

# Lesson 2: AI Fundamentals

## Lesson Objectives

In this lesson, you will be introduced to Artificial Intelligence fundamentals. You will go over the definitions of AI and Machine Learning and will be introduced to AI in Azure. Upon successful completion of this lesson, you should be able to understand the following:

- Artificial Intelligence Definition
- History of Artificial Intelligence
- Types of Artificial Intelligence
- Machine Learning Definition
- Types of Machine Learning
- Advantages and Disadvantages of AI and ML
- Data Science

# Artificial Intelligence Definition

**Artificial Intelligence** (AI) is a branch of computer science related to creating intelligent systems that simulate human cognitive abilities such as learning, reasoning and problem-solving. AI technology is used to automate tasks, make informed decisions and provide valuable insights by analyzing and processing vast amounts of data.

The field of AI combines principles from computer science, statistics and mathematics, with a heavy emphasis on mathematical algorithms that allow machines to perform intelligent actions. These algorithms enable AI systems to process information, make predictions and adapt to new data, leading to the development of cutting-edge AI applications in various industries.

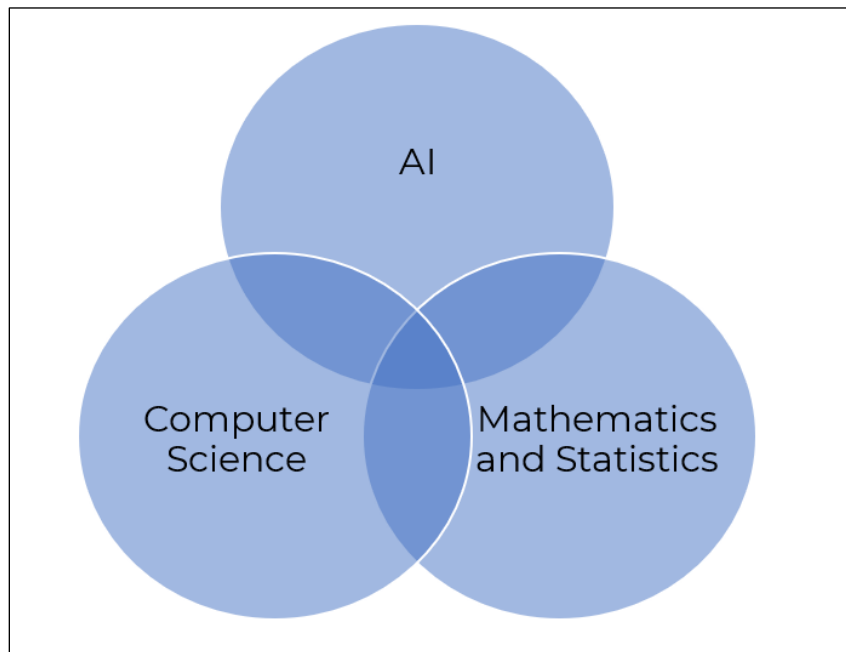


Figure 2-1: Field of AI

## History of Artificial Intelligence

AI is considered the new era of technology. However, researchers in AI found the concept of intelligent machines in Greek Mythology. Here is a brief history of AI.

- In 1956: The term “Artificial Intelligence” was mentioned for the first time by the computer scientist John McCarthy who is also the Father of AI
- In the 1960s and 1970s, the first AI programs were developed but they were limited in their abilities
- In the 1980s, AI experienced a decline known as the "AI winter." This was due to a lack of funding and progress in the field
- In 1997, IBM Deep Blue became the first computer to be a world chess champion
- Nowadays, AI is used in various applications, such as self-driving cars, voice-activated virtual assistants and medical diagnosis. AI is also being used in areas like finance, retail, and education

# Types of Artificial Intelligence

AI can be differentiated based on two primary characteristics: capabilities and functionalities.

Capabilities: This classification is based on the level of intelligence displayed by an AI system.

- **Narrow AI:** It is also known as weak AI. This system is designed to perform a single task exceptionally well, such as recommendation systems on streaming websites
- **General AI:** This type of AI can solve a wide range of problems, much like a human mind
- **Strong AI:** These systems have the potential to surpass human intelligence in multiple tasks, such as decision-making and problem-solving

*Figure 2-2: AI based on capabilities vs functionalities*

## Data Science

**Data science** is a field of study that applies scientific methods, algorithms and systems to analyze and extract valuable insights and knowledge from data. Typically, this data is presented in tables, like banking records. While data science and AI are related fields, they have different focuses and goals. Data science is primarily concerned with analyzing and extracting insights and knowledge from data, typically presented in tables or other structured formats that can help humans make informed decisions. In contrast, AI is focused on building computer systems that can perform tasks that would typically require human intelligence, such as recognizing speech, understanding natural language, or making decisions.

Data science can convert raw data into meaningful information, knowledge and insights using visualizations that can help to enhance decision-making. It has many applications, such as healthcare, finance, marketing and sports. For instance, in healthcare, data scientists can use data to develop new treatments, improve patient outcomes and support clinical decision-making. In finance, data science helps to detect fraud, evaluate investments and manage risks, while in sports, it is used to improve player performance, game strategy and fan engagement.