WORKS CREATED BY ARTIFICIAL INTELLIGENCE: INTELLECTUAL PROPERTY OR NOT? ***

ABSTRACT

The continued advancement in innovation and technology continues to radically change what is believed to be possible. The progress of technology particularly in the field of entertainment has been most profound. In 1995, British musician, David Bowie and a colleague, Ty Roberts, created the Verbalizer – a program which could take up to 25 sentences and groups of words, rearrange them aleatorically into different combination and by so doing, create new lyrics. In 2016 researchers at Sony took the concept of Artificial Intelligence music a step further. Using a software called Flow Machines they created a melody in the style of The Beatles. In this article we consider the place of works created by Artificial Intelligence, the status of such works as intellectual property and who the owners of such intellectual property should be where Artificial Intelligence is involved in the creative process. This article argues that works created by artificial intelligence software and robots ought to qualify as intellectual property provided other requirements (such as originality) are met. The article however queries whether such intellectual property rights should lie with human inventors or the artificial intelligence. This work also recommends that the extant laws on the recognition and protection of intellectual property rights be amended to reflect the growing involvement of artificial intelligence in the field of intellectual property.

Keywords: Intellectual Property, Artificial intelligence, Innovation and Technology Laws, technological advancement, Regulation of Artificial Intelligence and Intellectual Property Rights.

INTRODUCTION

The 21st century has seen quantum leaps in advancement in almost every sphere of human endeavour and the role technology has played in this progress cannot be overemphasised. From self-driving cars like the Tesla Model S to electronic voice-controlled personal assistants like Siri, there is hardly any field of human endeavour that has remained unchanged by technology. An essential element of this technological advancement is the introduction of Artificial Intelligence ("**AI**") making machines capable of executing even complex tasks. In the field of medicine for example, robotic surgeries, or robot-assisted surgeries, allow doctors perform many types of complex procedures with more precision, flexibility and control than was ever thought possible with conventional technique.[1]

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On 14 February 2016, Sophia, a social humanoid robot developed by Hong Kong based company, Hanson Robotics, was activated. She made her first public appearance at South by Southwest Festival (SXSW) in mid-March 2016 in Austin, Texas, United States and by October 2017, she had been granted citizenship of the Kingdom of Saudi Arabia; the first robot ever to be granted citizenship. She is capable of displaying more than 60 facial expressions. Using artificial intelligence, she imitates human gestures and facial expressions and is able to answer certain questions and to make simple conversations on predefined topics like the weather.[2]

These advancements in modern technology and the growing use of AI however pose certain legal challenges particularly in the field of intellectual property. There are questions as to whether AI may create works considered to be the subject matter of intellectual property; who possesses the intellectual property rights in such works; whether an AI is cable of breaching intellectual property laws and, how to seek redress for breach of intellectual property created by AI.

THE CONCEPT OF ARTIFICIAL INTELLIGENCE

American Computer Scientist, John McCarthy[3], first coined the term "artificial intelligence" in 1956 when he invited a group of researchers from a variety of disciplines including language simulation, neuron nets, complexity theory and more to a summer workshop called the Dartmouth Summer Research Project on Artificial Intelligence to discuss what would ultimately become the field of AI. At that time, the researchers came together to clarify and develop the concepts around "thinking machines".[4]

For a concept that we have come to rely upon on our day-to-day lives, artificial intelligence lacks a widely accepted definition capturing its entire essence. Every definition of the term has been subject to debate and the discontent seems to revolve around what qualifies as artificial intelligence. Is the concept of artificial intelligence limited to advanced robotics capable of carrying out human-like functions with little or no oversight control from humans? Does a software capable of running complex algorithms faster and with greater accuracy and

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[1] Mayo Clinic, *Robotic Surgery* culled from https://www.mayoclinic.org/tests-procedures/robotic-surgery/about/pac-20394974 on 18 March 2020

[2] Culled from https://en.wikipedia.org/wiki/Sophia_(robot) on 19 March 2020

[3] John McCarthy defined Artificial Intelligence as the science and engineering of making intelligent machines.

[4]Bernard Marr, *The Key Definitions Of Artificial Intelligence (AI) That Explain Its Importance*, published on 14 February 2018, culled from https://www.forbes.com/sites/bernardmarr/2018/02/14/the-key-definitions-of-artificial-intelligence-ai-that-explain-its-importance/#8387f6e4f5d8 on 11 March 2020

efficiency than the human brain ever qualify as artificial intelligence? The answers to the above questions would depend on the definition of artificial intelligence one chooses to adopt.

The Encyclopaedia Britannica defines artificial intelligence, as the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings. The term artificial intelligence has also been used to describe machines (or computers) that mimic "cognitive" functions that humans associate with the human mind, such as "learning" and "problem solving".[5] These definition of artificial intelligence leans towards excluding all other forms of technology not including the use of robotics from the definition of artificial intelligence.

A more elaborate definition characterises artificial intelligence as "a system's ability to correctly interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation."[6] By this definition, not only are advanced robotics considered artificial intelligence, but computer systems able to perform human-like tasks through the aid of software and programs would also qualify as artificial intelligence.

From the above definitions, it is safe to define artificial intelligence as the ability of a machine, computer system or program to imitate the human intelligence processes, learning from experiences, adapt to new information while performing human-like activities.

The progress of technology in the field of entertainment has, in our view, been most profound. In 1995, British musician, David Bowie and a colleague, Ty Roberts, created the Verbalizer – a program with which Bowie could input up to 25 sentences and groups of words. The Verbalizer would then aleatorically rearrange the words into different combinations. In effect, creating new lyrics.[7] In 2016 researchers at Sony took the concept of artificial intelligence music a step further. Using a software called Flow Machines they created a melody in the style of The Beatles. This material was then turned over to human composer Benoît Carré and developed into a fully produced pop song called “Daddy’s Car.”[8] Flow works by analysing a

[5] Russel and Norvig, Artificial Intelligence: A Modern Approach, 3rd edition, 2009

[6] Kaplan, Andreas; Haenlein, Michael, "Siri, Siri, in my hand: Who's the fairest in the land? On the interpretations, illustrations, and implications of artificial intelligence". Business Horizons. published 1 January 2019

[7] Adam Bielenberg, *Will Artificial Intelligence Penetrate The Music Industry?* Culled from https://www.headstuff.org/entertainment/music/will-artificial-intelligence-penetrate-the-music-industry/ on 18 March 2020

[8] Dani Deahl, *The Future of Music, episode 2 - How AI-Generated Music is Changing The Way Hits Are Made,* published on 31 August 2018. Culled from https://www.theverge.com/2018/8/31/17777008/artificial-intelligence-taryn-southern-amper-music on 18 March 2020

selection of music from Sony's database and then runs an analytical model known as a Markov chain that identifies patterns in those selections and then imitates and varies them to create its own original composition.[9]

THE REGULATORY FRAMEWORK FOR ARTIFICIAL INTELLIGENCE

Although the world is still a long way from the level of artificial intelligence of the like depicted in Hollywood blockbusters like the *Terminator* franchise and *I, Robot*, with each passing year, the line between science fiction and scientific reality becomes thinner and thinner. The potential for artificial intelligence indeed appears limitless with countless benefits, but the possibility for abuse is an ever-present danger.

There is therefore the need for the law to regulate this relatively novel field of human endeavour. The approach adopted by most countries of the world so far is largely tentative.

Nigeria

Simply put, there are no stand-alone Nigerian legislation that regulate the field of artificial intelligence. What exist instead are specific provisions in laws regulating allied fields. For example, the National Information Technology Development Agency Act 2007 ("**NITDA Act**') establishes the National Information Technology Development Agency. This agency has the duty to introduce appropriate regulatory policies and incentives to encourage investment in the information technology industry. Where artificial intelligence used in Nigeria is of an IT nature, such artificial intelligence will be regulated by the NITDA and its policies, specifically the policies on data processing, protection and the rights of the data subject. Pursuant to its functions under the NITDA Act, the NITDA issued the Nigeria Data Protection Regulation in 2019. This regulation ensures that where artificial intelligence or technology in general is used, the principles of an individual's right to privacy which also extends to personal data is protected.

Australia

Australia has been an active participator in the artificial regulation discussion with several bodies seeking comments on how best to approach the issue. The Australian Human Rights Commission published a white paper in 2019 seeking comments on the proposed method of

[9] Lucy Jordan, *Inside the Lab That's Producing the First AI-Generated Pop Album* published on 13 April 2017 culled from https://www.seeker.com/tech/artificial-intelligence/inside-flow-machines-the-lab-thats-composing-the-first-ai-generated-pop-album on 18 March 2020

regulation. The paper suggests an independent regulatory body be developed, either from an existing organisation or a new one, called a 'responsible innovation organisation'. This body would provide guidance on how to approach artificial intelligence and possibly even have some enforcement powers to ensure that artificial intelligence is used appropriately and in accordance with Australian law and some governing principles

However, Australia currently has no specific regulatory framework for the development and use of artificial intelligence and so is relying on current legislation and standards pending the development of specific legislation to regulate artificial intelligence. It however seems that the wealth of discussion papers and the existence of a current set of artificial intelligence principles indicate that Australia may not be far from AI-specific regulatory instruments.[10]

The European Union

In June 2018 the European Union through the office of the European Commission set up the independent High-Level Expert Group on AI to provide guidelines on how artificial intelligence can achieve trustworthiness.

In light of the guidelines, the Commission has since published its own 'White Paper on Artificial Intelligence – A European approach to excellence and trust' on 19 February 2020.

The Commission's white paper identified that the most pressing risks that need to be addressed regarding artificial intelligence are the risks to fundamental rights, privacy of data, safety and effective performance, and liability identification. The Commission noted that the best approach to regulation should be risk-based to ensure responses to artificial intelligence development are proportionate and do not stifle innovation.[11]

So, while the European Commission has not at this time laid down any specific regulations on regulating artificial intelligence, it has set out legal requirements that any regulatory framework must cover to ensure that artificial intelligence remains trustworthy and respectful of the values and principles of the European Union.[12]

ARTIFICIAL INTELLIGENCE AND INTELLECTUAL PROPERTY RIGHTS

[10] Buddle Findlay , *Artificial intelligence and the regulatory landscape* published on 26 March 2020 culled from https://www.lexology.com/library/detail.aspx?g=4c845762-e954-4f47-8809-f5ad0f5d3716 on 19 March 2020

[11] Ibid
[12] Ibid

Sometime in 1624 Britain passed the Statute of Monopolies and the British Statute of Anne later in 1710. Thereafter, the law began to recognise the rights of individuals over properties of an intangible nature. Prior to these statutes, the law mostly recognised only property rights but with these statutes, the courts began to recognise proprietary rights and thus the concept of intellectual property was born. [13]

Generally, the term intellectual property rights refer to a group of rights recognised and protected by the law over the products of the exercise of the human intellect. The main purpose of intellectual property law is to encourage the creation of a wide variety of intellectual goods. To achieve this, the law gives people and businesses, proprietary rights to the information and intellectual goods they create, usually for a limited period. This gives economic incentive for their creation, because it allows them profit from the information and intellectual goods they create. The most common forms of intellectual property protected by the law today include copyrights, trademarks, trade secrets, patents and designs.

Balancing rights so that they are strong enough to encourage the creation of intellectual goods but not so strong that they prevent the goods' wide use is the primary focus of modern intellectual property law.[14] As has been discussed earlier in this work, the world has begun to see advancements in technology where artificial intelligent machines are now able to imitate the creative.

According to the World Intellectual Property Organization (WIPO), nearly 340,000 patents related to artificial intelligence [have been] published from 1960 until early 2018. Apart from patent, copyright protects software codes that constitute the building blocks of artificial intelligence programs. As a matter of requirement, such codes must have been reduced into writing. Artificial intelligence algorithms can be protected as trade secrets, and trademark protects the names of robots. Current intellectual property laws therefore protect man's inventions of artificial intelligence and accommodate the exploitation of intellectual property rights in artificial intelligence.

However, the real problem arises when the product of man's invention starts inventing on its own. Can intellectual property protection be extended to cover such second level inventions? For instance, let us say that Mr. Jacobs invents a robot and this robot invents, through the

[13] Goldstein, Paul; Reese, R. Anthony (2008). *Copyright, Patent, Trademark and Related State Doctrines: Cases and Materials on the Law of Intellectual Property* (6th ed.). New York: Foundation Press. ISBN 978-1-59941-139-2.
[14] Goldstein, Paul; Reese, R. Anthony (2008) ibid

powers of artificial intelligence, another device, can protection be afforded to the robot over the device invented by it?

The traditional view which is still extant in most jurisdictions like the U.K and U.S is that intellectual property rights such as copyright in a work only subsist in a natural person. This, no doubt, stems from the belief that artificial intelligence lacks the ability to independently create copyrightable content without at least some form of human input, owing to the fact that the actions of artificial intelligence are fuelled by the instructions fed into it by humans and artificial intelligence makes inventions based on the instructions – which are in the form of algorithm -- fed in it. This leads to a situation that can be called "chain of creation" i.e. man invented artificial intelligence and artificial intelligence invented another subject, ultimately the real inventor is man. It follows logically that since the creative process of artificial intelligence works are usually initiated by a human, the copyright in the work should belong to the human creator.

An analogy can be drawn from the case of in *Naruto v Slater*[15] where the issue was whether the copyright in a selfie taken by a monkey vested in the monkey. The defendant [the photographer whose camera the monkey used] had argued that he had a valid copyright claim, as he engineered the situation that resulted in the pictures. The US court held that:

> *"We must determine whether a monkey may sue humans, corporations, and companies for damages and injunctive relief arising from claims of copyright infringement. Our court's precedent requires us to conclude that the monkey's claim has standing under Article III of the United States Constitution. Nonetheless, we conclude that this monkey—and all animals,* ***since they are not human—lacks statutory standing under the Copyright Act****. We therefore affirm the judgment of the district court".*

Similarly, in August 2019, applications for patents for two inventions - a warning light and a food container - were filed on behalf of Stephen Thaler, the CEO of Imagination Engines in 17 different jurisdictions including, the US, UK, several European countries, and South Africa. However, instead of listing a human inventor(s) on the applications, the application listed an artificial intelligence called Device for Autonomous Bootstrapping of Unified Sentience ("DABUS") which was itself invented by Thaler. DABUS came up with the innovations after being fed general data about the inventions. As it goes, Thaler could have built DABUS but he

[15] Naruto v. Slater, No. 16-15469 (9th Cir. 2018)

had no expertise in creating the two products which were the subject of the patents application and would not have been able to generate the ideas on his own. The UK and European patent offices though considering the inventions as patentable, rejected the applications holding that the inventor was not a natural person and could not qualify as an inventor within the meaning of the UK Patents Law 1977.

However, in July 2021, the South African Patent Office approved the registration with DABUS on record as the patent holder. This marked the first time that an artificial intelligence has been conferred with intellectual property rights[16]. The South African Patents Act 57 of 1978 states under Section 25 that:

> *(1) A patent may, subject to the provisions of this section, be granted ·for any new invention which involves an inventive step and which is capable of being used or applied in trade or industry or agriculture.*

From the above provision, it is easy to see why the South African Patent Office had no difficulty in approving the application. This is because, while the UK Patent laws and indeed the patent laws of many other countries state that an inventor shall be a natural person, the South African laws have no such restrictions.

Proponents of the view that intellectual property cannot be vested on artificial intelligence insist that for works created by artificial intelligence to have protection under intellectual property laws, the meaning of "person" under intellectual property laws would have to be expanded so as to include non-humans; however, those for artificial intelligence protection have gone the length to argue that the refusal to vest intellectual property rights on artificial intelligence is discriminatory, stating that discriminating against machine is akin to persecuting people for their gender or skin colour; they argue that if corporations can be termed persons why not robots (AI)? They argue that though artificial intelligence does not just spring into existence as it must be coded and trained, however that does not necessarily mean that everything an artificial intelligence creates can be traced back to humans.

The position under Nigerian law is less settled. Section 1 of the Copyrights Act defines works eligible for copyright to include literary works, musical works, artistic works, cinematograph films, sound recordings and broadcasts. Section 2 of the Nigerian Copyright Act provides that:

[16] https://www.mondaq.com/india/patent/1122790/south-africa-grants-a-patent-with-an-artificial-intelligence-ai-system-as-the-inventor-world39s-first

*"copyright shall be conferred by this section on every work eligible for copyright of which the **author** or, in the case of a work of joint authorship, any of the authors is at the time when the work is made, a qualified person, that is:*

a. An individual who is a citizen of or is domiciled in Nigeria; or
b. A body corporate incorporated by or under the laws of Nigeria."

The Copyright Act in Section 51 defines author "in the case of literary, artistic or musical works" as the "creator of the work." The Act however does not define who or what a "creator" is. In spite of this lacuna in the law, for an application for copyright registration by an artificial intelligence to succeed under Section 2 of the Act, not only must it be shown that the artificial intelligence is the creator of the work, it must also be shown that the artificial intelligence is a "qualified person" within the meaning of Section 2 of the Act. That is, that the artificial intelligence must either be "an individual who is a citizen or domiciled in Nigeria" or "a body corporate incorporated by or under the laws of Nigeria." Suffice to say that an application under this section is unlikely to succeed as the Constitution of the Federal Republic of Nigeria, 1999 which makes provisions for who qualifies as a citizen of Nigeria only contemplates the conferment of citizenship on natural persons. Until such a time as artificial intelligence or robots running on artificial intelligence are recognised as citizens of Nigeria, it is unlikely that that an application under section 2 of the Copyright Act would be successful.

Notwithstanding the above, we note that Section 3 of the Copyright Act states that:

(1) Copyright shall be conferred by this section on every work, other than a broadcast, which is eligible for copyright and which-
a. being a literary, musical or artistic work or a cinematograph film, is first published in Nigeria; or
b. being a sound recording, is made in Nigeria,

and which has not been the subject of copyright conferred by section 2 of this Act.

(2) Copyright conferred on a work by this section shall have the same duration as is provided by section 2 of this Act in relation to the same type of work

The above section provides an enabling framework for persons/corporations which might not be Nigerian citizens or domiciled in Nigeria to apply for and register their copyright eligible works in Nigeria, provided that they can show that the work is copyright eligible and that the work was first published in Nigeria. The question that arises from the above analysis is, can

this section be extended to confer on artificial intelligence software and robots copyright over works created by them? We answer this question in the affirmative. Whereas the other provisions of the Copyright Act deal with individual creators who are natural persons and/or are citizens or domiciled in Nigeria, section 3 of the Copyright Act has no requirement that an applicant under the section be an individual or corporate body or be domiciled in or be a citizen of Nigeria. All that is required is that an applicant shows that its works is copyright-eligible and that it was first published in Nigeria.

It should, however, be stated that the Copyright Act only deals with copyrights and performance rights. Patents, Designs and Trademarks are regulated by different laws. The Patent and Designs Act 1971 ("The Patent Act") regulates the recognition and registration of patents, and industrial designs. Section 2 of the Patent Act which deals with the right to Patent states as follows:

> *Subject to this section, the right to a patent in respect of an invention is vested in the statutory inventor, that is to say**, the person who, whether or not he is the true inventor**, is the first to file, or validly to claim a foreign priority for, a patent application in respect of the invention.*

Similarly, Section 14 of the Patent Act which deals with the right to designs states:

> *Subject to this section, the right to registration of an industrial design shall be vested in the statutory creator, that is to say, **the person who, whether or not he is the true creator**, is the first to file, or validly to claim a foreign priority for, an application for registration of the design.*

Although the Patent Act does not go further to define who or what a "person" is, it is safe to argue that the provisions of the Act are intended to apply only to natural persons. Similarly, Section 67(1) of the Trade Marks Act provides that:

> *Subject to the provisions of this section and of sections 7 and 8 of this Act, the registration (whether before or after the commencement of this Act) **of a person in Part A** of the register as proprietor of a trade mark (other than a certification trade mark) in respect of any goods, shall, if valid, give or be deemed to have given **to that person the exclusive right** to the use of that trade mark in relation to those goods.*

From the above analysis, it is safe to say that while the conferment of artificial intelligence with copyright right under Nigerian law is arguable, it is unlikely that such rights can be conferred on artificial intelligence under the extant Patent Act and Trade Marks Act.

The argument in favour of artificial intelligence protection seems to have been further triggered by recent attitudes of the courts in some countries which have vested "personhood" status on non-human entities. In March 2017, two rivers in New Zealand were granted personhood status. Days later the Indian Court of Uttarakhand in a bid to prevent pollution of two indigenous rivers followed similar vein when it ordered that the Ganges and its main tributary, the Yamuna (Rivers) be accorded status of living human entities. They considered pollution of the river as equivalent to harming a person.

The apparent recognition of the need for an extension of the personhood status to non-human entities has also seen some animals been accorded similar status in New Zealand. In New Zealand, following the passage of the Animal Welfare Amendment Bill (now Act), dogs have now been accorded the status of sentient beings. The Animal Welfare Amendment Act stipulated that it is now necessary to recognize animals as "sentient" and that owners must "attend properly to the welfare of those animals. These parliamentary and judicial attitudes have no doubt paved the way for a new form of thinking that a non-human can, where necessary attain the status of a person and thus enjoy the rights and privileges of human beings, including those granted under intellectual property laws.

However, granting artificial intelligence intellectual property rights may itself not be enough as issues of transfer and enforcement of the rights may pose several challenges.

ENFORCEMENT OF INTELLECTUAL PROPERTY RIGHTS BY ARTIFICIAL INTELLIGENCE

Recent trends show that AI powered machines, which are hitherto invented by humans, are now making remarkable inventions in the field of science and technology. This situation has seen the call for some sort of protection for AI inventions as there have been arguments that AI should be granted IP rights over its inventions.

However, granting AI Intellectual Property rights raises serious legal issues. As patent or copyright holders, the law allows an individual to assign the right to reproduce, sell or otherwise exploit the use of intellectual property. The assignment of such rights is usually a contractual affair. That is, the holder of a right as assignor, transfers or licenses an

assignee/licensee through a contract signed by both parties to use or otherwise exploit the intellectual property rights. This presents a challenge where artificial intelligence as intellectual property right owners are involved. This is because, for a contract to be valid, Nigerian law, and indeed the laws of most jurisdictions, requires that parties to a contract must have contractual capacity. Under extant laws, only natural persons and corporate bodies are recognised as having the power to contract.

Further, legal personality of an artificial intelligence or more appropriately, the lack thereof, also poses a challenge in the event of dispute arising from an alleged breach of intellectual property rights. in *Alagbe & Ors v. The Incorporated and Registered Trustees of The Assemblies of Gods Church*[17] it was held that the law recognises two categories of persons who can sue and be sued. These are natural persons (human beings) and artificial bodies which have been fully incorporated or registered under the relevant law. Also, in the event that the courts find that an artificial intelligence possesses legal personality to sue or be sued, what happens where a court finds against an artificial intelligence for having breached the intellectual property of a claimant? How may such a judgment be enforced against the artificial intelligence? More importantly, how would a judgment creditor enforce an order restraining an errant artificial intelligence from further breaches? Shall the courts compel the creator of the artificial intelligence to rewrite its code to avoid further breaches? Does an order against the inventor of an artificial intelligence for a civil or criminal wrong committed by the artificial intelligence not vitiate the principle of separate legal identity and the principles against vicarious criminal liability as espoused by the Supreme Court in *APC VS. PDP & Ors*[18] per Justice Fabiyi?

CONCLUSION AND RECOMMENDATIONS

The contribution of artificial intelligence to intellectual property in today's world can no longer be ignored. The advancement in technology has given rise to high tech artificial intelligence power which has in the same vein led to improvement in intellectual property in terms of speed, quality of products and more.

The current legal framework on intellectual property in the world and Nigeria in particular calls for urgent re-visitation to accommodate modern realities. It is often said that the law cannot exist in a vacuum and must rather keep pace with society. It is suggested that, given modern

[17] (2019) LPELR-51508(CA)
[18] (2015) 4 SCM 48 at 99H

day realities, specific laws are created which provide for and cover the legal complexities of Artificial Intelligence and its ever-evolving involvement in our daily lives. While the debate as to the recognition of legal personality of artificial intelligence is in general and their right to intellectual property rights in particular is sure to linger on for a few more decades, it is advisable that the law gets ahead of the curve and lays down clear rules of engagement. Countries which intend to recognise the role of artificial intelligence in the creation of intellectual property must put in place laws which clearly spell out the rights if any, conferrable on such artificial intelligence. While countries which intend to exclude artificial intelligence from all forms of recognition must clearly legislate these positions into law.

Either way, what is certain is that the world has only begun to scratch the surface of what artificial intelligence is capable of and as modern technology continues to advance, we can expect to see some forms of regulation on the subject before the decade runs out.