**Difference Between Machine Learning and Artificial Intelligence**

Machine Learning and Artificial Intelligence are two closely related but distinct fields within the broader field of computer science. Artificial Intelligence (AI) is a discipline that focuses on creating intelligent machines that can perform tasks that typically require human intelligence, such as visual perception, speech recognition, decision-making, and natural language processing. It involves the development of algorithms and systems that can reason, learn, and make decisions based on input data.

On the other hand, Machine Learning (ML) is a subfield of AI that involves teaching machines to learn from data without being explicitly programmed. ML algorithms can identify patterns and trends in data and use them to make predictions and decisions. ML is used to build predictive models, classify data, and recognize patterns, and is an essential tool for many AI applications.

*The development of AI and ML has the potential to transform various industries and improve people’s lives in many ways. AI systems can be used to diagnose diseases, detect fraud, analyze financial data, and optimize manufacturing processes. ML algorithms can help to personalize content and services, improve customer experiences, and even help to solve some of the world’s most pressing environmental challenges.*

Despite the many benefits of AI and ML, there are still many differences between Machine Learning and Artificial Intelligence as they concerns about the potential risks and challenges associated with these technologies. These include the risk of job displacement, the impact on human autonomy and decision-making, and the potential for AI and ML to be used in harmful ways. As such, it is important to approach the development and use of AI and ML responsibly and ethically and to address the potential risks and challenges associated with these technologies.

**Artificial Intelligence (AI)**

Artificial Intelligence comprises two words “Artificial” and “Intelligence”. Artificial refers to something which is made by humans or a non-natural thing and Intelligence means the ability to understand or think. There is a misconception that Artificial Intelligence is a system, but it is not a system. AI is implemented in the system. There can be so many definitions of AI, one definition can be ***“It is the study of how to train the computers so that computers can do things which at present humans can do better.”***Therefore It is an intelligence that we want to add all the capabilities to a machine that human contains.

To learn more about Artificial Intelligence, you can refer to these articles:

* [Artificial Intelligence | An Introduction](https://www.geeksforgeeks.org/artificial-intelligence-an-introduction/)
* [Impact and Example of Artificial Intelligence](https://www.geeksforgeeks.org/impact-and-example-of-artificial-intelligence/)
* [Top 20 Artificial Intelligence(AI) Applications in 2023](https://www.geeksforgeeks.org/artificial-intelligence-applications/)

**Machine Learning (ML)**

Machine Learning is the learning in which a machine can learn on its own without being explicitly programmed. It is an application of AI that provides the system the ability to automatically learn and improve from experience. Here we can generate a program by integrating the input and output of that program. One of the simple definitions of Machine Learning is ***“Machine Learning is said to learn from experience E w.r.t some class of task T and a performance measure P if learners performance at the task in the class as measured by P improves with experiences.”***

You can refer to these articles to get in-depth knowledge of Machine Learning:

* [Getting Started with Machine Learning](https://www.geeksforgeeks.org/getting-started-machine-learning/)
* [Applications of Machine Learning](https://www.geeksforgeeks.org/machine-learning-introduction/)
* [ML | Introduction to Data in Machine Learning](https://www.geeksforgeeks.org/ml-introduction-data-machine-learning/)

**Artificial Intelligence vs Machine Learning**

Moving ahead, now let’s check out the basic differences between artificial intelligence and machine learning.

| **S.No.** | **ARTIFICIAL INTELLIGENCE** | **MACHINE LEARNING** |
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| 1. | The terminology “Artificial Intelligence” was originally used by **John McCarthy in 1956**, who also hosted the first AI conference. | The terminology “Machine Learning” was first used in **1952 by IBM computer scientist Arthur Samuel**, a pioneer in artificial intelligence and computer games. |
| 2. | AI stands for Artificial intelligence, where intelligence is defined as the ability to acquire and apply knowledge. | ML stands for Machine Learning which is defined as the acquisition of knowledge or skill |
| 3. | AI is the broader family consisting of ML and DL as its components. | Machine Learning is the subset of Artificial Intelligence. |
| 4. | The aim is to increase the chance of success and not accuracy. | The aim is to increase accuracy, but it does not care about; the success |
| 5. | AI is aiming to develop an intelligent system capable of  performing a variety of complex jobs. decision-making | Machine learning is attempting to construct machines that can only accomplish the jobs for which they have been trained. |
| 6. | It works as a computer program that does smart work. | Here, the tasks systems machine takes data and learns from data. |
| 7. | The goal is to simulate natural intelligence to solve complex problems. | The goal is to learn from data on certain tasks to maximize the performance on that task. |
| 8. | AI has a very broad variety of applications. | The scope of machine learning is constrained. |
| 9. | AI is decision-making. | ML allows systems to learn new things from data. |
| 10. | It is developing a system that mimics humans to solve problems. | It involves creating self-learning algorithms. |
| 11. | AI is a broader family consisting of ML and DL as its components. | ML is a subset of AI. |
| 12. | Three broad categories of AI are :   1. Artificial Narrow Intelligence (ANI) 2. Artificial General Intelligence (AGI) 3. Artificial Super Intelligence (ASI) | Three broad categories of ML are :   1. Supervised Learning 2. Unsupervised Learning 3. Reinforcement Learning |
| 13. | AI can work with structured, semi-structured, and unstructured data. | ML can work with only structured and semi-structured data. |
| 14. | AI’s key uses include-   * Siri, customer service via chatbots * Expert Systems * Machine Translation like Google Translate * Intelligent humanoid robots such as Sophia,  and so on. | The most common uses of machine learning-   * Facebook’s automatic friend suggestions * Google’s search algorithms * Banking fraud analysis * Stock price forecast * Online recommender systems, and so on. |
| 15. | AI refers to the broad field of creating machines that can simulate human intelligence and perform tasks such as understanding natural language, recognizing images and sounds, making decisions, and solving complex problems. | ML is a subset of AI that involves training algorithms on data to make predictions, decisions, and recommendations. |
| 16. | AI is a broad concept that includes various methods for creating intelligent machines, including rule-based systems, expert systems, and machine learning algorithms. AI systems can be programmed to follow specific rules, make logical inferences, or learn from data using ML. | ML focuses on teaching machines how to learn from data without being explicitly programmed, using algorithms such as neural networks, decision trees, and clustering. |
| 17. | AI systems can be built using both **structured**and **unstructured**data, including text, images, video, and audio. AI algorithms can work with data in a variety of formats, and they can analyze and process data to extract meaningful insights. | In contrast, ML algorithms require large amounts of structured data to learn and improve their performance. The quality and quantity of the data used to train ML algorithms are critical factors in determining the accuracy and effectiveness of the system. |
| 18. | AI is a broader concept that encompasses many different applications, including **robotics**, **natural language processing**, **speech recognition**, and **autonomous vehicles**. AI systems can be used to solve complex problems in various fields, such as healthcare, finance, and transportation. | ML, on the other hand, is primarily used for**pattern recognition**, **predictive modeling**, and decision-making in fields such as marketing, fraud detection, and credit scoring. |
| 19. | AI systems can be designed to work autonomously or with minimal human intervention, depending on the complexity of the task. AI systems can make decisions and take actions based on the data and rules provided to them. | In contrast, ML algorithms require human involvement to set up, train, and optimize the system. ML algorithms require the expertise of data scientists, engineers, and other professionals to design and implement the system. |