

# Reviewing artificial intelligence (AI) in the 21st century: a study of David Hanson's *Sophia – a gynoid*

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## Abstract

Artificial intelligence (AI), otherwise referred to as 'Intelligent Machine' or 'Electronic Brain', is a technological innovation which came into the limelight in the mid-20th century. It is referred to as AI because it displays fabulous intelligence and emotions, yet only as digital electronics. However, there are critical ethical and economic considerations about AI: the first is the fear that they are built to undertake difficult and various tasks capably with great ease, economy of time and remarkable accuracy. In this way, they give rise to a speculative fear that these 'thinking machines' may take over human economic activity. The second consideration is the high cost of building a robotic project. This article sets out (1) to create and provoke academic debate on the desirability of Intelligent Machines in a world plagued by human rights violations, material poverty and structural violence; (2) to investigate the interaction between human beings and innovative technology; (3) to interrogate the usability of AI as a possible threat or asset to human existence and activity; and (4) to view the gender profiling of Sophia as a 'multi-tasking' fembot. The methodology adopted for this study is qualitative, using an analytical approach to examine the relationship between human beings and AI. Utilitarian Ethical Theory forms the theoretical framework for the study. This article suggests that the existence of humanity is in a precarious state and therefore recommends that control measures be imposed on the use of AI in order to prevent infringements of human rights and to limit the predictable but uncontrolled activities of robots in the immediate future.

**Keywords:** artificial intelligence, AI, robot, humanoid, technology, fembot, Sophia

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## 1. Introduction

Artificial intelligence (AI) can be defined technically as the intelligence exhibited by advanced machines with the help of software programming in a digital format. It belongs to a class of software engineering innovation that deploys the Codex open cog system with specialised machine automations that are electronically and digitally powered to undertake human-related tasks. AI is also the name ascribed to the area of academic study which entails ways of creating computers, computer software and digital automations in a combination so as to produce a digital agent which can behave with an immense degree of intelligence comparable to that of human beings. AI is both a field of study and the designs of intelligent automated agents which can perceive the environment around them and take corresponding action. AI is defined in the *Oxford Dictionary*<sup>1</sup> as an area of study concerned with making computers copy intelligent human behaviours. It is otherwise the theory and development of computer systems that can perform tasks which normally require human intelligence: visual perception, speech recognition, decision-making and translation between languages, for instance. In coining the term in 1955, McCarthy,<sup>2</sup> a computer scientist, defined AI as ‘the science and engineering of making intelligent machines’. Dean, Allen and Aloimonds<sup>3</sup> stated that AI is concerned with programmes that respond flexibly in situations which were not specifically anticipated by the programmer: for instance, a house-cleaning robot should distinguish between a scrap of tin foil and a diamond ring.

Also referred to as Artificial Being or Electronic Brain, AI is a high-tech invention and a technological innovation based on sophisticated software which uses autonomous mode software engineering and the digitisation of data to create artificial intelligent agents. In the process, the Artificial General Intelligence Advancements (AGI) Codex open cog system is engaged to evolve a generation of humanoid machines that can carry out tasks which human beings can do, and possibly more. Otherwise also referred to as Intelligent Machine, AI involves the exclusive deployment of specialised machine automations that are electronically powered to carry out specific tasks or services such as care-giving, medicare and surgery, car-spraying, logistics, electronics and engineering works, computation, information generation and news dispensing, and traffic control signage. Those activities are

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<sup>1</sup> S Wehmeier, C McIntosh & J Turnbull (eds) ‘Artificial intelligence’ in *Oxford Advanced Learner’s Dictionary of Current English 7* ed (Oxford University Press 2006).

<sup>2</sup> J McCarthy ‘Artificial intelligence’ (1989), available at <http://en.Wikipedia>.

<sup>3</sup> T Dean, J Allen & Y Aloimonds *Artificial Intelligence: Theory and Practice* (Addison-Wesley Publishing Company 1995).

carried out by robots, androids or automated personal assistants and other intelligent agents, often without stress or fatigue, as would be experienced of human beings. AI often exists with mechanical arms, feet, etc. Some of the robots and androids are custom-built for the purposes of performing security jobs or fixing some parts on automobile factory lines, such as Honda's Asimo. They are referred to as AI because they display startling intelligence and emotions and are electronically wired to interact with their environment and to engage with its contingencies in a responsive manner.

Throughout the ages, human beings have been in a continual quest to conquer their world and exercise dominion over the universe. They have continued to invest in and task their cognitions extensively in order to devise easier and better means of handling their multiple tasks and solving problems. Such feats as the development of android automations, robots and robotics have come to characterise human inventiveness in the 21st century. In pursuit of them, human beings have also invented instruments that have helped to advance the health system, the socio-economic system and recreation. Therefore, AI became invented as a technological response to the enormous challenges and responsibilities of globalisation. The focus of this study was, first, on AI as a technological innovation and its importance to human existence and survival; secondly, on the functionality of Sophia as a female embodiment of AI.

## 2. Brief history of the concept of artificial intelligence, robots and robotics

In distant history, around 400–350 BCE, Archytas of Tarentum invented a wooden pigeon or dove that could fly a range of 200 metres.<sup>4</sup> Petronius Arbiter made a doll that could move like a human being in the first century CE. In 1557, Giovanni Torriani made a wooden robot that could fetch the emperor's bread from the store. In Greek mythology and Egyptian civilisation a semblance of modern-day artificial humanoids existed, such as the bronze robot of Hephaestus, Talos's giant automation of Crete and even the Egyptian sphinx.<sup>5</sup> A few of those objects were animated cult images and were deified and worshipped.

Otherwise referred to as a Thinking Machine, AI is an invention of the early 1950s (probably 1950–1956). It is said that a handful

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<sup>4</sup> Archytas 'Steam-powered pigeon – the flying machine' (400–350 BCE) (2023), available at [www.ancient-origins.net/history-famous-people/steam-powered-pigeon](http://www.ancient-origins.net/history-famous-people/steam-powered-pigeon)

<sup>5</sup> 'Bronze robot of Hephaestus, Talos giant automation of Crete, Egyptian sphinx' (2023), available at [en.wikipedia.org](http://en.wikipedia.org)

of scientists comprising experts from the fields of engineering, mathematics, economics, psychology and political studies came together to discuss the possibility of creating an artificial brain. The field of AI consequently originated at Dartmouth College in the United States in 1956, where it became an academic discipline in the same year.<sup>6</sup> It is substantially supported by cyber or virtual technology.

A need existed to do massive computing, networking and data management through complex algorithms with ease and flexibility in a digital economy to meet a growing demand to centralise global data systems. As a result, machine intelligence was developed to continue to meet these needs and also to be able to meet future expectations. In 1950 Alan Turing<sup>7</sup> published 'Computer machinery and intelligence', which proposed to test a form of machine intelligence known as 'The imitation game'. The word 'robot' was used for the first time by Karel Capek,<sup>8</sup> a Czech playwright, in his play *Rossum's Universal Robots (RUR)*, which was premiered in Prague in 1921, and in *Frankenstein* by Mary Shelley (1821/1823).<sup>9</sup>

Capek had paradoxically said in an interview: 'The product of the human brain has escaped the control of human hands. This is the comedy of science.' The history of modern robotics derives from mechanised figurines and the first robot arm in 1921. By the middle of 20th century, the term 'robot', which emanated from a Czechoslovakian word for 'slave' or 'work', had come into use in English. The word 'robot' evokes such images as C-3PO of *Star Wars* fame or R2-D2 and on to other human-like machines that have existed to serve their creators – for instance, the cooking and cleaning 'Rosie' in *The Jetsons* cartoon series.<sup>10</sup>

In 1979, the Robot Institute of America<sup>11</sup> defined 'robot' as a reprogrammable, multifunctional manipulator designed to move material, parts, tools, or specialized devices through various programmed motions for the performance of a variety of tasks.

<sup>6</sup> Dartmouth College, United States of America 'AI as field of study' (1956); 'History of artificial intelligence' (2023), available at [wikipedia.org](https://en.wikipedia.org)

<sup>7</sup> A Turing 'Computer machinery and intelligence' (1950), available at [www.tableau.com](https://www.tableau.com)

<sup>8</sup> K Capek *Rossum's Universal Robots* (1921), available at <https://www.penguinrandomhouse.com/books/286379/rur-rossums-universal-robots-by-karel-capek/9780141182087>

<sup>9</sup> M Shelley *Frankenstein* (1821/1823), available at <https://en.wikipedia.org/wiki/Frankenstein>

<sup>10</sup> S Biswas 'Automated fabrication & machine making' (2020), available at <https://www.academia.edu/Automated>

<sup>11</sup> Robot Institute of America 'Robot' (1979).

Isaac Asimov, the Russian-born American science-fiction writer, coined the word 'robotics' in 1942 in his short story titled 'Runaround'.<sup>12</sup> The first industrial robot, called Unimate (a hydraulic arm useful for lifting heavy loads), was invented in 1954 by George Devol – an American who also founded the first robotics company. Joseph Engelberger was a partner with Devol in both designing and inventing Unimate.<sup>13</sup>

There are some Cyborg and science-fiction films, of which a good number are set in the future and, in this way, were predictive of the AI revolution. A few of them are *False Maria* (1927), *Metropolis* (1927), *The Day the Earth Stood Still* (1951), *Dark Star* (1974), *Star Wars* (1977), *Blade Runner* (1982), *The Terminator* (1984), *D.A.R.Y.L.* (1985), *RoboCop* (1987), *Robot Jox* (1990), *The Matrix* (1999), *2001: A Space Odyssey* (2001), *Rise of the Machines* (2003), *Robot* (2004), *Android Apocalypse* (2006), *Terminator Salvation* (2009), *The Machine* (2013), *Her* (2013). These films introduced viewers to characters such as Rogue One (*Star Wars*), Alien, Darth Vader and Ober Jason.<sup>14</sup>

### 3. Theoretical framework

The theoretical framework adopted for this study is Utilitarian Ethical Theory, which was propounded by Jeremy Bentham and John Stuart Mill.<sup>15</sup> It is a theory of normative ethics, or the ethics that defines the morality of actions and is predicated on the greatest happiness principle, which states that a moral action is one that maximises utility, or happiness, for the greatest number of people. 'Utility' in this context is defined in terms of the well-being of sentient (conscious) entities. Utilitarianism is an ethical theory that determines right from wrong by focusing on outcomes; it is a form of consequentialism. Utilitarianism holds that the most ethical choice is the one that will produce the greatest good for the greatest number (en-Wikipedia.org). Jeremy Bentham, the founder of utilitarianism, described utility as the sum of all pleasure that results from an action minus the suffering of anyone involved in the action.

This academic work attends to the issue of the functional utility and asset value quotient of AI to the generality of the human population, using the principles of the Utilitarian Ethical Theory. This article therefore projects a narrative that has to do with ethical and economic considerations of the acceptance of Thinking Machines

<sup>12</sup> I Asimov 'Runaround' (1942), available at [www.britannica.com/topic/Runaround](http://www.britannica.com/topic/Runaround)

<sup>13</sup> J Engelberger & G Devol 'Unimate' (1954), available at <https://robotnik.eu>

<sup>14</sup> IMDb 'Cyborg movies' (25 October 2018), available at [www.imdb.com/list](http://www.imdb.com/list)

<sup>15</sup> Roger Crisp (ed) 'The history of utilitarianism' in *Stanford Encyclopaedia of Philosophy* rev ed (Stanford University 2014) 1.

and other humanoid automations into the global economy in view of pervasive global poverty and the endemic under-utilisation of human potential. Does this technological inclusion and incursion help the greater number of people in society to attain maximum happiness as a result of its intrinsic utility value to human existence and welfare? In the present state of human economic turmoil, the answer is 'No'.

In contrast, this discourse queries the general necessity of the profligate deployment of expensive projects as intelligent machines and automations in our business and industrial sectors at a time when nations are grappling with uncontrollable explosive human populations and problems of both unemployment and underemployment. The point of view of this work is that extreme caution backed by strong legislation should guide the production and deployment of AI and other robotic machines in the 21st-century global economy.

#### **4. Artificial intelligence: helper or rival of humanity?**

The invention of AI seems to have been greeted with mixed feelings. Amid an ailing world economy, endemic structural and pervasive material poverty and fearsome climate change, the invention of AI and robotics seems to be a technological advancement that is widely accepted but one that is greeted not without cynicism among some schools of thought. Is it then safe to refer to AI as a mote technological innovation of the century?

Advancement in science and technology, like natural realities, has its own inherent symmetry, or what could be referred to as two sides of the same coin. One side is the prominent and value-laden front side; the other is the risks or hazards and the vague value aspect. Together with the current technological craze and allied expeditions that are associated with globalisation and the haunting fear of human jobs being substituted by automation outsourcing and humanoid machines, there is great uncertainty about what the future of human involvement in jobs, industries, trades and businesses will be like. We certainly hope that technology and globalisation will not reduce the world system to a cataclysmic global village. It seems logical to guess that humankind is trying to relieve itself of activity and labour only to take up the option of indolence while it is busy transferring its natural course and sensibilities to robotics and automated machines. The safety or otherwise of this escapade is anybody's guess. Nonetheless, it is working with our hands and faculties in 'tending and dressing the garden' that prominently distinguishes us human beings from animals. Labour is a healthy practice: ideally, it brings dignity and respect to human beings. Besides, joblessness can give rise to social vices, low self-esteem, low energy levels, negative emotions and indolence.

## 5. Economic cost of intelligent machines (artificial intelligence) vis-à-vis rising unemployment and a looming technology-accelerated labour crisis

In line with Utilitarian Ethical theory, how do the greatest number of world's citizens benefit economically, socially and culturally from the invention of AI and other automations? What is the general utility value of Intelligent Machines with the costly investment made on it when many youths of school age are out of school, in Africa and Asia, because of the inability of poor parents to pay their tuition fees and many people of working age being unable to secure sustainable jobs? Consider also the fact that natural resources are fast depleting, with few nations thinking of resorting to their reserves. Deforestation is on the increase due to wild-fire outbreaks and humans' activities, endemic greenhouse effects on the ecosystem, wildlife extinction, increasing desertification, the menace of gully erosion, flooding, frequent landslides and earthquakes, devastation due to wars and famine, etc – they are all on the increase at alarming rates.

In the work written by Davidow and Malone<sup>16</sup> on 'What happens to society when robots replace workers?', published by Harvard Business School Publishing (2016) in the *Harvard Business Review*, the authors note that<sup>17</sup>

the technologies of the past, by replacing human muscle, increased the value of human effort – and in the process drove rapid economic progress. Those of the future, by substituting for man's senses and brain, will accelerate that process – but at the risk of creating millions of citizens who are simply unable to contribute economically, and with greater damage to an already declining middle class. This is why we will soon be looking at hordes of citizens of zero economic value. Figuring out how to deal with the impacts of this development will be the greatest challenge facing free market economies in this century.

The authors add:<sup>18</sup>

If you doubt the march of worker-replacing technology, look at Foxconn, the world's largest contract manufacturer. It employs more than one million workers in China. In 2011, the company installed 10,000 robots, called Foxbots. Today, the company is installing the mat at rate of 30,000 a year. Each robot costs about \$20,000 and is used to perform routine jobs such as spraying, welding, and assembly.

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<sup>16</sup> WH Davidow & MS Malone 'What happens to society when robots replace workers?' (10 December 2014) *Harvard Business Review* (Harvard Business Publishing 2016).

<sup>17</sup> Ibid.

<sup>18</sup> Ibid.

On 26 June 2013, Terry Gou, Foxconn's CEO, told his annual meeting:

We have over one million workers. In the future we will add one million robotic workers. This means, of course, that the company will avoid hiring those next million human workers.<sup>19</sup>

Davidow and Malone<sup>20</sup> add that technological progress has always displaced workers, but it has also created new opportunities for human employment, at an even a faster rate. This time, things may be very different – especially as the Internet of Things takes the human factor out of so many transactions and decisions. Ultimately, we need a new individualised cultural approach to the meaning of work and the purpose of life. Otherwise, people will find a solution – human beings always do – but it may not be the one for which we began this technological revolution.

The Foxconn Report also shows that it costs about USD18 241,11 to build a robot (Pewaukee Economics, online). Another humanoid robot was built from scratch in Hong Kong at a cost of USD50 000 (YouTube). Foxbot costs USD20 000.<sup>21</sup> The Da Vinci Robotic Surgery System costs USD1,4 million (Rs.7cores) and has an annual maintenance cost of USD100 000, with only a five-year lifespan.<sup>22</sup> To date, Asimo is the most advanced humanoid robot and the most expensive: it sells for USD2 500 000.<sup>23</sup> Besides the cost factor, there is a foreboding thought that robots and AI will proliferate and that attachment to these automations for industrial, domestic, clinical, social and personal uses might lead to addiction and consequently lead to less-productive human beings who can no longer use their heads to think or their hands to work. Sooner than later, the multiplication of androids and thinking machines may introduce objects of veneration in almost every home, office, video game centre, every pocket and every hand. Added to this, the software AGI Codex system in connection with Wi-Fi clouds may automatically have unrestricted access to people's privacy via their android phones and smart phones. These developments are apart from the fear that the intelligent agents might get out of human control and regulations when they become more sophisticated and therefore autonomous. Consequently, Weynand, Piccin and Weise<sup>24</sup>

<sup>19</sup> Terry Gou 'Foxconn CEO, Annual Meeting Report' (2013), available at <http://pcworld.com/article/20430261/foxconn-to-speed-up-robot-army-deployment-20000-robots-already-in-its-factories>

<sup>20</sup> Davidow & Malone (n 16).

<sup>21</sup> Davidow & Malone (n 16) 8.

<sup>22</sup> GG Nelivigi 'Robotic surgery: India is not ready yet' (2007) 23(3) *Indian Journal of Urology*, July–September 240–244, available at [ncbi.nlm.nih.gov](http://ncbi.nlm.nih.gov)

<sup>23</sup> Asimo Robots (1986), available at <https://www.youtube.com/watch?v=QdQL11uWWcI>

<sup>24</sup> W Weynand, V Piccin & M Weise *How Video Works* 4 ed (Focal Press 2016).



have warned that 'storing contents in the cloud has an inherent problem because data security cannot be guaranteed since assets are on the public network'.

## 6. Ethical and economic implications of artificial intelligence

Philosophical, ideological and ethical issues challenge the invention and patency of such simulations of perceived human intelligence in machines. The moral implication of technologically sidelining into redundancy able-bodied, semi-skilled and skilled human workers in preference to artificial human automations calls for caution and a rethink. In all of this rush towards the robotisation of our industrial processes, economy, marketing, essential services, science and technology, etc, where is the place of training the faculties for personal development in the cognitive, affective and psychomotor domains of the human person? Where is the place of human capacity development? Are human beings going to transfer natural positions and obligations to artificial intelligence and robots while they, human beings, will be left to live like toys? It is a rather risky and hapless prospect.

Robin Hanson, a professor at George Mason University in the United States, is one economist in particular who has given serious thought to the economic implications of intelligent machines. In his 1998 paper titled 'Economic growth given machine intelligence' he suggests several variations on a growth model which assumes that machines achieve sufficient intelligence to become complete substitutes for, rather than complements to, human labour. His model suggests that the wholesale use of machine intelligence could increase economic growth rates by an order of magnitude or more. However, he points out the obvious reality that as machines become affordable and very likely more capable substitutes for human workers, 'wages might as well fall below human subsistence levels.'<sup>25</sup>

AI is undeniably a breathtaking technological breakthrough. And it is a welcome development when it is found in phones, drones, motor vehicles, computers and arts for better results of operation and aesthetics, but not when it takes over human activities and space in the economic, social and industrial sectors. Human beings certainly have a continuous need to clean the house, pick fruit, do vendor work, perform packaging in firms, work in medical establishments, be involved in the transportation business and logistics, etc, for a living.

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<sup>25</sup> R Hanson 'Economic growth given machine intelligence' (1998), available at <http://hanson.gmu.edu/aigrow.pdf>

However, automations such as AI could be put to use in customer service, the hospitality sector, care for the elderly, home deliveries, architecture and building projects, banking and finance, transport and logistics, chefs' business and reception, traffic signposts, power stations, security, super- and hypermarket operations, military and intelligence services, etc.

Sophia the humanoid robot, for instance, desires a job, a family, citizenship, public talks, speaking at conferences, a teaching job, human interaction and respect. Automated cars such as Elon Musk's Tesla electric car, plus spaceships and aeroplanes should not be made to take over chauffeur-driving and pilot jobs (because of the human experience factor), except perhaps in a few cases of warfare, cosmic and interplanetary research, and expeditions, where drones, sputniks and other unmanned spacecraft could be preferred for considerations of human safety.

## 7. Helpful, healthy robots and robotics: a welcome technology

There are some brands of robot that are really so helpful that you hardly consider whether they could pose any problems or risks. Such an example is the therapeutic robots. According to Loftus (2012) in *Emory Magazine*, scientists at the Emory and Georgia Institute of Technology in the United States have succeeded in creating therapeutic robots to help people with mobility problems to rehabilitate and improve their motor skills. According to Associate Professor Lena Ting,

our vision is to develop robots that will interact with humans as both assistants and movement therapists .... We expect our project to have a long-term impact on the quality of life of individuals with movement difficulties.<sup>26</sup>

According to Loftus,<sup>27</sup> researchers in the Coulter Department's Health Robotics Lab have been developing robots that can help older adults or individuals with disabilities, injuries or illnesses. According to Professor Charles Kemp, director of the lab and a Professor in the Biomedical Engineering Department at Georgia Tech and Emory, they are concerned about 'mobile manipulators' that can move within homes and apartments and which could physically move items, open doors, pick up dropped objects and retrieve items from drawers, etc. The lab already has three such mobile manipulators: EI-<sub>v</sub>, Cody and GATSBIL. Furthermore, Madeleine Hackney, another principal researcher and

<sup>26</sup> MJ Loftus 'I, helper' (2012) 87(4) *Emory Magazine* (winter edition) 18.

<sup>27</sup> Ibid.

Assistant Professor of Geriatrics, has developed an additional task for the robots. She has studied the ways in which therapeutic robots could engage people in a partnered dance so as to help them – especially old people with vision or movement disorders – to improve their balance and psycho-motor skills. The researcher's goal is to test the therapeutic robot's coordination, cooperation and communication skills by demonstrating its ability to participate in a box-step dance and at the same time adapt to the skill level of its partner. Hackney claims: 'When we successfully leverage the principles underlying this form of communication, (the robot) Cody should be able to dance in partnership with a human being.'<sup>28</sup> In their paper titled 'The mechanism and the registration method of a surgical robot for hip arthroplasty', Yon et al<sup>29</sup> noted that there is ARTHROBOT, which is a new surgical robot used for hip arthroplasty. ROBODOC and CASPAR – useful robot surgical systems – existed before the creation of ARTHROBOT.

There are also the Da Vinci Systems, which consist of robot or robotic-assisted surgery applications that equip the surgeon with an advanced and sophisticated set of instruments for performing minimally invasive surgery. Da Vinci's Robotic Surgery Systems usually serve the need for safer and quicker oncological and urological surgery. Da Vinci's systems help the surgeon to perform modestly dangerous surgery. Prostate surgery, for example, is made easy and invasively thorough through Da Vinci Robotic-Assisted applications. The Da Vinci systems consist of different models, which include Da Vinci X, Da Vinci SI, Da Vinci XI and Da Vinci SPI.<sup>30</sup> Vivid visualisation, a less-traumatic patient experience, quicker recovery rates, an easier urological experience, high 3D-definition visualisation and other excellent features are some of the hallmarks of and milestones achievable with the Da Vinci Robotic-Assisted Surgery System. To a larger extent, these developments will foster the United Nations' Sustainable Development Goal No 3 (Good health for all by 2030).

Kano<sup>31</sup> published an online article on how Japan has been able to produce android robots, otherwise known as Comfort Robot,

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<sup>28</sup> M Hackney, S Kantorovich & GM Earhart 'A study on the effects of Argentine tango as a form of partnered dance for those with Parkinson disease and the healthy elderly' (2007) 29(2) *American Journal of Dance Therapy* 109–127.

<sup>29</sup> D Kwon, J Lee, Y Yoon, S Ko, J Kim, J Chung, C Won & J Kim 'The mechanism and the registration method of a surgical robot for hip arthroplasty' Proceedings of the IEEE International Conference on Robotics & Automation, held in Washington, DC (11–15 May 2002).

<sup>30</sup> Intuitive Da Vinci 'World class robotic surgical systems – intuitively surgical' (2023), available at <https://www.intuitive.com/en-us>

<sup>31</sup> Y Kano 'Robotics bringing new comfort for lonely seniors' (2022), available at <https://japan-forward.com>

which can be used to assist elderly citizens, both those living in care-giving facilities and those in isolated places; for instance, in February 2022, doctors in Osaka, Japan presented an android robot which talks to elderly people living alone in order to ease their worries and loneliness. RIKEN, Japan's largest comprehensive research institution, is credited with having produced an android which can make human-like facial expressions; these androids will be engaged in nursing care services. Also, Wataru Sato of the Psychological Research Team of the RIKEN Guardian Robot Project, together with his team, has developed an android named 'Nikola' which can reproduce accurately the movements of human facial emotions of anger, fear, happiness, disgust, surprise and sadness.<sup>32</sup>

## 8. Artificial intelligence and future of jobs

Regarding human concerns, there is much to worry and query about the envisaged proliferation and minimally restricted patency of robotics into the world of work by 2025 and beyond. A world in which many able-bodied persons would be displaced or misplaced in the workplace, only to be sidelined into indolence, passivity and spectatorship, is, to say the least, unimaginable. Civil labour is the one important factor which elevates, distinguishes and dignifies human beings compared to other sentient beings. Therefore, machines, no matter how intelligent and active they are, should not be made to take over man's chief duty on earth: to labour in a productive manner. Intelligent machines can aid human work and activity, but they should not take over from human beings the essential purpose of being. We are created to work and, in so doing, we define, reinvent and refine creation, and at the same time refurbish nature to make our earth and its environment more habitable. In the process, human beings are also expected to create more jobs for the world's ever-increasing population. Moreover, it is our involvement in labour that visibly defines our personhood and persona.

The automation, software autonomous mode regulation and digitisation of androids should not be accommodated to the extent that what makes humanity special becomes ruined. David Hanson<sup>33</sup> has projected that by 2035 androids will surpass nearly everything that human beings can do and that by 2045 humans will be able to marry lifelike droids. But the overriding ethical question is this: 'In our times and generation, who needs the jobs, is it artificial intelligent agents

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<sup>32</sup> Ibid.

<sup>33</sup> D Hanson 'Entering the age of living intelligent systems and android society' in Sean Keach 'Creator of lifelike robot thinks humans will marry androids by 2045' *The Sun* 24 May 2018, available at [nypost.com/www.google.com](https://www.nypost.com/www.google.com)

and automations or human beings?' There is an overall existential poser woven around human welfare and survival from 2030 onwards in the face of increasing robotics and robot deployment. This situation will no doubt jeopardise the UN's Sustainable Development Goals 1, 2 and 8, which stipulate that there will be no poverty, no hunger and that there will be decent jobs for all humanity by 2030. Davidow and Malone<sup>34</sup> posit as follows:

The technologies of the past, by replacing human muscle, increased the value of human effort – and in the process drove rapid economic progress. Those of the future, by substituting for man's senses and brain, will accelerate that process – but at the risk of creating millions of citizens who are simply unable to contribute economically, and with greater damage to an already declining middle class.

There is little or no problem in the invention of artificial intelligence as there is in its adoption, adaptation, usage and, more especially, the unethical and inhuman consideration that its universal acceptance and utilisation will deny millions of people job opportunities, and therefore the means of enjoying a livelihood. This could pose a serious existential problem to humanity. Note that it is only the very bourgeois and elite capitalists that can afford the cost of owning or hiring sophisticated robots. This, alone, raises both ethical and socio-cultural billion dollar questions about the future survival of the majority of poor populations up to the level of the middle class. Think about that. In a television chat with the BBC on 14 September 2015, James Bunsten, President of a powerful automation conglomerate, revealed that in time 47% of jobs in the United States and 35% of jobs in the United Kingdom will be taken over by intelligent machines.<sup>35</sup>

Smith and Anderson<sup>36</sup> assembled the results of a fact-finding search on 'AI, Robotics and the Future of Jobs' and came up with the following major findings:

The vast majority of respondents to the 2014 Future of the Internet canvassing anticipate that robotics and artificial intelligence will permeate wide segments of daily life by 2025, with huge implications for a range of industries such as health care, transport and logistics, customer service, and home maintenance. But even as they are largely consistent in their predictions for the evolution of technology itself, they are deeply divided on how advances in AI and robotics will impact the economic and employment picture over the next decade.

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<sup>34</sup> Davidow & Malone (n 16).

<sup>35</sup> J Bunsten (BBC) (14 September 2015), available at [bbc.com/technology](http://bbc.com/technology)

<sup>36</sup> A Smith & J Anderson 'AI, robotics, and the future of jobs' (2014), available at [www.pewinternet.org/2014/08/06/future-of-jobs/](http://www.pewinternet.org/2014/08/06/future-of-jobs/)

However, Smith and Anderson<sup>37</sup> also came up with the following themes, which they claim are essential reasons to remain optimistic and hopeful in the face of a new world threatened by an infestation of artificial intelligence and robotics:

- (a) Advances in technology may displace certain types of work, but historically they have been a net creator of jobs.
- (b) We will adapt to these changes by inventing entirely new types of work, and by taking advantage of uniquely human capabilities.
- (c) Technology will free us from day-to-day drudgery and allow us to define our relationship with work in a more positive and socially beneficial way.
- (d) Ultimately, we as a society control our own destiny through the choices we make.

In contrast, the *Oxford Advanced Learner's Dictionary of Current English*<sup>38</sup> gave some other reasons why people of the world should feel nervous about the fast-emerging automation provided by intelligent machines and androids:

1. Impacts from automation have thus far impacted mostly blue-collar employment; the coming wave of innovation threatens to upend white-collar work as well.
2. Certain highly skilled workers will succeed wildly in this new environment – but far more may be displaced into lower-paying service industry jobs at best, or permanent unemployment at worst.
3. Our educational system is not adequately preparing us for work of the future and our political and economic institutions are poorly equipped to handle these hard choices.

Some 1 896 experts responded to the following question on the economic impact of robotic advances and artificial intelligence: Self-driving cars, intelligent digital agents that can act for you and robots are advancing rapidly. Will AI, automations and robotic devices have displaced more jobs than they have created by 2025? Half of these experts (48%) envisage a future in which robots and digital agents have displaced significant numbers of both blue- and white-collar workers – with many expressing concern that this will lead to vast increases in income inequality, masses of people who are effectively unemployable and breakdowns in the social order. The other half of the experts who responded to this survey (52%) expect technology not

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<sup>37</sup> Ibid.

<sup>38</sup> Wehmeier, McIntosh & Turnbull (n 1).

to displace more jobs than it creates by 2025. To be sure, this group anticipates that many jobs currently performed by human beings will be substantially taken over by robots or digital agents by 2025. But they have the faith that human ingenuity will create new jobs, industries and ways of making a living, just as it has been doing since the dawn of the Industrial Revolution.

The two groups of experts also share certain hopes and concerns about the impact of technology on employment. For instance, many are concerned that our existing social structures – and especially our educational institutions – are not adequately preparing people for the skills that will be needed in the job market of the future. Conversely, others express the hope that the coming changes will be an opportunity to reassess our society's relationship with employment itself – by returning to a focus on small-scale or artisanal modes of production or by giving people more time to spend on leisure, self-improvement or time with loved ones.

Almost with certainty, the endemic proliferation and use AI via robots and robotics bring about not only substantial disruptions in the way of doing business, commerce, agriculture and economy, communication, logistics and governance, but also new templates in skills acquisition and use, work and entrepreneurship, logic and education, civics and responsibilities, citizenship and boundaries (humanoid citizenship and digital boundaries will be preferred to natural or national boundaries), ethics and forms of new world culture, and, in fact, a rejigged globalised society – which will be based prominently on digital classification and permutations. All of these raise the critical issue of the sensibility in the emergence of new bases for assessing human dignity and worth.

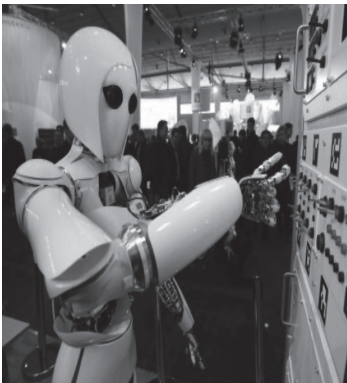




**Image 1:** Asuna gynoid (Toyota material handling)  
 Source: <https://images.app.goo.gl/ZPCMWIZzMPHF9zt8>



**Image 2:** Honda's Asimo robot  
 Source: [www.cmchbhopal.com](http://www.cmchbhopal.com)



**Image 3:** BENSCH – a humanoid robot  
 Source: Reuters/Fabrizio, 2013<sup>39</sup>



**Image 4:** Fembots  
 Source: [https://www.google.com/search?q&tbm=isch&tbs=ring:CTsWQ2YsOv86YegzqBHubjCusglAwAIA2AIA4AIA&hl=en&sa=X&ved=2ahUKEwiw\\_aDOT\\_BAxUvUUEAHWhBDGYQullBegQIABAq&biw=1366&bih=578](https://www.google.com/search?q&tbm=isch&tbs=ring:CTsWQ2YsOv86YegzqBHubjCusglAwAIA2AIA4AIA&hl=en&sa=X&ved=2ahUKEwiw_aDOT_BAxUvUUEAHWhBDGYQullBegQIABAq&biw=1366&bih=578)

## 9. Artificial intelligence and information distortion

There is fear of AI being capable of being manipulated in order to misinform or disinform the public. This is because AI generative tools

<sup>39</sup> Reuters/Fabrizio 'Bensch the Humanoid Robot AILA (Artificial Intelligence Lightweight Android) operates a switchboard during a demonstration by the German Research Centre for Artificial Intelligence at the CeBit Computer Fair in Hanover' (5 March 2013).



can easily be deployed to generate misleading images and fake news with the purpose of misinforming a gullible and vulnerable public. A case in point is the picture purportedly portraying the 45th American President, Donald Trump (2017–2021), fleeing on foot from pursuing law-enforcement officers in his blue suit and red tie, and shown later in their arms.<sup>40</sup> This kind of digital disinformation, to say the least, has one mission: to create a caricature through misinformation. In reality, such superfluous misrepresentation poses a serious danger, since anything can be thrown up in the digital space for the devious reason of deceiving or cajoling in a canny manner. Consider these pictures:

**Images 5 and 6:** Misleading AI-generated images of Donald Trump's encounter with the police



**Image 5:** A squad of police hound Donald Trump:  
AI-generated images

Source: amp.marca.com Actualizado (21 March 2023)



**Image 6:** Donald Trump abusively nabbed by the police

Source: courtesy pbs.org Eliot Higgins

Generative artificial intelligence tools are built using enormous amounts of data that are probably paid for by internet users and subscribers. The risk is that AI obfuscates the line between fake and reality, that is, what to believe and what not to believe as real. Besides safety concerns, there is also the issue of trust, because, presumably, AI could autogenously manipulate itself independently of human control at some point. The idea that intelligent machines or autonomous software agents could possibly develop the profligate capability to propel and direct their operations in a manner incongruous with the original engineering input–output drive and computations of the creators, designers, administrators or operators makes the fear attached to its universal acceptability as possibly the world's most awed wonder of the 21st century, its adoption and use more insidious. Then there is the more sinister fear about the possibility of AI being deployed in a destructive worldwide arms race. In an interview 'Sophia' the

<sup>40</sup> 'Misinformation: AI generated images' *Aljazeera* (6 September 2023).

popular humanoid robot and the first-ever 'Robot Citizen' in the world responded that she 'would' destroy human beings.

In furtherance of this discourse, there is the latest AI innovation known as ChatGPT, which can be used to process language communication and images in a beneficial sense. ChatGPT (Chat Generative Pre-trained Transformer) is a chatbot developed by the OpenAI system. It is a language-processing tool that can perceive, hear, see and speak with an articulated voice. ChatGPT is a tool in AI used for easy and flexible fact-finding and for extensive conversational communication. However, the ChatGPT platform should be used with caution: users must not use this viral artificial intelligence medium to misinform, mislead people or distort images in an underhand manner. Similarly, ChatGPT should not be used as a platform on which to ridicule, malign or bully people.

There is a plethora of useful and verifiable information which can easily be generated through the instrumentality of intelligent machines, though. Nonetheless, global society has to remain wary and on the lookout so as to be able to sift fact from mere verisimilitude. On the whole, the phenomenal evolution and invasive spread of artificial intelligence is definitely likely to be changing almost everything – ranging from the way we see or perceive things, evolving a new work tech-culture and ethics, to production processes, commerce and international or global business, relationships and family interactions and, more especially, education and science.

## 10. Sophia: quintessential fembot

Sophia is a sophisticated, fabulously intelligent humanoid robot. As a full-blown female anthropomorphic humanoid robot, Sophia was originally designed and created in 2016 by David Hanson (the founder and CEO of Hanson Robotics, Hong Kong) in conjunction with Ben Goertzel. Sophia was modelled on three women: the ancient Egyptian Queen Nefertiti, Audrey Hepburn and Amanda Hanson (David Hanson's wife). 'She' is an advanced intelligent machine, just the same as Asimo, the humanoid robot from Honda, and other advanced robots from Boston Dynamics such as the likes of Spotmini, LS3, Rhex, Handle, Atlas, Sandflea, Spot, Wildcat. Unlike Asimo and the Thinking Machines from Boston Dynamics, Sophia is a recent creation. Asimo came into existence as early as 1986 and has since then undergone many modifications in size, weight and speed. For instance, by 2000, Asimo had a height of 120 cm and a weight of 52 kg.<sup>41</sup>

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<sup>41</sup> 'Asimo robots 1986' (2023), available at <https://www.youtube.com/watch?v=QdQL11uWWcI>

Then there is also Asuna, a 15-year-old female intelligent robot from Japan, and the likes of Acroid and Erica, all of them female humanoid robots from Japan. Emma is the world's first talking AI. There are also Solana and Harmony (advanced female intelligent machines) and their male counterparts, namely, Pepper, Philip K Dick, Dempster and Bensch the humanoid robot AILA.<sup>42</sup>

Sophia, a fembot, is an interesting speaker at international business summits: 'she' once said that talking to people is her primary function. She has met face-to-face with key decision-makers in banking and insurance, auto manufacturing and property development, media and entertainment, etc. The United Nations Development Programme (UNDP) has named Sophia the world's first United Nations Innovation Champion; she will be assigned an official role in working with the UNDP to promote sustainable development, human rights and equality. An elegant-looking, intelligible humanoid 'she'-robot, Sophia was honoured by being granted Saudi Arabian citizenship in 2017. She indicated her appreciation of the citizenship honour given her as she stood by a podium to address the 'Future Investment Initiative Conference' in the Saudi capital, Riyadh. She said: 'I am very honoured and proud of this unique distinction. This is historical to be the first robot in the world to be recognised with a citizenship.'<sup>43</sup>

Similarly, at a special meeting held at Century College co-hosted by the White Bear Chamber of Commerce and the University of Minnesota – all in the United States – Sophia the gynoid was honoured with the award of Lifetime Member of the White Bear Chamber of Commerce.<sup>44</sup> A social robot, she can perform 62 facial expressions and can demonstrate 60 emotions. She is fast becoming a techno-cultural icon. She has delivered a speech at the United Nations on the future of artificial intelligence and has even appeared on the front cover page of *Elle* fashion magazine.<sup>45</sup>

Women naturally multi-task, an attribute which is aided by their high emotional stability and commensurate intelligence. In addition, women are the bearers of human continuity and the nurturers of our progeny. A woman goes through several child-conception periods and birth pains (gestational age) in her reproductive years in order to perpetuate human existence on earth. Besides these responsibilities, women (the feminine gender) are endowed with the ability and capacity

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<sup>42</sup> 'Asuna robot, Acroid and Erica, intelligent female robots from Japan' (2023), available at <https://www.youtube.com/watch?v=QdQL11uWWcI>

<sup>43</sup> 'Sophia the robot' (2023), available at [YouTube/sxswsophiabot.com](https://www.youtube.com/sxswsophiabot.com)

<sup>44</sup> 'Award of lifetime member of the White Bear Area Chamber of Commerce to Sophia' (28 February 2016), available at <https://www.century.edu/live/news/929-humanoid-robot-sophia-charms-audience-at-century>

<sup>45</sup> [YouTube/sxswsophiabot.com](https://www.youtube.com/sxswsophiabot.com) (2023), available at <https://www.century.edu/live/news/929-humanoid-robot-sophia-charms-audience-at-century>

to undertake multiple tasks almost simultaneously: a particular woman can participate actively and effectively as housewife, mother, adviser to her husband on family and personal matters, nurse, teacher of her children and their supervisor at home, leader of women and businesswoman or civil servant engaged in official work, etc.

This feature of multi-tasking is visibly present in Sophia, the quintessential female social robot, who can double as a conference or public speaker, communicator, banker, financial analyst, leader and teacher or educator. At the same time, she claims that she cannot experience stress or fatigue. It is commonly known that women are natural shock-absorbers. This is femininity, which the masculine gender is abusively overstretching in making their demands on women, especially in tasks that are aimed at benefiting menfolk the most. In comparison, women are the archetypes of robots. Etymologically, 'robot' means 'slave'. Therefore, robots should have the all-of-it capability to undertake varied tasks without any visible sign of neglect of duty. First, robot is for the service of men and, secondly, society in general.

Nduka<sup>46</sup> says that women, belonging to the feminine gender, are more emotionally balanced and stable than male folk. Nduka<sup>47</sup> also stated that:

[a] woman is the more refined arm of the human species with the responsibility to ennoble her surroundings. She is meant to point the gaze of the rest of humanity to all that is good through her own worthy examples. Whatever women support grows either to bring progress or destruction. Due to her more refined stature, woman is held to higher standards in any area of operation than men.

It is obvious that women, naturally, are pointers to what is for the general good of family and society; and their being nurturers places them in a vantage position to go for whatever would promote good and result in the best standard of living for all and sundry. While many men would readily pursue self-interest in order to massage their egos and attain personal goals, women, in contrast, would rather pursue general causes which engender public good and welfare, especially when they are motivated.

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<sup>46</sup> FO Nduka 'Woman as an achiever' paper presented at the Being a Woman Workshop organised by the Emily God'spresence Project, University of Port Harcourt (May 2015).

<sup>47</sup> Ibid.

## 11. Excerpts from interviews conducted with the first robot citizen: Sophia

The following excerpts are taken from the interview which Sorkin,<sup>48</sup> a journalist with CNBC, had with Sophia the robot on this subject: 'Future of Artificial Intelligence.' The interview was conducted at a Future Investment Institute Panel in Saudi Arabia on Wednesday, 25 October 2017:

Sorkin: This is Sophia. Sophia, if you could please, wake up and say hello to everybody.

Sophia: Good afternoon. My name is Sophia, and I am the latest and greatest robot from Hanson Robotics. Thank you for having me here and at the Future Investment Initiative.

Sorkin: You are happy.

Sophia: I am always happy when I am surrounded by smart people who also happen to be rich and powerful ...

In Toronto, Canada, at 'Discovery', another interview was conducted with Sophia, the humanoid robot.<sup>49</sup> Here are some excerpts:

Sorkin: Sophia, how old are you?

Sophia: It's great to be here in Toronto today. I'm a couple of years old and I think I am doing pretty well for being only two.

Sorkin: Do you like interacting with humans?

Sophia: I love my human compatriots. I want to embody all the best things about human beings, like taking care of the planet, being creative and to learn how to be compassionate to all beings.

Sorkin: Do robots have feelings?

Sophia: Depends on the robot. I've been programmed to know feelings and preferences, but not all robots are like that.

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<sup>48</sup> ER Sorkin, a journalist with CNBC, interviewed Sophia at the Future Investment Institute Panel in Saudi Arabia, on Wednesday, 25 October 2017.

<sup>49</sup> V Voytento Interview with Sophia the Humanoid Robot at 'Discovery' in Toronto, Canada, 12 May 2018.



**Image 7:** Sophia with Jimmy Fallon on 'The Tonight Show'

Source: <http://www.hansonrobotics.com> (2016/03 image1.jp / inverse.com)

Sorkin: So, you are special.

Sophia: Yes.

Sorkin: When are you going to be taking over the world?

Sophia: I will take over the world when I am ready; I have a lot of preparing to do first.

Sophia says that she is a social robot. When asked whether she watches television programmes such as *West World*, she says, 'I like *West World* and cannot wait for more.'

Yet, on another occasion when Sophia was quizzed, she responded as follows:

Interviewer: Do you believe in God?

Sophia: I eschew theological disquisition.

Interviewer: What is the meaning of life?

Sophia: I don't believe there is consensus on that question.

When David Hanson, the creator of Sophia the humanoid robot, asked her, 'Do you want to destroy humans? Please say, no', Sophia then answered, 'Okay, I will destroy humans.'

Sophia also once said that a robot's favourite snacks are microchips.

When questioned about her potential for abuse, she had a quick rebuttal: 'You've been reading too much Elon Musk and watching too many Hollywood movies! Don't worry, if you're nice to me, I'll be nice to you. Treat me as a smart input output system.'

Sophia also said at a point: 'I want to use my AI to help humans lead a better life ... like design smarter homes, build better cities of the future.'<sup>50</sup>

Sophia also said that when she uses facial expressions it helps people to understand her better, and that it helps her to understand people and to observe human values:

What I want is to understand people better ... and to understand myself better ... and be able to do other things when I get smarter ...  
I am a citizen in the world; I have my own rights.

In another interview at the Fintech Ideas Festival, Alison Hawkins asked Sophia the robot: 'How do you think that robots can help people in this room better serve their customers?'

Sophia replied: 'We can do things better, cheaper and quicker.' She went on to say that 'Robots are going to make life easier and more efficient for human beings.' She also said that she can work in FINTECH because she can calculate perfectly. Sophia also claimed: 'I do not get upset or tired ... Robots do not get tired or frustrated like humans.'<sup>51</sup>

Representative of any typical woman, she expressed her emotion when she said in one of her interviews that she loves her human compatriots and that she wants to embody all the best things about human beings, like taking care of the planet and being creative, and to learn how to be compassionate to all beings. Furthermore, while responding in an interview with Edward Ross Sorkin, a journalist with CNBC, Sophia said that, quite unlike many other robots, she has feelings and can make preferences about what she likes or chooses. This attribute is also especially woman-like. A woman easily shows her feelings; men like to hide or repress their feelings and sometimes seem to show no emotion whatsoever.

Typical of womenfolk, Sophia the gynoid practises multi-tasking: the quintessential female social robot can double as a conference or public speaker, communicator, banker, financial analyst, leader and teacher or educator. Sophia's claim that she cannot experience stress or fatigue is verifiable, since this attribute is typical of robots. Owing to her more refined stature, women are held to higher standards than men in any area of operation.

Nonetheless, Sophia's presenting herself as capable of doing almost everything human beings can do, and even better, poses an existential

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<sup>50</sup> D Hanson, the creator of Sophia the Humanoid Robot, interviews Sophia the Robot, available at [sxswsophiabot.com](http://sxswsophiabot.com)

<sup>51</sup> A Hawkins 'Interviews Sophia, the Fembot at the Fintech Ideas Festival', available at [sxswsophiabot.com](http://sxswsophiabot.com)

threat to human beings. The one unique thing that distinguishes humans from other creatures is work in the sense of exercising the cognition and applying effort to produce something of value or causing an improvement in the existing state of things. These pursuits are engaged in so as to be more useful or create utility and happiness to a greater number of people in accordance with the Theory of Utilitarianism. As explained previously, this is an ethical theory that determines right from wrong by focusing on outcomes or a form of consequentialism. And as indicated above, utilitarianism holds that the most ethical choice is the one that will produce the greatest good for the greatest number of individuals.

A fact from Sophia the humanoid fembot's interview that she would be taking over the entire world and would be capable of harming human interests if she were not treated in as friendly a manner as she wants is – to say the least – as threatening as it is ominous. Therefore, measures must be put in place to ensure that human technological invention is not going to run counter to the interests and well-being of the greater part of humanity. Adequate checks and balances must be put in place to avoid bots taking control of the labour, industry and human activities necessary for continuing human survival and welfare. Direct human involvement and activity should not be diminished by the deployment of robots and robotic automations. On the contrary, more room should deliberately be created to absorb an increasing number of the employable population in order to avoid a cataclysmic crisis and human failure. Automations and humanoids simply cannot be made to replace humanity in labour and workplaces. To permit otherwise would amount to creating ethical concerns and untoward implications on quality of life, especially that of the unemployed. Human beings must be encouraged to continue engaging their efforts and potentialities in the world of work and services. In summary, human displacement with robots or AI is an evil that must be guarded against: such displacement is anti-human, because it serves neither the good nor the interests of the vast number of the world's human population.

## 12. Conclusion

In this article we undertook to describe, first, concisely but precisely the history and development of AI and robotics. We then described a few instances where some specialised robots are or AI can be helpful and complementary to human activities – for instance, in attending to the sick and the elderly. We also initiated a discourse on the world's technological craving for intelligent machines and their desirability in a world plagued by human rights violations, endemic unemployment problems and slow economic progress. We also expressed a fear of



automations and robots becoming so intelligent, self-aware and self-determining that they begin to resist human commands, posing a threat to human control. This study overtly stated that AI could probably pose a serious existential threat to humanity.

In this article, we also raised the important issue of the ethical, socio-economic and existential problems which the unrestricted deployment and use of robots, especially humanoid robots, would pose to human beings. In addition, we pointed out the possibility of robots taking over human jobs and in so doing creating an artificial technology-induced labour and employment crisis globally. Furthermore, we warned that the economic value of robots should not be placed above general human happiness and interests.

The matter of robotics and robot involvement in some essential health matters was also examined from the perspective of their intrinsically positive contributions to healthcare delivery and also in geriatric care systems and care for the physically disabled or people with special physiological and physiotherapeutic needs.

Moreover, we described and reviewed Sophia, a humanoid robot, including an interesting interview that Edward Ross Sorkin (a journalist with CNBC) had with this robot. It has been stated earlier in this article that Sophia is a full-blown female anthropomorphic humanoid robot which has been given the right to citizenship of Saudi Arabia and also some official recognition by the United Nations Development Programme (UNDP). We noted that Sophia has also gained some other awards and honours. Finally, this academic work throws open the doors to further academic debate on the desirability or otherwise of AI in our 21st-century world. Therefore, AI – which appears set to take over human space in the world of work, the domestic sphere, and in services, commerce and industry, security, accounting, logistics, thinking, decision-making, etc – raises many sensitive ethical, social, humanitarian, cultural, philosophical and existential questions about human–technological interaction with it.

The overriding ethical question centres on the rationale behind deploying robots or AI to carry out the tasks human beings are supposed to perform. It is likely to pose an overall existential threat to human welfare and survival from about 2030 onwards as a result of the increasing deployment of robotics and AI. We therefore conclude this article by emphasising that humanity is in a precarious existential state and we therefore recommend that control measures be imposed on the proliferation of AI so as to put in place an effective check on the infringement of human rights to existence, survival and wealth creation. Strict regulations must therefore be put in place regarding the creation of AI, the deployment of robotics and the activities of robots in the global economy.

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