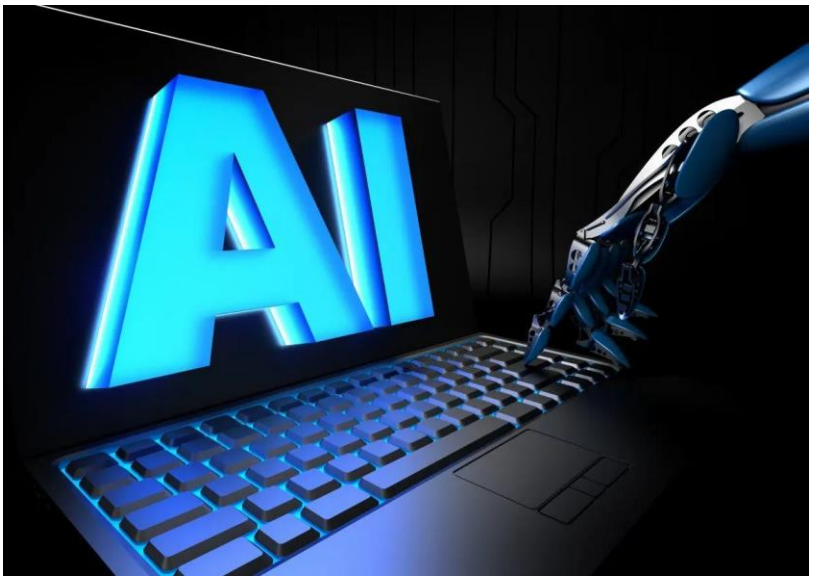
# What is the history of artificial intelligence (AI)?

**It may sometimes feel like AI is a recent development in technology. After all, it's only become mainstream to use in the last several years, right? In reality, the groundwork for AI began in the early 1900s. And although the biggest strides weren't made until the 1950s, it wouldn't have been possible without the work of early experts in many different fields.**




**Knowing the history of AI is important in understanding where AI is now and where it may go in the future. In this article, we cover all the major developments in AI, from the groundwork laid in the early 1900s, to the major strides made in recent years.**

## History of artificial intelligence: Key dates and names

**The idea of "a machine that thinks" dates back to ancient Greece. But since the advent of electronic computing (and relative to some of the topics discussed in this article) important events and milestones in the evolution of artificial intelligence include the following:**

- **1950: Alan Turing publishes Computing Machinery and Intelligence (link resides outside ibm.com). In this paper, Turing—famous for breaking the German ENIGMA code during WWII and often referred to as the "father of computer science"— asks the following question: "Can machines think?" From there, he offers a test, now famously known as the "Turing Test," where a human interrogator would try to distinguish between a computer and human text response. While this test has undergone much scrutiny since it was published, it remains an important part of**

**the history of AI, as well as an ongoing concept within philosophy as it utilizes ideas around linguistics.**

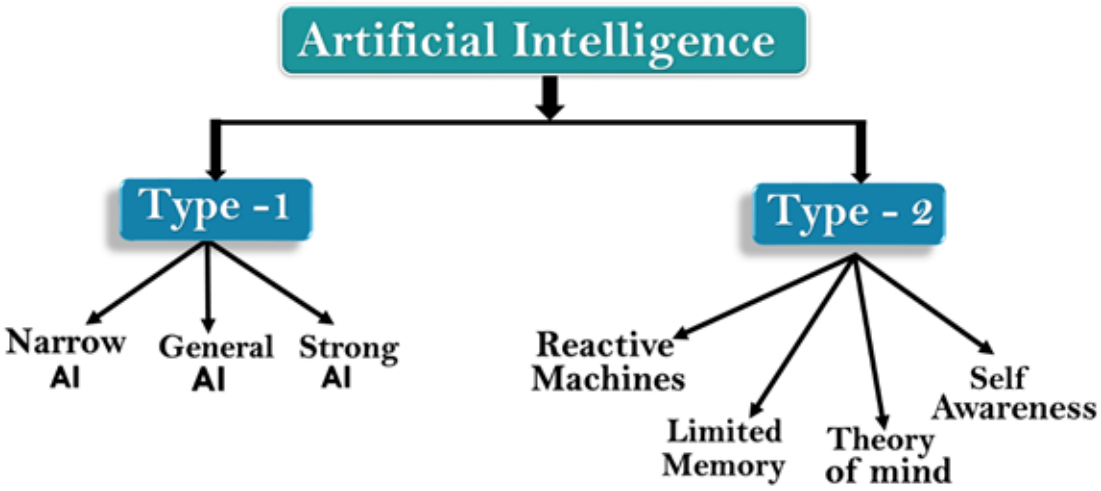
- **1956: John McCarthy coins the term "artificial intelligence" at the first-ever AI conference at Dartmouth College. (McCarthy would go on to invent the Lisp language.) Later that year, Allen Newell, J.C. Shaw, and Herbert Simon create the Logic Theorist, the first-ever running AI software program.**
- **1967: Frank Rosenblatt builds the Mark 1 Perceptron, the first computer based on a neural network that "learned" though trial and error. Just a year later, Marvin Minsky and Seymour Papert publish a book titled *Perceptrons*, which becomes both the landmark work on neural networks and, at least for a while, an argument against future neural network research projects.**
- **1980s: Neural networks which use a backpropagation algorithm to train itself become widely used in AI applications.**
- **1995: Stuart Russell and Peter Norvig publish Artificial Intelligence: A Modern Approach (link resides outside ibm.com), which becomes one of the leading textbooks in the study of AI. In it, they delve into four potential goals or definitions of AI, which differentiates computer systems on the basis of rationality and thinking vs. acting.**
- **1997: IBM's Deep Blue beats then world chess champion Garry Kasparov, in a chess match (and rematch).**
- **2004: John McCarthy writes a paper, What Is Artificial Intelligence? (link resides outside ibm.com), and proposes an often-cited definition of AI.**
- **2011: IBM Watson beats champions Ken Jennings and Brad Rutter at *Jeopardy!***
- **2015: Baidu's Minwa supercomputer uses a special kind of deep neural network called a convolutional neural network to identify and categorize images with a higher rate of accuracy than the average human.**
- **2016: DeepMind's AlphaGo program, powered by a deep neural network, beats Lee Sodol, the world champion Go player, in a five-game match. The victory is significant given the huge number of possible moves as the game progresses (over 14.5 trillion after just four moves!). Later, Google purchased DeepMind for a reported USD 400 million.**
- **2023: A rise in large language models, or LLMs, such as ChatGPT, create an enormous change in performance of AI and its potential to drive enterprise value. With these new generative AI practices, deep-learning models can be pre-trained on vast amounts of raw, unlabeled dat**

## What is artificial intelligence?

**Artificial intelligence (AI) technology allows computers and machines to simulate human intelligence and problem-solving tasks. The ideal characteristic of artificial intelligence is its ability to rationalize and take action to achieve a specific goal. AI research began in the**

**1950s and was used in the 1960s by the United States Department of Defense when it trained computers to mimic human reasoning**
**A subset of artificial intelligence is machine learning (ML), a concept that computer programs can automatically learn from and adapt to new data without human assistance.**

## Types of Artificial Intelligence




## 1. Weak AI or Narrow AI:



- **Narrow AI is a type of AI which is able to perform a dedicated task with intelligence.The most common and currently available AI is Narrow AI in the world of Artificial Intelligence.**
- **Narrow AI cannot perform beyond its field or limitations, as it is only trained for one specific task. Hence it is also termed as weak AI. Narrow AI can fail in unpredictable ways if it goes beyond its limits.**
- **Apple Siriis a good example of Narrow AI, but it operates with a limited pre-defined range of functions.**

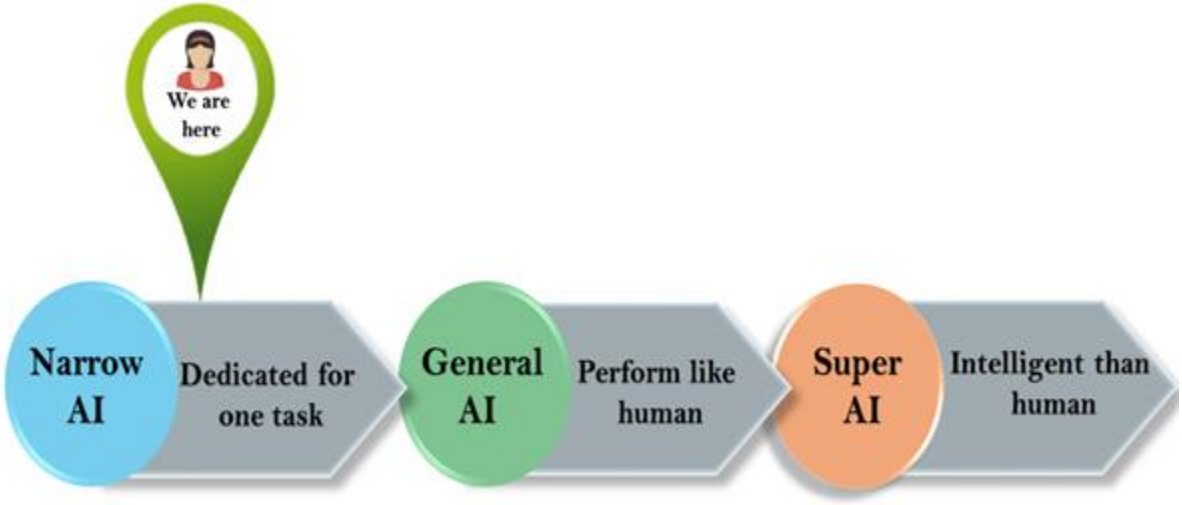
- **IBM's Watson supercomputer also comes under Narrow AI, as it uses an Expert system approach combined with Machine learning and natural language processing.**
- **Some Examples of Narrow AI are playing chess, purchasing suggestions on e-commerce site, self-driving cars, speech recognition, and image recognition.**

## 2. General AI:

- **General AI is a type of intelligence which could perform any intellectual task with efficiency like a human.**
- **The idea behind the general AI to make such a system which could be smarter and think like a human by its own.**
- **Currently, there is no such system exist which could come under general AI and can perform any task as perfect as a human.**
- **The worldwide researchers are now focused on developing machines with General AI.**
- **As systems with general AI are still under research, and it will take lots of efforts and time to develop such systems.**

## 3. Super AI:

- **Super AI is a level of Intelligence of Systems at which machines could surpass human intelligence, and can perform any task better than human with cognitive properties. It is an outcome of general AI.**
- **Some key characteristics of strong AI include capability include the ability to think, to reason,solve the puzzle, make judgments, plan, learn, and communicate by its own.**
- **Super AI is still a hypothetical concept of Artificial Intelligence. Development of such systems in real is still world changing task.**



## Artificial Intelligence type-2:

### 1. Reactive Machines

- **Purely reactive machines are the most basic types of Artificial Intelligence.**
- **Such AI systems do not store memories or past experiences for future actions.**
- **These machines only focus on current scenarios and react on it as per possible best action.**
- **IBM's Deep Blue system is an example of reactive machines.**
- **Google's AlphaGo is also an example of reactive machines.**

### 2. Limited Memory

- **Limited memory machines can store past experiences or some data for a short period of time.**
- **These machines can use stored data for a limited time period only.**
- **Self-driving cars are one of the best examples of Limited Memory systems. These cars can store recent speed of nearby cars, the distance of other cars, speed limit, and other information to navigate the road.**

### 3. Theory of Mind

- **Theory of Mind AI should understand the human emotions, people, beliefs, and be able to interact socially like humans.**
- **This type of AI machines are still not developed, but researchers are making lots of efforts and improvement for developing such AI machines.**

### 4. Self-Awareness

- **Self-awareness AI is the future of Artificial Intelligence. These machines will be super intelligent, and will have their own consciousness, sentiments, and self-awareness.**
- **These machines will be smarter than human mind.**
- **Self-Awareness AI does not exist in reality still and it is a hypothetical concept.**
- **concept.**

## How Is AI Used in Healthcare?

**In healthcare settings, AI is used to assist in diagnostics. AI can identify small anomalies in scans to better triangulate diagnoses from a patient's symptoms and**

**vitals. AI can classify patients, maintain and track medical records, and deal with health insurance claims.**

## The Bottom Line

**Artificial Intelligence (AI) is an evolving technology that tries to simulate human intelligence using machines. AI encompasses various subfields, including machine learning (ML) and deep learning, which allow systems to learn and adapt in novel ways from training data. It has vast applications across multiple industries, such as healthcare, finance, and transportation. While AI offers significant advancements, it also raises ethical, privacy, and employment concerns.**

## What is AI?

**Artificial intelligence, or AI, is technology that enables computers and machines to simulate human intelligence and problem-solving capabilities.**
**On its own or combined with other technologies (e.g., sensors, geolocation, robotics) AI can perform tasks that would otherwise require human intelligence or intervention. Digital assistants, GPS guidance, autonomous vehicles, and generative AI tools (like Open AI's Chat GPT) are just a few examples of AI in the daily news and our daily lives.**

**As a field of computer science, artificial intelligence encompasses (and is often mentioned together with) machine learning and deep learning. These disciplines involve the development of AI algorithms, modeled after the decision-making processes of the human brain, that can 'learn' from available data and make increasingly more accurate classifications or predictions over time.**

**Artificial intelligence has gone through many cycles of hype, but even to skeptics, the release of ChatGPT seems to mark a turning point. The last time generative AI loomed this large, the breakthroughs were in computer vision, but now the leap forward is in natural language processing (NLP). Today, generative AI can learn and synthesize not just human language but other data types including images, video, software code, and even molecular structures.**

**Applications for AI are growing every day. But as the hype around the use of AI tools in business takes off, conversations around ai ethics and responsible ai become critically important. For more on where IBM stands on these issues, please read Building trust in AI.**

**White paperWhy AI governance is a business imperative for scaling enterprise AI**

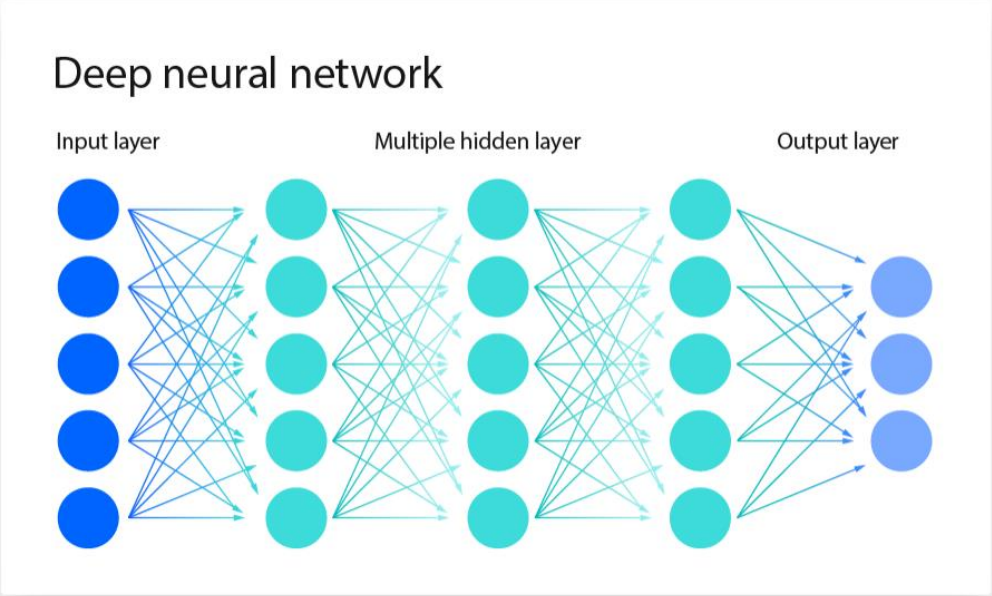
## Deep learning vs. machine learning

**Machine learning and deep learning are sub-disciplines of AI, and deep learning is a sub-discipline of machine learning.**

**Both machine learning and deep learning algorithms use neural networks to 'learn' from huge amounts of data. These neural networks are programmatic structures modeled after the decision-making processes of the human brain. They consist of layers of interconnected nodes that extract features from the data and make predictions about what the data represents.**

**Machine learning and deep learning differ in the types of neural networks they use, and the amount of human intervention involved. Classic machine learning algorithms use neural networks with an input layer, one or two 'hidden' layers, and an output layer. Typically, these algorithms are limited to supervised learning: the data needs to be structured or labeled by human experts to enable the algorithm to extract features from the data.**

**Deep learning algorithms use deep neural networks—networks composed of an input layer, three or more (but usually hundreds) of hidden layers, and an output layout. These multiple layers enable unsupervised learning: they automate extraction of features from large, unlabeled and unstructured data sets. Because it doesn't require human intervention, deep learning essentially enables machine learning at scale.**




## The rise of generative models

**Generative AI refers to deep-learning models that can take raw data—say, all of Wikipedia or the collected works of Rembrandt—and "learn" to generate statistically probable outputs when prompted. At a high level, generative models encode a simplified representation of their training data and draw from it to create a new work that's similar, but not identical, to the original data.**

**Generative models have been used for years in statistics to analyze numerical data. The rise of deep learning, however, made it possible to extend them to images, speech, and other complex data types. Among the first class of AI models to achieve this cross-over feat were variational autoencoders, or VAEs, introduced in 2013. VAEs were the first deep-learning models to be widely used for generating realistic images and speech.**

**"VAEs opened the floodgates to deep generative modeling by making models easier to scale," said Akash Srivastava, an expert on generative AI at the MIT-IBM Watson AI Lab. "Much of what we think of today as generative AI started here."**

**Early examples of models, including GPT-3, BERT, or DALL-E 2, have shown what's possible. In the future, models will be trained on a broad set of unlabeled data that can be used for different tasks, with minimal fine-tuning. Systems that execute specific tasks in a single domain are giving way to broad AI systems that learn more generally and work across domains and problems. Foundation models, trained on large, unlabeled datasets and fine-tuned for an array of applications, are driving this shift.**

**As to the future of AI, when it comes to generative AI, it is predicted that foundation models will dramatically accelerate AI adoption in enterprise. Reducing labeling requirements will make it much easier for businesses to dive in, and the highly accurate, efficient AI-driven automation they enable will mean that far more companies will be able to deploy AI in a wider range of mission-critical situations. For IBM, the hope is that the computing power of foundation models can eventually be brought to every enterprise in a frictionless hybrid-cloud environment.**
**Explore foundation models in watsonx.ai**

# 1.


## Programming

- Spark
- Python 3 Whatever Artificial Intelligence career you're looking to pursue developing a strong knowledge of programming languages is a key skill that you need to harness.
- Programming is essential in a number of AI-based careers such as:
- Machine learning engineer
- Algorithm developer
- Computer vision engineer

- **SLAM engineer**
- **Over the course of our dedicated Object Orientated Programming (OOP) module, you'll learn how to design, implement, test and document programs and gain practical programming experience by solving small scale problems.**
- **Anyone who works in AI will benefit from understanding a range of programming languages, and on the AI pathway of our Computer Science MSc you'll learn a firm grasp of several:**
- **Python**
- **Java**
- **Apache**
- **Pandas**

# 2 .


## Database Modelling, Data Warehousing and Data Processing

- **Employers around the world are searching for Artificial Intelligence experts who have a broad computer science skill set. AI jobseekers must not only manage large amounts of data, but also use machine learning techniques to use it faster and more efficiently.**
- **In our dedicated Data Modelling and Analytics module, you'll:**
- **Get to grips with current database technology**
- **Learn how to design and manipulate databases with relational algebra and SQL**
- **Build an appreciation of non-traditional data types, systems and applications, such as NoSQL databases.**
- **Have plenty of opportunities to put these skills into practice.**
- **Being able to understand and manipulate data is key to making AI systems work.**

# 3.


## Machine Learning

1. **Put simply, Artificial Intelligence enables machines to carry out tasks in a way that we consider 'smart'. Machine learning is the method we use to make this a reality, without telling the machines what to do.**
2. **If your dream role is to be a machine learning engineer, for instance, it would be your job to create machines which can learn by themselves – or be able to unearth patterns hidden in huge amounts of data – without being explicitly programmed to do so.**
3. **One thing is certain: machine learning is changing society forever and, as an Artificial Intelligence expert, it would be your role to push this technology to new heights.**
4. **In our AI and Digital Technology module, you'll see first-hand how this technology is transforming business and manufacturing. In our AI Studio module, you'll learn:**

- **The fundamental theory behind machine learning**
- **The fundamental concepts**
- **Current AI and machine learning techniques**

# 4.


## Knowledge of Intelligent User Interfaces (IUI)

**What do Amazon's Echo range, Ring Video doorbells and Google's Nest Hub all have in common? They're all interactive systems with intelligent interfaces.**

**Autonomous technologies like these carry out tasks for us but also prompt our input and respond to our commands. As systems like these become increasingly capable, Artificial Intelligence experts are challenged to design user interfaces.**

**The ways in which people interact with a system - such as a remote control, touch–screen or voice recognition – must be transparent, understandable and responsive. The essential skill here is recognising human factors. You'll need to master our interactions with AI when designing, using and evaluating IUIs.**

**In our dedicated Intelligent User Interfaces module, you'll learn how to:**

- **Prototype and evaluate an IUI design**

# 5.


## Problem Solving

**AI and computer science more broadly can be seen as a way of solving problems. From small ones such as which piece of code to feed into an AI, to finding automated solutions to global education or health issues.**

**No matter what career route you choose, developing an analytical mind will take you far in Artificial Intelligence – and honing those skills will take practice.**

**Throughout the course you'll be encouraged to do just that. During your dissertation project you'll have the opportunity to apply your knowledge and improve your problem solving capabilities during a substantial piece of independent research.**