International Journal of Scientific & Technical Development
(A Peer-Reviewed Bi-Annual Journal) ISSN: 2348-4047

# Artificial Intelligence (AI): Prospectus and Challenges

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**Abstract**
One of the most popular buzzwords in business, industry, and academia right now is artificial intelligence. It is a key lynchpin of a lot of the digital transformation happening now as businesses get ready to profit from the ever-increasing volume of data being generated and gathered. The abundance of data has increased research into its processing, analysis, and application. The emphasis was on teaching computers to do this in the most "smart" way possible because machines are significantly more suited to humans than this work. This growing interest in the field's study from academia, business, and the middle-ground open source community has produced innovations and advancements that have the potential to bring about significant change. It is playing a major part in the day-to-day operations of human societies, from healthcare to autonomous vehicles to predicting the results of judicial disputes to weather forecasting. The ability of building intelligent robots brings about some difficulties for the IT sector. A feeble attempt has been made to highlight the moral concerns surrounding artificial intelligence or "thinking machines" in this article.
**Key words:** Science and Technology; Artificial intelligence; Thinking Machines; Recent Developments.

**Introduction:**
In the field of computer science known as artificial intelligence, the development of intelligent machines that function and respond just like people is emphasised. It is now a crucial component of the technological sector. Programming computers with particular abilities, such as knowledge, reasoning, problem-solving, perception, learning, planning, and the ability to operate and move objects, is at the heart of artificial intelligence. One of the main focuses of artificial intelligence research is knowledge engineering. Only when they have a wealth of information about the outside world can machines frequently behave and react like humans. To perform knowledge engineering, artificial intelligence needs to have access to objects, categories, properties, and relations between them all. It is challenging and time-consuming to start up machines with logic, reasoning, and problem-solving abilities.
Another essential component of artificial intelligence is machine learning. While learning under proper supervision involves categorization and numerical regressions, learning without any supervision necessitates the capacity to spot patterns in streams of inputs. Regression focuses on obtaining a set of numerical input or output examples in order to discover functions that allow the generation of suitable outputs from respective inputs. Classification determines which category an object belongs to. Computational learning theory is a well-defined subfield of theoretical computer science that studies the mathematical analysis of machine learning algorithms and their performance.
Computer vision is the ability to analyse visual inputs with a few sub-problems such as facial, object, and gesture recognition. Machine perception deals with the ability to use sensory inputs to deduce the various aspects of the world. Another important area of artificial intelligence is robotics. Robots need intelligence to perform functions like object handling and navigation, as well as the related issues of mapping, motion planning, and localisation.

**Artificial intelligence advancements in recent years:**
Because of the emphasis on modelling human thought processes, all of these developments have been made possible. The area of study known as "machine learning" has produced the most fruitful results in recent years. The phrases "artificial intelligence" and "machine learning" are now sometimes used interchangeably because they are both so fundamental to modern artificial intelligence. The ideal approach to think of machine learning, however, is as the current state-of-the-art in the broader field of artificial intelligence, as this is an inaccurate use of terminology. The premise of machine learning is that, if machines can be programmed to think like us, they can learn to work by observing, classifying, and learning from its mistakes, just like we do. Instead of having to be taught how to do everything step-by-step.

Artificial neural networks were created as a result of applying neuroscience to IT system architecture, and while work in this field has advanced over the past 50 years, it has only recently become feasible for everyone, outside of those with access to the most expensive, specialised tools, to carry out this task on a daily basis. The data explosion that has been unleashed since traditional society combined with the digital world may be the single largest enabling factor. Computers today have access to a vast amount of data to aid in their learning and decision-making, ranging from the information we share on social media to machine data produced by connected industrial machines.

**Artificial Intelligence Prospectus:**

Apocalyptic science fiction like The Matrix or The Terminator is not the only source of concern for the future of humanity; respected scientists like Stephen Hawking have also raised concerns about the development of intelligence that is equal to or greater than our own but has the ability to operate at much higher speeds. Even if robots don't exterminate us or turn us into living batteries, a less dramatic but no less terrifying possibility is that automation of labour (both mental and physical) will result in significant societal change. These changes could be for the better or worse.

This natural worry prompted several digital behemoths, including Google, IBM, Microsoft, Facebook, and Amazon, to establish a cooperation in artificial intelligence a few years ago. The goal of this group is to establish standards for future research and the use of robots and artificial intelligence. It will also advocate for ethical applications of AI. Research in a variety of fields—from economics and law to technological subjects like verification, validity, security, and control—is motivated by the desire to keep the influence of artificial intelligence on society positive. If an AI system is in charge of your car, aeroplane, pacemaker, automated trading system, or power grid, it becomes even more crucial that it follows your instructions. While a laptop crash or hack may be little more than a minor inconvenience, this is not the case. Preventing a deadly arms race in lethal autonomous weapons is another immediate challenge.

What would happen in the long run if the quest for strong artificial intelligence is successful and an artificial intelligence system outperforms humans in every cognitive task? I.J. Good noted in 1965 that creating more intelligent artificial intelligence systems is in and of itself a cognitive endeavour. Such a system might undergo recursive self-improvement, resulting in an intelligence explosion that would far surpass human intelligence. Strong artificial intelligence may be the biggest development in human history because it might help humanity end war, sickness, and hunger by creating ground-breaking new technologies. However, if we don't figure out a way to mesh AI aims with ours before it becomes superintelligence, it might also be the last, according to some researchers.

Some people doubt that powerful artificial intelligence will ever be developed, while others are adamant that the development of superintelligent artificial intelligence would always be advantageous. At FLI, we are aware of both of these possibilities as well as the possibility that an AI system could inadvertently or intentionally cause significant harm. We are certain that current research will enable us to better anticipate and prevent such potentially detrimental effects in the future, allowing us to take advantage of the advantages of artificial intelligence while avoiding pitfalls.

**Artificial intelligence problems:**

The majority of scientists concur that a superintelligent "Artificial Intelligence" is unlikely to display human emotions like love or hate, and that there is no reason to anticipate that Artificial Intelligence will purposefully turn good or malevolent. Instead, scientists believe two possibilities are most possible when evaluating how Artificial Intelligence might become a risk:

The artificial intelligence is set up to act in a terrible way: Systems with artificial intelligence that are programmed to kill are referred to as autonomous weapons. These weapons have the potential to easily result in massive casualties in the wrong hands. Furthermore, a race for artificial intelligence weapons could unintentionally end in a conflict between the two that causes large numbers of victims. These weapons would be built to be incredibly hard to simply "switch off," so humans may conceivably lose control of such a situation in order to avoid being foiled by the enemy. This risk is one that exists even with limited artificial intelligence, but it increases as AI and autonomy develop.

This can happen whenever we are unable to fully align the goals of Artificial Intelligence with ours, which is remarkably challenging. Despite the fact that the Artificial Intelligence is programmed to do something beneficial, it develops a destructive method for achieving its goal. If you order an intelligent, obedient car to bring you to the airport as quickly as possible, it might really do what you asked for, which would be to get you there while being followed by helicopters and covered

in vomit. If an ambitious geoengineering project is given to a superintelligent machine, it might cause havoc with our ecology as a side consequence and see human attempts to stop it as a danger that needs to be defeated. These instances show that competence, not malice, is the main worry regarding developing artificial intelligence. A super-intelligent AI will be very adept at achieving its objectives, and if those objectives conflict with ours, we have a problem. If you are in charge of a hydroelectric green energy project and there is an anthill in the area to be flooded, it is unfortunate for the ants. You are probably not a malicious ant-hater who steps on ants with purpose. Never putting humanity in the same situation as those ants is a major objective of AI safety research.

**Safety Concerns:**

Recent media reports and open letters from prominent scientists and technologists, including Stephen Hawking, Elon Musk, Steve Wozniak, Bill Gates, and many more, have raised worry about the dangers that artificial intelligence poses. Why are the headlines now referencing the topic?

Long considered science fiction, the eventual success of the search for powerful artificial intelligence was centuries or more away. But owing to recent advances, several AI milestones that scientists once thought were decades away have now been attained, leading many experts to take seriously the idea of superintelligence in our lifetimes. The majority of artificial intelligence researchers at the 2015 Puerto Rico Conference predicted that human-level artificial intelligence would exist by 2060, despite the fact that other experts still believe that this is centuries away. It is wise to start the necessary safety studies now because it could take decades to complete.

We have no reliable means of forecasting how Artificial Intelligence will act because it has the ability to become more intelligent than any human. We can't really base future technical advancements on the past because we've never made something that could intentionally or unintentionally outwit us. Perhaps our own evolution is the finest illustration of what we might encounter. Not because we are the biggest, quickest, or strongest, but because we are the smartest, people now rule the earth. Are we guaranteed to maintain control if we are no longer the smartest?

According to FLI, as long as we prevail in the contest between the expanding strength of technology and the wisdom with which we handle it, civilisation will flourish. FLI believes that in the case of artificial intelligence technology, advancing the latter by funding safety research is the best strategy to win the race rather than slowing the former.

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