TECHNICAL COMMUNICATION

ARTIFICIAL INTELLIGENCE



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ARTIFICIAL INTELLIGENCE

1. INTRODUCTION

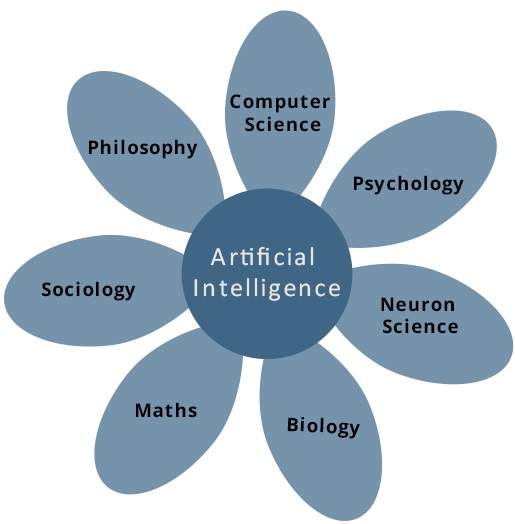
Artificial intelligence (AI) is the simulation of human intelligence processes by machines, especially computer systems. These processes include learning (the acquisition of information and rules for using the information), reasoning (using rules to reach approximate or definite conclusions) and self-correction. Particular applications of AI include [expert systems](https://searchenterpriseai.techtarget.com/definition/expert-system), [speech recognition](https://searchcrm.techtarget.com/definition/voice-recognition) and [machine vision](https://searchenterpriseai.techtarget.com/definition/machine-vision-computer-vision).

AI can be categorized as either [weak](https://searchenterpriseai.techtarget.com/definition/narrow-AI-weak-AI) or [strong](https://searchenterpriseai.techtarget.com/definition/artificial-general-intelligence-AGI). Weak AI, also known as narrow AI, is an AI system that is designed and trained for a particular task. Virtual personal assistants, such as Apple's Siri, are a form of weak AI. Strong AI, also known as artificial general intelligence, is an AI system with generalized human cognitive abilities. When presented with an unfamiliar task, a strong AI system is able to find a solution without human intervention.

Because hardware, software and staffing costs for AI can be expensive, many vendors are including AI components in their standard offerings, as well as access to Artificial Intelligence as a Service ([AIaaS](https://searchenterpriseai.techtarget.com/definition/Artificial-Intelligence-as-a-Service-AIaaS)) platforms. AI as a Service allows individuals and companies to experiment with AI for various business purposes and sample multiple platforms before making a commitment. Popular AI cloud offerings include [Amazon AI](https://searchaws.techtarget.com/definition/Amazon-AI)services, [IBM Watson Assistant](https://whatis.techtarget.com/definition/IBM-Watson-Assistant), [Microsoft Cognitive Services](https://whatis.techtarget.com/definition/Microsoft-Cognitive-Services) and [Google AI](https://whatis.techtarget.com/definition/Google-AI) services.

While AI tools present a range of new functionality for businesses, the use of artificial intelligence raises ethical questions. This is because deep learning algorithms, which underpin many of the most advanced AI tools, are only as smart as the data they are given in training. Because a human selects what data should be used for training an AI program, the potential for human bias is inherent and must be monitored closely.

Some industry experts believe that the term artificial intelligence is too closely linked to popular culture, causing the general public to have unrealistic fears about artificial intelligence and improbable expectations about how it will change the workplace and life in general. Researchers and marketers hope the label [augmented intelligence](https://whatis.techtarget.com/definition/augmented-intelligence), which has a more neutral connotation, will help people understand that AI will simply improve products and services, not replace the humans that use them.



In the near term, the goal of keeping AI’s impact on society beneficial motivates research in many areas, from economics and law to technical topics such as verification, validity, security and control. Whereas it may be little more than a minor nuisance if your laptop crashes or gets hacked, it becomes all the more important that an AI system does what you want it to do if it controls your car, your airplane, your pacemaker, your automated trading system or your power grid. Another short-term challenge is preventing a devastating [arms race in lethal autonomous weapons](http://futureoflife.org/open-letter-autonomous-weapons/).

In the long term, an important question is what will happen if the quest for strong AI succeeds and an AI system becomes better than humans at all cognitive tasks. As pointed out by [I.J. Good](http://io9.com/why-a-superintelligent-machine-may-be-the-last-thing-we-1440091472) in 1965, designing smarter AI systems is itself a cognitive task. Such a system could potentially undergo recursive self-improvement, triggering an intelligence explosion leaving human intellect far behind. By inventing revolutionary new technologies, such a superintelligence might help us eradicate war, disease, and poverty, and so the creation of strong AI might be the biggest event in human history. Some experts have expressed concern, though, that it might also be the last, unless we learn to align the goals of the AI with ours before it becomes superintelligent.

There are some who question whether strong AI will ever be achieved, and others who insist that the creation of superintelligent AI is guaranteed to be beneficial. At FLI we recognize both of these possibilities, but also recognize the potential for an artificial intelligence system to intentionally or unintentionally cause great harm. We believe research today will help us better prepare for and prevent such potentially negative consequences in the future, thus enjoying the benefits of AI while avoiding pitfalls.

Most researchers agree that a superintelligent AI is unlikely to exhibit human emotions like love or hate, and that there is no reason to expect AI to become intentionally benevolent or malevolent. Instead, when considering how AI might become a risk, experts think two scenarios most likely:

1. **The AI is programmed to do something devastating:** Autonomous weapons are artificial intelligence systems that are programmed to kill. In the hands of the wrong person, these weapons could easily cause mass casualties. Moreover, an AI arms race could inadvertently lead to an AI war that also results in mass casualties. To avoid being thwarted by the enemy, these weapons would be designed to be extremely difficult to simply “turn off,” so humans could plausibly lose control of such a situation. This risk is one that’s present even with narrow AI, but grows as levels of AI intelligence and autonomy increase.
2. **The AI is programmed to do something beneficial, but it develops a destructive method for achieving its goal:** This can happen whenever we fail to fully align the AI’s goals with ours, which is strikingly difficult. If you ask an obedient intelligent car to take you to the airport as fast as possible, it might get you there chased by helicopters and covered in vomit, doing not what you wanted but literally what you asked for. If a super intelligent system is tasked with a ambitious geoengineering project, it might wreak havoc with our ecosystem as a side effect, and view human attempts to stop it as a threat to be met.

As these examples illustrate, the concern about advanced AI isn’t malevolence but competence. A super-intelligent AI will be extremely good at accomplishing its goals, and if those goals aren’t aligned with ours, we have a problem. You’re probably not an evil ant-hater who steps on ants out of malice, but if you’re in charge of a hydroelectric green energy project and there’s an anthill in the region to be flooded, too bad for the ants. A key goal of AI safety research is to never place humanity in the position of those ants.

Stephen Hawking, Elon Musk, Steve Wozniak, Bill Gates, and many other big names in science and technology have recently expressed concern [in the media](http://www.forbes.com/sites/ericmack/2015/07/27/hawking-musk-wozniak-freaked-about-artificial-intelligence-getting-a-trigger-finger/) and via open letters about the [risks posed by AI](http://futureoflife.org/ai-open-letter/), joined by many leading AI researchers. Why is the subject suddenly in the headlines?

The idea that the quest for strong AI would ultimately succeed was long thought of as science fiction, centuries or more away. However, thanks to recent breakthroughs, many AI milestones, which experts viewed as decades away merely five years ago, have now been reached, making many experts take seriously the possibility of superintelligence in our lifetime. While some experts still guess that human-level AI is centuries away, most AI researches at the [2015 Puerto Rico Conference](http://futureoflife.org/2015/10/12/ai-safety-conference-in-puerto-rico/) guessed that it would happen before 2060. Since it may take decades to complete the required safety research, it is prudent to start it now.

Because AI has the potential to become more intelligent than any human, we have no sure fire way of predicting how it will behave. We can’t use past technological developments as much of a basis because we’ve never created anything that has the ability to, wittingly or unwittingly, outsmart us. The best example of what we could face may be our own evolution. People now control the planet, not because we’re the strongest, fastest or biggest, but because we’re the smartest. If we’re no longer the smartest, are we assured to remain in control?

FLI’s position is that our civilization will flourish as long as we win the race between the growing power of technology and the wisdom with which we manage it. In the case of AI technology, FLI’s position is that the best way to win that race is not to impede the former, but to accelerate the latter, by supporting AI safety research.

* 1. HISTORY

The idea of inanimate objects coming to life as intelligent beings has been around for a long time. The ancient Greeks had myths about robots, and Chinese and Egyptian engineers built automatons.

The beginnings of modern AI can be traced to classical philosophers' attempts to describe human thinking as a symbolic system. But the field of AI wasn't formally founded until 1956, at a conference at Dartmouth College, in Hanover, New Hampshire, where the term "[artificial intelligence](https://www.livescience.com/3407-robot-madness-creating-true-artificial-intelligence.html)" was coined.

MIT cognitive scientist Marvin Minsky and others who attended the conference were extremely optimistic about AI's future. "Within a generation [...] the problem of creating 'artificial intelligence' will substantially be solved," Minsky is quoted as saying in the book "AI: The Tumultuous Search for Artificial Intelligence" (Basic Books, 1994). [[Super-Intelligent Machines: 7 Robotic Futures]](https://www.livescience.com/29376-rise-of-super-intelligent-robots.html). But achieving an artificially intelligent being wasn't so simple.

After several reports criticizing progress in AI, government funding and interest in the field dropped off – a period from 1974–80 that became known as the "AI winter." The field later revived in the 1980s when the British government started funding it again in part to compete with efforts by the Japanese.

The field experienced another major winter from 1987 to 1993, coinciding with the collapse of the market for some of the early general-purpose computers, and reduced government funding. But research began to pick up again after that, and in 1997, IBM's Deep Blue became the first computer to beat a chess champion when it defeated Russian grandmaster Garry Kasparov. And in 2011, the computer giant's question-answering system [Watson won the quiz show "Jeopardy!"](https://www.livescience.com/47591-ibm-watson-science-discoveries.html) by beating reigning champions Brad Rutter and Ken Jennings.

This year, the talking computer "chatbot" Eugene Goostman captured headlines for tricking judges into thinking he was real skin-and-blood human during a Turing test, a competition developed by British mathematician and computer scientist Alan Turing in 1950 as a way to assess whether a machine is intelligent. But the accomplishment has been controversial, with artificial intelligence experts saying that only a third of the judges were fooled, and pointing out that the bot was able to dodge some questions by claiming it was an adolescent who spoke English as a second language.

Many experts now believe the Turing test isn't a good measure of artificial intelligence. "The vast majority of people in AI who've thought about the matter, for the most part, think it’s a very poor test, because it only looks at external behavior," Perlis told Live Science. In fact, some scientists now plan to develop an [updated version of the test](https://www.livescience.com/47296-turing-test-needs-an-update.html). But the field of AI has become much broader than just the pursuit of true, humanlike intelligence.

1. DISCUSSION
   1. REACTIVE MACHINES

The most basic types of AI systems are purely reactive, and have the ability neither to form memories nor to use past experiences to inform current decisions. [Deep Blue, IBM’s chess-playing supercomputer](http://www.techrepublic.com/article/ibm-watson-the-inside-story-of-how-the-jeopardy-winning-supercomputer-was-born-and-what-it-wants-to-do-next/), which beat international grandmaster Garry Kasparov in the late 1990s, is the perfect example of this type of machine.

Deep Blue can identify the pieces on a chess board and know how each move. It can make predictions about what moves might be next for it and its opponent. And it can choose the most optimal moves from among the possibilities.

But it doesn’t have any concept of the past, nor any memory of what has happened before. Apart from a rarely used chess-specific rule against repeating the same move three times, Deep Blue ignores everything before the present moment. All it does is look at the pieces on the chess board as it stands right now, and choose from possible next moves.

This type of intelligence involves the computer [perceiving the world directly](https://www.youtube.com/watch?v=t3kXWSctj2Q) and acting on what it sees. It doesn’t rely on an internal concept of the world. In a seminal paper, AI researcher Rodney Brooks argued that [we should only build machines](http://dx.doi.org/10.1016/0004-3702(91)90053-M) like this. His main reason was that people are not very good at programming accurate simulated worlds for computers to use, what is called in AI scholarship a “representation” of the world.

The current intelligent machines we marvel at either have no such concept of the world, or have a very limited and specialized one for its particular duties. The [innovation in Deep Blue’s design](https://www.scientificamerican.com/article/how-the-computer-beat-the-go-master/) was not to broaden the range of possible movies the computer considered. Rather, the developers found a way to narrow its view, to [stop pursuing some potential future moves](https://www.cnet.com/news/did-a-bug-in-deep-blue-lead-to-kasparovs-defeat/), based on how it rated their outcome. Without this ability, Deep Blue would have needed to be an even more powerful computer to actually beat Kasparov.

Similarly, Google’s AlphaGo, which has beaten top human Go experts, can’t evaluate all potential future moves either. Its analysis method is more sophisticated than Deep Blue’s, using a [neural network](http://pages.cs.wisc.edu/~bolo/shipyard/neural/local.html) to evaluate game developments.

* 1. LIMITED MEMORY

This Type II class contains machines can look into the past. Self-driving cars do some of this already. For example, they observe other cars’ speed and direction. That can’t be done in a just one moment, but rather requires identifying specific objects and monitoring them over time.

These observations are added to the self-driving cars’ pre-programmed representations of the world, which also include lane markings, traffic lights and other important elements, like curves in the road. They’re included when the car decides when to change lanes, to avoid cutting off another driver or being hit by a nearby car.

But these simple pieces of information about the past are only transient. They aren’t saved as part of the car’s library of experience it can learn from, the way human drivers compile experience over years behind the wheel.

So how can we build AI systems that build full representations, remember their experiences and learn how to handle new situations? Brooks was right in that it is very difficult to do this. My own research into methods inspired by Darwinian evolution can start to [make up for human shortcomings](http://dx.doi.org/10.1162/NECO_a_00475) by letting the machines build their own representations.

* 1. THEORY OF MIND

We might stop here, and call this point the important divide between the machines we have and the machines we will build in the future. However, it is better to be more specific to discuss the types of representations machines need to form, and what they need to be about.

Machines in the next, more advanced, class not only form representations about the world, but also about other agents or entities in the world. In psychology, this is called “[theory of mind](http://dx.doi.org/10.1017/S0140525X00076512)” – the understanding that people, creatures and objects in the world can have thoughts and emotions that affect their own behaviour.

This is crucial to [how we humans formed societies](https://theconversation.com/can-great-apes-read-your-mind-66224), because they allowed us to have social interactions. Without understanding each other’s motives and intentions, and without taking into account what somebody else knows either about me or the environment, working together is at best difficult, at worst impossible.

If AI systems are indeed ever to walk among us, they’ll have to be able to understand that each of us has thoughts and feelings and expectations for how we’ll be treated. And they’ll have to adjust their behavior accordingly.

* 1. SELF-AWARENESS

The final step of AI development is to build systems that can form representations about themselves. Ultimately, we AI researchers will have to not only understand consciousness build machines that have it.

This is, in a sense, an extension of the “theory of mind” possessed by Type III artificial intelligences. Consciousness is also called “self-awareness” for a reason. (“I want that item” is a very different statement from “I know I want that item.”) Conscious beings are aware of themselves, know about their internal states, and are able to predict feelings of others. We assume someone honking behind us in traffic is angry or impatient, because that’s how we feel when we honk at others. Without a theory of mind, we could not make those sorts of inferences.

While we are probably far from creating machines that are self-aware, we should focus our efforts toward understanding memory, learning and the ability to base decisions on past experiences. This is an important step to understand human intelligence on its own. And it is crucial if we want to design or evolve machines that are more than exceptional at classifying what they see in front of them.

### ARTIFICIAL NARROW INTELLIGENCE (ANI)

### This type of artificial intelligence represents all the existing AI, including even the most complicated and capable AI that has ever been created to date. Artificial narrow intelligence refers to AI systems that can only perform a specific task autonomously using human-like capabilities. These machines can do nothing more than what they are programmed to do, and thus have a very limited or narrow range of competencies. According to the aforementioned system of classification, these systems correspond to all the reactive and limited memory AI. Even the most complex AI that uses machine learning and deep learning to teach itself falls under ANI.

### ARTIFICIAL SUPER INTELLIGENCE (ASI)

### The development of Artificial Superintelligence will probably mark the pinnacle of AI research, as AGI will become by far the most capable forms of intelligence on earth. ASI, in addition to replicating the multi-faceted intelligence of human beings, will be exceedingly better at everything they do because of overwhelmingly greater memory, faster data processing and analysis, and decision-making capabilities. The development of AGI and ASI will lead to a scenario most popularly referred to as the singularity. And while the potential of having such powerful machines at our disposal seems appealing, these machines may also threaten our existence or at the very least, our way of life.

At this point, it is hard to picture the state of our world when more advanced types of AI come into being. However, it is clear that there is a long way to get there as the current state of AI development compared to where it is projected to go is still in its rudimentary stage. For those holding a negative outlook for the future of AI, this means that now is a little too soon to be worrying about the singularity, and there's still time to ensure AI safety. And for those who are optimistic about the future of AI, the fact that we've merely scratched the surface of AI development makes the future even more exciting.

* 1. ARTIFICIAL GENERAL INTELLIGENCE (AGI)

### Artificial General Intelligence is the ability of an AI agent to learn, perceive, understand, and function completely like a human being. These systems will be able to independently build multiple competencies and form connections and generalizations across domains, massively cutting down on time needed for training. This will make AI systems just as capable as humans by replicating our multi-functional capabilities.

* 1. HOW DOES IT WORK?

Less than a decade after breaking the Nazi encryption machine Enigma and helping the Allied Forces win World War II, mathematician Alan Turing changed history a second time with a simple question: "Can machines think?"  Turing's paper "[Computing Machinery and Intelligence](https://www.csee.umbc.edu/courses/471/papers/turing.pdf)" (1950), and it's subsequent Turing Test, established the fundamental goal and vision of artificial intelligence.  At its core, AI is the branch of computer science that aims to answer Turing's question in the affirmative. It is the endeavor to replicate or simulate human intelligence in machines. The expansive goal of artificial intelligence has given rise to many questions and debates. So much so, that no singular definition of the field is universally accepted.  The major limitation in defining AI as simply "building machines that are intelligent" is that it doesn't actually explain what artificial intelligence is? What makes a machine intelligent?

In their groundbreaking textbook Artificial Intelligence: A Modern Approach, authors Stuart Russell and Peter Norvig approach the question by unifying their work around the theme of intelligent agents in machines. With this in mind, AI is "the study of agents that receive percepts from the environment and perform actions."

Norvig and Russell go on to explore four different approaches that have historically defined the field of AI:

1. **Thinking humanly**
2. **Thinking rationally**
3. **Acting humanly**
4. **Acting rationally**

The first two ideas concern thought processes and reasoning, while the others deal with behavior. Norvig and Russell focus particularly on rational agents that act to achieve the best outcome, noting "all the skills needed for the Turing Test also allow an agent to act rationally." (Russel and Norvig 4). Patrick Winston, the Ford professor of artificial intelligence and computer science at MIT, [defines AI](https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos/lecture-1-introduction-and-scope/) as  "algorithms enabled by constraints, exposed by representations that support models targeted at loops that tie thinking, perception and action together."

While these definitions may seem abstract to the average person, they help focus the field as an area of computer science and provide a blueprint for infusing machines and programs with machine learning and other subsets of artificial intelligence. While addressing a crowd at the [Japan AI Experience in 2017](https://www.youtube.com/watch?v=ZChA63CpX5o),  DataRobot CEO Jeremy Achin began his speech by offering the following definition of how AI is used today:

"AI is a computer system able to perform tasks that ordinarily require human intelligence... Many of these artificial intelligence systems are powered by machine learning, some of them are powered by deep learning and some of them are powered by very boring things like rules."

* 1. ADVANTAGES

1. **Less Errors:**As decisions are taken on previously gathered information and certain algorithms, without the interference of humans, so errors are reduced and the chance of reaching accuracy with a greater degree of precision is a possibility.
2. **Faster Decisions:**Using Artificial intelligence, decisions can be taken very fast. For example, we all have played Chess game in Windows. It is nearly impossible to beat CPU in hard mode because of the A.I. behind that game.  Because it took the best possible step in very short time according the algorithms used behind it.
3. **Daily Applications:**In today’s era, A.I. is used in many applications just like Apple’s **Siri,**Window’s **Cortana,**Google’s **OK Google.**Using these types of applications we can communicate with our device using our voice. Which makes our work easily. For example, in recent android phones if we want to search for a location then all we have to do is say “OK Google where is Agra”. It will show you Agra’s location on google map and best path between you and Agra.
4. **No Emotions:**The complete absence of emotions makes machines to think logically and take right decision where in humans emotions are associated with moods that can affect human efficiency. Complete absence of emotions make machines to take right decisions.
5. **Digital Assistants:**Some of highly advanced organizations uses digital assistants to interact with users which saves need of human resource. Digital assistant also used in many websites to provide things that user want. We can chat with them about what we are looking for. Some chat bots are designed in such a way that its become hard to determine that we’re chatting with a chat bot or a human being. For Example, Mitsuku.
6. **No Breaks:**Unlike humans, machines can work 24\*7 without any break. Humans need a break after work to regain their speed and freshness whereas machines can work for long hours without getting bored or distracted.
7. **Medical Applications:**Increasing the integration of [A.I. tools in every day medical applications](https://builtin.com/artificial-intelligence/artificial-intelligence-healthcare) could improve the efficiency of treatments and avoid cost by minimizing the risk of false diagnosis. AI has begun transforming the field of surgical robotics wherein it has enabled the advent of robots that perform semi-automated surgical tasks with increasing efficiency. A.I is not going to replace Doctors, it will help them by providing the relevant data need to take care of patient (such as history of aortic aneurism, high blood pressure, coronary blockages, history of smoking, prior pulmonary embolism, cancer, implantable devices or deep vein thrombosis). Otherwise this information would take long time to collect.
8. **Taking risks on behalf of humans:**In various situations, Robots can be used instead of Humans to avoid the risks. Such as Robots can be programmed to explore Space because metal body can suffer in different situations but the human body can not. In Military forces Robots can be programmed to defuse a bomb, so the error will be reduced and can save human lives. Complex machines can be used for exploring the ocean floor and hence overcoming the human limitations.
9. **Public Utilities:**Self-Driving cars, which would greatly reduce the number of car crashes. Facial recognition can be used for security. Natural language processing to communicate with humans in their language.

#### 24/7 Availability

Machines don’t require frequent breaks and refreshments as like human beings.That can be programmed to work for long hours and can able to perform the job continuously without getting bored or distracted or even tired.Using machines, we can also expect the same kind of results irrespective of timings, season and etc., those we can’t expect from human beings.

#### Day to Day Application

In our daily needs, a smartphone also becomes the 4th necessity for the human along with dress, food & shelter.If you are using a smartphone, it indirectly means that you are enjoying the AI by knowingly or unknowingly.Design the methods for automation by using learning and perception have become a common phenomenon in our everyday lives.We have our lady Siri for iOS devices or Cortana for Windows devices to help us out.We also prefer the help from GPS for the long drives and trips.

A smartphone is one of the apt everyday examples of how we utilize the [power of artificial intelligence](https://www.educba.com/introduction-to-artificial-intelligence/) to reduce the barriers in a day to day life.

In the part of utilities, we can find that how they predict what we are going to type and provide the suggestion to correct the human errors in spelling. That is one of the most used machine intelligence at work irrespective of industries and freelancers.

While coming to the social media users based utilities, the artificial intelligence algorithm identifies and detects the person’s face and tags the individuals while we post the photographs on the social media sites.

Artificial Intelligence is widely deployed and utilized by the financial institutions and banking sectors to organize and manage data. Detection Of Fraud uses one of the best advantages of an artificial intelligence involvement in the smart card based system transactions

#### Digital Assistance

Highly advanced organizations already implemented machines on behalf of humans to interact with their customers by using ‘avatars’. It is the digital assistants or replicas which will help to reduce the need for human resources.For AI Machines, emotions only can be identified in the way of rational thinking.

Robots can’t identify the sentimental factor of the user. It actually programmed for only think logically and take the right program decisions based on the existing experience taught to the machine.

Emotions can’t be identifying by the machines that may be dissatisfying the customer. In that case, we need human intervention. This lagging tries to rule out for machine intelligence. But still, it helps in other aspects.

#### Handling Repetitive Jobs :

#### Repeated jobs are tedious in nature. That kind of jobs can be easily handled with the help of AI algorithms. These kinds of job don’t require much intelligence in between the process.

Machines can think much faster than humans and can perform multi-tasking to obtain the best results.

Machine intelligence can be employed to carry out the dangerous tasks which may cause injury to the human involved in that. Their parameters can be adjusted is the benefit here. Their speed and time can be customized based on the requirement calculation.

Whenever human operates the machine like playing a game or run a computer-controlled robot, it means that we are actually interacting with AI Machines.

In the computer game, the machine itself plays the game like as an opponent based on our activity in the game. The machine plans its movement based on the user response. So, we can say gaming is one of the most common uses of the advantages of artificial intelligence.

#### Medical Applications

One of the great advantages of Artificial Intelligence is utilized in the field of medicine. We can identify the numerous numbers of medical applications which rely on AI.

Doctors/Physician assesses the patient’s health-related data and intimates the risk factors to the customers via the health care devices with the help of artificial machine intelligence.

It helps the patient to know about the side effects of different medicines and also behaves as personal digital care. Artificial surgery simulator is the great innovation part of the AI. The efficiency of that always prefers to utilize that simulator by the Professionals for the treatment.

Currently, we have huge software to detect as well as monitor the neurological disorders. It can simulate the functionality of the human brain.

Robotics is used often in the treatment for mentally sick patients to come out from their depression also make them remain active in the real world.

The current medical industry has the popular application of artificial intelligence is Radiosurgery. It helps us to operate the tumors without damaging the unaffected surrounding tissues.

#### Hazardous Exploration

Artificial Intelligence and the science of robotics are the fascinating advancements in technological development. Using this, we can able to handle the huge volume of data for storing and processing but not limited to as well as we can use that in the process of mining and other fuel exploration processes.

These complex machines can be utilized to overcome human limitations. We can utilize these machines as a replacement for the humans wherever we felt the process done by the human is hazardous but can’t neglect that because of the goodness or results received.

They can perform difficult tasks and accurate work with greater responsibility without any lag. Moreover, they do not wear out easily.

#### Reduction of Error

The advantage of Using Artificial Intelligence is, it helps us for error reduction and increasing the chance of reaching higher accuracy with a greater degree of precision.

It can be applied in various situations including the process called exploration of space.

In that intelligent robots are fed with information because of the velocity of the data creation. Such kind of information forwarded to explore the space. Even though those are machines with metal bodies, those are the most resistant in nature also it has a great character which can help us to abide by the space and unfriendly atmosphere. Because of that, they used to create and acclimatize. It cannot be modified unknowingly or can’t get disfigured or breakdown in a hostile environment. In this scenario, we can’t neglect anything, by handling this we need to address this issue with the efficient solution like Artificial Intelligence.

* 1. DISADVANTAGES

1. High Costs: The hardware and software need to get updated with time to meet the latest requirements. Machines need repairing and maintenance which need plenty of cost.
2. Unemployment: The increasing number of machines leading to unemployment and job security issues. As machines are replacing human resources, the rate of people losing their jobs will increase. Because machines can work 24\*7 with no break, which is more beneficial of industries instead of working with people who needs break and refreshment. Machines do their work as they programmed to do without any error while error can be occurred from humans.
3. Can’t think out of box: Robots can only do the work that they are programmed to do. They cannot act any different outside of whatever algorithm or programming is stored in their internal circuits. And when it comes to a creative mind, nothing can beat a human mind. A computer can’t think differently while making or drawing something. The thoughts comes from the emotions and experience which machine’s cannot. So machine can’t think out of box whereas thousands of new thoughts and ideas comes into a human mind.
4. Can’t feel Compassion and Sympathy: There is no doubt that machines are much better when it comes to working efficiently but they cannot replace the human connection that makes the team. Machines cannot develop a bond with humans.
5. Highly dependent on machines: In todays generation, most of the people are highly dependent on Applications like Siri. With so much assistance from machine, if humans do not need their thinking abilities, these abilities will be gradually decrease. In future with the heavy use of application of artificial intelligence, human may become fully dependent on machines, losing their mental capacities.
   1. APPLICATIONS OF ARTIFICIAL INTELLIGENCE
6. **Artificial Intelligence in Healthcare:**Companies are applying machine learning to make better and faster diagnoses than humans. One of the best-known technologies is IBM’s Watson. It understands natural language and can respond to questions asked of it. The system mines patient data and other available data sources to form a hypothesis, which it then presents with a confidence scoring schema. AI is a study realized to emulate human intelligence into computer technology that could assist both, the doctor and the patients in the following ways:

* By providing a laboratory for the examination, representation and cataloguing medical information
* By devising novel tool to support decision making and research
* By integrating activities in medical, software and cognitive sciences
* By offering a content rich discipline for the future scientific medical communities.

1. **Artificial Intelligence in business**: Robotic process automation is being applied to highly repetitive tasks normally performed by humans. Machine learning algorithms are being integrated into analytics and CRM (Customer relationship management) platforms to uncover information on how to better serve customers. Chatbots have already been incorporated into websites and e companies to provide immediate service to customers. Automation of job positions has also become a talking point among academics and IT consultancies.
2. **AI in education:** It automates grading, giving educators more time. It can also assess students and adapt to their needs, helping them work at their own pace.
3. **AI in Autonomous vehicles:** Just like humans, self-driving cars need to have sensors to understand the world around them and a brain to collect, processes and choose specific actions based on information gathered. Autonomous vehicles are with advanced tool to gather information, including long range radar, cameras, and LIDAR. Each of the technologies are used in different capacities and each collects different information. This information is useless, unless it is processed and some form of information is taken based on the gathered information. This is where artificial intelligence comes into play and can be compared to human brain. AI has several applications for these vehicles and among them the more immediate ones are as follows:Directing the car to gas station or recharge station when it is running low on fuel.Adjust the trips directions based on known traffic conditions to find the quickest route.Incorporate speech recognition for advanced communication with passengers.Natural language interfaces and virtual assistance technologies.
4. **AI for robotics: It** will allow us to address the challenges in taking care of an aging population and allow much longer independence. It will drastically reduce, may be even bring down traffic accidents and deaths, as well as enable disaster response for dangerous situations for example the nuclear meltdown at the fukushima power plant.
5. **Cyborg Technology:** One of the main limitations of being human is simply our own bodies and brains. [Researcher Shimon Whiteson thinks](https://www.techinsider.io/researchers-predictions-future-artificial-intelligence-2015-10)that in the future, we will be able to augment ourselves with computers and enhance many of our own natural abilities. Though many of these possible cyborg enhancements would be added for convenience, others may  serve a more practical purpose. Yoky Matsuka of Nest believes that AI will become useful for people with amputated limbs, as the brain will be able to communicate with a robotic limb to give the patient more control. This kind of cyborg technology would significantly reduce the limitations that amputees deal with daily.

In the future, predictive analytics and [artificial intelligence](https://www.shapingtomorrow.com/item/search?mitsu=%22artificial+intelligence%22&itemtypeid=9) could play an even more fundamental role in content creation and also in the software fields. Open source information and [artificial intelligence](https://www.shapingtomorrow.com/item/search?mitsu=%22artificial+intelligence%22&itemtypeid=9) collection will provide opportunities for global technological parity and the technology of artificial can become the future in all the domains of health, environment, public safety and security.

1. CONCLUSION

Artificial Intelligence(AI) is the simulation of human intelligence by machines. In other words, it is the method by which machines demonstrate certain aspects of human intelligence like learning, reasoning and self- correction. Since its inception, AI has demonstrated unprecedented growth. Sophia the AI Robot, is the quintessential example of this. The future of Artificial intelligence is hazy. But going by the bounds of progress AI has been making, it is clear AI will permeate every sphere of our life. Listed below are the diverse ways in which AI can change in the future.

Breakthrough in Science

The scope of AI in science is the largest. Recently ‘Eve’ was in the news for discovering that an ingredient found commonly in toothpaste, is capable of curing Malaria. Here the subject in appreciation ‘Eve’ is not a human scientist, rather a Robot created by a team of scientists at the Universities of Manchester, Aberystwyth, and Cambridge.

Eve’s example hints at the possibility of AI playing a bigger role in science in future, not just merely for augmentation. AI will be able to create science, not merely do science as evidenced by the Robot Scientist, Eve. Automation using AI for drug discovery is a field that is rapidly growing, mainly because machines work faster than humans. AI is also being applied in related areas such as synthetic biology for the manufacture and rapid design of microorganisms for industrial uses. Taking all this in stride, AI is sure to transform science as we know it.

Cyber Security

The future application of AI in cybersecurity will ensure in curbing hackers. The incidence of cybercrime is an issue that has been escalating through the years. It costs enterprises in term of brand image as well as material cost. Credit card fraudery is one of the most prevalent cybercrimes. Despite there being detection techniques, they still prove to be ineffective in curbing hackers. AI can bring a remarkable change to this. Novel AI techniques like Recurrent Neural Networks can detect fraudery in initial stages itself. This fraud detection system will be able to scan thousands of transactions instantly and predict/ classify them into buckets. RNN can save a lot of time as it focuses on cases where there is a high probability for fraud.

Face Recognition

The launch of iPhone x with face recognition feature was a step towards AI future. In the coming years, iPhone users might be to unlock their phones by looking into the front camera. Authenticating personal content is not the only use of facial recognition. Governments and security forces make use of this feature to track down criminals and identify citizens. In the future, facial recognition can go beyond physical structure to emotional analysis. For example, it might become possible to detect whether a person is stressed or angry.

Data Analysis

One of the ways AI will benefit business is in the field of Data Analysis. AI would be able to perceive patterns in data that humans cannot. This enables business’ to target the right customers for the product. An example of this is the partnership between IBM and Fluid. Fluid, a digital retail company uses Watson – an AI created by IBM for insightful product recommendation to its customers.

Transport

AI-guided transport will no longer be confined to the pages of sci-fi literature. Self- driving cars have already populated the market, however, a driver is required at the wheels for safety purposes. With Google, Uber and General Motors trying to establish themselves at the top in this market, it will not be long before driverless vehicles become a reality. Machine Learning will be crucial in ensuring that these Automated Vehicles operate smoothly and efficiently.

Various Jobs

Robotic Process Automation is the application of machine learning to automate rule-based tasks. It will help people to focus on the critical aspects of their job while leaving the routine aspects to machines. Automation can range from data entry to complete process automation. The reach of AI is also expected to blanket jobs that are risky or health-hazardous like bomb diffusion and welding.

Emotion Bots

Tech has advanced in terms of Emotional Quotient. Virtual assistants Siri, Cortana & Alexa show how the extent to which AI comprehends human language. They are able to understand the meaning from context and make intelligent judgments. Back in 2015, a companion robot called, ‘Pepper’ went on sale. All the initial 1000 units were sold within a minute. Overall, considering all this, the possibility of emotional bots might become a reality in the future.

Marketing & Advertising

The application of AI in sales and marketing seems a definite, considering the fact that marketing professionals leave no stone unturned to benefit their business. AI can increase the efficiency of sales and marketing organization. The focus will be on improving conversion rates and sales. Personalised advertising, knowledge of customers and their behavior gleamed through facial recognition can generate more revenue.