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RESEARCH PAPER ON ARTIFICIAL INTELLIGENCE& ITSAPPLICATIONS

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ABSTRACT

Intelligent machine creation, particularly computer programming, is the science and engineering of artificial intelligence. The goal of using computers to understand human intelligence is similar to this one, but artificial intelligence is not limited to approaches that can be observed through biological means. The broad definition of Artificial Intelligence (AI) is the study of computations that enable perception, reasoning, and action, although there is no universally accepted definition of AI. Humans can no longer comprehend, evaluate, or make sophisticated decisions based on the volume of data that is generated today— by both humans and machines.

Computer learning relies on intelligence, which will drive complex decision-making in the future. The characteristics, definitions, history, applications, development, and accomplishments of artificial intelligence are all covered in this paper.

Keyword: - machine learning,deep learning,neural networks,Natural LanguageProcessing and Knowledge Base System

1. Introduction

The field of computer science known as artificial intelligence (AI) studies the intelligence of machines. An intelligent agent is a system that makes decisions to increase its chances of success. The study of ideas is what gives computers the ability to perform actions that give the impression of intelligence. Reasoning, knowledge, planning, learning, communication, perception, and the capacity to move and manipulate objects are among the fundamental ideas of artificial intelligence. It is the engineering and science of creating intelligent machines, particularly computer programs.

1.1 Methodology

Machine InstructionIt is an AI application in which machines automatically learn from experience and become better at what they do instead of having specific tasks explicitly programmed into them. A subset of machine learning for predictive analysis based on artificial neural networks is called deep learning. Algorithms for machine learning include reinforcement learning, supervised learning, and unsupervised learning. The algorithm does not use classified data to make decisions on its own in unsupervised learning. A function is inferred from the training data in supervised learning, which consists of a set of input objects and the intended output. Machines employ reinforcement learning to automatically take appropriate actions that maximize rewards and identify the optimal option that needs to be considered.

Natural Language Processing, or NLP, is the study of how computers and human language interact when the computers are designed to process natural languages. A dependable method for extracting meaning from human languages in natural language processing is machine learning. In natural language processing (NLP), a machine records the audio of a human speaker. After the audio to text exchange, the text is processed so that the audio data is converted. Then, the machine responds to people using the audio. Natural language processing is utilized in IVR (Interactive Voice Response) systems used in contact centers, language translation programs like Google Translate, and word processors like Microsoft Word to verify that text contains proper grammar.

Due to the rules that are involved in information transfer via natural language and which are challenging for computers to comprehend, natural language processing is made more challenging by the nature of human languages. In order to transform unstructured data from human languages into a format that computers can understand, natural language processing (NLP) uses algorithms to identify and abstract language rules. Robotics and automationAutomation aims to increase productivity by having machines complete repetitive and monotonous tasks, resulting in more economical and efficient outcomes. Artificial intelligence, neural networks, and graphs are widely used in automation in many organizations. By employing CAPTCHA technology, this kind of automation helps avoid fraud concerns during internet financial transactions. The high volume repetitive tasks that robotic process automation is designed to perform can be adjusted to suit varying conditions.

2. Case Study

Considering its many uses and features, artificial intelligence seems like the best option for us. Does this mean that the world of the future will be artificial given the advancement of AI? While the new paradigm of non-biological computation and intelligence is expanding exponentially, biological intelligence is fixed because it is an old, established paradigm. An estimated ten thousand million binary digits could be stored in the human brain. Unfortunately, the majority of this is most likely wasted on other relatively inefficient processes like recalling visual impressions. It is therefore possible that the world will increasingly rely on computers to function properly, given that natural intelligence is finite and unstable as well.In the years and decades to come, artificial intelligence (AI) will likely be a fundamental feature of all software, making it a truly revolutionary advancement in computer science.

Both a threat and an opportunity are presented by this. Artificial Intelligence will be used to support both offensive and defensive cyber operations. Furthermore, new methods of cyberattack will be developed to exploit the specific flaws in AI technology. Lastly, AI's voracious appetite for vast volumes of training data will intensify the value of data and redefine our perspectives on data protection. Globally responsible governance will be necessary to guarantee that this revolutionary technology will result in widely shared prosperity and safety.

2.1 Applications Of A.I.

1. Fraud detection. The financial services industry uses artificial intelligence in two ways. Initial scoring of applications for credit uses AI to understand creditworthiness. More advanced AI engines are employed to monitor and detect fraudulent payment card transactions in real time.

2. **Virtual customer assistance (VCA).** Call centers use VCA to predict and respond to customer inquiries outside of human interaction. Voice recognition, coupled with simulated human dialog, is the first point of interaction in a customer service inquiry. Higher-level inquiries are redirected to a human

3. **Medicine:** A medical clinic can use AI systems to organize bed schedules, make a staff rotation, and provide medical information. AI has also application in fields of cardiology (CRG), neurology (MRI), embryology (sonography), complex operations of internal organs etc.

4. **Heavy Industries** : Huge machines involve risk in their manual maintenance and working. So in becomes necessary part to have an efficient and safe operation agent in their operation.

5. **Telecommunications**: Many telecommunications companies make use of heuristic search in the management of their work forces for example BT Group has deployed heuristic search in a scheduling application that provides the work schedules of 20000 engineers.

Artificial Intelligence Methods

Machine Learning:

This is an example of an artificial intelligence application where machines are automatically trained to learn from experience rather than having specific tasks explicitly programmed into them. A branch of machine learning called "Deep Learning" uses artificial neural networks for predictive analysis. Algorithms for machine learning include reinforcement learning, supervised learning, and unsupervised learning. The algorithm in unsupervised learning does not act on classified data on its own without supervision. A function is inferred from the training data in supervised learning, which consists of a set of an input object and the intended output. Machines employ reinforcement learning to find the best option that should be considered by taking appropriate actions to increase the reward.

Natural Language Processing(NLP):

The way in which computers are programmed to process natural languages is through their interactions with human language. When it comes to interpreting human languages, machine learning is a dependable technology for natural language processing. In NLP, a machine records the audio of a human speaking. Following the audio to text exchange, the text is processed so that the audio data is converted. After that, the computer responds to people by using the audio. Natural language processing is used in word processors like Microsoft Word to verify textual grammar, IVR (Interactive Voice Response) systems used in call centers, and language translation programs like Google Translate.

Automation & Robotics:

Automation is used to get repetitive and monotonous tasks completed by machines, which increases productivity and yields more economical and effective results. Neural networks, graphs, and machine learning are widely used in automation in many organizations. By utilizing CAPTCHA technology, this kind of automation helps avoid fraud concerns during online financial transactions. Robotic process automation is designed to carry out a large number of repetitive tasks and can adjust to changing conditions.

Machine Vision:

Technology is able to record and process visual data. Here, visual data is recorded using cameras, converted to digital data using analogue to digital conversion, and processed using digital signal processing. Next, a computer receives the generated data. The two most important components of machine vision are resolution, or the range at which the machine can distinguish objects, and sensitivity, or the machine's capacity to detect weak impulses. Machine vision is applied to various fields such as medical image analysis, pattern recognition, and signature identification.

Knowledge-Based Systems(KBS):

One definition of a KBS is a computer system that uses human expert knowledge to provide recommendations in a specific field. The knowledge, which can be represented in a variety of ways, including rules, frames, or cases, and the inference engine or algorithm that consults the knowledge base to reach a conclusion are two key characteristics of KBS.

Neural Networks:

A massively connected network of computational "neurons," arranged in layers, makes up neural networks (NNs), which are biologically inspired systems. Artificial neural networks (NNs) can be "trained" to approximate almost any nonlinear function to a desired level of accuracy by varying the network's weights. A set of input and output exemplars is usually given to NNs. The weights in the network would then be adjusted using a learning algorithm (like back propagation) to ensure that the network produced the desired output. This sort of learning is known as supervised learning.

4. Applications Of AI

The modern world can benefit from artificial intelligence in many ways. Given that it can effectively address complex issues in a variety of industries, including healthcare, entertainment, finance, and education, it is quickly becoming indispensable in the modern world. AI is accelerating the speed and comfort of daily living.

Following are some sectors which have the application of Artificial Intelligence:

1. **AI in Astronomy** Artificial Intelligence can be very useful to solve complex universe problems. AI technology can be helpful for understanding the universe such as how it works, origin, etc.

2. **AI in Healthcare** In the last, five to ten years, AI becoming more advantageous for the healthcare industry and going to have a significant impact on this industry. o Healthcare Industries are applying AI to make a better and faster diagnosis than humans. AI can help doctors with diagnoses and can inform when patients are worsening so that medical help can reach to the patient before hospitalization.

3. **AI in Gaming** AI can be used for gaming purpose. The AI machines can play strategic games like chess, where the machine needs to think of a large number of possible places.

4. **AI in Finance** AI and finance industries are the best matches for each other. The finance industry is implementing automation, chatbot, adaptive intelligence, algorithm trading, and machine learning into financial processes.

5. **AI in Data Security** The security of data is crucial for every company and cyber-attacks are growing very rapidly in the digital world. AI can be used to make your data more safe and secure. Some examples such as AEG bot, AI2 Platform,are used to determine software bug and cyber-attacks in a better way.

6. **AI in Social Media** Social Media sites such as Facebook, Twitter, and Snapchat contain billions of user profiles, which need to be stored and managed in a very efficient way. AI can organize and manage massive amounts of data. AI can analyze lots of data to identify the latest trends, hashtag, and requirement of different users.

7. **AI in Travel & Transport** AI is becoming highly demanding for travel industries. AI is capable of doing various travel related works such as from making travel arrangement to suggesting the hotels, flights, and best routes to the customers. Travel industries are using AI-powered chatbots which can make human-like interaction with customers for better and fast response.

8. **AI in Automotive Industry** Some Automotive industries are using AI to provide virtual assistant to their user for better performance. Such as Tesla has introduced TeslaBot, an intelligent virtual assistant. o Various Industries are currently working for developing self-driven cars which can

make your journey more safe and secure.

9. **AI in Robotics** Artificial Intelligence has a remarkable role in Robotics. Usually, general robots are programmed such that they can perform some repetitive task, but with the help of AI, we can create intelligent robots which can perform tasks with their own experiences without pre-programmed. o Humanoid Robots are best examples for AI in robotics, recently the intelligent Humanoid robot named as Erica and Sophia has been developed which can talk and behave like humans.

10. **AI in Entertainment**

5. Pros of cloud-usage in health-concern market

Cloud computing is revolutionizing the healthcare landscape in the modern age. By 2025, estimates from Global Markets Insights Inc. predict that the healthcare cloud computing sector could reach a valuation of $55 billion. Presently, healthcare institutions are swiftly embracing cloud technologies for their array of advantages, including enhanced collaboration, accessibility, efficiency, and security. Scalability and storage capabilities further amplify its appeal. Infrastructure as a service (IaaS) offers healthcare establishments' substantial storage and on-demand computational power. Additionally, cloud-based platforms (PaaS) provide a secure environment for delivering web-based services and applications. Depicted in Figure 1.

This shift towards cloud-based healthcare is more than just facilitating the exchange of medical information across various devices and locations; it forms the core of a transformative process. The advantages of seamlessly sharing patient health data between healthcare facilities and cloud users are also highlighted. Healthcare cloud computing not only proves cost-effective and easily implementable but also boasts numerous additional perks. Consequently, cloud-based services play a pivotal role in boosting interoperability and data accessibility within healthcare infrastructure.
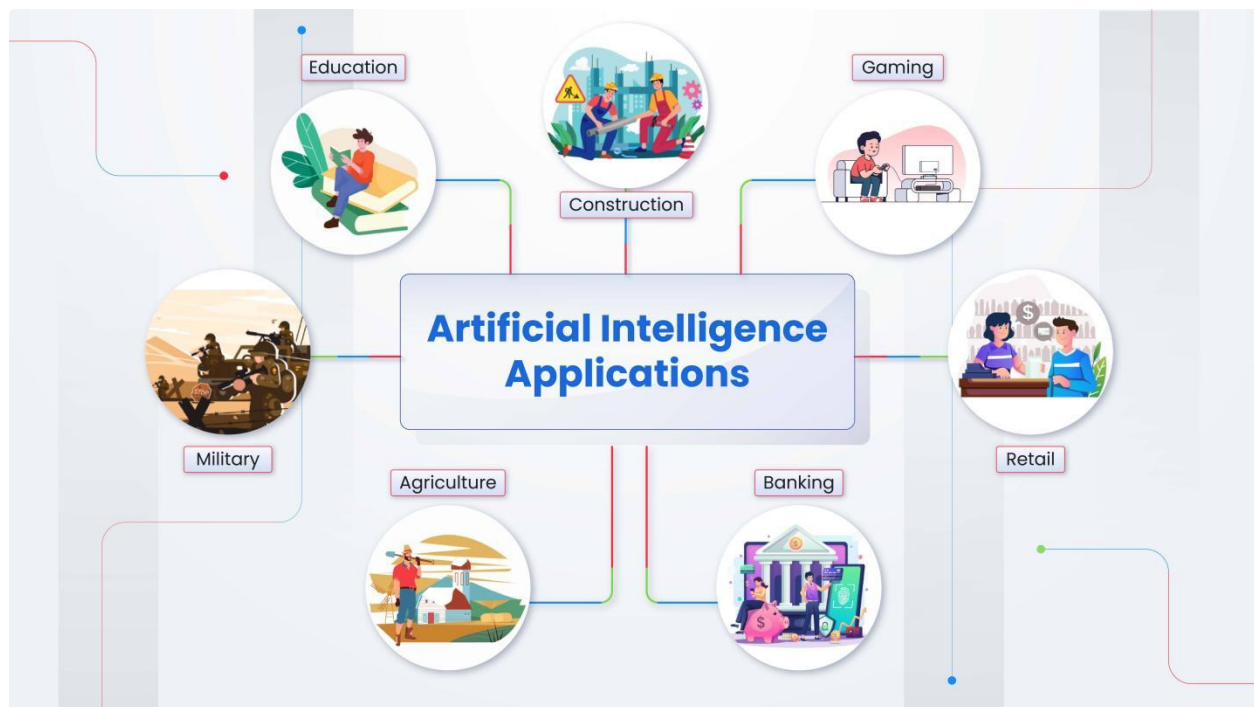
6. Evolution Of A.I.

The history of artificial intelligence (AI) is much longer than most people realize, dating back to ancient Greece in both science and philosophy (Dennehy, 2020). However, the modern form of AI owes a great deal to Alan Turing (Turing, 1950) and a 1956 conference at Dartmouth College (McCorduck, 2004), where John McCarthy officially coined the term and defined it as "the science and engineering of making intelligent machines." It was called "the birth of artificial intelligence" by Russell and Norvig (2020). High-level cognition was central to one of the early AI paradigms.

Not the concept recognition, object perception, or performance of sophisticated motor skills that most animals share, but the capacity for multi-step reasoning, natural language comprehension, creative artifact creation, goal-achieving planning, and even self-reflection (Langley, 2011). According

to Kurzweil (2005), strong AI is this general intelligence that resembles that of humans. The main theory behind strong artificial intelligence has been symbolic reasoning, which holds that computers are general symbol manipulators rather than just numerical calculators. With its many applications and features, artificial intelligence seems like the best option for us. Is the future world turning artificial given the advancement of AI?

Since its early development in the 1950s, artificial intelligence (AI) has experienced numerous highs and lows, which are commonly referred to as AI "summer and winters" (Russel and Norvig, 2020). However, since 2010, it can be argued that AI has entered a new phase, primarily because of significant advancements in computer processing power and the availability of vast amounts of data (PWC, 2019).Three innovations have led to this rebirth of AI research: (1) the emergence of an extremely complex class of algorithms; (2) the introduction of low-cost graphics processors that can process massive amounts of data in a matter of milliseconds; and (3) the availability of extremely large, accurately annotated databases that enable more complex intelligent system learning.

7.Previous systematic literature reviews of AI in IS research

Although there is a lot of interest in artificial intelligence (AI) these days (Watson, 2017), there isn't much theoretically supported research on how businesses should build their digital business strategies that use AI to generate revenue (Mikalef, Bourab, Lekakosb, & Krogstiea, 2019). We examine this assertion and point out deficiencies in IS academics' research on AI. We recognize that there have been four prior Systematic Literature Reviews (SLRs) carried out (Borges, Laurindo, Spínola, Gonçalves, & Mattos, 2021; Karger, 2020; Hofmann et al., 2019; Rzpeka and Berger, 2018); however, we draw attention to their limitations (see Table 1).

Comparison Element	Purpose	Years Included	Number of primary studies
Rzpeka and Berger (2018)	Provides insight into individual user interaction with AI systems in IS.	1987–2017	91
Hofmann et al. (2019)	Identifies opportunities and challenges of ML across the radiology value chain.	2012–2018	29
Borges et al. (2021)	Studies the integration of AI and organisational strategy	2009–2020	41
Karger (2020)	Studies the interactions between Blockchain and AI	Not specified (primary studies ranged from 2014 to 2020)	32
This Study	AI, as a subject and as a use in the field of IS	2005–2020	98

8. Cloud applicability in health concern

Cloud computing serves as the backbone for various healthcare applications including electronic medical records, mobile apps, patient portals, Internet of Things Medical research and predictive health benefit significantly from big data analytics in the cloud. Healthcare applications integrated with cloud technology function on a subscription-based model, offering a predictable cost structure that provides insights into monthly expenses. The concept of interoperability drives cloud platforms, enabling the aggregation, analysis, and sharing of data from various sources like IoT devices, pharmacies, insurance providers, hospitals, clinics, and the broader healthcare industry. Cloud solutions seamlessly connect central and distributed master data, enhancing collaborative medicine practices.

Since the inception of electronic medical records, collaborative medicine has evolved, reducing errors and delays in critical information exchange through tailored solutions. The integration of Internet of Things further streamlines information processes, augmenting healthcare efficiency. In today's landscape, technology plays a pivotal role across industries, healthcare being no exception. Cloud computing, with its on-demand computing capabilities, proves especially valuable for hospitals and healthcare entities, facilitating deployment, retrieval, and processing of network information. While embracing these technological advancements, adherence to healthcare standards is essential to prevent compromise and data loss. [5]

9. Discussion

Beyond their scientific significance, our results also highlight some significant practical ramifications. The kinds of AI applications that are most sought after by organizations and, consequently, most intriguing to researchers are the ones that our analysis specifically records. Practitioners can learn a little bit about future organizational technology deployments and common applications from the particular AI applications and technologies that receive the most research. As the most studied technology in the AI space, machine learning applications offer some guidance on future investment priorities and the kind of business value they should be able to produce.

The evaluation of studies also identifies studies that can help practitioners learn valuable lessons from the application of AI technologies, as well as those that offer general guidance and best practices. It also identifies how approaches have been used and what common problems have emerged. It can be difficult for many practitioners to find empirical studies that are useful due to the vast and varied body of literature on AI in organizational settings. Practitioners can more readily identify the studies that add to the difficulties they and their organizations encounter when implementing AI by using the synthesis of findings and the presentation of studies based on a thematic classification.

10. Future Reach

Considering its many uses and features, artificial intelligence seems like the best option for us. Given the advancement of AI, does this mean that the world of the future will increasingly be artificial? Because it is an established, mature paradigm, biological intelligence cannot be changed, but the new paradigm of non-biological computation and intelligence is expanding rapidly. The human brain can most likely store information equivalent to ten thousand million binary digits. However, the majority of this is presumably utilized in other relatively inefficient ways, such as recalling visual impressions.

In today's world, artificial intelligence has many uses. Because it can effectively solve complex problems in a variety of industries, including healthcare, entertainment, finance, education, etc., it is becoming increasingly important in the modern era.

11. Peroration

We have only touched briefly on artificial intelligence thus far. Some of its tenets, uses, accomplishments, etc., have been covered.The majority of the issues and tasks that humans are unable to complete on their own are what institutions and scientists working on AI are ultimately trying to solve. Undoubtedly, advancements in the field of computer science will fundamentally alter the global landscape. Currently, it is the duty of the upper echelons of engineers to further this discipline.

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