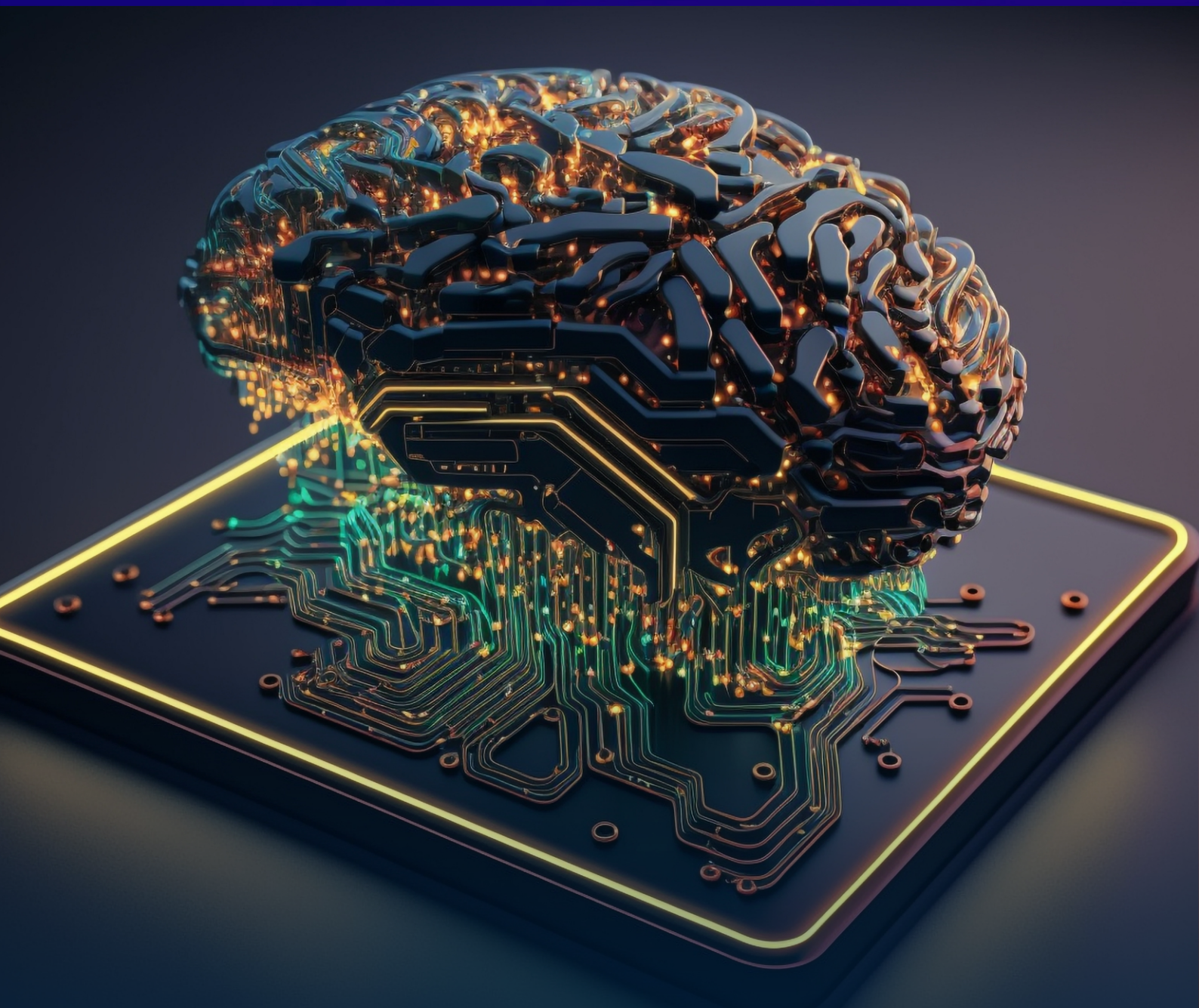


Artificial Intelligence: What Does This Mean For Nigeria And Africa?





Introduction

The term Artificial Intelligence (AI) refers to a simulation of human intelligence that can rationalize and take actions that have the best chance of achieving a specific goal.¹ It can further be defined as an existing network of computer components and connections that mimic the human ability to receive, process, reason and communicate information through various media. It can search through data to combine information for the production of a specific result through multiple media based on an initial request from a human operator. Artificial Intelligence consists of both hardware and software infrastructure that exist in various combinations of each other, depending on the intended use and scale of the AI application. This article will briefly highlight the fundamentals and brief history of AI and assess how best the technology can be exploited for the benefit of Nigeria and Africa.

Brief History of Artificial Intelligence

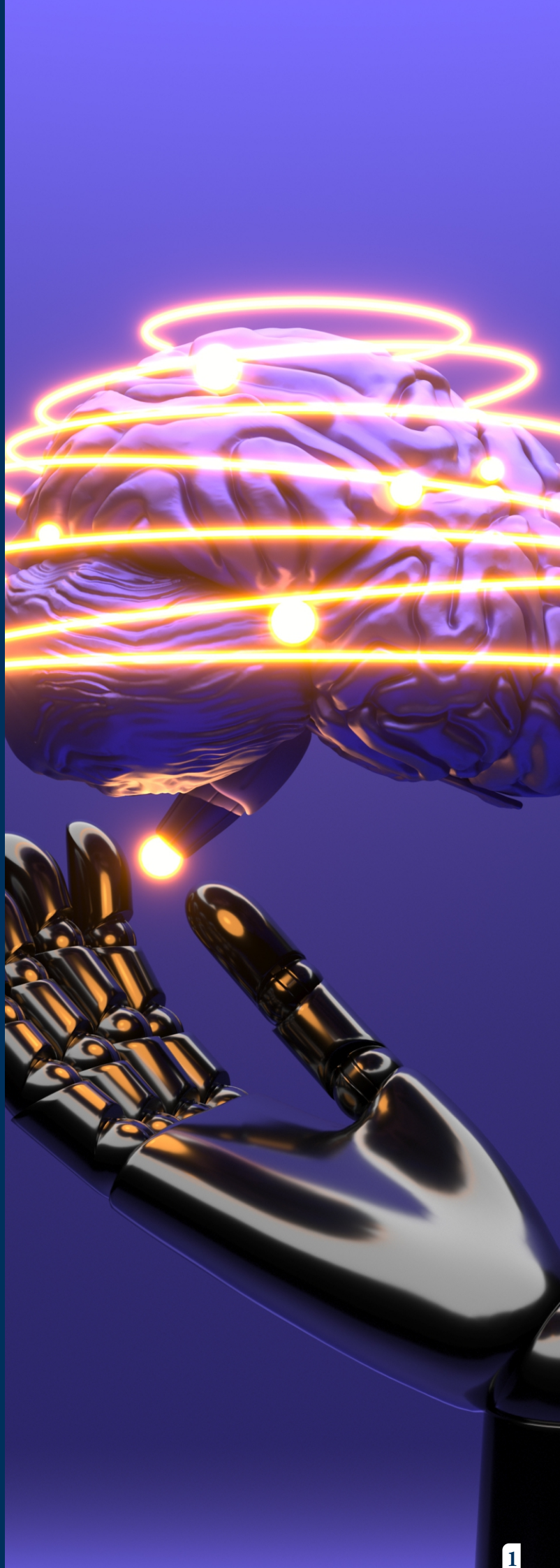
The early days of AI can be traced to 1950 when Alan Turing first proposed the idea that machines could think in his publication *Computing Machinery and Intelligence*.² In 1956 the term Artificial Intelligence was first coined by John McCarthy. In 1967 the first computer-based neural network called the Mark 1 Perceptron and was built by Frank Rosenblatt. The 1980's saw the widespread adoption of a backpropagation algorithm which AI used to train itself across different applications. The first AI computer to defeat the world chess champion occurred in 1997. The AI supercomputer called *Watson* actively participated in the television gameshow 'Jeopardy' and defeated its game champions in 2011. In 2015 a supercomputer with the ability to identify and categorize images with a higher rate of accuracy than the average human was created and used by Baidu in China. The year 2016 saw the advancement of deep neural networks as they powered the *AlphaGo program* to defeat the world champion of the game 'Go' in a five-game match. What makes this win remarkable is that the world champion was defeated after just 4 moves out of a total number of 14.5 trillion possible moves. In November 2022, Chat GPT was released to the public, and it set the world record of being the first application to sign up one million subscribers within the shortest period ever at 5 days.³

Interestingly, in November 2022, the response of the public to the unveiling of Chat GPT was a variation of excitement, hysteria, and denial. Notwithstanding, the younger generation, specifically the Gen Zs were quick to adopt the technology, especially in view of how instrumental the technology is, as a research tool.

¹ Artificial Intelligence: What It Is and How It is used <https://www.investopedia.com/terms/a/artificial-intelligence-ai.asp> accessed 12:00pm, 27 April 2023

² The History of Artificial Intelligence by Rockwell Anyoha <https://sitn.hms.harvard.edu/flash/2017/history-artificial-intelligence/> accessed 1:15pm, 28 April 2023

³ What is Artificial Intelligence? <https://www.ibm.com/topics/artificial-intelligence> accessed 12:00pm, 27 April 2023





How Does AI Work

Depending on the use case, artificial intelligence requires a large set of data to sift through, learn and train itself to perform the required function. The way artificial intelligence works and operates is dependent on the purpose for which it was created. Notwithstanding its functionality, a common characteristic that exists among all forms of AI is collection of data from which the AI learns to perform the task or tasks for which it was created. In further support of this, the popular chatbot, known as Chat GPT⁴ responded to the question ‘What is artificial intelligence?’ thus:

“Artificial Intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think and learn like humans. In other words, AI is the ability of machines to perform tasks that would normally require human intelligence, such as problem solving, reasoning, perception, natural language processing, and decision making”.

AI technology involves the development of algorithms and software that enable machines to learn from data, recognize patterns, and make decisions based on that learning. AI systems can be trained to perform specific tasks, such as image or speech recognition, and can also be designed to adapt and learn on their own, without being explicitly programmed.

AI has a wide range of applications in fields such as healthcare, finance, manufacturing, transportation, and entertainment. It is rapidly evolving and is expected to have a significant impact on society in the coming years.”

Types of Artificial Intelligence

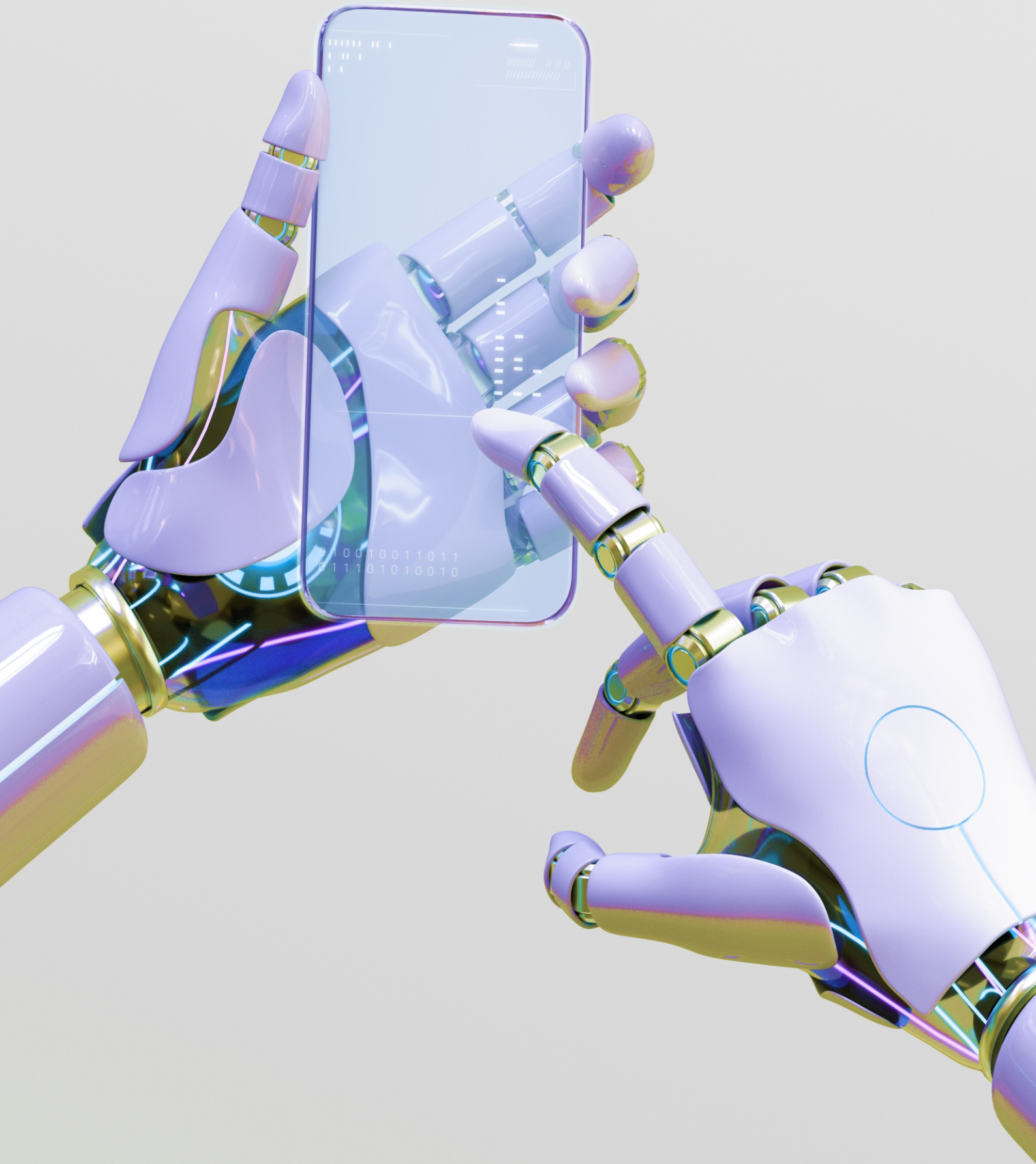
AI is typically divided into four categories, namely:⁵

- 1.Reactive machines:** They are designed to respond to specific prompts without the capability of learning anything beyond what it has been taught. It cannot solve a problem it was not trained to solve, and once solved (if at all), it does not store the learning experience in its memory. For instance, IBM’s Deep Blue was designed to play the game of chess.
- 2.Limited memory:** this is more complex than the reactive machine. In addition to its training data, this type of AI possesses a memory where it stores records of previous encounters from performing a particular task and compares the records to the current challenge in real time for a possible solution. An example of this is found in how self-driving cars observe other cars on the road for their speed, direction and proximity.⁶
- 3.Theory of mind:** it refers to AI with ability to determine how external factors make it feel and make decisions through a process of self-reflection and determination. This type of AI attempts to simulate the cognitive ability of a human. Whilst some AI models are trained to identify emotional responses in humans, this might sound as though the technology can develop emotional responses, in actual sense, it still remains limited to a mimicked cognitive ability designed to identify a range of physical characteristics and changes to the finest details of triggered pre-set responses and thus perpetuating the perceived capability of emotional intelligence. For now, this type of AI remains at the theoretical stages of development, hence a proven example remains non-existent at this moment.
- 4.Self-awareness:** It is regarded as the AI of the future, where the AI fully depicts the sentient mind of a human being. This AI is said to be conscious of the world around it and it is expected to be capable of understanding what external elements might require of it; not just from what is communicated, but from how it is communicated. Much like the theory of the mind, this type of AI also exists only as a theory and not an existing and publicly proven model.

⁴ Chat Generator Pre-trained Transformer

⁵ Artificial Intelligence. What is Artificial Intelligence (AI) How Does AI Work? By Alyssa Schroer. 3 March 2023. <https://builtin.com/artificial-intelligence> accessed 17 May 2023.

⁶ 4 Types of AI: Getting to know Artificial Intelligence <https://www.coursera.org/articles/types-of-ai?isNewUser=true> accessed 2:58pm 15 June 2023





Artificial Intelligence and the Law

There is a race for supremacy and dominance in the innovation, regulation and adoption of AI among the largest tech companies and the governments of the developed world. In the area of regulation, the European Union (EU) is set to take the global lead in this regard⁷. The EU is at the forefront of enacting the first legislative framework in the world to regulate the use and implementation of AI. The draft negotiating mandate is still advancing through the legislative process at the EU Parliament at the time this article was published, however, the draft is expected to adopt a risk-based approach. The premise upon which the rules were prepared would be by the imposition of compliance obligations on the providers and users of the technology contingent on the degree of risk involved, such as the potential misuse of facial recognition software, deep fakes⁸ and predictive policing⁹. The implications of the risk posed to people's safety from the technology's application are the primary determinants of how fast or slow AI would be adopted within the EU. This approach is favoured because it is the most accommodating for innovation and subsequent development. Conversely, a major disadvantage would be an underestimation of the identified risk¹⁰.

The United States of America developed a National AI strategy through legislation and Executive orders such as The National Artificial Intelligence Initiative Act 2020 and the National Artificial Intelligence Initiative (NAII) respectively.¹¹ The motivation behind the US government was to ensure its leadership in AI research and development (R&D). The private sector has seen 'big tech' companies such as Microsoft and Google compete in recent months to gain greater market supremacy over the other. In the process, the AI ethics teams have experienced increased degrees of marginalization, to such an extent that Microsoft, Twitch, Twitter among others dissolved their AI ethics team partially or entirely to expedite the deployment process of AI consumer products to the market. Such actions have been criticized by industry

stakeholders as short-sighted because the trade-off could be AI consumer products that are unproven and subject to unmitigated consequences far beyond the intention behind their creation¹².

In October 2022, the US government published a Blueprint for an AI Bill of Rights.¹³ Making automated systems work for the American People. The vision of the government is to create a body of guiding principles through which AI deployment, application and subsequent development are managed in the best way for the American public. The goal of the government is to establish automated systems to power the public sector and all or most government functions, in the administration of public services. The five principles outlined include:

1. Safe and Effective Systems¹⁴
2. Algorithmic Discrimination Protections¹⁵
3. Data Privacy¹⁶
4. Notice and Explanation¹⁷
5. Human Alternatives, Consideration, and Fallback¹⁸

⁷ Europeans Take a Major Step Toward Regulating A.I by Adam Satarino June 14 2023 <https://www.nytimes.com/2023/06/14/technology/europe-ai-regulation.html#:~:text=rapidly%20developing%20technology,-,The%20European%20Parliament%2C%20a%20main%20legislative%20branch%20of%20the%20European,while%20requiring%20makers%20of%20A.I.> accessed 4:20pm, 26 June 2024

⁸ a video of a person in which their face or body has been digitally altered so that they appear to be someone else, typically used maliciously or to spread false information.

⁹ Prohibit predictive policing and profiling AI systems in law enforcement and criminal justice by European Digital Rights (EDRI) <https://edri.org/wp-content/uploads/2022/05/Prohibit-predictive-and-profiling-AI-systems-in-law-enforcement-and-criminal-justice.pdf> accessed 4:39pm, 26 June 2023

¹⁰ Risk Based Approach: Is it Really the Best Decision-Making Approach? <https://www.qualityze.com/risk-based-approach-is-it-really-the-best-decision-making-approach/> accessed 11:00am 19 May 2023

¹¹ National Artificial Intelligence Initiative May 2023 <https://www.ai.gov/#:~:text=The%20National%20AI%20Initiative%20Act,economic%20prosperity%20and%20national%20security> accessed at 9:50am 27 June 2023

¹² As AI booms, tech firms are laying off their ethicists by Gerrit De Vynck and Will Oremus 30 March, 2023 <https://www.washingtonpost.com/technology/2023/03/30/tech-companies-cut-ai-ethics/> accessed 2:00 pm 25 May 2023.

¹³ BLUEPRINT FOR AN AI BILL OF RIGHTS: MAKING AUTOMATED SYSTEMS WORK FOR THE AMERICAN PEOPLE- The White House Published October 2022.

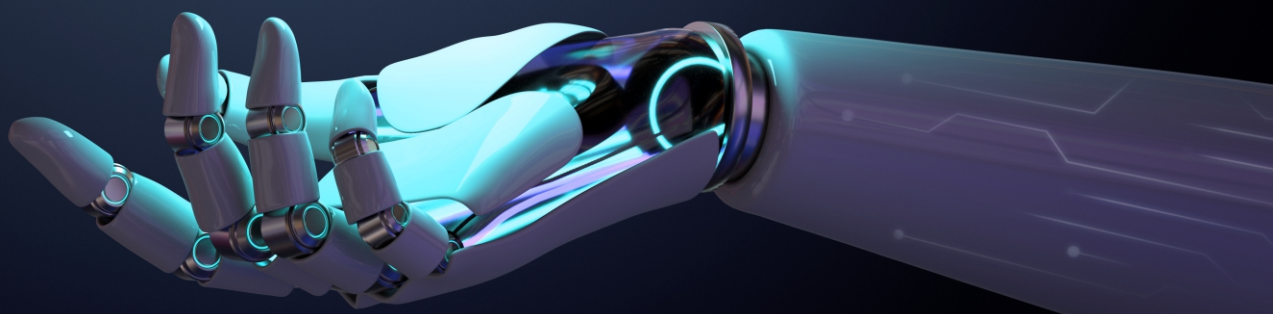
¹⁴ *Ibid*. Automated systems should be developed appropriately with relevant data. The system must be tried, proven and tested to be trusted to produce the desired result upon subsequent use. Users or subscribers must not be subjected to a system that is fundamentally ineffective and irrelevant. AI ethicists are the professionals directly tasked with safeguarding this principle but the private sector are either downsizing or currently dissolving their AI ethics teams to deploy their consumer products to the market, to avoid losing market share.

¹⁵ It is established as the protection of users of automated systems from unjustified treatment premised on any classification whatsoever.

¹⁶ Data collection forms and subsequent protection from violations of privacy through strict use of data within the specified parameters of use.

¹⁷ Every automated system is required to be described in the simplest language for users and other stakeholders to fully comprehend the scope of the automated system.

¹⁸ A mechanism through which users of automated systems can seek redress from human interfaces in the event the wrong of inappropriate solution is generated.



Important to note that the United Kingdom Minister for science and technology addressed the House of Parliament on 29 March 2023 highlighting the goal to becoming a science and technology powerhouse driven by AI by year 2030 through five guiding principles¹⁹

Regulation of AI in Africa

Africa is often described as the new frontier by foreign investors given its potential for economic growth and a younger demography²⁰. As such, investments have been made into about 82 AI-powered start-up projects within the tech sector worth 251.1 million U.S dollars²¹. Venture Capitalism is often the preferred method of investment for startups within Africa due to the inadequacy of seed funding required to develop a product from ideation to deployment.

Africa's AI regulatory landscape will be assessed briefly through Nigeria, Kenya, Egypt and South Africa as they are considered to be the big 4 with the highest growth potential on technological return on investments on the continent²².

Nigeria

There is no exclusive regulatory body of law for AI in Nigeria. On the other hand, there are ancillary legislation that partially suffice in the interim, and they include the Startup Act 2022, the Data Protection Act 2023 and the Advertising Regulatory Council of Nigeria Act (ARCON) 2022. The Startup Act streamlined the process of resource and fund gathering for startups.²³ The fund established under the Act is managed by the Nigerian Sovereign Investment Authority (NISA), out of which a percentage approved by NISA as the Fund Manager would be apportioned for research and development. Nonetheless, the direct impact of the Startup Act on AI may not be beyond 'seed funding' like most startups for the time being, because the Act was not enacted for the exclusive regulation of AI; rather, it acts as a facilitator of all innovative business initiatives through its unique provisions including tax and fiscal incentives, funding, development zones and technological transfer but to name a few. Additionally, the Data Protection Act 2023 is another crucial complementary legal framework that will aid in the impending regulation of AI by classifying the various types of data, and providing legal context within which data rights are regulated. The ARCON Act 2022 will be applicable in the instance of its mandatory licence requirement for advertisers. Due to the use of generative AI to produce content, the Act only considers AI as a variation of the medium through which content is generated. Thereby, it will still require of the content creator, an application for a licence to produce content which is subject to screening by ARCON before getting released to the public. The Buhari administration established the National Digital Economy Policy and Strategy (NDEPS) to align the Nigerian economy with technological advancements toward growth and development²⁴.

¹⁹ A pro-innovation approach to AI regulation, by UK Govt last updated 22 June 2023 <https://www.gov.uk/government/publications/ai-regulation-a-pro-innovation-approach/white-paper#ministerial-foreword> accessed 1:00pm 30 June 2023

²⁰ United Nations 'Young People's Potential, the Key to Africa's Sustainable Development' Accessed 12:56pm on 21 June 2023

²¹ Artificial Intelligence Startups in Africa <https://startuplist.africa/industry/artificial-intelligence> accessed 5:45pm on 31 May 2023.

²² VC's set sights on African countries beyond the 'Big Four' Investors are shifting to other regions as deals get expensive in top investment destinations by Annie Njanja published by Tech Crunch on 15 August, 2022 accessed 10:39am 27 June 2023

²³ See Section 19 of the Startup Act.

²⁴ National Blockchain Policy for Nigeria



The National Information Technology Development Agency (NITDA) is the regulatory body charged with the responsibility of developing and regulating information technology in Nigeria²⁵ and as such it established the National Centre for Artificial Intelligence and Robotics (NCAIR)²⁶ under its research and development areas. NCAIR is a department created for the promotion and research and development of AI for Nigeria's national interest. The NITDA is yet to publish a strategy or recommendations for AI at the time this article was prepared.

Kenya

Within Kenya, there is no specific legal framework for AI governance. Notwithstanding, there are existing legislations that enable the technology's progressive adoption and regulation, such as the Data Protection Act, 2019 and the Computer Misuse Act, 2007. The Kenyan government indicated intent of drafting legislation along these lines through the establishment of the Blockchain and AI Task force in 2018 which is primarily tasked with the responsibility of making recommendations on how best to regulate AI in Kenya.²⁷

South Africa

As a sovereign state, it is yet to enact exclusive AI legislation, and it is speculative that it may choose to use foreign legislation as a base on which it will draft its own codification. In consideration of existing legislation such as the Protection of Personal Information Act (Popia), South Africa has some laws that can intermittently satisfy the Advent of AI, however, these pre-existing laws need to be amended to address AI concerns in the interim, pending when exclusive legislation is enacted.²⁸

Egypt

In 2019 the Egyptian government established the National Council for Artificial Intelligence, and in April 2023 announced the launch of the Egyptian Charter for Responsible AI.

²⁵ Section 6(a) National Information Technology and Development Agency Act

²⁶ National Center for Artificial Intelligence and Robotics <https://nitda.gov.ng/ncair/> accessed 11:30am 2 June 2023

²⁷ AI Regulation in Kenya May 22, 2023 by Ms Teresia Mutindi Munywoki LinkedIn publishing <https://www.linkedin.com/pulse/ai-regulation-kenya-ms-teresia-mutindi-munywoki/> accessed 4:00pm 27 June 2023.

²⁸ South Africa faces many challenges in regulating the use of artificial intelligence by Kayla Casillo and Alex Powell 23 April 2023. Daily Maverick South Africa. <https://www.dailymaverick.co.za/article/2023-04-23-south-africa-faces-many-challenges-in-regulating-the-use-of-artificial-intelligence/> accessed 4:30pm 27 June 2023





It outlines AI guiding principles pertaining to human rights and dignity, fairness and equity, transparency and explainability, accountability and responsibility, privacy and data protection and collaboration and international cooperation. These principles exist to pay attention to AI's developments and align the principles with the subsequent frameworks and guidelines²⁹.

The AfCFTA

The AfCFTA included a protocol for e-commerce and digital trade to increase market reach for traders within the single market with the intent of enabling a seamless process through which traders communicate, trade and access their desired target market. Much like the NITDA in Nigeria, the AfCFTA intends to build inclusive digital skills and human capacity through digital transformation and technologies with AI forming one of the core innovative areas of technological development.³⁰

How best to employ AI Technology in Africa?

The infrastructure and regulatory requirements are the primary determinants among other essentials, such as funding, deal structuring, project management, monetization, and business advisory. Some of the critical infrastructure required for AI adoption in Africa include the following:

1. Data Centres: Data centres are physical locations where large repositories of digital information are stored, managed, and processed in special machines which are often laid out on a facility that requires significant amounts of energy to operate. Data centres and collocation services are the backbone of AI infrastructure because the information/data they contain are vital for training AI models. The reason why both Open AI's Chat GPT chatbots³¹ and Google's Bard are seemingly humanly intelligent is due to their access to the terabytes of data Microsoft servers and Google's servers respectively, to train and develop their text, image and video generative models. Given the current pace at which AI models are trained, coupled with the need for inclusion, it is important that the local content and native languages and colloquialism of the African continent are represented in generative AI models. Large Language Models (LLM's) are the algorithmic basis for chatbots, and they intrinsically require a need for vast quantities of data for AI models to learn and undergo an intensive training regimen to the point where they can satisfactorily receive a prompt, decipher the most appropriate response, and communicate the solution effectively through media.



²⁹ The new 'Egyptian Charter for Responsible AI': between interpretation and enforcement by Aliah Yacoub 23 May 2023. Synapse Analytics <https://www.synapse-analytics.io/post/the-new-egyptian-charter-for-responsible-ai-between-interpretation-and-enforcement> accessed 5:15pm 27 June 2023

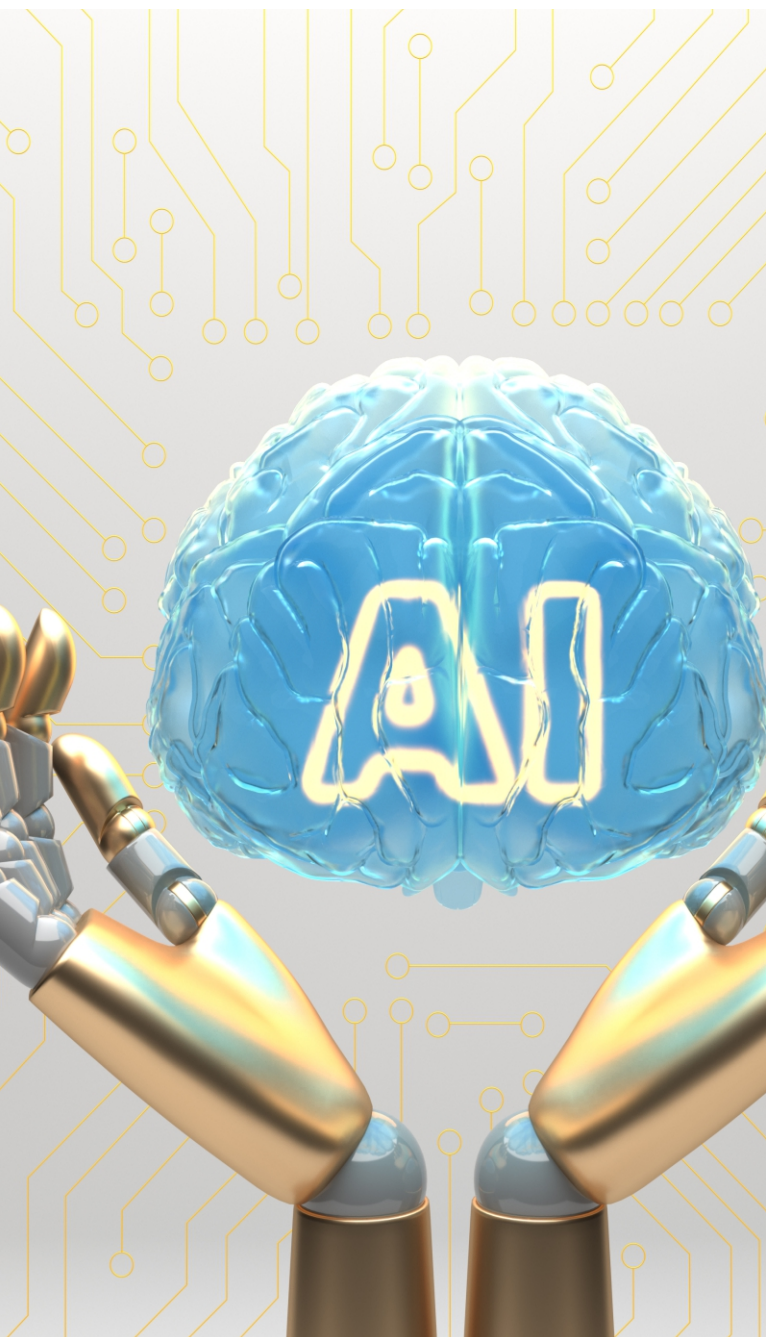
³⁰ African Union: The Digital Transformation Strategy for Africa (2020-2030)

³¹ 'What are LLMs, and how are they used in generative AI?' <https://www.computerworld.com/article/3697649/what-are-large-language-models-and-how-are-they-used-in-generative-ai.html> accessed 5:10pm, 2 June 2023



Every emerging market possesses components that are of economic value and fundamental importance to the larger emerging sector. Hence, with data being a component of AI; data centres will improve the African continent's position of leverage for data localisation³² in negotiations with foreign companies. The capacity of a sovereign country to manage and process the data of its citizens within its jurisdiction is increasingly important in today's technology and information age. The likes of Europe and China enforce data-centric legislation that limits third-country personal data transfers without appropriate levels of protection.³³ Different countries possess unique regulatory approaches to advance their data policy mandates, but the establishment of technology driven infrastructure like data centres will give Nigeria and the African continent increased leverage and representation in the development of AI.³⁴

With due consideration for these factors, the nouveaux industrial development process of the African continent will continue to happen subject only to the speed and capacity of governments to facilitate public sector infrastructure through private sector engagement. Hence, widespread AI adoption ought to be considered as an impending reality that is not a far-fetched reality.



Harmonized AI Legislation: Member states are right to exercise their sovereignty by enacting laws that best suit their requirements, however, it is advisable that for AI, member states make provisions for international cooperation.

It is recommended that any AI policy developed by any member state must consider the digital economy plans of the AfCFTA for ease of adaptability and subsequent uniformity in AI adoption among trading entities within member states as seen in the instance of the Egyptian Charter on AI adoption. Alternatively, the AfCFTA could outline a Charter for AI adoption among its member states.

It is important to note that excessive or strenuous regulations coupled with vague and inconsistent interpretations of the law deter foreign investment. Therefore, it is advisable that AI legislation of member states under the AfCFTA form the basic principles upon which dynamic AI regulations are applied; with room for them to be reassessed intermittently in consideration of how best the legislative principles achieve the desired goal.

The true test of AI regulation in Africa will be upon the adoption strategy of the technology in an official capacity synonymous with the United States of America's Government's vision of 'Automated Systems' as referred to under its Blueprint for an AI Bill of Rights and the UK's vision of becoming an AI driven powerhouse by 2030.

Conclusion

The advances in AI technology caused an increase in demand for data storage and processing, amidst the pre-existing high demand for cloud infrastructure, streaming services, remote working and 5G networks.³⁵

³² Data localisation is the requirement of storing and processing data within a specific geographic location. 'What is Data Localisation/ Pros and Cons' <https://www.imperva.com/learn/data-security/data-localization/> accessed 10:00am, 5 June 2023

³³ Localization of data privacy regulations creates competitive opportunities authored by McKinsey & Company 30 June 2022, <https://www.mckinsey.com/capabilities/risk-and-resilience/our-insights/localization-of-data-privacy-regulations-creates-competitive-opportunities> accessed 10:50am, 5 June 2023.

³⁴ The Importance of Inclusivity and Diversity in ChatGPT-3.5 and Other AI Language Models authored by Marcin Fackiewicz, 5 April 2023. <https://ts2.space/en/the-importance-of-inclusivity-and-diversity-in-chatgpt-3-5-and-other-ai-language-models/> accessed 1:25pm, 5 June 2023

³⁵ 'This Might Be The Most Overlooked AI investing Play Out There' authored by Russell Burns www.finimize.com accessed 31 May 2023.



With the dawn of the Internet of Things (IoT) and the anticipation of the vast amounts of data to be generated from it, in tandem with the development of AI models; a most prudent way for Nigeria and the African continent to position itself for an influx of growth and development would be by creating legislative and regulatory incentives for technical experts and investors in the field of AI. In the event AI's adoption is operational at incremental levels of scale, regulations must also undergo commensurate reassessments to ensure that the goals for which the technology was adopted are achieved.

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