

IMPACT OF AI-DRIVEN PERSONALIZED LEARNING SOLUTIONS IN EDUCATION

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Abstract

Artificial intelligence (AI) is defined as human-produced structured and organized knowledge developed with the assistance of technology, specifically computer systems. The construction of AIs makes use of human insight methods such as learning, reasoning, and self-remedy. In a larger sense, learning is the process of accumulating rules and information for the purpose of applying them to reality, and thinking is the application of these principles to arrive at conclusions. Methods based on AIs are very stimulating and have the potential to be applied in the resolution of certain real challenges. Artificial intelligence (AI), sometimes known as "man-made consciousness," is a subfield of software engineering that focuses on the creation of robots that can process and handle difficult problems in an increasingly human-like manner. AI is also known by its acronym, "man-made consciousness." The primary focus of artificial intelligence research is on developing computational models that can mimic human intellect in a variety of domains, including language comprehension, information acquisition, problem solving, and more. People's interest in Artificial Intelligence programming processes that display sensible behavior and are now turning into a reality has been sparked by the advent of the computer and the almost half a century of study that has before it.

Key word : Artificial intelligence, information, computer, programming

Introduction

John McCarthy, an American researcher on workstations, was the one who introduced the concept of computer-based intelligence at the Dartmouth conference in 1956, which is when the topic was first created. In today's world, it is more of an umbrella term that encompasses the whole spectrum, from the robotization of mechanical procedures to actual autonomy in clinical settings. It has already gained noteworthy popularity, in part because of massive measurements, or the explosion in the speed, length, and kind of data that organizations are truly accumulating. Computer-based intelligence is capable of doing tasks include recognizing patterns within the data more efficiently than people can, which enables businesses to get more information from their records. The development of artificial intelligence (AI) is beginning to reshape our world in such a way that it will become more incumbent upon us to comprehend precisely what we mean when we use such a broad term and how everything works. We break down the many forms of artificial intelligence and deep learning, and then examine a few of the ways in which this technology is already being put to use in the real world.

Automation refers to the process of giving a machine or structure the ability to function accurately. For instance, mechanical method mechanization may be adjusted to carry out higher-level, repeated tasks that are typically carried out by persons. RPA differs from other forms of IT mechanization in that it is able to adapt to changing circumstances.

One new breakthrough that may be called device learning is one in which a computer behaves without being programmed. The processing of information to a profound level is a subset of machines that discover a speed at which they can function. In layman's words, one may describe it as the mechanization of clairvoyant investigation. It is believed that there are three different sorts of device learning calculations:

The study of how to make computer frameworks perceive is referred to as "device vision." Machine vision is the process of detecting and dissecting observable realities via the employment of sophisticated cameras, simple-to-computerized image conversion, and virtual sign processing. It is commonly when compared with human visual perception, nevertheless, the framework creative and insightful aren't always certain by techniques for science and may be adjusted to see across partitions, for example. It has a wide range of uses, from establishing the authenticity of a signature to conducting a logical inquiry into a photograph. Workstation vision, which concentrates on framework-based absolutely photography preparation, is usually confused with framework creative and perceptive. Workstation vision focuses on framework-based absolutely photography preparing.

Natural language processing, often known as NLP, refers to the processing of human language using techniques typically reserved for computer language. trash mail discovery is one of the most well-established applications of NLP and has received five stars for its recognition. This application looks at the subject line and the content of an email and decides whether or not it is trash based on its findings. NLP commitments include content interpretation, assumption evaluation, and discourse notoriety. Modern approaches to NLP rely entirely on the gathering of information via electronic devices.

A component of framework acing known as sample notoriety is tasked with the responsibility of identifying patterns present in data. The phrase is out of date in today's society.

STANDARDS FOR MAN-MADE ARTIFICIAL INTELLIGENCE

Before reaching a decision on a potential investment, the researcher considered massive amounts of data, extensive files, and data mining. The researcher discovered that big data, large files, and data mining all played roles in the corporate decision making process in this particular study. The methodologies of research are in accordance with these criteria. It is a truth universally accepted that the ability to arrive at logical conclusions quickly and accurately is one of the most important skills for chief executive officers to possess in modern management. Executives at every level of a company are tasked with making choices that are informed by a diverse set of considerations. One definition of a choice is a strategy that looks out prospective courses of action to complete a set of prerogatives or obligations. Another definition of a decision is the act of choosing between two or more alternatives. This strategy is used by each and every company, and it is an essential component of running a corporation. In order to succeed in their careers, executives at all levels of a business are required to make choices. The judgments provide an illustration of the key utilitarian traits that ensure optimum growth and driveability for the services and products that are being given. (The Art of Deciding: An Overview for 2019).

When considering this parameter, researchers have to keep their subjects' privacy and the safety of their data in mind. This information, which was collected from the replies to the questionnaire, will be used for the testing of hypotheses and the interpretation of results. It is necessary to prevent unauthorized access to the information in order to ensure its safety. Encryption and hashing of data are the two most important building blocks of any security system. Information must be encrypted and safeguarded across all platforms if security is to be maintained. (What Exactly Is Data Security? | Micro Focus. 2019).

The field of human resources (HR), which has received a lot of attention from scholars, might be taken over by AI. It is not possible for AI-based insight frameworks to take the position of HR specialists. Character qualities are one of the factors that are considered while making hiring decisions. The enthusiasm that the candidate has for the position is something that the recruiter looks for. In point of fact, a good recruiter is not interested in the candidate in question's resume; rather, they are interested in the person's personality and talents as a catalyst for inspiration inside the firm and the creation of a high-performing team. The rise of artificial intelligence will not result in a reduction in the need for human resources personnel and recruiters. (Shanmugham and Shanmugham, 2017).

Mining for Data Mining for Data Mining for Data Data mining is one of the most important aspects that plays a significant role in the decision-making process. To "mine" data is to search through significant quantities of it. In the course of the research, this variable was taken into consideration, and it will play a role in helping to demonstrate the study's hypotheses and achieve its objectives. As a consequence of advances in technology and innovative thinking, artificial intelligence has achieved new heights that were previously unimaginable. One of the best ways to explain artificial intelligence is to say that it is "not as smart as human intelligence." On the one hand, humans have the ability to utilize their surroundings and their experience of the past when making decisions, but artificial intelligence systems just need a large number of data to be accumulated inside them before they can identify their objectives. The creation of an article is a very basic procedure, but artificial intelligences need a large quantity of data in order to complete the task. The most recent iterations of AI are notoriously complex and bear eerie similarities to human brains.

Humans base their decisions on their past experiences and the information that is available around them, whereas artificial intelligence relies on large amounts of data from the past to do the same. The decision was made by AI after it mined the data. AI would be of little worth if it did not have access to enormous volumes of data. As a consequence of this, artificial intelligence calls for a large data collection from which to form conclusions. (Alaisawi, and Salem, and Salem Khalifa 2020).

Costs in both terms: For the researcher, the most important factors to take into account are time and money. The time and money that will be saved by utilizing AI to extract the information from a questionnaire is what will enable us to determine whether or not our hypotheses and goals are supported by the data. The use of artificial intelligence (AI) technology to the field of human resources may enable firms to realize yearly cost savings in the millions of dollars. Since 2011, IBM has won "nearly one billion in investment funds," as stated by Obed Louissaint, the worldwide head of ability for IBM. This success may be attributed to the company's combination of artificial awareness and other efforts at modernization in the HR sector. Savings of One Billion Dollars in Personnel Costs for IBM (paraphrased from MARIA ASPAN, 2020) Because of artificial intelligence, etc.

OBJECTIVE OF THE STUDY

1. To assess the impact of AI-driven personalized learning solutions in education on student engagement, academic performance, and overall learning outcomes.

LITERATURE REVIEW

Villaverde et al. (2006) gave an elucidation of the operational mechanisms of a feed-forward neural network with the aim of discerning the cognitive inclinations of people. By using Felder and Silverman's methodology, it is possible to classify students based on their unique perspectives and approaches to the process of learning. The Backpropagation Artificial Neural Network (ANN) architecture is used to analyze the correlation between students' activities in a learning environment, using the techniques proposed by the Felder and Silverman model. The use of the Artificial Neural Network may facilitate the accomplishment of this task.

A scholarly article authored by Felix Castro and colleagues in 2007 presents a comprehensive exploration of several data mining methodologies that have the potential to enhance the efficacy of e-learning. The optimization of e-learning necessitates the use of a diverse range of methodologies, including neural networks, genetic algorithms, cluster analysis, fuzzy logic, inductive learning, and visualization. Moreover, these methodologies are essential in determining a student's present academic proficiency and their prospective aptitude for future accomplishments. The study results suggest that the use of data mining methods has the potential to aid students in addressing the difficulties related to e-learning and categorizing them based on their academic performance.

In 2007, Marc El Alami and his colleagues created an e-learning management system that adopts a proactive approach and utilizes a digital classroom. The primary objective behind the development of this system was to examine and assess user engagement and conduct within the realm of online education. In the building process, a dynamic rule-based expert system was used. By using this strategy, it becomes possible to access information, ideas, and recommendations at one's convenience. The researchers suggested the integration of intelligent agents as an additional enhancement for the pre-existing web-based system.

Based on the findings of a study done by Xinye Li, Qi Luo, Jinsha, and J. Yuan (2007), it has been determined that personalized e-learning platforms have promise in facilitating the provision of course content recommendations. It is advisable to use the offered model for a personalized web-based learning system in order to choose the user interest module, taking into consideration the user characteristics and the teaching resource. The use of the Vector matrix is advantageous while constructing a user-interest module. In order to enhance the student's learning experience by providing a more personalized and targeted approach, the use of the adaptive filtering technique, rooted in the vector space idea, is employed to selectively filter educational materials with the objective of attaining this purpose.

Morales et al. (2008) did a study on the object model of an e-learning system. The use of this paradigm may be advantageous in the development of an interactive learning system. The researchers established an object hierarchy consisting of four aggregate levels, namely example, strategy, practice activity, and assessment activity, at the first level. The second tier encompasses the following elements: content, summary, cognitive level, aims, and overview items. Moreover, the level encompasses factual information, conceptual frameworks, theoretical methods, and practical methodologies. At the advanced level, many preceding courses and activities are consolidated into a unified and complete activity. The implementation of a learner-centered education may be facilitated by the modular structure of the e-learning system.

Kacalak and Majewski (2009) provided a detailed analysis of the intelligent elements inherent in the e-learning system. The aforementioned components included voice recognition, biometric authentication, phrase meaning analysis, word and sentence recognition, and user response assessment. The primary focus of the study is in examining the difficulties that occur when attempting to compare the use of terms across other languages. Furthermore, proponents of this approach endorse the integration of hybrid neural networks inside an intelligent e-learning environment as a means to facilitate problem-solving.

A test for the learner has been devised by Ahmad Baylari and Gh.A. Montazer (2009) to determine the capacities of learners; according to the learners' knowledge, training material is delivered, and the adaptive exam is done. The recommendations of the learners are gathered from the review exams so that they may be further adapted in the learning content. When employing supervised learning to gain knowledge from the dataset, a Backpropagation network is put to use. The output that is produced by the system is compared with the outcome of the procedure known as the learning style index. Researchers have shown that an ANN-based personalized e-learning system is an excellent learning approach for learners since it allows them to study according to their individual abilities.

The research conducted by Norsham Idris and colleagues in 2009 demonstrates that the adoption of soft computing approaches is beneficial for dealing with the ambiguity and incompleteness of situations. ANN is one of the strategies for concept-based learning goal

classification that are under the umbrella of soft computing. Support for data prediction, recommendation, filtering, and categorization is provided by the Adaptive Education Hypermedia System, often known as AEHS, as well as by soft computing approaches. The categorization of nonlinear data according to patterns, speech recognition, and control are all areas in which ANN is helpful. The researchers construct learning frameworks inside their models, such as the user model, the domain model, and the adaptability model, in order to provide the learner with tailored learning routes. Clustering of learning objects may be accomplished by the use of an unsupervised learning strategy known as Self-Organizing Map, or SOM. It utilizes both an analytical and graphical technique to arrange data into two-dimensional displays and then organizes the data into clusters based on the projections created by these displays. Backwards propagation The concept-based categorization of the learning object is accomplished with the assistance of ANN. A traditional backpropagation learning technique is utilized during the training of the multilayer perceptron network. When applying the Conjugate Gradient approach, the output Weight Optimization (OWO) approach is utilized in order to find a learning route that is most suitable for the individual learner. Research indicates that ANN is able to choose learning items and pathways for learners based on the expectations students have for their own learning.

In their 2009 paper, Wojciech Kacalak and Maciej Majewski developed an interactive e-learning system that made use of natural language recognition and was accomplished through the implementation of a hybrid neural network. The user and the e-learning system are able to communicate verbally with one another via this technology, which works in both directions. The researchers used a hamming neural network approach for pattern recognition, while they used a fuzzy neural network to recognize words and sentences. A piece of study offers an effective method for evaluating, analyzing, and assessing the level of knowledge possessed by students participating in interactive e-learning systems.

In their 2010 research article, Pipatsarun Phobun and Jiracha Vichanpanya described the Intelligent Tutoring System (ITS). It is an expert system that can monitor the performance of learners and tailor their teachings based on the learner's preferred method of learning. Computer-based instructions can be created using either the Instructional Technology Standard (ITS) or the Adaptive Hypermedia System (AH). The component-based models that researchers describe comprise expert, instructional, and learner systems for the accomplishment of learners in order to increase learners' performance.

Because of the research carried out by Susnea (2010), our comprehension of the significance of Artificial Neural Networks (ANN) in improving the effectiveness of an e-learning system has been significantly bolstered. In order to identify the categories that will be utilized for the categorization of the dataset comprising student answers, an analysis of the findings of the online questionnaire is being carried out right now. In the field of data processing, Artificial Neural Network (ANN) approaches, such as the Multilevel Perceptron (MLP) and the Radical-Based Function (RBF), are used. The output that is produced by the Radial Basis Function (RBF) network and the output that is produced by the Multilayer Perceptron (MLP) network are both evaluated via the use of a comparative analysis. Calculations are performed on both the processed and unprocessed datasets to determine the error rate. According to the findings of the research, it was found that the radial basis function (RBF) network had a much lower error rate when compared to the multilayer perceptron (MLP) network. It's possible that the larger number of classes included in the MLP network is to blame for the higher error rate that was seen in that network. The researcher has proposed that one potential strategy for resolving this problem is to make use of Artificial Neural Networks (ANN), which stands for artificial neural networks.

Research method

The research design provides a framework that may be used to gather and analyze data for a study. This study used an analytical and descriptive research technique. The technique used in this analysis is characterized by the systematic investigation and evaluation of data,

facts, and statistics. The proposed research is a sector-based study of the businesses which are using AI and only in India the researcher will make an attempt to compare sales growth of the company before AI was adopted and sales growth of the company after AI was adopted. This will clearly exhibit the growth on sales after the adoption of AI. The research design will bring out the relationship between which AI functions implemented in the organization impacts overall sales growth of the organization and what factors are perceived as barriers in the way of implementation and sustenance of AI Artificial intelligence operations in the organization. It will also explain in detail the business models adopted by the SMEs in the selected 1 sectors namely education, which the senior leaders in the industry can make a note of while designing their revenue models. The research study will attempt to create a performance measurement framework that can measure the success of AI function in all fairness basis the capabilities that it possesses. The study in addition to designing the performance measurement framework will also design effective real life Using artificial intelligence function set-up framework conducive to the business environment which will include guidance on investment, skills to be hired, functions to be deployed, effectively using the functions for business growth, marketing channels to be invested upon, cost efficiencies and many more aspects which the SME's can adopt artificial intelligence channel for sustained growth and competitive advantage.

Data analysis

DEMOGRAPHIC PROFILE

This section states the demographic characteristics of the respondents to the study. The respondents were asked to furnish information about their gender, age group, education, chief wage earner and assets owned. For this information, descriptive statistical analysis was used, such as frequencies, percentageage so as to present the data systematically and meaningfully with the aim to understand the profile of the respondents and SME Company's profile.

Table no. 1: Gender of Respondent

		Regularity	Percentage	Proportional Reliability	Entire Assist Rate
Reliable	Male	244	64.1	64.3	64.3
	Female	136	35.7	35.7	100.1
	Entire	380	100.1	100.9	

Out of 380 respondents, 64.2% are Male and 35.8% are Female

Table No. 2: Age of Respondent

		Regularity	Percentage	Proportional Reliability	Total Assist Rate
Reliable	22 to 35 decades	247	65.0	65.1	65.1
	36 to 50 decades	126	32.2	32.2	98.2
	51 to 69 decades	7	1.8	1.8	100.0
	Entire	380	100.0	100.0	

Of the 380 respondents, 65% fall into the 22–35 decade age range, 33.2% fall into the 36–50 decade age range, and 1.8% fall into the 51–69 decade age range.

Table. No. 4.3: Educational Qualification of the Respondent

		Regularity	Percentage	Proportional Reliability	Total Share of All Percentage Percentage
Reliable	Graduate	181	47.4	47.3	47.3
	Diploma	15	3.9	3.9	51.3
	PG	58	15.3	15.3	66.6
	Professional	127	33.4	33.4	100.0
	Entire	380	100.0	100.0	

Figure no. 3: Educational Qualification of the Respondent

Out of 380 respondents, 47.4 are Graduate, 3.9% are Diploma, 15.3 are PG and 33.4% are Professional.

Table no. 4: The Chief Wage Earner of your Household

		Regularity	Percentage	Proportional Reliability	Total Share of All Percentage Percentage
Reliable	Yes	168.5	44.1	44.1	44.3
	No	212.2	55.7	55.7	100.1
	Entire	380.5	100.1	100.1	

Out of 380 respondents, 44.2% are the chief wage earner of household and 55.8% are not chief wage earner of household.

Table no. 5: Type of Business under Education Sector using artificial intelligence

		Regularity	Percentage	Proportional Reliability	Total Share of All Percentage
Reliable	Online Professional Degree Course & Certification	125	32.9	32.9	32.9
	Education content	172	45.3	45.3	78.2
	Education institution's	73	19.2	19.2	97.4
	Other's	10	2.6	2.6	100.0
	Entire	380	100.0	100.0	

Out of 380 respondents, 32.9% are having Using artificial intelligence of online Professional Degree Course and Certification, 45.3% are having Using artificial intelligence of Education content, 19.2% are having Using artificial intelligence of Education institutions and 2.6% are from the category of others.

Table no. 6: Online Education Courses using artificial intelligence

		Regularity	Percentage	Proportional Reliability	Total Share of All Percentage
Reliable	Not Important	36	9.5	9.5	9.5

Marginal Important	62	16.3	16.3	25.8
Some Important	65	17.1	17.1	42.9
Important	108	28.4	28.4	71.3
Very Important	109	28.7	28.7	100.0
Entire	380	100.0	100.0	

Out of 380 respondents, 28.7% respondent considers online education can increase the sales of the company very important.

Table no. 7: Capabilities of AI Development of online education sector

		Regularity	Percentage	Proportional Reliability	Total Share of All Percentage
Reliable	Not Important	9	2.4	2.4	2.4
	Marginal Important	23	6.1	6.1	8.4
	Some Important	90	23.7	23.7	32.1
	Important	190	50.0	50.0	82.1
	Very Important	68	17.9	17.9	100.0
	Entire	380	100.0	100.0	

Out of 380 respondents, 50% respondent considers Capabilities of AI development of online education sector for organizations providing online education courses is mandatory for the success of the business.

Table no. 8: Capabilities of AI Development of the sector for education institutions

		Regularity	Percentage	Proportional Reliability	Total Share of All Percentage
Reliable	Not Important	8	2.1	2.1	2.1
	Marginal Important	33	8.7	8.7	10.8
	Some Important	74	19.5	19.5	30.3
	Important	130	34.2	34.2	64.5
	Very Important	135	35.5	35.5	100.0
	Entire	380	100.0	100.0	

Out of 380 respondents, 35.5% respondent considers Capabilities of AI development of the sector for education is mandatory for the success of the business.

Table no. 9: Kruskal-Wallis Test of the impact of Age in opinion regarding the importance of AI functions implemented in organization in order to impact overall sales growth of the organization

	Kruskal- Wallis H	df	Asymp. Sig.
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Capabilities of AI Development of global information dissemination & travel bookings E-Commerce sector is a must for the success of the business	5.345	2	.004
Capabilities of AI Development of organizations financial services E-Commerce sector is mandatory for the success of the business	2.030	2	.362
Capabilities of AI Development of online education sector for organizations providing online education courses is mandatory for the success of the business	.714	2	.700
Capabilities of AI Development of the sector for education Institutions is mandatory for the success of the business	.069	2	.966

Conclusion

Technology plays a pivotal role in today's hyper competitive business environment and it also helps in solving the competent business constraints. The demand for key skills has been intensified by increased financial stresses, intense competition and complex global challenges, and innovation-led innovations in the education industry can handle the constraints in a more effortless way. One such technological aspects which solves the complex problems in the education is artificial intelligence. This research has mainly focused on artificial intelligence enablement practices in online education, services and measuring the impact of artificial intelligence enablement on organizational performance. In recent decades numerous organizations have taken wide initiatives in implementing artificial intelligence in different sector. Many of the organizations have incorporated effective artificial intelligence enablement practices which enhance the productivity of their workforce. The digital service providers have accomplished consistent growth by achieving their target desires with the tools and systems allowed by the advent of artificial intelligence. Over the decades, artificial intelligence driven approach has transformed the traditional online education, practices into a novel enactment and has opened doors to new opportunities.

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