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The Role of Artificial Intelligence in Graphic Design

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Abstract

The research aims at studying the definition of artificial intelligence. It will present the history of AI. The research also demonstrates the different kinds of artificial intelligence. It also demonstrates the various applications of using AI. The research presents how graphic design uses AI for different purposes. Then the research discussed the impact of using artificial intelligence on graphic design and how this will impact the profession.

Keywords: Artificial intelligence, Learning, Graphic design

Introduction

Artificial Intelligence is one of the leading technologies in many fields and industries these days, and it is often associated with the future of the world. Many theorists and intellectuals have high aspirations for artificial intelligence, but others believe that it is a dangerous technology that could do a tremendous deal of harm to people in the future. In numerous films and works of art, artificial intelligence has been depicted as either a hope or a menace to civilization. Science fiction literature, innovative scientific theories, and discussions about the future both terrify and inspire us. On the one hand, AI has been shown as a technique that transforms the world into a preferable place to live by making the lives of humans much easier. On the other hand, the vision is that AI is a technology that can surpass human beings by making machines too powerful.

State of art/review of literature

The research aims at studying the definition of artificial intelligence. It will present the history of AI. The research also demonstrates the different kinds of artificial intelligence. It also demonstrates the various applications of using AI. The research presents how graphic design uses AI in different purposes. Then the research discussed the impact of using artificial intelligence on the graphic design and how this will impact the profession.

Artificial intelligence

The word, “artificial intelligence” has been repeated in many industries these days. Before moving on to define the concept, I’ll demonstrate the definition of the term, “intelligence” as defined in Cambridge British English Dictionary, the capacity to acquire knowledge, comprehend it, and form rational conclusions or ideas (Dictionary.cambridge.org, 2022). From
this meaning, the core concept of “artificial intelligence” came from, which tends to providing the machines with qualities that human mind has such as learning, understanding language, analyzing data and solving problems. It means the imitation of human intellect by devices that have been designed to think and act like people (Investopedia, 2022). Any machine that demonstrates characteristics of a human mind, such as learning from experience, adapting to new inputs, and executing human-like activities, may also be referred to as AI.

Artificial intelligence (AI) that can carry out tasks that traditionally require human intelligence is the goal of artificial intelligence (AI), a broad field of computer science (BuiltIn.com, 2022). AI is a multifaceted, interdisciplinary field of study. A multidisciplinary approach based on mathematics, computer science, linguistics, psychology, and other fields is used to wire machines.

History of artificial intelligence

Since ancient times, there have been ideas of intelligent entities. As the Chinese and Egyptian engineers created automatons, the ancient Greeks actually had mythology about robots. However, the roots of contemporary AI can be found in the attempts of classical thinkers to characterize human thought as a symbolic system (livescience.com, 2022).

A few scientists from several disciplines talked about the viability of developing an artificial brain between the 1940s and 1950s. As a result, the field of AI research grew.

John McCarthy, who is now regarded as the father of artificial intelligence, originally used the term when he organized the first academic meeting at Dartmouth College in Hanover, New Hampshire, in 1956, on the topic “The science and engineering of producing intelligence robots,” was how he defined it (open-research.amsterdam, 2022).

Despite decades of well-funded international research, scientists were unable to successfully make intelligent machines. Researchers struggled with a severe lack of funding for AI research from the middle of the 1970s until the 1990s. But by the end of the 1990s, American corporations had renewed interest in AI. Additionally, the Japanese government also devised plans to create a computer of the fifth generation to enhance AI. Finally, IBM’s Deep Blue defeated “Garry Kasparov” in 1997 to become the first machine to defeat a global chess champion.

Corporations and governments started to successfully apply AI techniques in other specialised fields as the field advanced, partly as a result of advancements in computer hardware. Amazon, Google, Baidu, and many more companies have used AI technology to great commercial advantage during the past 15 years. Many of the web services we use now contain AI. As a result, technology has been able to influence not only every industry but also a sizable portion of the stock market (open-research.amsterdam, 2022).

Understanding artificial intelligence

The first thing that comes to mind for the majority of people when they hear the term “artificial intelligence” is typically robots. That’s because high-profile movies and books frequently include human-like machines that bring havoc on Earth. But the opposite is actually true.

Artificial intelligence is founded on the idea that human intelligence can be described in a way that makes it simple for a computer to duplicate it and carry out activities of any complexity. Artificial intelligence has three main objectives: learning, reasoning, and perception (Headquarters, 2022). Machines can learn from experience, adapt to new inputs, and carry out human-like activities thanks to artificial intelligence (Sas.com, 2022).

IT professionals began experimenting with artificial neural networks. Biological neural networks make up the human brain, which is generally clever. These networks are capable of forming connections in response to external stimuli and human perceptions.

Similar to the brain, artificial neural networks build a straightforward framework programme to respond to a challenge and receive feedback on how it behaves in an effort to replicate this learning system on computers. A computer can refine its solution by repeatedly solving the
same issue and modifying it in response to user feedback. The computer can then be given a new problem to solve using the knowledge it gained from the first one. Computer scientists can teach a computer to be a generalist by altering the challenges and the amount of solutions it has learned to each one (Techopedia.com, 2022).

Kinds of artificial intelligence

Artificial intelligence is founded on the idea that human intelligence can be described in a way that makes it simple for a computer to imitate it and carry out tasks of any complexity. It can be classified based on the functionalities of each kind as the following:

**Weak artificial intelligence**

Weak artificial intelligence is represented by a system that complete a specific task (Search-EnterpriseAI, 2022b). It is also called narrow AI, is as being limited to a specific or small area. Weak AI mimics human thought processes. By automating time-consuming jobs and evaluating data in ways that people often can't, it has the potential to be beneficial to humans, as shown in the following examples (Investopedia, 2022):

Examples of weak AI:

- Video games such as the chess.
- Google search suggestion.
- Suggested replies to the mails.
- Email spam filters, where a computer knows which redirects messages from the inbox to the spam folder if they are suspected to be spam.
- Suggested purchases' ads
- Image recognition software.
- Digital personal assistants like Apple's Siri and Amazon's Alexa. The assistance will answer any questions the user may have (BuiltIn.com, 2022).

**Strong artificial intelligence**

Systems with strong artificial intelligence can do tasks that are thought to be human-like. These have a tendency to be more intricate and difficult systems. They are programmed to deal with circumstances when problem-solving may be necessary without human intervention. A machine that is equal to human intelligence is known as strong artificial intelligence. Strong AI has the capacity to reason, solve puzzles, make judgments, plan, learn, and communicate. It should also be aware, have unbiased thinking and self-consciousness. It is also named True Intelligence or Artificial General Intelligence (AGI) (Investopedia, 2022).

These kinds of systems can be found in applications like the following examples:

Examples of weak AI:

- Robots.
- Self-driving cars.
- Hospital operating rooms.

According to certain theories, a machine with strong artificial intelligence should be able to experience the same stages of mental growth as a person, beginning with a childish mind and evolving into an adult mind through learning. It ought to be able to engage with the outside world, absorb its knowledge, and develop its own language. Strong AI would genuinely have human cognition, as contrast to Weak AI, which only mimics it. One system could solve all the same issues as one human could with Strong AI. Strong AI might be required to replace some subsets of highly skilled individuals, but Weak AI can replace many low- and medium-skilled workers (SearchEnterpriseAI, 2022b).

**Super artificial intelligence**

Till now super artificial intelligence is a science-fiction. It is regarded as the natural next step after AGI. A system with Artificial Super Intelligence (ASI) would be able to outperform humans in every way. This would entail making judgments, making sensible decisions, and even doing things like improving one's art and developing strong emotional bonds. Once we develop Artificial General Intelligence, AI systems will be able to rapidly advance into fields
that we may not have even dared to imagine (Wait But Why, 2022).

Applications of artificial intelligence

The benefits of artificial intelligence are being realized across a wide range of industries and sectors. The following examples prove the various applications:

Healthcare industry

Several applications in healthcare industry has been founded, are working by artificial intelligence technology. It may provide enormous amounts of data for training and makes it possible for algorithms to recognize patterns more quickly than human analysts. Fig. (1) represents an example of a medical website called “Medecision” that created an algorithm that recognizes 8 characteristics in diabetic patients to identify those who need hospitalization (HackerEarth Blog, 2022).

An app called “BiliScreen” utilizes a smartphone camera, use algorithms to find elevated levels of bilirubin in the sclera (white portion) of a person’s eye, which is used to screen people for pancreatic cancer. This cancer has one of the worst prognoses of all cancers because it lacks any obvious signs (HackerEarth Blog, 2022). Fig. (2) represents screenshots of how it works.

Another examples of using artificial intelligence in healthcare industry those apps which use big data to detect the disease and recommend the most effective treatment for it such as “GNS Healthcare” website as shown in fig. (3). Additionally, it can analyse a patient’s medical background and identify potential ailments to which the person may be predisposed in the future.

Artificial intelligence is also being used for surgical procedures in the operating room through robots.
Gaming

Chess is one of several classic examples of artificial intelligence in use. Just think back to the time when IBM’s Deep Blue defeated Gary Kasparov, a grandmaster of chess who had never lost. However, their drawback is that after completing that mission, they are essentially powerless (Encyclopedia Britannica, 2022).

Entertainment

Artificial intelligence is used in entertainment such as which used in the movies or musical platforms like Spotify and Netflix that provide material for the many demographic groups of people with varying tastes and preferences. These businesses employ artificial intelligence (AI) to analyse user behaviour and demographics to suggest the next thing they would like to watch or listen to, keeping them interested all the time. These AI-based platforms are giving clients material that is tailored to their own tastes as a result, giving them a highly personalised experience.

Amazon uses artificial intelligence as well, analysing user activity data and comparing it to that of other users to decide what programmes or goods to propose. These algorithms are getting smarter over time to the point where they can recognise things like the fact that a user might wish to purchase a product as a present rather than for themselves, or that various family members have varied viewing habits (HackerEarth Blog, 2022). Fig. (4) presents an example of a personalized experience that shared by Netflix.

Finance

An significant use of artificial intelligence in the financial services industry is fraud detection. For instance, Mastercard analyses numerous data points using Decision Intelligence technology to find fraudulent transactions, increase the accuracy of real-time approvals, and lower the number of incorrect denials (Anand, 2022).

Automotive industry

Self-driving automobiles are one of the most significant applications of artificial intelligence. Every decision made by these vehicles must be carefully considered because it will have an impact on the final outcome. To operate in a way that avoids a collision, the computer system must calculate all external data and take it into consideration (Search-EnterpriseAI, 2022a). Utilizing the top engineers and scientists, Uber AI Labs is developing self-driving vehicles. Uber tested a group of autonomous vehicles in 2016. In addition, Volkswagen and Nvidia are working together to create in-car intelligence technologies that will include voice and facial recognition, gesture control, and safety warnings. Tesla created a sophisticated virtual assistant that is built into its models and enables consumers to communicate with their cars from a phone or computer (HackerEarth Blog, 2022).
Manufacturing

Self-driving robots that can transport finished goods without endangering anyone or anything nearby may be developed for use in industries. Robots frequently remain stationary, but they nevertheless run the risk of colliding with nearby items. A novel idea known as collaborative robots, or “cobots,” made possible by AI, can take orders from people and operate effectively with them. This includes instructions that the robot has never seen before.

By identifying patterns in product demand across time, space, and socioeconomic groups, artificial intelligence can have an impact on the manufacturing supply chain. This will therefore have an impact on inventories, raw material sourcing, financial decisions, hiring and firing practises, energy usage, and equipment maintenance.

AI tools assist in tracking operational conditions and production tooling performance as well as predicting equipment breakdown and malfunction and performing or advising preventive steps.

Digital marketing and advertising

There are billions of user profiles on social media platforms like Facebook, Twitter, and Snapchat, all of which need to be saved and handled very effectively. Massive volumes of data can be managed and organised by AI. A lot of data may be analysed by AI to find the newest hashtags, trends, and user requirements. Based on intricate big data, these autonomous algorithms place the appropriate adverts in front of the appropriate audiences to avoid creating a chaotic situation. What is referred to be “programmatic advertising” is this. The key is to target the correct audience and communicate the proper message based on their interests and preferences.

Consumers and business to business buyers are overwhelmed every day with advertisements. Most of them are pointless, so they just close the advertisement or carry on with their current task. Advertisers suffer financial loss as a result. Businesses can maximize their return on investment with AI by only showing relevant users their adverts. Ads may be automatically purchased and then mass-customized. This technique is already being used by many advertisers (Sava Digital, 2022).

As for advertising copywriting, in 2018 Lexus was the first brand who created a commercial that was fully scripted by IBM’s Watson artificial intelligence system. The agencies worked together with the IBM Watson team to employ artificial intelligence to examine 15 years’ worth of video, text, and audio for luxury and automobile brand advertisements that have received Cannes Lions prizes for creativity, as well as a variety of other outside data. According to IBM, Watson discovered components that were present in award-winning ads that were “both emotionally intelligent and entertaining.” It’s not as though the machine performed all the effort, though: The script flow and outline were created by the AI engine, and
the creative agencies then built the tale from them (Variety.com, 2022). Fig. (5) represents shots of Lexus ad.

**Graphic design**

As discussed, these days, artificial intelligence has become an overused buzzword in a variety of industries, and the design community is not immune to its significant influence especially graphic design. Artificial intelligence online tools can be various from these websites that can create themselves to those which have the ability to create logos depending on several parameters and preferences. So, this part will present the different applications of using artificial intelligence in graphic design across the various kinds of media.

**Self-made websites**

As for the “self-made websites”, the most popular resources are:

**Wix** ([Wix.com, 2022](https://www.wix.com)). Wix was founded in 2006. This website builder has had a high level of success. It offers an artificial intelligence solution — Wix ADI (Artificial Design Intelligence). Wix builder has long been touted as having the ability to build websites by itself. The user-provided content is used to generate countless gorgeous design alternatives. The user must select their favourite alternative. The programme itself is responsible for reformatting. In particular for non-designers, it simplifies the routine and expedites the design process ([Page and Design, 2022](https://www.pagendesign.com)). As presented in fig. (6) which shows the home page of Wix, the website contains a lot of tutorials that explain how to use it build your own website step by step. It also contains lessons about how to create your brand, how to build its visual identity, how to manage the brand reputation and a lot of concepts related to successful branding process, promoting for the website and growing up the business. It has part related to photography and choosing the professional photos. It has a new part which is specialized in designing a logo and the latest trends in logo design.

**DesignScape** ([designscape-inc.com](https://www.designscape-inc.com)). This project was presented by the University of Toronto in 2015.
Unlike Wix, DesignScape does not guarantee that it will complete all the work for you. Its function is closer to that of a teacher than an assistant. It gives the user hints toward alternate and better solutions. Website creation is still far off for these new AI-based solutions. Unfortunately, it appears that preset templates were frequently used to achieve the outcomes. But these template choices and drag-and-drop user interfaces have already made going online easier for small and medium-sized firms (Page and Design, 2022).

The next part will present design-related resources that have been empowered by AI such as:

**Design softwares**

As for the different examples of applications or programs that incorporate AI in its work are like:

**ColorMind.** ColorMind is a deep-learning colour palette generator. It can come up with aesthetically acceptable colour selections on its own or with your input. Media like movies, photos, and traditional art are frequently used by designers as inspiration. By training on distinct datasets made up of millions of images and movies, ColorMind accomplishes this with just one click (Colormind.io, 2022).

**Let’s Enhance.** Let’s Enhance uses machine learning to enhance images of low quality. By remembering the ways one or more photos might be enhanced, the website is able to learn on its own (letsenhance.io, 2022).

**Prisma.** It is a photo and video editing program that turns user-submitted materials into masterpieces by well-known artists. The use of picture and video filters makes this possible. This program gives the visual content the appearance that it was made by Van Gogh, Edvard Munch, etc.

Another application that used artificial is the scope of packaging design as illustrated in the next point.

**Packaging**

Ogilvy & Mather Italia generated for Nutella millions of unique packaging designs using AI that was pulled from a database of dozens of patterns and colors to create seven million different versions of Nutella’s graphic identity, all of them unique, which, in Italy, have been splashed across the lids of jars. In less than a month, all seven million jars had been sold. Every Nutella jar is described as “like a work of art.” (Rima Sabina Aouf, 2017). Examples are demonstrated in fig. (7).

**Logo design/Identity**

Artificial intelligence also empowers a lot of graphic design softwares and applications by adding tools or options that help the designers...
so much while the designing identity process. Examples of these design-related sources are as following:

**Designs.AI.** This user can generate the full identity in a blink of an eye by entering the information and logo preferences. This logo-maker can auto-generate thousands of logo variations in seconds. Then the user can customize with the editor and export the logo with a full brand kit as illustrated in Fig. (8).

**Advantages & disadvantages of artificial intelligence**

The advantages of AI are endless. Some of them are:

1. **Reduction in human error**

   In an Artificial intelligence model, all decisions are taken from the previously gathered information. As a result, errors are decreased and the likelihood of correctness only rises with increased precision. Any task that is carried out by humans has a probability of being wrong.

2. **Available 24 × 7**

   While an average human works 6–8 h a day, AI manages to make machines work 24 × 7 without any breaks or boredom. As one might know, humans do not have the capability to work for a long period, our body requires rest. An AI powered system won’t require any breaks in between and is best used for tasks that need 24/7 concentration.

3. **Helps in repetitive work**

   AI can productively automate boring human tasks and free them up to become more creative, starting with sending thank-you mail, or verifying documents to decluttering or answering queries. When people are overworked or bored for a prolonged period of time, they can make mistakes when performing repetitive tasks like cooking food at restaurant or a factory. With the use of AI, such duties can be carried out effectively with ease.

4. **Digital assistance**

   Many of the highly developed firms use digital assistants to interact with users in order to conserve human resources. Many websites employ these digital assistants to respond to customer inquiries and offer a user-friendly interface.

5. **Faster decisions**

   AI and other technologies enable robots to make decisions more quickly than the average humans, enabling them to complete tasks more
quickly. This is because, in contrast to AI-powered computers that quickly offer pre-programmed outcomes, people have a tendency to consider many things both emotionally and practically while making decisions.

6 Rational Decision Maker

Although technologically speaking, humans have made significant progress, when it comes to selecting choices, we still let our feelings rule. In some circumstances, it’s critical to make quick, effective decisions based on reasoning, without allowing our feelings to cloud our judgement. Algorithms will be used to control AI-powered decision making, eliminating the possibility for emotional judgement. This ensures that productivity will improve without affecting efficiency.

7 Improves Security

With advancement in technology, there are chances of it being used for the wrong reasons such as fraud and identity theft. However, if properly applied, AI can be quite useful in maintaining our security.

8 Efficient Communication

People who didn’t speak the same language couldn’t connect with each other before a few years ago without the aid of a human translator who could understand and speak both languages. Such a dilemma does not exist thanks to AI. Systems can translate words from one language to another without an intermediary thanks to natural language processing. In its sophisticated state, Google Translate even offers an audio demonstration of how to pronounce a word or sentence in a different language.

The disadvantages of AI are concluded in the following points:

1 Cost overruns

AI operates on a much larger scale than traditional software development, which is what sets it apart. This magnitude would exponentially increase the amount of computing power needed, driving increasing the cost of the operation and bringing us to the following point.

2 Dearth of talent

As a relatively new field, there aren’t many resources available of experienced professionals, and the best ones are quickly snapped up by corporations and research institutes. This increases the talent cost, which further drives up Artificial Intelligence implementation prices.

3 Highly dependent on machines

Most people are already highly dependent on applications such as Siri and Alexa. By receiving constant assistance from machines and applications, we are losing our ability to think creatively. We are losing out on learning basic life skills, getting more lazy, and producing a generation of people who are excessively reliant as a result of our entire reliance on machines.

4 Requires Supervision

We would still have to continually supervise the functioning. Although the task is performed by machines, We must make sure that errors don’t occur (Cass, 2019).

Analysis

There are ongoing discussions among designers and developers around the future impact of artificial intelligence. They expect that their jobs may be changing over time. Some of them even have second thoughts that they’d have to start looking for a new profession (Info with art, 2018).

When the first machines were created, people believed that they would replace human workers, creating a shortage of jobs that would raise the global poverty rate. In many industries, robots have indeed taken the place of human employees, but this does not mean that humans have run out of possibilities. In addition, machines have assisted humankind in creating a new world and achieving objectives that would not have been feasible without them.

Similar circumstances apply to AI in the design sector. Although AI won’t totally replace the necessity for human designers, it will make the process much more manageable and enable
them to reach greater objectives. The capabilities of AI design systems and how they stack up against human designing abilities. These synthetic cognitive capabilities, which can be employed to support the design process, for example:

- AI is able to distinguish between various shapes, colours, language codes, design patterns, and other properties.
- AI has the ability to classify various input data and use a certain piece of data as needed in the future.
- AI have longer-lasting memories that are even superior than human memory in retaining information.

AI tools work in a specific order and followed processes. They are unable to “think” independently because they are unable to evaluate the context in which a task should be performed. They merely carry out instructions, nothing else. For instance, if social media platforms were unable to discern our preferences and instead displayed all available online material in our newsfeeds. We would have scarcely discovered anything intriguing, and the entire social media experience would have felt like a dreadful waste of time. Users of social media sites find the platforms engaging since only the posts and status updates that are interesting to them are displayed in their newsfeeds.

We might discover that this can completely transform design. AI design systems are capable of determining what layout or style will appeal to a certain user group and what style will not draw the bulk of people to a product or website. Additionally, this functionality will let websites reinvent themselves when they notice a change in users' preferences and interests. This quality is somewhat reminiscent of the study and critical thought that designers conduct before to developing, which AI is now capable of accomplishing.

Conclusions

All of the aforementioned AI features make clear that the design business will be transformed by the technology, but they don't seem to support the notion that machines would eventually take the position of human designers. These machines will still be lacking one thing, and that is the aim, even if they begin to function on their own without any human intervention. To instruct a machine to design something and to later approve or reject the design, a human must be present. And that people need to comprehend design.

Machines cannot compete with humans because, despite the fact that they can perform some tasks more effectively than humans can, they are incapable of having any personal goals or aspirations. Because a machine will always be striving to achieve the goals of humankind and not their own, a designer is required to make an AI-based system recognise what type of design is appropriate and what is not.

Conflict of interest

None declared.

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