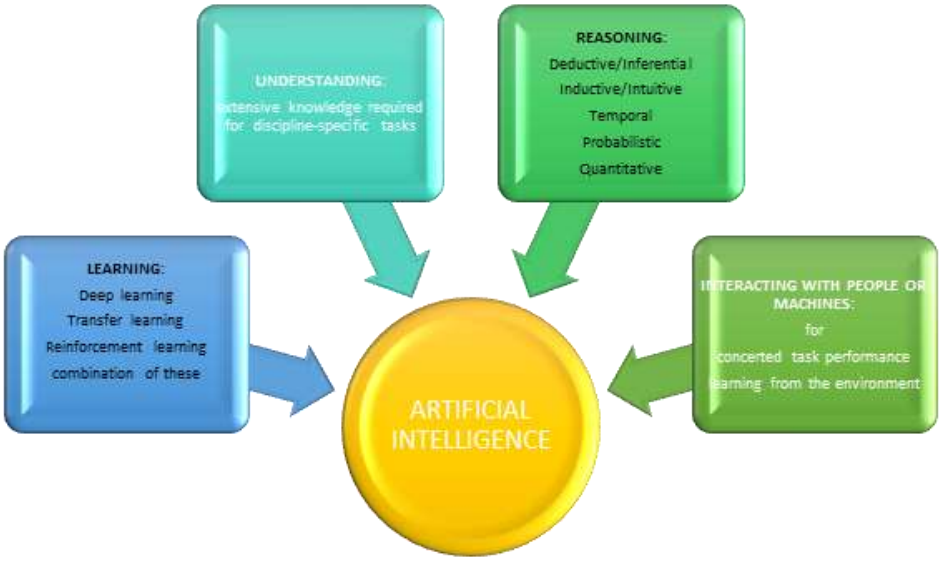
The long developmental process of AI has spanned more than 70 years in history with three steps in its development, namely, the initial phase spanning over 24 years (1956–1980), and the next two decades saw the industrialization phase of AI (1980–2000), and the explosion phase (2000–). During the initial phase, the only tasks performed by AI were solving algebraic application problems, proving geometric theorems, and learning English. The Dartmouth conference in 1956 marks the origin of AI, where young and promising scientists brainstormed the means to create a machine that thought like a human, communicated in natural language, and was provided by a certain extent of intelligence. Rapid advancement was seen in AI from 1980-2000 which marks the second major phase in its development. Substantial funding was provided by nations across the world for AI research, to create machines that could support human-machine dialogue, image recognition, and translation. In 1997, the chess champion was defeated by IBM's "Deep Blue". The 21st century heralded iconic advancements in the field of AI, marking the third major phase of its development. This era saw the development of the Internet, graphic processing units (GPU), AI technologies such as speech recognition and image recognition, as well as big data. (Yang Lu, 2019)



HISTORICAL BACKGROUND OF ARTIFICIAL INTELLIGENCE (adapted from Daniel Castro, et. al., 2016 & Caiming Zhang, et.al., 2021)

FUNCTIONALITIES OF ARTIFICIAL INTELLIGENCE (AI)

AI has a plethora of applications ranging from assisting us to carry out basic day-to-day tasks like voice recognition, recommendation of content, or searching photos based on people or objects in it to more complex ones such as understanding how COVID-19 attacks the human body or how to manage traffic jams. It has made it possible for researchers to tackle the most difficult problems in science, medicine, and technology, and help drive discovery in those areas. AI accomplishes to analyse volumes of data faster and provides better solutions. (Science 101: Artificial Intelligence | Argonne National Laboratory (anl.gov))



FUNCTIONALITIES OF ARTIFICIAL INTELLIGENCE

The seven main functions of AI include:

Monitoring

AI can quickly analyse large amounts of data to find anomalies and patterns. It can do this much faster and more accurately (often in real-time) than humans, making it well suited for monitoring applications such as alteration in the environment and cyber security intrusions.

Discovering

AI performs data mining by extracting discernment from large datasets and discovering new solutions through replication. (Daniel Castro, et. al., 2016) Dynamic models are used by AI that adapts following learning data. This effectively reveals the abstract pattern that conventional computers are unable to furnish. (Nelson Sizwe, et. al., 2015)

Predicting

AI can forecast the trends likely to evolve in the future. It also allows prediction, recommendation, and personalization of responses by systems. (Daniel Castro, et. al., 2016) An example of this is the Netflix recommender algorithms which dissect the viewing history of the user and his/her expressed preferences to recommend new titles that the user may like. (Ben Popper, 2016) AI's application of prediction can vastly benefit data-intensive applications like precision medicine and weather forecasts.

Interpreting

Based on its ability to learn and recognise patterns, AI can interpret unstructured and unclassifiable data such as images, videos, audio, and text. This has led to the ability of computers to analyse a vast array of information about the world. (Daniel Castro, et. al., 2016) An example of this is the use of AI by smartphone apps for quick interpretation of voice instructions for scheduling meetings, (Jared Newman, 2016) or by diagnostic software to decipher aneurysms through X-rays. (Klint Finley, 2015) Legal software also uses AI to interpret court decisions pertinent to a case. (Chris Weller, 2016)

Interacting with the Physical Environment

Direct engagement of autonomous systems and the physical environment is made possible through AI which permits diverse machine-environment interactions. AI facilitates robotic systems to control and navigate the world around them. Driverless cars are a classic example of this functionality of AI. These cars through various sensors, cameras, maps, and GPS systems analyse large amounts of real-time data to choose and suggest safe and efficient road routes.

Interacting with People

Human interaction with computer systems is made easy using AI. Keeping the needs of the computer, humans tailor their behaviour when interacting with it. With the assistance of AI, computer systems can respond to voice, gestures, and facial expressions, thus allowing a human-computer interaction akin to human-human interactions. For example, an AI-powered Chatbot can answer the questions an individual asks, or Beckon, a robot, nods, or waves when interacting with humans.

Interacting with Machines

AI can automatically adjust the interactions between complex machines. (Daniel Castro et. al., 2016) For example, data center control systems minimize energy costs by constantly monitoring the environmental conditions, internal temperature, and functioning of a computer and adjusting its cooling system. This permits the computer to perform optimally. (Joshua Hill, 2016) Autonomous trucks show fuel efficiency by arranging themselves in platoon formations using AI or effective communication can be carried out between autonomous robots working in a warehouse for sorting out and acquiring items. (Eric Limmer, 2016)

APPLICATION OF ARTIFICIAL INTELLIGENCE IN BUSINESS

Information technology has undergone a revolution through the development of AI, shaping the way we live today. AI algorithms have found applications in various fields such as agriculture, business operations, consumer convenience, disaster prevention and management, education, health care, industrial operations, research, and transportation.

Business intelligence (BI) is one of the areas of AI that gathers accurate information in the precise format at the correct time and delivers the results to carry out decision-making. It has a positive impact on business operations, modus operandi, and strategy in the establishments. Businesses today use a variety of information systems to perform routine and special tasks including logging sales, processing payrolls, substantiating decisions in various

departments, and furnishing alternatives for business operations. First introduced in the 1990s, BI enables users to adeptly draw out useful business information from huge amounts of data. Today, BI has become a premium tool used to increase the value of the business enterprise. Advanced BI systems help enhance the competitiveness of businesses. These systems have integrated themselves into all spheres of a business.

Marketing

Marketing is the process by which the management moves goods and services from concept to the consumers. Today, there is fierce competition in the market since there is a plethora of products or services that are not unique. Businesses can achieve the goal of competing for market advantage by identifying their market which would help them to determine their best strategy. AI programs can anticipate customer needs, aid in creating tailor-made campaigns, identify the purchasing trends of the customer, and help business enterprises deliver customer service. These programs analyse mountains of customer data that lead them to identify the characteristics of high-value customers. Automation can assist an organization to achieve its desired marketing results.

Sales

Sales and marketing are interwoven. Once potential clients have been recognised by the marketing team, the leads are taken over by the sales department. The bottom line of a business is greatly impacted by talented salespeople. AI provides the sales team with a tool to help them to build up their clientele and generate revenue. The most relevant client acquisition possibilities can be derived through the assessment of business goals by AI. Conversica is one such tool, a sales conversion management software that assists the sales department to connect, engage, nurture, and follow-up with a lead. Conversica and other such software can help save an enormous amount of time. AI and ML also help enterprises to achieve maximum profits through price optimisation. They also contribute to the improvement of consumer suggestions and market basket analysis for improved sales.

Inventory management

Businesses and e-commerce companies manage their inventories by using AI algorithms. An analytical study on past sales data is conducted by these algorithms that help them correlate between old and future sales. Through the prediction of future sales, management of inventories by managers is made feasible.

Accounting and Finance

The accounting and finance departments of a business function to ensure adherence to legal norms, create budgets, analyse the performance of the various department of a business, and develop business tactics. Automatization of many of these processes has been carried out by the application of AI in business. AI also helps with projections and forecasts for a business. AI allows accounting departments to downscale the amount of time their accountants spend conducting complex audits and asset estimates. Several analytical or BI programs are engaged for optimal decision-making by executives. These programs display the financial information of the business visual and report widgets which provide an insight into the market, product, operations, and possible investment opportunities. This allows the executive to decide the best strategies to meet company goals. Predictive analytics are also provided by some of the programs.

Customer Support

Satisfaction Prediction is a tool developed by Zendesk that uses ML to evaluate customer service interactions and predict the satisfaction rate of a customer. This allows it to prompt intervention if it gauges that a customer is at risk of leaving a business. The data analysed by this tool include customer-support ticket text, wait times, and the number of replies required to resolve a ticket. This helps to estimate customer happiness and adjust its predictive models in real-time.

Office assistants

Amy is a virtual-assistant service offered by Start-up X.ai. It can analyse employee calendars and emails to automatically schedule meetings and adjust calendar appointments. By copying Ami in emails when the user is setting up a meeting, it is made possible for Amy to analyse email text to determine the topic and time of a meeting, deliberate on any conflicts, and automatically schedule calendar appointments. Amy can also search for and add relevant phone numbers, reschedule meetings by conversing with users, and learn users' preferences over time.

Human resources

AI engines can assist in screening resumes for the selection of applicants. AI bots have been utilized for video interviews, and first-tier screening to save time and enhance the recruitment process. Innovative training techniques can also be proposed by ML.

E-commerce

Chatbots are used by e-commerce companies to enhance customer satisfaction and provide improved services to customers. These are developed using AI and ML techniques. Through their learning capabilities, these chatbots can provide the most suitable recommendation to customers based on the past data available to them.

Image processing algorithms of AI is also employed in image search on e-commerce websites to improve customer services by allowing the customers to search item by images instead of the keyword(s).

The result of the analysis of data by the ML algorithms can help in profit and sales maximization with optimization of resources. They can effectively predict customer choices and recommend the most suitable products to customers aiding e-commerce companies in increasing their sales and consumer satisfaction.

These algorithms also make the e-commerce platform secure by detecting security breaches in the system and providing suitable shields and firewalls. (Daniel Castro, et. al., 2016, Ann Giesel 2018, Yang Lu 2019, Harikumar Pallathadka, et. al., 2021)

ADVANTAGES OF AI IN BUSINESS

BI provides users with gainful insights into business or organization by assisting them to understand the company's information assets that include customer data; manufacturing, sales, and marketing data; supply chain data; and other sources of data that are essential for operation.

It also enables the users to integrate diverse data sources into a single logical framework for real-time reporting and detailed assessment.

SHORTCOMINGS OF AI IN BUSINESS

It is time-consuming to install, build and deploy Business intelligence systems.

It is difficult to use many business intelligence applications since most of these projects are focused on implementation, and adequate user training is often overlooked.

Business intelligence systems have increased the workload, even though they were originally conceived to relieve workload through intuitive reporting and analysis.

The cost and benefit can also be questioned. Once the applications cannot demonstrate a return on investment in time, or once a few benefits are realized, the end users are likely to be disenchanted with business intelligence. (Zeng, et. al., 2012)

CONCLUSION

Artificial intelligence has changed many aspects of human life and is rapidly reorganising the technological landscape. Along with other intelligent agents, AI can partner with human users and play a distinctive role in decision-making. BI is the right path for businesses to follow, but it requires more fine-tuning. The need of the hour is to prepare the future generation for the increasing pace of technological advancements in the field of AI. This can help them to use AI with ease in the workplace. Artificial intelligence is here to stay, and its credentials will continue to progress at an ever-increasing rate.

References

1. H. H. Pallathadka, Edwin Hernan Ramirez-Asis, Telmo Pablo Loli-Poma et al., Applications of artificial intelligence in business management, e-commerce and finance, Materials Today: Proceedings, https://doi.org/10.1016/j.matpr.2021.06.419
2. Ravi Manne and Sneha C. Kantheti. Application of Artificial Intelligence in Healthcare: Chances and Challenges. Current Journal of Applied Science and Technology 2021;40(6): 78-89. Article no. CJAST.67947 ISSN: 2457-1024
3. "AI Overview: Broad Discussions of Artificial Intelligence," AITopics, http://aitopics.org/topic/ai-overview.
4. Rajendra Akerkar. *Artificial intelligence for business*. Springer International Publishing AG, part of Springer Nature 2019. DOI: https://doi.org/10.1007/978-3-319-97436-1
5. S.R. Sandeep, Shahanawaj Ahamad, Divya Saxena, Kingshuk Srivastava, Sushma Jaiswal, Ashim Bora. To understand the relationship between Machine learning and Artificial intelligence in large and diversified business organisations. Materials Today: Proceedings. 2022;56:2082–2086. https://doi.org/10.1016/j.matpr.2021.11.409 (Cross ref)
6. Ann Geisel. The Current And Future Impact Of Artificial Intelligence On Business. International Journal of Scientific & Technology Research. 2018 (May);7(5):116-122.
7. Yang Lu. Artificial intelligence: a survey on evolution, models, applications and future trends, Journal of Management Analytics. (2019). DOI: 10.1080/23270012.2019.1570365.
8. Daniel Castro, Joshua New. The promise of artificial intelligence. Center for Data Innovation. 2016 Oct;115(10):32-5.

9. Caiming Zhang and Yang Lu. Study on artificial intelligence: The state of the art and future prospects. Journal of Industrial Information Integration. September 2021;23: 100224. https://doi.org/10.1016/j.jii.2021.100224

10. (Science 101: Artificial Intelligence | Argonne National Laboratory (anl.gov))

11. Nelson Sizwe, Madonsela, Paulin. Mbecke, Charles Mbohwa. "Integrating Artificial Intelligence Into Data Warehousing and Data Mining," Proceedings of the World Congress on Engineering and Computer Science. 2015(October);2:819-823, http://www.iaeng.org/publication/WCECS2015/WCECS2015_pp819-823.pdf.

12. Ben Popper, "How Netflix Completely Revamped Recommendations for Its New Global Audience," The Verge, February 17, 2016, http://www.theverge.com/2016/2/17/11030200/netflix-new-recommendation-system-global-regional

13. Jared Newman, "Everything You Need to Know About AI Assistants, From Siri to Ozlo," Fast Company, May 17, 2016, https://www.fastcompany.com/3059719/handicapping-the-ai-assistants-from-siri-to-ozlo

14. Klint Finley, "Robot Radiologists Will Soon Analyze Your X-Rays," Wired, October 27,2015, https://www.wired.com/2015/10/robot-radiologists-are-going-to-start-analyzing-x-rays/

15. Chris Weller, "The World's First Artificially Intelligent Lawyer Was Just Hired At A Law Firm," Tech Insider, May 16, 2016, http://www.techinsider.io/the-worlds-first-artificially-intelligent-lawyer-gets-hired-2016-5.

16. Joshua Hill, "Google's DeepMind AI reduces Data Center Cooling by 40%," Clean Technica, July 22, 2016, https://cleantechnica.com/2016/07/22/googles-deepmind-ai-reduces-data-center-cooling-bill-40/.

17. Eric Limer, "A Fleet of Self-Driving Trucks Just Completed a 1,000-Mile Trip Across Europe," Popular Mechanics, April 7, 2016, http://www.popular-mechanics.com/cars/trucks/a20310/european-platooning-challenge-self-driving-trucks-1000-miles/; Alexis Madrigal, "Autonomous Robots Invade Retail Warehouses," Wired, January 27, 2009, https://www.wired.com/2009/01/retailrobots/.

18. Zeng, L., Li, L. & Duan, L. Business intelligence in enterprise computing environment. *Inf Technol Manag*. 2012;13: 297–310. https://doi.org/10.1007/s10799-012-0123-z (104