

Impact of Artificial Intelligence on human behaviour & Well-Being- An Empirical Analysis

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Abstract: Artificial intelligence (AI), known by some as the industrial revolution (IR) 4.0, is going to change not only the way we do things, how we relate to others, but also what we know about ourselves. This article will first examine what AI is, discuss its impact on industrial, social, and economic changes on humankind in the 21st century, and then propose a set of principles for AI. The IR of the 18th century, impelled a huge social change without directly complicating human relationships. Modern AI, however, has a tremendous impact on how we do things and also the ways we relate to one another. Facing this challenge, new principles of AI bioethics must be considered and developed to provide guidelines for the AI technology to observe so that the world will be benefited by the progress of this new intelligence.

Keywords: Artificial intelligence, Industrial revolution (IR) 4.0, Principles of artificial intelligence, Impact of AI on human behaviour

1. Introduction:

There are numerous ways to define artificial intelligence (AI); some define it as the technology developed to enable computers and other machines to operate intelligently. Some believe it to be a machine that works faster and more effectively than humans, taking the place of labour-intensive tasks. Others refer to it as "a system" that is capable of accurately interpreting outside input, learning from it, and applying that knowledge to accomplish particular activities and goals through adaptable modification [1].

Although definitions vary, AI is generally understood to refer to the use of machines and computers to aid in problem solving and streamline operations for humans. It is, in essence, machine-designed intelligence created by humans. These features of artificial intelligence (AI)-powered tools that mimic the "cognitive" capacities of human minds are referred to as AI [2]. AI has become ingrained in almost every aspect of our lives along with the recent rapid advancement of cybernetic technology. Some of this technology, such as optical character recognition and computer systems that use Siri (speech interpretation and recognition interface) for information searching, may no longer be considered AI because of how commonplace it has become in our daily lives [3].

2. Various forms of artificial intelligence:

Two distinct kinds of AI can be identified based on its capabilities and functions. First, there is weak AI, sometimes referred to as narrow AI, which is intended to carry out a specific task like self-driving cars, facial recognition, or Internet Siri searches. Many of the systems in use today that make the claim to employ "AI" are probably weak AIs that concentrate on a single, well-defined task. Even while weak artificial intelligence (AI)

appears to be beneficial to human life, some people believe it could be dangerous since it has the potential to damage nuclear power plants or cause grid disruptions.

Strong artificial intelligence, or artificial general intelligence (AGI), is the long-term goal of many researchers. AGI is the speculative intelligence of a machine that can comprehend or learn any intelligent task that a human being can, helping humans solve problems they encounter. For example, narrow AI may beat humans at chess or solving mathematics, but its impact is still minimal. On the other hand, AGI might surpass humans in almost all cognitive tasks. A distinct view of artificial intelligence known as "strong AI" holds that the technology can be trained to behave like a human mind, to be intelligent in any task it is given, and even to possess perception, beliefs, and other cognitive abilities that are often reserved for people [4].

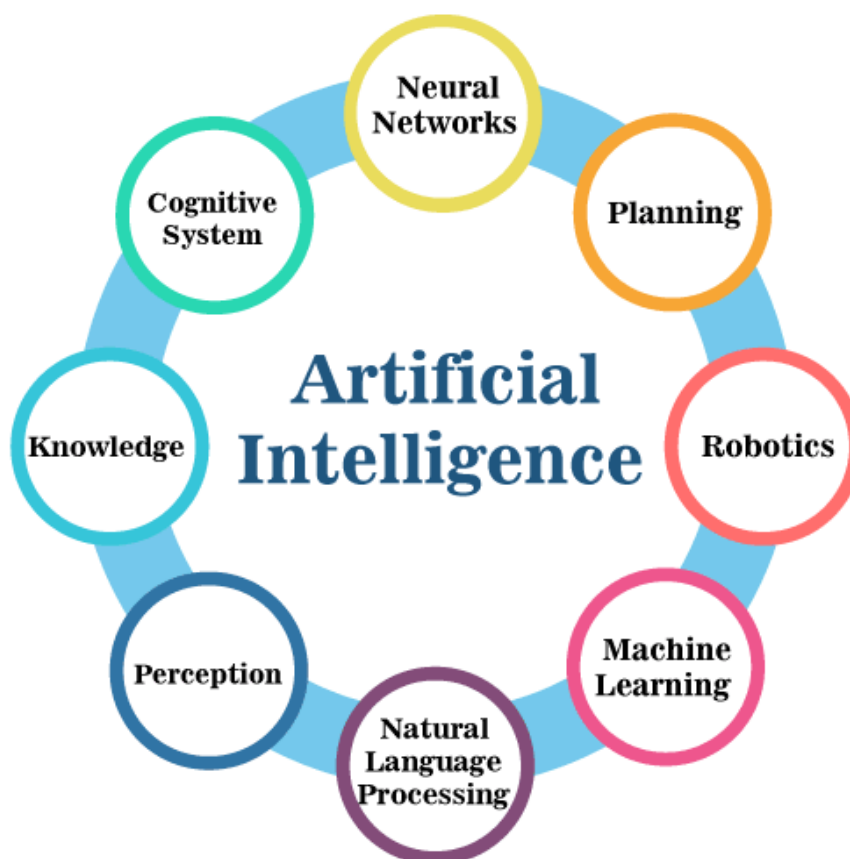


Fig 1: Various forms of artificial intelligence

In summary, we may observe the following many uses of AI [5,6]:

What causes a system or process to operate automatically is called automation. Machine learning and vision: the study of using digital signal processing, analog-to-digital conversion, and deep learning to teach a computer to anticipate, evaluate, and observe with a camera. Natural language processing is the computer program's ability to process human language and perform tasks like spam identification and instantaneous language translation to facilitate human communication. Robotics is an engineering discipline that focuses on creating and designing cyborgs, or "machine men." They can work continuously on assembly lines or other jobs that are too risky or complex for humans to complete, therefore they are employed for human convenience.

Self-driving car: To create automated control in a vehicle, combine deep learning, computer vision, and image recognition.

Do we really need artificial intelligence for humans?

Does human society actually need AI?

Yes, it is if a person chooses to work more quickly and efficiently and to work continuously without taking breaks. But it isn't if people are content to live in harmony with nature and don't feel the need to overthrow

the natural order. Humanity has always sought for faster, easier, more efficient, and more convenient ways to complete tasks. As a result, the pressure for continued development drives people to search for novel and improved methods of doing tasks. History demonstrates this tendency.

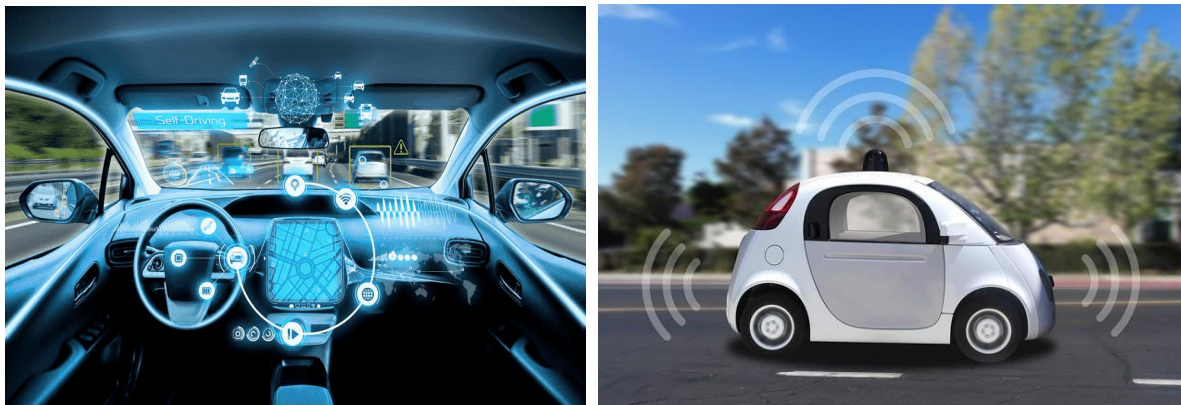


Fig 2: Self Driving car (Courtesy:Wikipedia)

Self-driving cars are also called "driverless" cars since they operate and drive the vehicle using sensors and software. They're the ones in which human drivers are never necessary to take control in order to run the vehicle properly.

Humankind as the homo-sapiens discovered that tools could facilitate many hardships for daily living and through tools they invented, human could complete the work better, faster, smarter and more effectively. The invention to create new things becomes the incentive of human progress. We enjoy a much easier and more leisurely life today all because of the contribution of technology. The human society has been using the tools since the beginning of civilization, and human progress depends on it. The human kind living in the 21st century did not have to work as hard as their forefathers in previous times because they have new machines to work for them. It is all good and should be all right for these AI but a warning came in early 20th century as the human-technology kept developing that Aldous Huxley warned in his book *Brave New World* that human might step into a world in which we are creating a monster or a super human with the development of genetic technology.

Besides, up-to-dated AI is breaking into healthcare industry too by assisting doctors to diagnose, finding the sources of diseases, suggesting various ways of treatment performing surgery and also predicting if the illness is life-threatening [7]. A recent study by surgeons at the Children's National Medical Center in Washington successfully demonstrated surgery with an autonomous robot. The team supervised the robot to perform soft-tissue surgery, stitch together a pig's bowel, and the robot finished the job better than a human surgeon, the team claimed [8,9]. It demonstrates robotically-assisted surgery can overcome the limitations of pre-existing minimally-invasive surgical procedures and to enhance the capacities of surgeons performing open surgery.

Above all, we see the high-profile examples of AI including autonomous vehicles (such as drones and self-driving cars), medical diagnosis, creating art, playing games (such as Chess or Go), search engines (such as Google search), online assistants (such as Siri), image recognition in photographs, spam filtering, predicting flight delays...etc. All these have made human life much easier and convenient that we are so used to them and take them for granted. AI has become indispensable, although it is not absolutely needed without it our world will be in chaos in many ways today.

3. The impact of artificial intelligence on human society:

Adverse effect:

There have been concerns raised about the possibility that as artificial intelligence advances, human labor will become unnecessary because everything can be done mechanically. Will people eventually grow lazy and deteriorate to the point where we revert to our most basic state of existence? Since evolution takes eons to complete, we won't be able to observe humanity's regression. But what if AI grows to such a degree of strength that it can defy commands from its master, humanity, and program itself to rule?

The following are some of the negative effects artificial intelligence will have on human society [10, 11]. There will be a significant social shift that depends on our way of life in the human community. To survive, humanity must work hard, but thanks to artificial intelligence (AI), we can just teach a machine to perform a task for us without ever picking up a tool. Artificial intelligence (AI) will eventually replace face-to-face meetings as the primary means of exchanging ideas, thereby decreasing human closeness. When face-to-face interactions become unnecessary for communication, artificial intelligence (AI) will act as a mediator. The next issue is unemployment as machinery replaces many jobs. Today, many automobile assembly lines have been filled with machineries and robots, forcing traditional workers to lose their jobs. Even in supermarket, the store clerks will not be needed anymore as the digital device can take over human labour.

Wealth inequality will be created as the investors of AI will take up the major share of the earnings. The gap between the rich and the poor will be widened. The so-called “M” shape wealth distribution will be more obvious. New issues surface not only in a social sense but also in AI itself as the AI being trained and learned how to operate the given task can eventually take off to the stage that human has no control, thus creating un-anticipated problems and consequences. It refers to AI's capacity after being loaded with all needed algorithm may automatically function on its own course ignoring the command given by the human controller

The human masters who create AI may invent something that is racial bias or egocentrically oriented to harm certain people or things. For instance, the United Nations has voted to limit the spread of nuclear power in fear of its indiscriminate use to destroying humankind or targeting on certain races or region to achieve the goal of domination. AI is possible to target certain race or some programmed objects to accomplish the command of destruction by the programmers, thus creating world disaster.

Positive impact:

There are, however, many positive impacts on humans as well, especially in the field of healthcare. AI gives computers the capacity to learn, reason, and apply logic. Scientists, medical researchers, clinicians, mathematicians, and engineers, when working together, can design an AI that is aimed at medical diagnosis and treatments, thus offering reliable and safe systems of health-care delivery. As health professors and medical researchers endeavor to find new and efficient ways of treating diseases, not only the digital computer can assist in analyzing, robotic systems can also be created to do some delicate medical procedures with precision. Here, we see the contribution of AI to health care [7,11]:

Prompt and precise diagnosis:

With intriguing results, IBM's Watson computer has been used for diagnosis. The computer will instantly receive an AI diagnosis upon loading the data. AI can also offer doctors a variety of treatment options to choose from. The steps involved are as follows: to upload the digital findings of the physical examination to a computer so that it can analyze all potential scenarios, automatically determine whether the patient is ill or has deficiencies, and even recommend different treatment options.

Robots with social therapeutics:

Seniors with pets are advised to have less stress, lower blood pressure, feel less anxious and lonely, and engage in more social activities. It has now been suggested that cyborgs visit elderly people who are alone and even assist with household chores. Seniors and people with physical disabilities can live better thanks to socially assistive robot technology and therapeutic robots [12].

Reduce errors related to human fatigue:

Human error at workforce is inevitable and often costly, the greater the level of fatigue, the higher the risk of errors occurring. AI technology, however, does not suffer from fatigue or emotional distraction. It saves errors and can accomplish the duty faster and more accurately.

Artificial intelligence-based surgical contribution:

AI-based surgical procedures have been available for people to choose. Although this AI still needs to be operated by the health professionals, it can complete the work with less damage to the body. The da Vinci

surgical system, a robotic technology allowing surgeons to perform minimally invasive procedures, is available in most of the hospitals now. These systems enable a degree of precision and accuracy far greater than the procedures done manually. The less invasive the surgery, the less trauma it will occur and less blood loss, less anxiety of the patients.

Improved radiology:

The first computed tomography scanners were introduced in 1971. The first magnetic resonance imaging (MRI) scan of the human body took place in 1977. By the early 2000s, cardiac MRI, body MRI, and fetal imaging, became routine. The search continues for new algorithms to detect specific diseases as well as to analyze the results of scans [9]. All those are the contribution of the technology of AI.

Virtual presence:

The virtual presence technology can enable a distant diagnosis of the diseases. The patient does not have to leave his/her bed but using a remote presence robot, doctors can check the patients without actually being there. Health professionals can move around and interact almost as effectively as if they were present. This allows specialists to assist patients who are unable to travel.

Some cautions to be reminded

Despite all the positive promises that AI provides, human experts, however, are still essential and necessary to design, program, and operate the AI from any unpredictable error from occurring. Beth Kindig, a San Francisco-based technology analyst with more than a decade of experience in analyzing private and public technology companies, published a free newsletter indicating that although AI has a potential promise for better medical diagnosis, human experts are still needed to avoid the misclassification of unknown diseases because AI is not omnipotent to solve all problems for human kinds. There are times when AI meets an impasse, and to carry on its mission, it may just proceed indiscriminately, ending in creating more problems. Thus vigilant watch of AI's function cannot be neglected. This reminder is known as physician-in-the-loop [13].

Elizabeth Gibney consequently raised the issue of an ethical AI in her Nature article to warn against prejudice and potential harm to society [14]. The 2020 Neural Information Processing Systems (NeurIPS) conference in Vancouver, Canada, raised ethical concerns about the use of AI in applications like face recognition and predictive policing, where biased algorithms may harm the most vulnerable members of society [14]. For example, the NeurIPS can be configured to identify specific racial groups or decrees as potential suspects of criminal activity or troublemakers.

Studies have shown that AI can reflect the very prejudices humans have tried to overcome. As AI becomes "truly ubiquitous," it has a tremendous potential to positively impact all manner of life, from industry to employment to health care and even security. Addressing the risks associated with the technology, "I don't think AI will ever be free of bias, at least not as long as we stick to machine learning as we know it today," stated Janosch Delcker, the AI correspondent for Politico Europe. "I think it's vitally important to acknowledge the existence of those biases and to have policymakers work to reduce them." [17]. In 2019, the European Union's High-Level Expert Group on AI released Ethics Guidelines for Trustworthy AI, which recommended that AI systems be impartial, accountable, and comprehensible. There are three highlights:

Lawful—adhering to all relevant laws and rules

Respecting the moral standards and ideals

Robust: from a technical standpoint, robust means adaptable, dependable, equitable, and trustworthy while taking into account its social environment [18].

It is advised to meet seven criteria [18]:

- AI should not trample on human autonomy. People should not be manipulated or coerced by AI systems, and humans should be able to intervene or oversee every decision that the software makes

- AI should be secure and accurate. It should not be easily compromised by external attacks, and it should be reasonably reliable
- Personal data collected by AI systems should be secure and private.
- It should not be accessible to just anyone, and it should not be easily stolen
- Data and algorithms used to create an AI system should be accessible, and the decisions made by the software should be “understood and traced by human beings.” In other words, operators should be able to explain the decisions their AI systems make
- Services provided by AI should be available to all, regardless of age, gender, race, or other characteristics. Similarly, systems should not be biased along these lines
- AI systems should be sustainable (i.e., they should be ecologically responsible) and “enhance positive social change”

AI systems should be auditable and covered by existing protections for corporate whistleblowers. The negative impacts of systems should be acknowledged and reported in advance. From these guidelines, we can suggest that future AI must be equipped with human sensibility or “AI humanities.” To accomplish this, AI researchers, manufacturers, and all industries must bear in mind that technology is to serve not to manipulate humans and his society. Bostrom and Yudkowsky listed responsibility, transparency, auditability, incorruptibility, and predictability [19] as criteria for the computerized society to think about.

Nathan Strout, a reporter at Space and Intelligence System at Easter University, USA, reported just recently that the intelligence community is developing its own AI ethics. The Pentagon made announced in February 2020 that it is in the process of adopting principles for using AI as the guidelines for the department to follow while developing new AI tools and AI-enabled technologies. Ben Huebner, chief of the Office of Director of National Intelligence's Civil Liberties, Privacy, and Transparency Office, said that “We're going to need to ensure that we have transparency and accountability in these structures as we use them. They have to be secure and resilient” [20]. Two themes have been suggested for the AI community to think more about: Explainability and interpretability. Explainability is the concept of understanding how the analytic works, while interpretability is being able to understand a particular result produced by an analytic [20].

All the principles suggested by scholars for AI bioethics are well-brought-up. I gather from different bioethical principles in all the related fields of bioethics to suggest four principles here for consideration to guide the future development of the AI technology. We however must bear in mind that the main attention should still be placed on human because AI after all has been designed and manufactured by human. AI proceeds to its work according to its algorithm. AI itself cannot empathize nor have the ability to discern good from evil and may commit mistakes in processes. All the ethical quality of AI depends on the human designers; therefore, it is an AI bioethics and at the same time, a trans-bioethics that abridge human and material worlds. Here are the principles:

Beneficence: Beneficence means doing well, and here it refers to the purpose and functions of AI should benefit the whole human life, society and universe. Any AI that will perform any destructive work on bio-universe, including all life forms, must be avoided and forbidden. The AI scientists must understand that reason of developing this technology has no other purpose but to benefit human society as a whole not for any individual personal gain. It should be altruistic, not egocentric in nature. Value-upholding: This refers to AI's congruence to social values, in other words, universal values that govern the order of the natural world must be observed. AI cannot elevate to the height above social and moral norms and must be bias-free. The scientific and technological developments must be for the enhancement of human well-being that is the chief value AI must hold dearly as it progresses further

Lucidity: AI must be transparent without hiding any secret agenda. It has to be easily comprehensible, detectable, incorruptible, and perceivable. AI technology should be made available for public auditing, testing and review, and subject to accountability standards ... In high-stakes settings like diagnosing cancer from radiologic images, an algorithm that can't “explain its work” may pose an unacceptable risk. Thus, explainability and interpretability are absolutely required

Accountability: AI designers and developers must bear in mind they carry a heavy responsibility on their shoulders of the outcome and impact of AI on whole human society and the universe. They must be accountable for whatever they manufacture and create.

4. Conclusion

AI is here to stay in our world, so we must work to ensure that it is used for good, upholds values, is transparent, and is accountable. Given that AI lacks a soul, its application must be transcendental in order to overcome its lack of empathy. The world is now a reality with AI. A pioneer in AI, stated that we shouldn't allow computers to make crucial decisions for us since they will never be able to emulate human traits like compassion and wisdom or the ability to morally discern and judge [10]. Even though AI designers have the ability to program AI to behave like a human, AI is still a tool and a machine. Without true human emotions and the ability to empathize, AI will always remain AI. As a result, great caution must be used when developing AI technology. "AI must always respect people's rights because it is meant to serve people. This is high-risk AI." Anything that might infringe upon people's rights must be approved and tested before entering our single market [21].

Conflicts of interest

There are no conflicts of interest.

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