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Introduction to
Artificial Intelligence
A Beginner's Guide

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INTRODUCTION

A decade ago, the term "Artificial Intelligence" would make most people think of futuristic, sci-fi machines or sentient, self-aware robots.
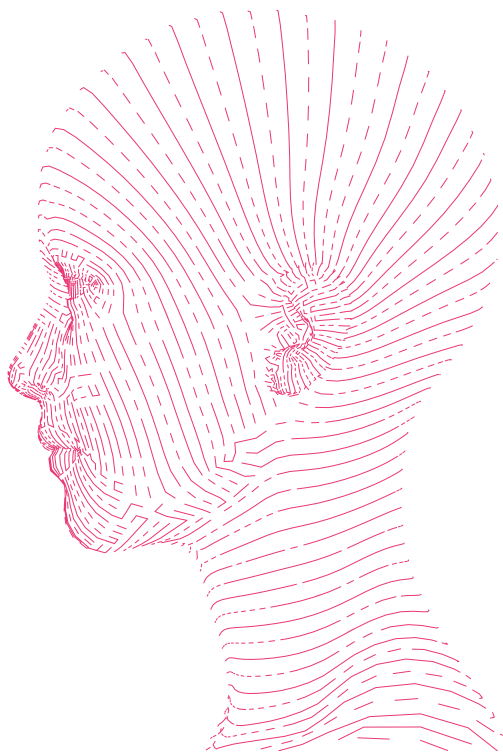
Artificial intelligence is today one of the most sought-after areas in business and industries across the world. As the amount the data created continues to rise globally, AI forms the crux of the ongoing digital transformation happening in all aspects of our professional and personal lives.

Once a mostly research-oriented field, AI has come out of the lab and is fuelling real-life applications, life in more ways than one. From aiding self-driving cars, transforming healthcare, and predicting legal outcomes to providing media and shopping suggestions, improving the video gaming experience, and advancing space exploration, AI is playing a more significant and more diverse role in our lives than ever before.

With more and more companies getting on the AI bandwagon, they are facing an increased need to acquire skilled talent who can help them capitalize on these technologies. This is opening up new career paths, not just in AI, but also in AI-adjacent fields such as computer science, math, and statistics.

Undoubtedly, this is an excellent time for career aspirants and opportunists to upskill in the technologies that drive the future of tech. Your first step in that direction is to understand the field of AI and the basics of it. Simplilearn's Artificial Intelligence guide for beginners walks you through the current AI landscape, provides the key fundamentals of AI, and offers practical guidelines on why and how you can be a part of the AI revolution.

THE RISING POPULARITY OF ARTIFICIAL INTELLIGENCE

One of the main reasons for AI's tremendous growth is the abundance of data. While nearly 90 percent of the world's data has been created in the last decade. According to IDC's predictions, one hundred seventy-five zettabytes (175 trillion gigabytes) of new data will be generated around the world by 2025.

Because AI thrives on data, it has led to more intense research into how the technology can be harnessed to process, analyze, and act upon such large swaths of data. Peaked interest in this field had led to breakthroughs and advances that are showing their potential to generate tremendous change.

Plus, the infrastructure speed, availability, and sheer scale has made it easier to crunch complex algorithms to solve more ambitious problems at a fraction of the cost.

On top of everything, there's a broader awareness of AI among the general population today, thanks to the natural language-powered virtual assistants such as Siri and Alexa. These factors taken together have boosted the popularity as well as the career viability of Artificial Intelligence in recent times.
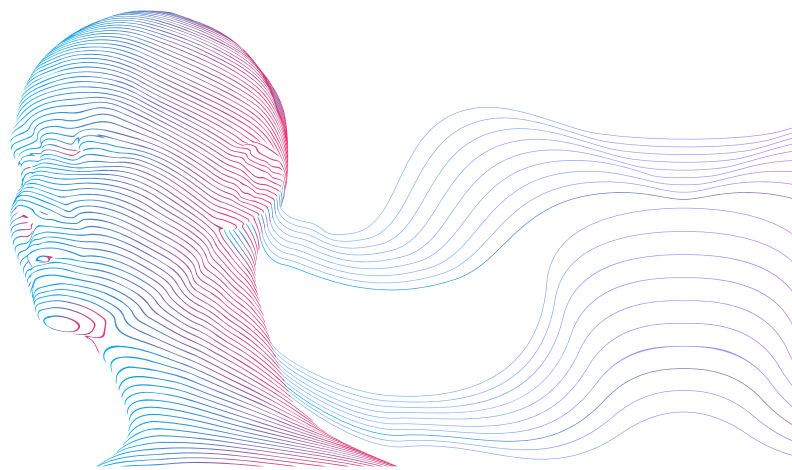
THE BASICS OF AI

In this section, we'll talk about what is AI, different levels of AI, its applications, and its future.

What is AI?

The term 'Artificial Intelligence' was coined in the 1950s when scientists started to explore the capabilities of computers to solve problems on their own. The concept of AI may have changed over time. However, at its core, AI has always been about building machines capable of thinking like humans and having the ability to perform cognitive functions such as observing, learning, reasoning, and solving problems.

There are three broad levels of AI, namely:

General AI: An artificial intelligence that can perform cognitive tasks with the same level of accuracy as a human brain is said to be General AI.

Narrow AI: This refers to applications where the machine can perform a specific task better than a human. Most of the current research in AI is happening in this area.

Strong AI: This level of AI enables machines to outperform the human brain in many tasks.

Types of Artificial Intelligence

1. Purely Reactive

These machines cannot form "memories", hence they don't have any past experiences or data to work with. They specialize in performing just one specific task. For example, programmable appliances that perform specific tasks such as automatic coffeemakers or washing machines fall under this category.

3. Theory of Mind

These machines are closer to the human brain in the way they can interpret human emotions and have a cognitive understanding based on the environment, facial features, etc. Though this type of AI has not practically arrived yet, there's a lot of research taking place around it.

2. Limited Memory

These machines keep collecting data they encounter and add it to their memory. They rely on past experiences when performing a function; however, they can only use these experiences to make a decision but can't form new ideas based on them. Hence they are "limited" in the way they utilize their memory. Some examples of this include self-driving cars, Netflix recommendations, and restaurant suggestions.

4. Self-Aware

This is the class of super-intelligent and self-aware machines that drive the future of AI and are seen as the next-gen of technology. They will be able to imitate many human reactions and will likely use internal models to simulate their actions.

AI Implementations

Artificial intelligence can be implemented in the form of:

✅ **Deep learning**

✅ **Machine learning**

Deep learning is a sub-field of machine learning, and quite similar to it, except that deep learning uses numerous layers of algorithms called an artificial neural network. It mimics the brain's neural network, which also has a layered architecture. Deep learning involves using these layers to look for patterns in the data. Google's LeNet model for image recognition is a deep learning application that counts 22 layers of the network.

Machine learning is the subset of AI that deals with the algorithms that learn from examples and previous experiences. It involves identifying patterns in data and utilizing them for future predictions.

The Applications of AI

With AI currently being used in almost every industry, its applications today are wide-ranging. While it's not surprising that AI is actively being leveraged in business sectors such as healthcare, medicine, and robotics, there are also industries entirely unrelated for AI and computer science that are taking advantage of its innovations. According to McKinsey, AI is slated to create 600 billions of dollars of value in retail. It has the potential to drive a 50% more incremental value in banking than other analytics techniques. The potential revenue jump for the transport and logistic sector is 89%.

The industries where AI is currently being implemented include (but is not limited to):

♥	Healthcare	🛡	Cybersecurity
🏭	Manufacturing	📢	Marketing
🏛	Banking	🎓	Education
⛑	Construction	👤	Human resources
🛒	Ecommerce	🚚	Transport

Considering that AI fuels a constellation of mainstream technologies that are having a substantial impact on everyday lives, AI's application area is only going to grow further.

The Future of AI

Given the pace of adoption and popularity of AI, it is headed towards a future where:

Automated transportation will become more common.

There will be an increased prevalence of smart cities where vehicles, phones, and home appliances will be run by AI.

Human augmentation, where robots — as tech billionaire and Tesla head, Elon Musk puts it — would "be able to do everything better than us..."

Robots will perform jobs that are potentially dangerous to humans, such as defusing bombs, lifting heavy objects, working in high-risk factories, or handling hazardous substances, etc.

As the AI revolution continues to gather steam, we'll witness disruptive innovations that will test the boundaries of our imagination.

AI TERMS TO KNOW ABOUT

In this section, we'll briefly introduce you to some basic AI terms that you'll encounter frequently while delving into this subject.

Heuristic Search Techniques – This is a problem-solving method that narrows down the search to optimal solutions by eliminating inaccurate options, hence increasing the speed and precision of the process.

Black Box - When an AI system offers useful outputs, yet users don't clearly understand its decisions and operations, it is referred to as Black Box AI.

Explainable AI (XAI) - As the name suggests, this term refers to AI applications and models whose purpose, rationale, and decision-making process is easily comprehensible to an average person.

Robotic process automation (RPA) - It is an automation technique that uses AI and ML capabilities to perform mundane, repetitive tasks once completed by humans.

Natural Language Processing (NLP) - Natural language processing is the subfield of AI that's focused on the interactions between human language and computers.

Tensorflow - TensorFlow is a free and open-source collection of software tools developed by Google. It finds the most use in differentiable programming, and data flow across a range of tasks.

Forward chaining - This is a condition where an AI system needs to move "forward" from a problem to come up with a solution. The AI uses a rule-based system to determine which "if" rules it would apply to the problem.

Backward chaining - This is a situation where an AI system works backward from the desired output to analyze and determine data or evidence to support those outputs.

Inductive reasoning - Inductive reasoning is an AI concept that uses proof and data to create statements and rules.

Turing Test – This test was created by computer scientist Alan Turing to check the machines' ability to exhibit intelligence equal to or indistinguishable from that of a human

BUILDING A CAREER IN AI

Today, AI is one of the fastest-growing skills in the world and a job area with high demand and equally high salaries. According to the World Economic Forum (WEF), AI is the fastest-growing skill on LinkedIn.

A career in AI can be accomplished in a wide range of settings — from private companies, public organizations, government agencies to healthcare units, startups, and even the military — now that all types of organizations are trying to capitalize on AI-related technologies. Some of the most popular AI job roles include:

- Data scientists

- Data engineers

- Machine learning engineers

- Cybersecurity experts

- Systems architects

- UI/UX designers

- Cloud computing specialists

If you're exploring career options in this emerging field or looking to upgrade your skills, and advance your career to the next level, below are the top skills you'll want to arm yourself with.

Computer programming skills - Employers look for computer science or mathematics degree with working knowledge of modern programming languages like Python, Java, SQL, Scala, and Perl when hiring for roles such as machine learning engineer, data scientist, and data engineer.

Software skills - These are skills most machine learning engineers are expected to possess. These professionals should have an understanding of software development methodology, agile practices, and must be well-versed with the full range of modern software development tools right from IDEs like Visual Studio, Eclipse, and IntelliJ to the elements of a continuous integration pipeline.

Data skills - Aspiring data engineers and data scientists should have in-depth knowledge of data mining, data warehouse design, and various BI technologies. At the same time, they must be familiar with data platforms and tools, including Hadoop, Pig, Hive, Spark, and MapReduce. Being able to work on cloud tools like Amazon's S3, and the ability to understand unstructured data are also prized skills.

Besides these skills, excellent communication and analytical skills, and certifications in AI technologies and data science are needed to propel you into a career in this thriving field.
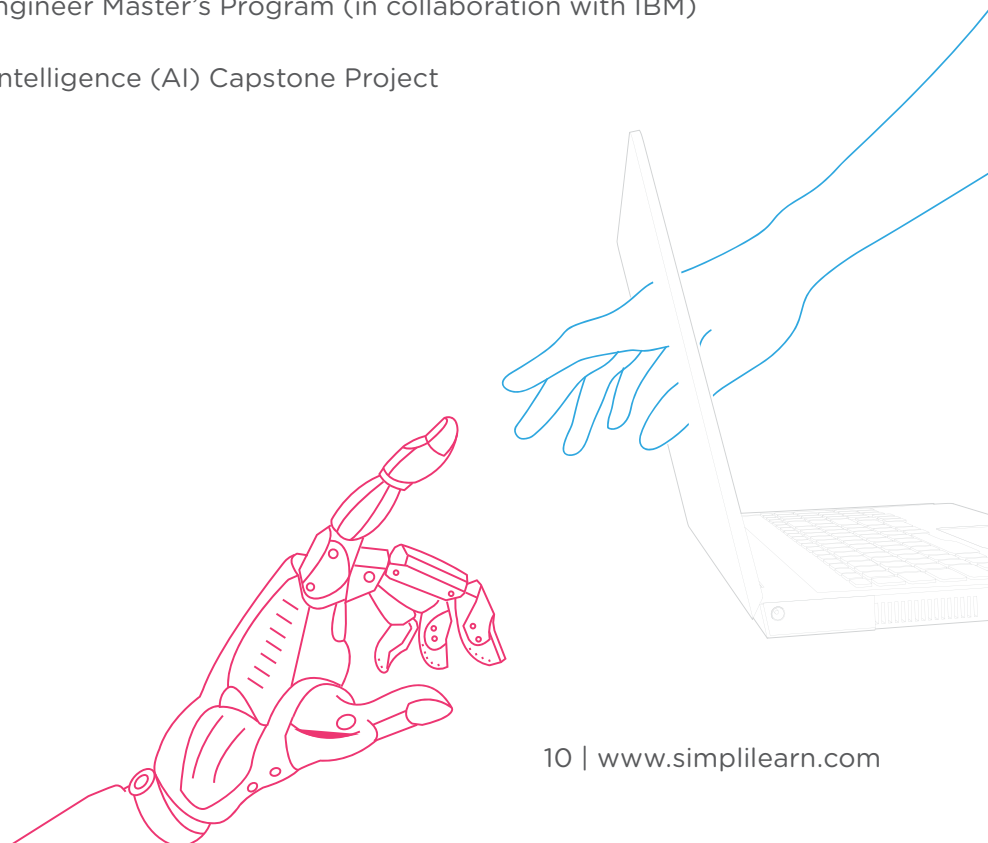
GET STARTED TODAY

AI has touched practically every industry, and an increasing number of organizations are joining the race to employ AI-related skills in some form or other. This has led to the fast and furious pace of demand for AI talent across the world, and if you want to take advantage of this scenario and up your skills, now is the time. But what if you don't the time or the luxury to become a full-time student? Simplilearn's e-learning courses are designed especially for learners like you.

Our range of expert-conducted courses are extremely detailed and will help you master every AI-related concept and framework effectively, at your own pace, while you can still be a part of the workforce. Apart from learning the fundamental concepts, you will also get the opportunity to apply your skills to solve real-world problems through industry-oriented projects. Get started with one of our AI courses today and give your career an exciting new turn!

AI courses we offer:

- Introduction to Artificial Intelligence Course

- Machine Learning Certification Course

- Artificial Intelligence Engineer Master's Program (in collaboration with IBM)

- Simplilearn's Artificial Intelligence (AI) Capstone Project

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