IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Artificial Intelligence In Information Systems

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Abstract: Artificial Intelligence is a broad field that encompasses various concepts in Information Technology. This research paper focuses on different technologies in AI and how they apply to improve the performance of multiple sectors. The purpose of this study is to discuss Artificial Intelligence and its present and future applications. AI is the foundation of multiple concepts, such as computing, software creation, and data transmission. The technologies that use AI are machine learning, deep learning, Natural Language Generation, speech recognition, robotics, and biometric identification. AI applies to many sectors such as healthcare sectors, assembling and manufacturing industries, business organizations, and in the automotive industries. AI also has various advantages that make it gain more popularity in many areas. The AI-powered machine can perform many jobs at once; they are not costly compared to human beings and are accurate and efficient. AI also encounters multiple problems that undermine its application. AI is prone to technical difficulties, security snags, data difficulties, and can cause accidents if users fail to understand the AI system. The increased use of AI has transformed various sectors by boosting the organization's performance and facilitating data safety.

Index Terms **- Artificial Intelligence, AI History, Biometrics, Machine Learning, Speech Recognition.**

I. INTRODUCTION

The digital world is becoming more complex annually. Scientists and researchers have come up with innovations in the field of technology. A significant breakthrough in digital technology is Artificial Intelligence (AI). Artificial Intelligence is a keyword that defines various concepts in Information Technology, such as computing, software creation, and data transmissions. Nonetheless, Artificial Intelligence has come at a time where cyberattacks are on the rise. Many corporates and business enterprises today apply Artificial Intelligence to provide security to them data and information systems. When people think of Artificial Intelligence, they think of cybersecurity and cyberattacks issues. Artificial Intelligence also defines various concepts within the field of computer science. Artificial Intelligence aims at creating machines that can think and work like the human brain. Engineers are currently creating robots that help in the manufacturing, assembling, and commercial industries. The robots provide information and work by assembling products using the concept of Artificial Intelligence. The idea of programming also has a significant application in Artificial Intelligence since these machines use computer programs to deliver information and perform different actions. Artificial Intelligence is becoming more complex as years pass. Apart from the many advantages, AI also has disadvantages that might affect the world's population in the future. It will be of significance to address how AI has become useful to the human community, its problems, and how its popularity will affect the future human society.

II. LITERATURE REVIW

The United States of America is one of the nations that apply Artificial Intelligence in many technology and business sectors. With President Trump's election, the U.S has invested massive funds to develop AI in many areas, such as the military, which are essential to the nation. Srivastava (2020) opines that the U.S government invests in AI since it is crucial in maintaining the economy and national security to protect the lives and citizens of the U.S. Not to forget, the government promotes Federal Investment in Artificial Intelligence collaborating different industries, academic institutions, and other non-federal agencies to innovate and develop various sectors by using Artificial Intelligence. The government of the U.S believes that Artificial Intelligence will be of great importance in facilitating good governance and global leadership in terms of global military supremacy and technology. Through AI, the United States will build partnerships with other global powers in the field of technology and strengthen its military force.

Artificial Intelligence is a foundation of many concepts in the field of computer science and technology. These concepts are machine learning, deep learning, robotics, computer vision, internet, recommender systems, and natural language processing. These concepts apply widely in the science and technology field as they work using computer programs. Artificial Intelligence is efficient since most of them do not rely on human assistance. Machine learning is a concept derived from Artificial Intelligence, and it relies on data and patterns that the system uses to make decisions. Robotics is also a concept derived from Artificial Intelligence, and it entails designing and construction of intelligent machines that perform human jobs. Engineers are currently using robotics and Artificial Intelligence to make future self-driven vehicles that will use commands from humans and prevent cases of accidents.

III. METHODOLOGY

This paper will provide an overview of AI in IS by discussing the main AI technologies that are being used in IS and their applications. We will begin by providing a general overview of AI in IS, including the key concepts and technologies that are used in this field. Next, we will focus on specific AI technologies, including machine learning, natural language processing, and computer vision, and their applications in IS. Finally, we will discuss the current and future applications of AI in IS, including data analysis, decision-making, and problem-solving.

Features of Artificial Intelligence

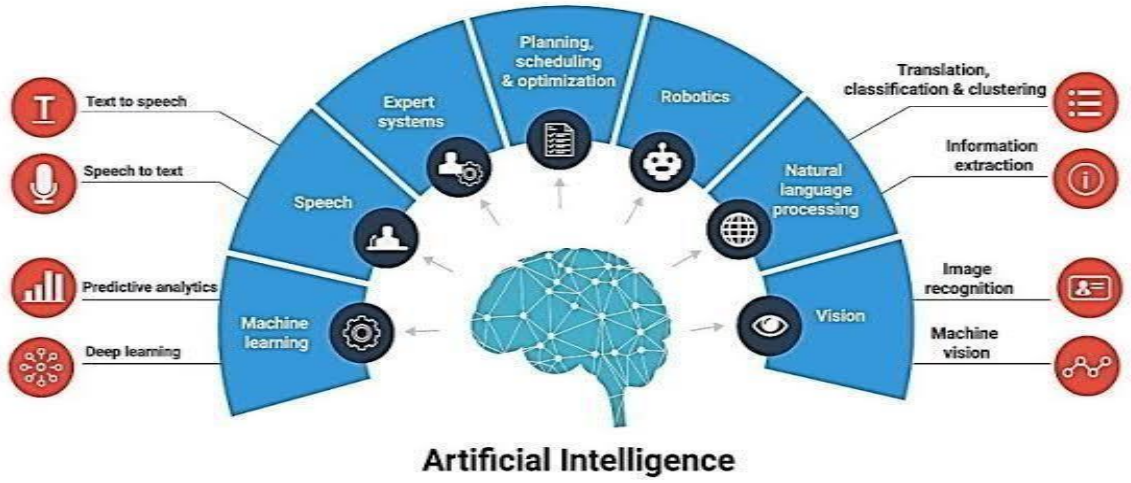

Fig.1 Features of Artificial Intelligence

Artificial Intelligence involves various tools and technologies used widely in the technological world. These technologies include:

3.1 Machine Learning

Machine learning is an application that uses AI and allows system automation. Machine learning focuses on computer data programs to access and analyze the data. Machine learning will enable computers to learn various things automatically without human assistance. Machine learning uses computer algorithms, which enables the computer to learn from examples and experiences. Machine learning algorithms occur in two categories, namely supervised and unsupervised algorithms. Supervised machine learning algorithms apply to basics learned previously to new data using examples that allow the machine to predict the future. The machine undergoes the training of datasets, and the algorithm produces an inferred function to predict output values. After training, the system provides new input. The learning output can perform a comparison between the correct and the intended output to modify the model in case there are errors.

Unsupervised machine learning algorithms applies in the case where the information used in training is not classified. Unsupervised learning can study how the system functions to give an account of a hidden structure from an unlabeled data system. Unsupervised machine learning can provide inferences among datasets to explain on describe invisible structures from unclassified data. In contrast, the semi-supervised machine learning algorithm happens to be between supervised and unsupervised machine learning since they employ labelled and unlabeled data when training datasets. Semi-supervised machine learning can improve learning accuracy, making it suitable for training tagged data since it provides adequate skill and is a relevant resource.

3.2 Deep Learning

Deep learning is a function of Artificial Intelligence that copy is how the human brain works in processing data and pattern creation that are vital in making strategic decisions. Deep learning is also known as a deep neural network since it has systems capable of learning unsupervised data from unstructured data. Deep knowledge helps to gain massive amounts of unstructured data that makes it strenuous for humans to process and understand. Deep learning uses a hierarchical level of artificial neural networks that makes the system undergo the process of machine learning (Hargrave, 2019). In general, deep learning artificial intelligence learns from unstructured and unlabeled data. Deep learning AI is vital to an organization since it helps prevent fraud or money laundering.

3.3 Natural Language Generation (NLG)

Natural Language Generation (NLG) is a function of Artificial Intelligence that generates written or spoken narrative from datasets. NLG relates to other AI functions like natural language processing (NLP), computational linguistics, and natural language understanding (NLU). These functions work by machine to human interaction and vice versa. Horacek opines that NLG can mine numerical data, perform pattern identification, and share information for human understanding. The internet can produce news and other stories due to the speed of the NLG software.

3.4 Speech Recognition

The current trend in technology is speech recognition, which many industries have developed to help them in their daily operations. Speech recognition is a technology that recognizes speech and converts it into readable information or text. Many corporates such as Amazon, Microsoft, Google, and Facebook are using the feature of speech recognition in various platforms like Siri, Google Home, and Amazon Echo to promote service delivery to online users. Most technology companies are looking forward to using speech recognition technologies to improve the standards of their services and products since it is efficient and easy to use. From conducted research by Jesus, about 66.6 million Americans had begun using speech recognition technology. Nonetheless, by 2018 people had started using virtual assistants that were efficient in speech recognition (Jesus, 2019). However, artificial intelligence teams need to focus on significant challenges such as accents and background noise to improve the speech recognition experience.

3.5 Biometrics

The digital age has become too complicated to the extent that security is a priority for data systems in many organizations. The introduction of Biometric identification has been a breakthrough in improving the safety of data systems. Biometric technology uses body traits such as facial recognition, iris scan, fingerprint scan, among other morphological characteristics that the AI system can easily understand. The AI can transform these visible traits into specific codes that the operation can easily comprehend to perform its work. Biometric ID validation occurs in many ways like fingertip recognition, iris recognition, face and voice recognition, and DNA matching. In general, Artificial Intelligence supports Biometric systems to perform these validations. Biometric validation is today used in a wide variety of devices. Many smartphones and computers currently support fingerprint scanners and face recognition due to Artificial Intelligence. Biometric identification is of considerable significance as it provides top security to data systems and digital devices

IV. APPLICATIONS AND TYPES OF ARTIFICAL INTELLIGENCE

4.1 Types of AI

According to computer scientists and software engineers, there are four types of AI. The first type of AI is reactive machines (Jackson, 2019). An example of a responsive device is Deep Blue, which is an IBM chess program. The Deep Blue Machine works by identifying and making predictions of the pieces on the chessboard. It can analyse its moves and the opponent's moves. The machine is not useful since it lacks memory that makes it unable to recall past experiences. The second type of AI is limited memory machines. Finite memory machines can recall past experiences and use them to make future decisions (Jackson, 2019). Vehicle engineers today use the concept of limited memory to make automatic vehicles that make them respond to specific commands. Thirdly, there are Artificial Intelligence systems that use the idea of self-awareness to perform different activities (Jackson, 2019). Machines using the idea of self-awareness can understand the events within their current environment. Lastly, some Artificial Intelligence systems apply the concept of "Theory of Mind" (Jackson, 2019). Such systems can understand how the beliefs and intentions can affect the decisions they make. Artificial Intelligence aims at providing machines with human Intelligence, which enables them to perform many operations as the modern man does.

4.2 Applications

Artificial Intelligence applies to a different sector in the modern world. Its apps have transformed most areas resulting in quality work and faster means of business operations. Firstly, Artificial Intelligence has an important use in the healthcare system. Engineers have designed machine learning systems which help medical practitioners to diagnose health issues. The advantage of machine learning is its ability to work at a faster rate compared to humans. An example of a technology, in this case, is IBM's Watson. The machine can comprehend natural language and reply to asked questions. Besides, Szalavitz suggests that the device can perform data mining to extract patients' data, thus helping in the hypothesis. Therefore, Artificial Intelligence has a wide range of uses in the healthcare sector. AI can help medical practitioners in the examination, representation, and cataloguing of medical information about patients. The healthcare sectors benefit from AI since it helps in decision making and in performing further research. AI can integrate different activities in medical and cognitive sciences. AI also provides rich content for future scientific medical disciplines. The healthcare sector highly benefits from the applications of AI; thus, medical practitioners can efficiently attend to patients and perform other medical operations. Secondly, Artificial Intelligence has a full application in business. Businesses use AI in transferring and cross-referencing data. Managers use AI to update different files that are important for the organization. Moving and cross-referencing of data strengthens the chain of communication between various departments, thus facilitating most of the organizational activities. Policymakers also use AI applications in analysing consumer behaviour and product recommendations. Consumers are major stakeholders of many business organizations; thus, AI helps in consumer behaviour forecasting to help internal stakeholders like managers to understand consumers and the products they recommend. Business organizations also have a case of fraud and theft that tend to undermine business operations. Organizations benefit from Artificial Intelligence since it helps in detecting fraud. AI is efficient in data analysis, making it easier to detect possible fraud within the data and information system. Today, organizations have various strategies for marketing. One crucial strategy used by companies in marketing is advertising their products and brands. Therefore, AI application helps companies to perform personalized advertising and marketing messaging. Through advertisements and messaging, organizations can communicate and attract more consumers, thereby improving their business. AI applications are also critical in customer service. Business organizations can communicate with customers via telephone, helping them to

know how they can improve their services to consumers. Thirdly, AI technology has a wide range of applications in modern education. Computer devices use machine learning concepts that help students to understand academic content. AI helps students to get an education at any time for instance, students highly benefit from

AI applications during this time of the pandemic. Students can study at home using their computers, smartphones, and tablets. AI enables students to engage with their teachers and professors from where they are, thus facilitating education. Artificial Intelligence helps students get a variety of educational options based on their needs. Students can access learning materials by using AI, enabling them to learn from anywhere. Students can choose a variety of topics to learn about, thus helping them in their areas of weakness. AI provides students with revision materials since students can go through various tests, and the AI system analyses them and gives correct answers. Karpenko opines that virtual mentors can monitor the progress of students by using AI-based platforms. Currently, teachers and professors use virtual mentors to provide information concerning the development of their students. AI technology, such as Coursera platforms, allows academic providers to identify weaknesses among their students. The Coursera platform works in a way that it can notify the teacher if students chose incorrect answers on a specific question. AI systems also allow for better engagement between students and teachers. AI-based algorithms can provide personalized recommendations and training programs through the analysis of the user's knowledge and interest. Teachers and professors also spend less time searching for educational materials for students since AI provides an automated curriculum platform. AI technology allows students and academic institutions to find competent teachers that can improve academic. Artificial Intelligence technology has developed various educational institutions enabling students to improve on their academic performance by using necessary academic resources.

V. FIGURES AND TABLS

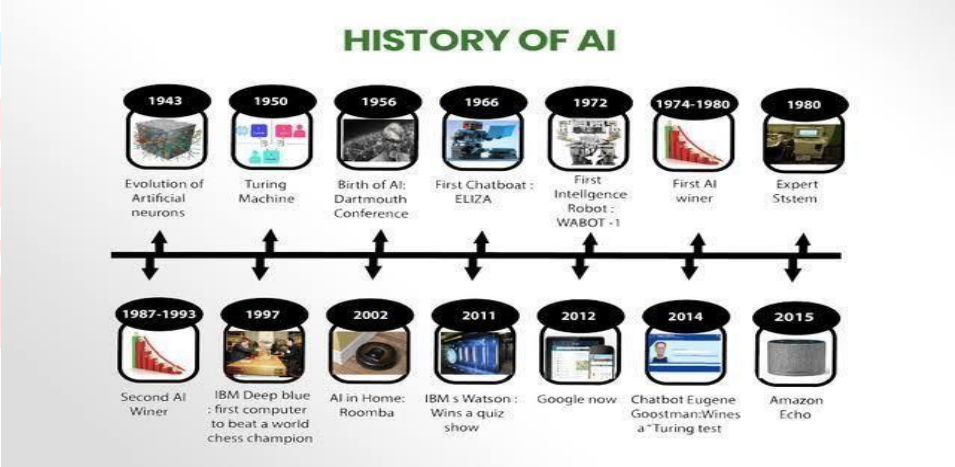

Fig.2 History Of AI.

VI. CONCLUSION

Artificial Intelligence has massively transformed the human population in terms of technology, leading to the rise of new devices and tools that are hugely important in doing business, education, and communication. The techniques that are functional in AI include machine learning, deep learning, biometrics identification, speech recognition, and Natural Language Generation (NLG). All these technologies apply in one way to improve human interaction with machines to facilitate most operations. For instance, biometric identification uses many devices to enhance the security of data. Machine learning refers to computers to aid various computer processes. Speech recognition applies to online activities such as listening to songs and looking for information on the internet. The types of AI technology machines include relative machines, memory machines, self-awareness machines, and machines using the Theory of Mind, a psychology concept. All these machines work in different ways to boost human experience in the world of technology. AI has gained popularity because of its many advantages, such as its availability and ease of use in many devices. It offers a wide range of activities such as digital assistance, medical applications, and correction of errors by increasing when it performs a job. However, policymakers should also be aware of its demerits, including

data difficulties, technological troubles, and security snags that may interfere with its performance. My research aims to educate the American people on Artificial Intelligence and how it can benefit the community. AI is gaining popularity with new inventions coming up annually. Therefore, policymakers should consider using AIpowered technologies in their organizations to help in most company operations that are important.

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