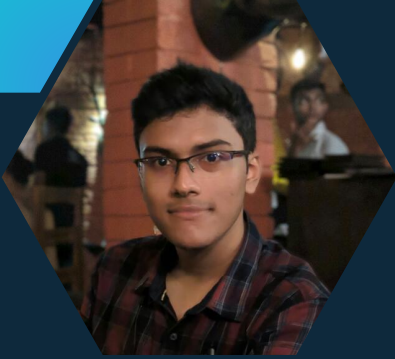




Python Workshop





Hello!

I am Soumotanu
Mazumdar



A decorative pattern of hexagons in various shades of blue and cyan on the left side of the slide. Some hexagons contain icons: a lightbulb, a thumbs up, a network of nodes, a smartphone, a magnifying glass, a gear, and a speech bubble.

1

What is programming?

Let's start with a basic introduction of what programming is.



Programming is how you get computers to solve problems.

Programming is a creative task. With the right skills and experience, a programmer can craft software to solve an unlimited number of problems – from telling you when your next train will arrive to playing your favourite music. The possibilities are constrained only by your imagination.



A decorative pattern of hexagons in various shades of blue and cyan. Some hexagons contain icons: a lightbulb, a thumbs up, a smartphone, a magnifying glass, and a gear. A large cyan hexagon in the center-left contains the number '2'.

2

What exactly is a programming language?

Programming languages are the tools we use to write instructions for computers to follow.



Low-Level vs. High-Level Programming Languages


Low-Level

Low-level programming languages are closer to machine code, or binary. Therefore, they're more difficult for humans to read, still easier than 1s and 0s.

High-level

High-level programming languages are closer to how humans communicate. They use words that are closer to the words we use in our everyday lives.





Most popular programming languages

Python

Python is a versatile, general-purpose programming language. It is a great first language to learn.

C#

It can be used for a wide variety of applications, including game development, enterprise software, mobile apps, and more.

R

R is a statistical programming language popular among data scientists. It's used data analysis and creating data visualizations.

Java

Java can be used for many things, including mobile applications, software development, and large systems development.

C++

C++ is one of the most powerful programming languages and is used in a wide range of industries.

Swift

Swift is Apple's programming language and is a must if you plan to develop applications for iOS and MacOS.

JavaScript

JavaScript is a front-end and back-end language that enables web, game, and mobile applications.

PHP

PHP is a widely-used server-side language. It's a great choice if you're interested in building dynamic web applications.

Kotlin

Kotlin is an open-source programming language developed by JetBrains. It's popular for Android development.

A decorative pattern of hexagons in various shades of blue and cyan on the left side of the slide. Some hexagons contain icons: a lightbulb, a thumbs up, a smartphone, a magnifying glass, and a gear. A network diagram with a central node and five peripheral nodes is also visible.

3

Python

Python is a high-level general-purpose programming language.



Advantages of Python

- ◇ Beginner friendly
- ◇ Strong demand
- ◇ Great support and large community
- ◇ Doesn't take long to learn
- ◇ Versatile
- ◇ Extensive libraries and frameworks

So yes, if you're looking to get started in programming, Python is a great choice.






Compiler vs. Interpreter

Compiler

A compiler is a program that reads a program written in the high-level language and converts it into machine language and reports the errors in the program. It converts the entire source code in one go or could take multiple passes, but at last, the user gets the compiled code ready to execute.

Interpreter

Interpreters and compilers are very similar in structure. The main difference is that an interpreter directly executes the instructions in the source programming language. An interpreter will typically generate an efficient intermediate representation and immediately evaluate it.



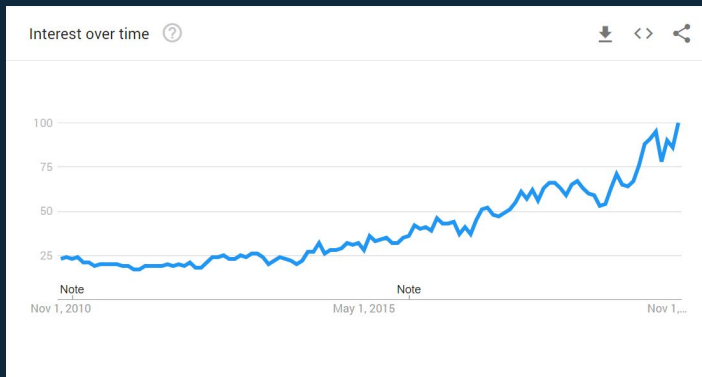


Is Python an interpreted Language?

For the most part, Python is an interpreted language and not a compiled one, although compilation is a step. Python code, written in .py file is first compiled to what is called bytecode (discussed in detail further) which is stored with a .pyc or .pyo format.



Python Popularity



Worldwide, Nov 2020 compared to a year ago:

Rank	Change	Language	Share	Trend
1		Python	30.8 %	+1.8 %
2		Java	16.79 %	-2.3 %
3		JavaScript	8.37 %	+0.3 %
4		C#	6.42 %	-0.9 %
5		PHP	5.92 %	-0.2 %
6		C/C++	5.78 %	-0.2 %

As you can see, Python has been slowly gaining popularity and now it can be considered to be the most popular programming language in the world.



Python lets you build many types of programs

- ◇ Business apps to capture, analyze, and process data.
- ◇ Dynamic web apps that a web browser can access.
- ◇ Games in both 2D and 3D.
- ◇ Financial and scientific apps.
- ◇ Cloud-based apps.
- ◇ Mobile apps.





4

Artificial Intelligence

Artificial intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think like humans and mimic their actions.



Artificial Intelligence vs Machine Learning vs Data Science

Artificial Intelligence

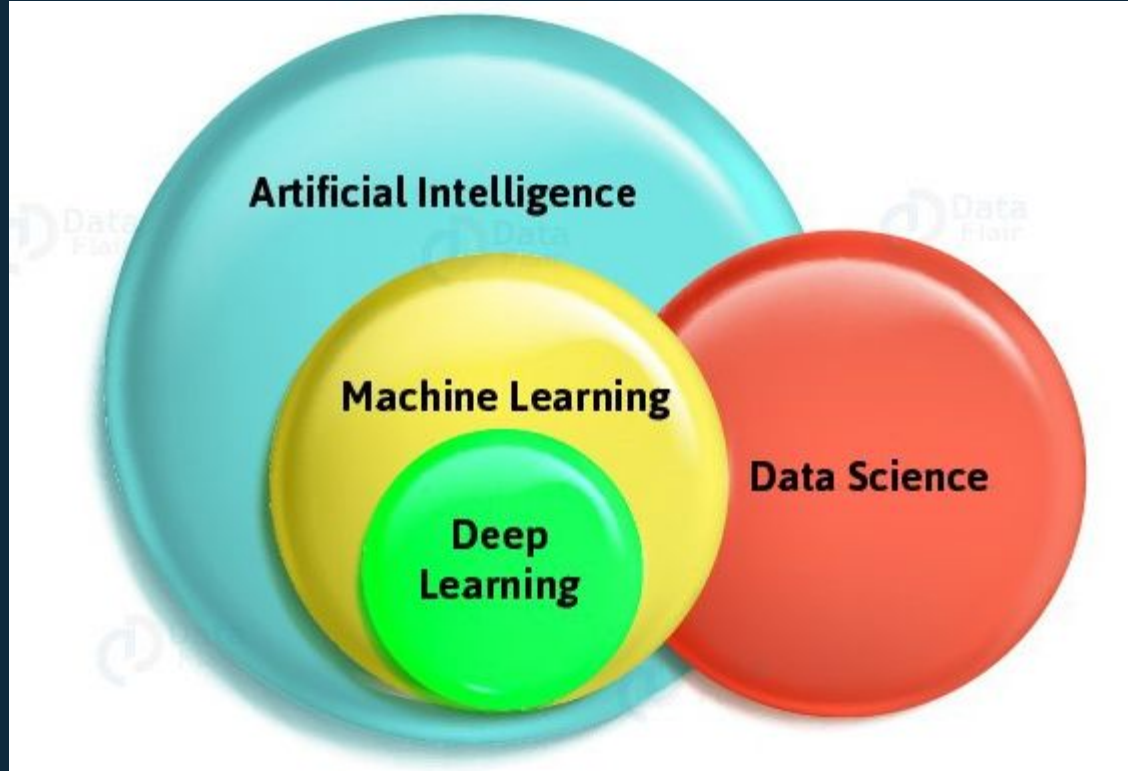
Artificial intelligence can be loosely interpreted to mean incorporating human intelligence to machines. Whenever a machine completes tasks based on a set of stipulated rules that solve problems, such a behavior is what is called artificial intelligence.

Machine Learning

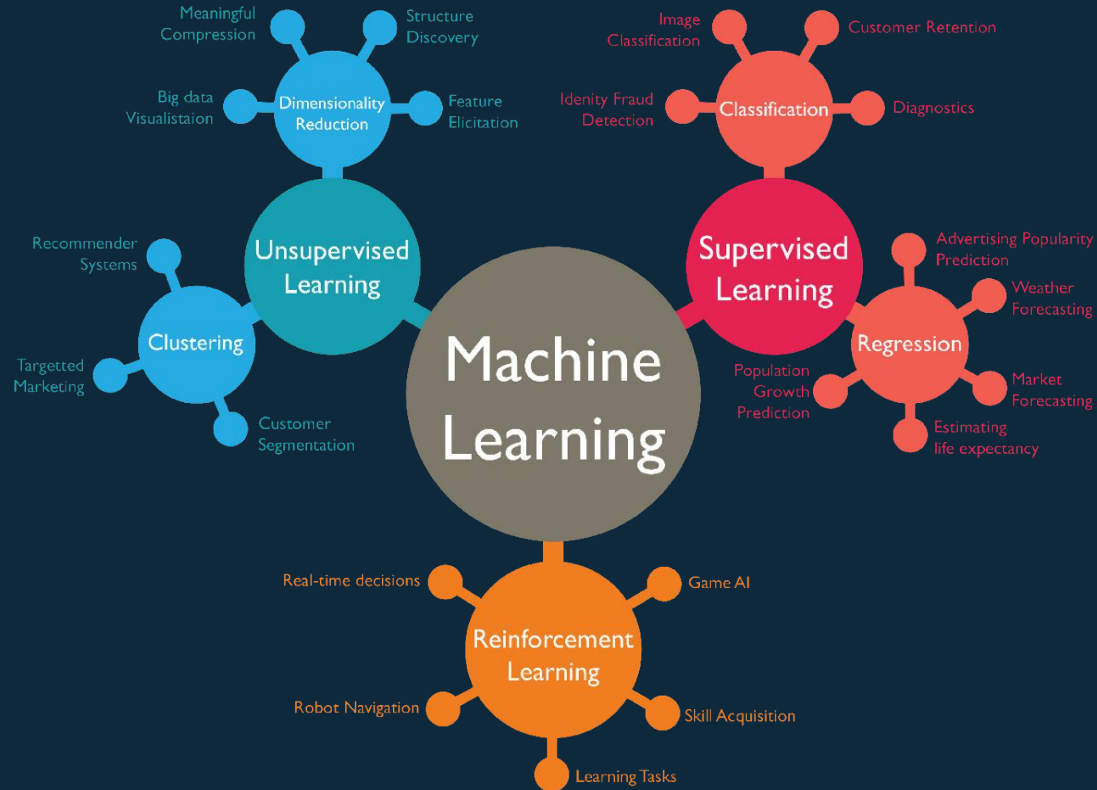
As the name suggests, machine learning can be loosely interpreted to mean empowering computer systems with the ability to “learn”. ML is a subset of artificial intelligence; in fact, it’s simply a technique for realizing AI.

Data Science

It is distinguished from the other two fields because its goal is an especially human one: to gain insight and understanding. The main distinction is that in data science there’s always a human involved in Data Science.



Types of Machine Learning

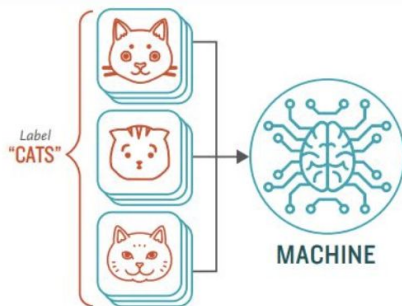


Supervised Learning

How Supervised Machine Learning Works

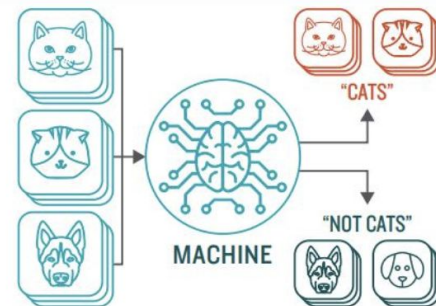
STEP 1

Provide the machine learning algorithm categorized or "labeled" input and output data from to learn

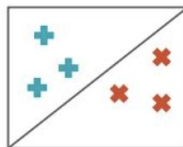


STEP 2

Feed the machine new, unlabeled information to see if it tags new data appropriately. If not, continue refining the algorithm

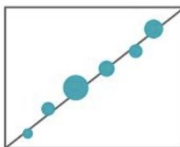


TYPES OF PROBLEMS TO WHICH IT'S SUITED



CLASSIFICATION

Sorting items into categories



REGRESSION

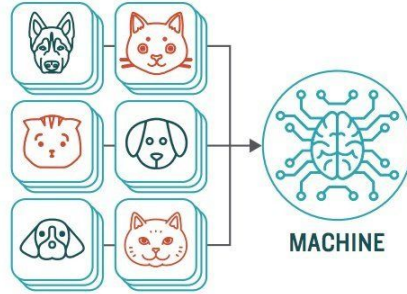
Identifying real values (dollars, weight, etc.)

Unsupervised Learning

How **Unsupervised** Machine Learning Works

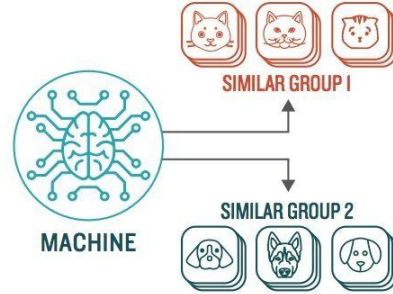
STEP 1

Provide the machine learning algorithm uncategorized, unlabeled input data to see what patterns it finds

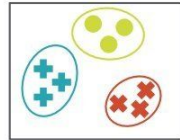


STEP 2

Observe and learn from the patterns the machine identifies



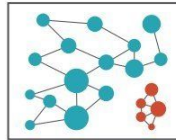
TYPES OF PROBLEMS TO WHICH IT'S SUITED



CLUSTERING

Identifying similarities in groups

For Example: Are there patterns in the data to indicate certain patients will respond better to this treatment than others?



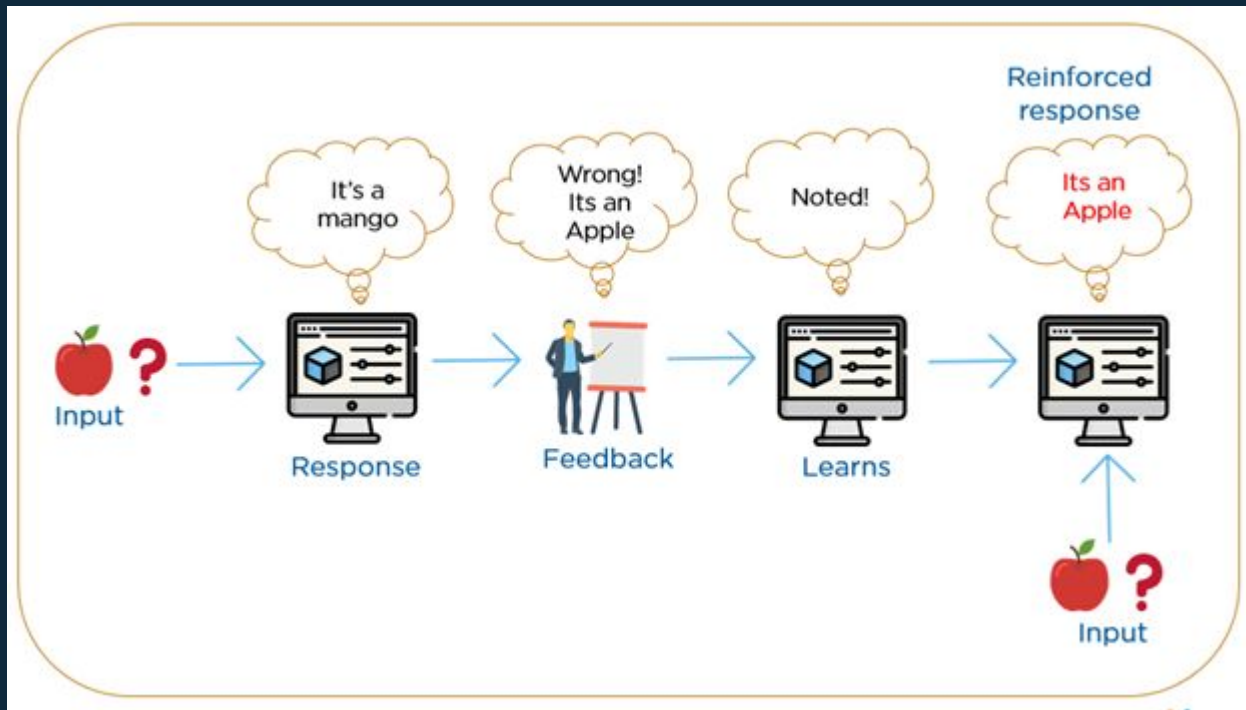
ANOMALY DETECTION

Identifying abnormalities in data

For Example: Is a hacker intruding in our network?



Reinforcement Learning





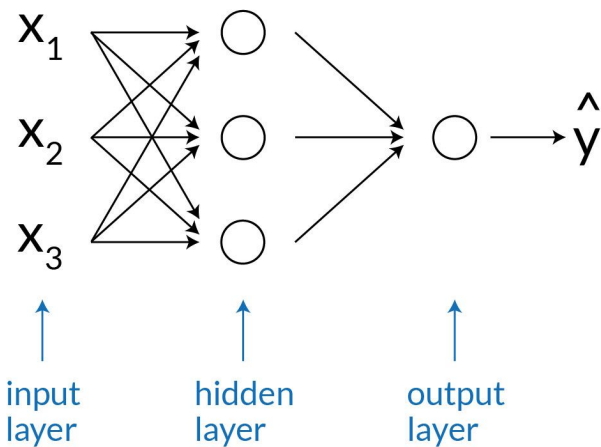
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Neural Network

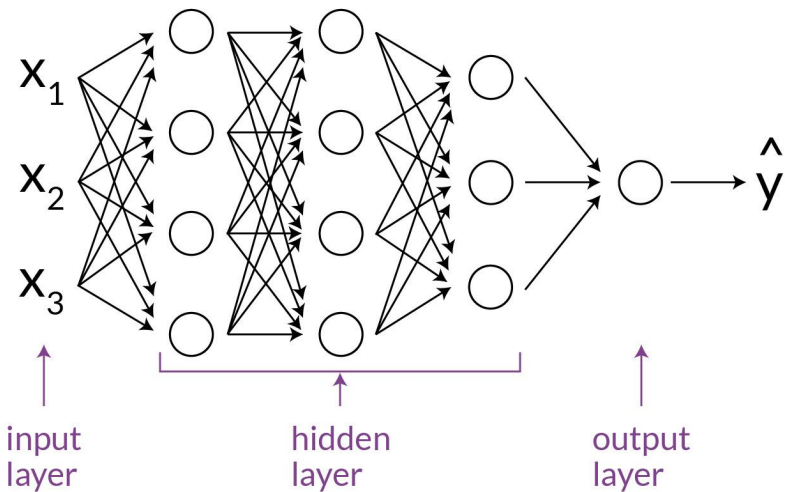
Artificial neural networks, usually simply called neural networks, are computing systems vaguely inspired by the biological neural networks that constitute animal brains. An ANN is based on a collection of connected units or nodes called artificial neurons, which loosely model the neurons in a biological brain.

Neural Networks

Shallow Neural Network




Deep Neural Network





Salaries for Python Developers

	Entry-Level	Mid-Level	Experienced	US	UK
Python Developer	₹430,000	₹900,000	₹1,500,000	\$120,000	£60,000
Web Developer	₹350,000	₹720,000	₹1,600,000	\$78,000	£45,000
Machine Learning	₹500,000	₹780,000	₹1,600,000	\$140,000	£50,000





Thanks!

Any questions?

