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**Artificial Intelligence Technology**

**Research Paper**

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AI stands for Artificial Intelligence. This is the idea that machines, such as computers have the ability to think as a human does. Artificial Intelligence has been around since the 1950s. There have been incredible strides in the development and progression of AI, it is very prominent in our daily lives.

AI was developed and introduced in the 1950s. The first instance of AI technology being created was by Arthur Samuel. He developed a game of chess where the computer was able to play and make its own moves utilizing AI. However, the first time AI was studied was by Alan Turing, 2 years prior to Arthur Samuels program. Alan Turing had studied and tested machines to find out whether or not they had the ability to think. In 1955, there was the first Artificial Intelligence meeting at Dartmouth College, which coined the term “Artificial Intelligence”. In 1961, the first robot for industrial usage in a factory was invented. In 1986, the world's first driverless car was invented. In 2011 Siri, a voice activated aide from Apple was released. In 2023 ChatGPT was released, changing the way in which we use generative AI. We have come a long way from the 1950s and the development of Artificial Intelligence. We are rapidly developing and improving upon what Artificial Intelligence is capable of. We use AI daily and don’t even realize it. For example social media, online shopping, our bank accounts, personalized algorithms on apps. These all utilize AI in some way, without Artificial Intelligence we would have to put a lot more effort into our daily tasks. AI simplifies things and makes them easier.

There are many uses and functions of Artificial Intelligence, we come across it everyday. Businesses, websites, computer programs, etc. all utilize Artificial Intelligence. For example, you go on a business page after hours and need to ask a question, typically there is a 24 hour chat function, which may be Artificial Intelligence answering your questions. Artificial Intelligence has many benefits. CSU Global states, “This makes AI an incredibly powerful, and extremely valuable technology, since it essentially allows computers to think and behave like humans, but at much faster speeds and with much more processing power than the human brain can produce.” This means Artificial Intelligence can be more efficient than humans can be, this is why AI is an important tool, for certain tasks it can help in getting things done at a faster pace. For example Artificial Intelligence is able to learn extremely quickly. CSU Global writes, “AI systems get smarter with each successful round of data processing since each interaction allows the system to test and measure solutions, and develop expertise in the task it’s been set to accomplish.” With AI being able to learn this quickly it is an essential tool for office work, etc. Artificial Intelligence takes the data that it has compiled, and with that it searches for patterns, abnormalities, connections, etc. This is why Artificial Intelligence can be so useful, it can analyze hundreds of different types of data, and do it quickly. Another thing AI is able to do is, it has learned how to identify things in images. Take for example an app that identifies different types of birds or plants based on photos you take, this is AI working to identify the image and provide you with the information without having to do excessive searching. AI can also create algorithms based on your searches and interests, this way your algorithm online, on social media, etc is tailored to you specifically.

Artificial Intelligence contains two different subsets of learning, Deep learning and Machine learning. A way to picture this is Artificial Intelligence contains Machine learning and within Machine learning, there is Deep learning. Artificial Intelligence is the umbrella term for these two separate sections of learning. Machine learning means that the program can continue to evolve and improve without the need of programmers continuously working on it. Without the help of a human the program can adapt and refine itself. Deep learning is when a program can learn from its mistakes and improve upon itself.” Coursera explains deep learning, Deep learning is a machine learning technique that layers algorithms and computing units—or neurons—into what is called an artificial neural network. These deep neural networks take inspiration from the structure of the human brain.” Deep learning also utilizes much more data than machine learning needs to function. There are two different kinds of Artificial Intelligence, Weak AI and Strong AI. Weak Artificial Intelligence is described as completing specific tasks one at a time. Weak AI is the only form of Artificial Intelligence we currently have. Strong AI on the other hand is the idea of AI being able to complete tasks in the fashion that humans are able to. This is thought to be developed in the near future, however the timeline is unclear. Weak AI is commonly known as “Narrow AI”. Weak AI is still very powerful despite the name. It can complete tasks at a more advanced rate than humans can possibly do them.

There are four different kinds of Artificial Intelligence. Reactive machines, limited memory, theory of mind, and self aware. Reactive machines are not able to learn from themselves and evolve. They react based on what is presented to them but otherwise cannot do anything outside of their specific set of functions. Limited memory machines have the ability to learn from the data that they are presented with, and then proceed to use that information and act on it. Forbes explains, “Nearly all existing applications that we know of come under this category of AI. All present-day AI systems, such as those using deep learning, are trained by large volumes of training data that they store in their memory to form a reference model for solving future problems.” Theory of mind Artificial Intelligence is the concept that AI can understand humans on an emotional level. It is also supposed to understand the way that humans think and our wants and needs. However Theory of mind is still being developed and has not yet been made a reality. Self aware Artificial Intelligence like Theory of mind, has not been invented. The idea of this is that Artificial Intelligence would become fully aware, as is a human. It would develop human emotions and thoughts and be self aware of its existence. This is far from being developed however it is an eventual goal.

Alongside the benefits of AI, there has recently been a lot of discourse about the potential negatives of AI being utilized. For example, some of the main concerns being discussed are AI putting people out of work due to it replacing them, since Artificial Intelligence can be so efficient and cheaper than paying someone a full salary. Jobs involving technology such as coding, are the jobs that Artificial Intelligence can easily take over. However with the growth of AI, jobs would need to be created in order to develop the technology, still lots of people would be out of jobs due to this change. Virginia Tech states “as these models are trained on vast amounts of internet text, they might unknowingly propagate biases present in their training data.” This is a big issue due to people using AI to do research or analyze data. AI should not be taken as the complete truth without looking further into it due to this issue. This causes problems, especially since data online can contain major biases that are harmful to people, but also that spread misinformation. Another negative, scalper bots. Buying tickets, limited release items, etc. has become increasingly hard with the increase of scalper bots. These are bots that can easily acquire the items in question far faster than a human can. This has made it difficult and frustrating for people waiting in queues just for the item to end up being sold out in seconds. These then get resold online for a much higher price. Even with CAPTCHA, AI has been managing to get past this and continue to scalp these items from actual customers. Self driving cars also utilize AI, this has had some surrounding controversy. Self driving cars are not considered safe by some, they also take away jobs from Uber and taxi drivers.

A benefit of AI would be that it can help those with disabilities or those in need of extra aid. For example, text to speech is powered by Artificial Intelligence, this feature helps those that may have sight impairments. Artificial Intelligence also aids us with protecting our accounts. Artificial intelligence is used by banks, when it suspects an unusual purchase or suspicious activity, it can notify you immediately, helping prevent credit card fraud. Without this feature we would be at risk of fraudulent charges, and not be notified immediately. Translation applications are also of necessity. They can translate based off of a photo, words, and even audio. These are necessary functions for people who are traveling, dealing with language barriers, etc. Artificial Intelligence can help with the communication between people and help us overcome any boundaries we have previously faced.

Education and AI have been an ongoing problem recently. Artificial Intelligence models such as ChatGPT have been up for recent discussion due to students using it to do their work for them. This has been a real issue, students simply tell the AI model what to write and it will write their paper for them. Schools have banned the use of these websites, and have programs to detect its usage. However Turnitin, which is a program made to detect the use of AI is actually itself a form of AI. Turnitins website states, “We use state-of-the-art artificial intelligence to help students, educators, and institutions advance integrity and learning outcomes, at scale.” This kind of Artificial intelligence model is known as Generative AI. This is an AI program that creates data for the user. This technology has been around for years. The Markov model was what preceded Generative text AI. It could predict the next data that would be input in a text, email, etc. However this new technology differs from that. Generative AI applications have been given a huge amount of data, and from that data they can create text, images, music, etc. This technology has greatly improved over the past few years. We are currently seeing a rise in these models of Artificial Intelligence. However there are flaws in these programs. As with any Artificial Intelligence model, they can portray biases and harmful information due to the data they have been exposed to. They are also able to plagiarize work, which leads to even more issues concerning students utilizing these models for their work.

Ai engineers are those whose careers are to work on the development and improvement of Artificial intelligence. Their jobs are to create the programs that can then be used to help jobs be more efficient and create new programs. The new programs complete tasks that Artificial Intelligence can accomplish. There are many careers in Artificial Intelligence technology. Such as machine learning engineer, software engineer, etc. Even without a career in Artificial intelligence, most people will have to learn the basics of AI and learn how to adapt to the changes coming to the workplace.

The future of Artificial Intelligence technology is the eventual development of theory of mind and self aware AI. Artificial Intelligence is going to continue playing a role in our lives, one that will get larger and larger. People's jobs may be at risk due to the benefits of Artificial Intelligence technology outweighing the employee. Artificial Intelligence will be a part of everyday life, and play a role in all careers. As it adapts we will have to adapt with it. Overall Artificial Intelligence can be a very positive thing, it helps provide fast results for tedious work, helps bridge communication gaps, and can help with the development of technology, and much more. The cons of Artificial Intelligence will have to be tolerated as AI is not going anywhere anytime soon.

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