ARTFICIAL INTELLIGENCE

# What is Artificial Intelligence?

Artificial intelligence (AI) is a wide-ranging branch of computer science concerned with building smart machines capable of performing tasks that typically require human intelligence. AI is an interdisciplinary science with multiple approaches, AI is also defined as,

* An Intelligent Entity Created By humans
* Capable of Performing Tasks intelligently without being explicitly instructed.
* Capable of thinking and acting rationally and humanely.

A layman with a fleeting understanding of technology would link it to robots. They’d say Artificial Intelligence is a terminator like-figure that can act and think on its own.

If you ask about artificial intelligence an AI researcher, he would say that it’s a set of algorithms that can produce results without having to be explicitly instructed to do so. The intelligence demonstrated by machines is known as Artificial Intelligence. Artificial Intelligence has grown to be very popular in today’s world.

# How do we measure if Artificial Intelligence is acting like a human?

## Turing Test in Artificial Intelligence

The basis of the Turing Test is that the Artificial Intelligence entity should be able to hold a conversation with a human agent. The human agent ideally should not be able to conclude that they are talking to an Artificial Intelligence. To achieve these ends, the AI needs to possess these qualities:

* [Natural Language processing](https://www.mygreatlearning.com/blog/natural-language-processing-tutorial/) to communicate successfully.
* Knowledge Representation acts as its memory.
* Automated Reasoning uses the stored information to answer questions and draw new conclusions.
* [Machine learning](https://www.mygreatlearning.com/artificial-intelligence/courses) to detect patterns and adapt to new circumstances.

# How to achieve Artificial Intelligence (AI)?

Building an AI system is a careful process of reverse-engineering human traits and capabilities in a machine, and using its computational prowess to surpass what we are capable of.   
To understand How Artificial Intelligence actually works, one needs to deep dive into the various sub-domains of Artificial Intelligence and understand how those domains could be applied to the various fields of the industry.

* **Machine Learning:** ML teaches a machine how to make inferences and decisions based on past experience. It identifies patterns and analyses past data to infer the meaning of these data points to reach a possible conclusion without having to involve human experience. This automation to reach conclusions by evaluating data saves human time for businesses and helps them make a better decisions.
* **Deep Learning:** Deep Learning is an ML technique. It teaches a machine to process inputs through layers in order to classify, infer and predict the outcome.
* **Neural Networks:** [Neural Networks](https://www.mygreatlearning.com/blog/types-of-neural-networks/) work on similar principles to Human Neural cells. They are a series of algorithms that captures the relationship between various underlying variables and processes the data as a human brain does.
* **Natural Language Processing:** NLP is a science of reading, understanding, and interpreting a language by a machine. Once a machine understands what the user intends to communicate, it responds accordingly.
* **Computer Vision:** Computer vision algorithms try to understand an image by breaking down an image and studying different parts of the object. This helps the machine classify and learn from a set of images, to make a better output decision based on previous observations.
* **Cognitive Computing:** [Cognitive computing](https://www.mygreatlearning.com/blog/cognitive-computing-and-its-applications/) algorithms try to mimic a human brain by analyzing text/speech/images/objects in a manner that a human does and tries to give the desired output.

# What are the Types of Artificial Intelligence?

Not all types of AI all the above fields simultaneously. Different Artificial Intelligence entities are built for different purposes, and that’s how they vary.

## 1. Purely Reactive

These machines do not have any memory or data to work with, specializing in just one field of work. For example, in a chess game, the machine observes the moves and makes the best possible decision to win.

## 2. Limited Memory

These machines collect previous data and continue adding it to their memory. They have enough memory or experience to make proper decisions, but memory is minimal. For example, this machine can suggest a restaurant based on the location data that has been gathered.

## 3. Theory of Mind

This kind of AI can understand thoughts and emotions, as well as interact socially. However, a machine based on this type is yet to be built.

## 4. Self-Aware

Self-aware machines are the future generation of these new technologies. They will be intelligent, sentient, and conscious.

## What is Artificial Narrow Intelligence (ANI)?

This is the most common form of AI that you’d find in the market now. These Artificial Intelligence systems are designed to solve one single problem and would be able to execute a single task really well. By definition, they have narrow capabilities, like recommending a product for an e-commerce user or predicting the weather. This is the only kind of Artificial Intelligence that exists today. They’re able to come close to human functioning in very specific contexts, and even surpass them in many instances, but only excelling in very controlled environments with a limited set of parameters.

## What is Artificial General Intelligence (AGI)?

[AGI](https://www.mygreatlearning.com/blog/artificial-general-intelligence/) is still a theoretical concept. It’s defined as AI which has a human-level of cognitive function, across a wide variety of domains such as language processing, image processing, computational functioning and reasoning and so on.  
We’re still a long way away from building an AGI system. An AGI system would need to comprise of thousands of Artificial Narrow Intelligence systems working in tandem, communicating with each other to mimic human reasoning. Even with the most advanced computing systems and infrastructures, such as Fujitsu’s K or IBM’s Watson, it has taken them 40 minutes to simulate a single second of neuronal activity. This speaks to both the immense complexity and interconnectedness of the human brain, and to the magnitude of the challenge of building an AGI with our current resources.

## What is Artificial Super Intelligence (ASI)?

We’re almost entering into science-fiction territory here, but ASI is seen as the logical progression from AGI. An Artificial Super Intelligence (ASI) system would be able to surpass all human capabilities. This would include decision making, taking rational decisions, and even includes things like making better art and building emotional relationships.  
Once we achieve Artificial General Intelligence, AI systems would rapidly be able to improve their capabilities and advance into realms that we might not even have dreamed of. While the gap between AGI and ASI would be relatively narrow (some say as little as a nanosecond, because that’s how fast Artificial Intelligence would learn) the long journey ahead of us towards AGI itself makes this seem like a concept that lies far into the future.

# Applications of Artificial Intelligence in Business

AI truly has the potential to transform many industries, with a wide range of possible use cases. What all these different industries and use cases have in common, is that they are all data-driven. Since Artificial Intelligence is an efficient data processing system at its core, there’s a lot of potential for optimization everywhere.  
  
Let’s take a look at the industries where AI is currently shining.

## Healthcare:

* **Administration:** AI systems are helping with the routine, day-to-day administrative tasks to minimize human errors and maximize efficiency. Transcriptions of medical notes through NLP and helps structure patient information to make it easier for doctors to read it.
* **Telemedicine:** For non-emergency situations, patients can reach out to a hospital’s AI system to analyses their symptoms, input their vital signs and assess if there’s a need for medical attention. This reduces the workload of medical professionals by bringing only crucial cases to them.
* **Assisted Diagnosis:** Through computer vision and convolutional neural networks, AI is now capable of reading MRI scans to check for tumors and other malignant growths, at an exponentially faster pace than radiologists can, with a considerably lower margin of error.
* **Robot-assisted surgery:** Robotic surgeries have a very minuscule margin-of-error and can consistently perform surgeries round-the-clock without getting exhausted. Since they operate with such a high degree of accuracy, they are less invasive than traditional methods, which potentially reduces the time patients spend in the hospital recovering.
* **Vital Stats Monitoring:**  A person’s state of health is an ongoing process, depending on the varying levels of their respective vital stats. With wearable devices achieving mass-market popularity now, this data is not available on tap, just waiting to be analyzed to deliver actionable insights. Since vital signs have the potential to predict health fluctuations even before the patient is aware, there are a lot of live-saving applications here.

## E-commerce

* **Better recommendations:** This is usually the first example that people give when asked about business applications of AI, and that’s because it’s an area where AI has delivered great results already. Most large e-commerce players have incorporated Artificial Intelligence to make product recommendations that users might be interested in, which has led to considerable increases in their bottom-lines.
* **Chatbots:** Another famous example, based on the proliferation of [Artificial Intelligence chatbots](https://www.mygreatlearning.com/blog/basics-of-building-an-artificial-intelligence-chatbot/) across industries, and every other website we seem to visit. These chatbots are now serving customers in odd-hours and peak hours as well, removing the bottleneck of limited human resources.
* **Filtering spam and fake reviews:** Due to the high volume of reviews that sites like Amazon receive, it would be impossible for human eyes to scan through them to filter out malicious content. Through the power of NLP, Artificial Intelligence can scan these reviews for suspicious activities and filter them out, making for a better buyer experience.
* **Optimizing search:** All of the e-commerce depends upon users searching for what they want, and being able to find it. Artificial Intelligence has been optimizing search results based on thousands of parameters to ensure that users find the exact product that they are looking for.
* **Supply-chain:** AI is being used to predict demand for different products in different timeframes so that they can manage their stocks to meet the demand.

## Human Resources

* **Building work culture:** AI is being used to analyses employee data and place them in the right teams, assign projects based on their competencies, collect feedback about the workplace, and even try to predict if they’re on the verge of quitting their company.
* **Hiring:** With NLP, AI can go through thousands of CV in a matter of seconds, and ascertain if there’s a good fit. This is beneficial because it would be devoid of any human errors or biases, and would considerably reduce the length of hiring cycles.

## Robots in AI

The field of robotics has been advancing even before AI became a reality. At this stage, artificial intelligence is helping robotics to innovate faster with efficient robots. Robots in AI have found applications across verticals and industries especially in the manufacturing and packaging industries. Here are a few applications of robots in AI:

**Assembly**

* AI along with advanced vision systems can help in real-time course correction
* It also helps robots to learn which path is best for a certain process while it’s in operation

**Customer Service**

* AI-enabled robots are being used in a customer service capacity in retail and hospitality industries
* These robots leverage Natural Language Processing to interact with customers intelligently and like a human.
* More these systems interact with humans, more they learn with the help of machine learning

**Packaging**

* AI enables quicker, cheaper, and more accurate packaging
* It helps in saving certain motions that a robot is making and constantly refines them, making installing and moving robotic systems easily.

**Open Source Robotics**

* Robotic systems today are being sold as open-source systems having AI capabilities.
* In this way, users can teach robots to perform custom tasks based on a specific application
* Eg: small scale agriculture

# What are the Pros and Cons of Artificial Intelligence?

There’s no doubt in the fact that technology has made our life better. From music recommendations, map directions, and mobile banking to [fraud prevention](https://www.mygreatlearning.com/blog/credit-card-fraud-detection/), AI and other technologies have taken over. There’s a fine line between advancement and destruction. There are always two sides to a coin, and that is the case with AI as well. Let us take a look at some advantages and disadvantages of Artificial Intelligence-

Pros

* Reduction in human error
* Available 24×7
* Helps in repetitive work
* Digital assistance
* Faster decisions
* Rational Decision Maker
* Medical applications
* Improves Security
* Efficient Communication

Cons

* It’s costly to implement
* It can’t duplicate human creativity
* It will definitely replace some jobs, leading to unemployment
* People can become overly reliant on it

# Prerequisites for Artificial Intelligence

As a beginner, here are some of the basic prerequisites that will help get started with the subject.

1. A strong hold on Mathematics – namely Calculus, Statistics and probability.
2. A good amount of experience in programming languages like Java, or Python.
3. A strong hold in understanding and writing algorithms.
4. A strong background in data analytics skills.
5. A good amount of knowledge in discrete mathematics.
6. The will to learn machine learning languages.