

First Session :

Introduction to Machine Learning

Session Objective :

The aim of this session is to provide a comprehensive introduction to the general concepts of machine learning and introduce key terminology. This knowledge will serve as a foundation for subsequent sessions.

Recap of the Roadmap (Already Introduced in the Info Session)

Review the key topics covered in the previous session to establish context and continuity.

Introduction to Machine Learning :

Explain the fundamental differences between Machine Learning (ML) and Deep Learning (DL).

Clarify the real meaning of Machine Learning as a subset of Artificial Intelligence (AI).

Types of Datasets :

Discuss different types of datasets used in machine learning, such as structured, unstructured, and semi-structured data.

Machine Learning Types :

Provide an overview of the various types of machine learning, including supervised, unsupervised, and reinforcement learning.

Applications of Machine Learning :

Explore real-world applications of machine learning across different domains, such as healthcare, finance, and natural language processing.

Machine Learning Life Cycle :

Describe the stages of a typical machine learning project, including data collection, preprocessing, model selection, training, evaluation, and deployment.

Traditional Programming vs. Machine Learning :

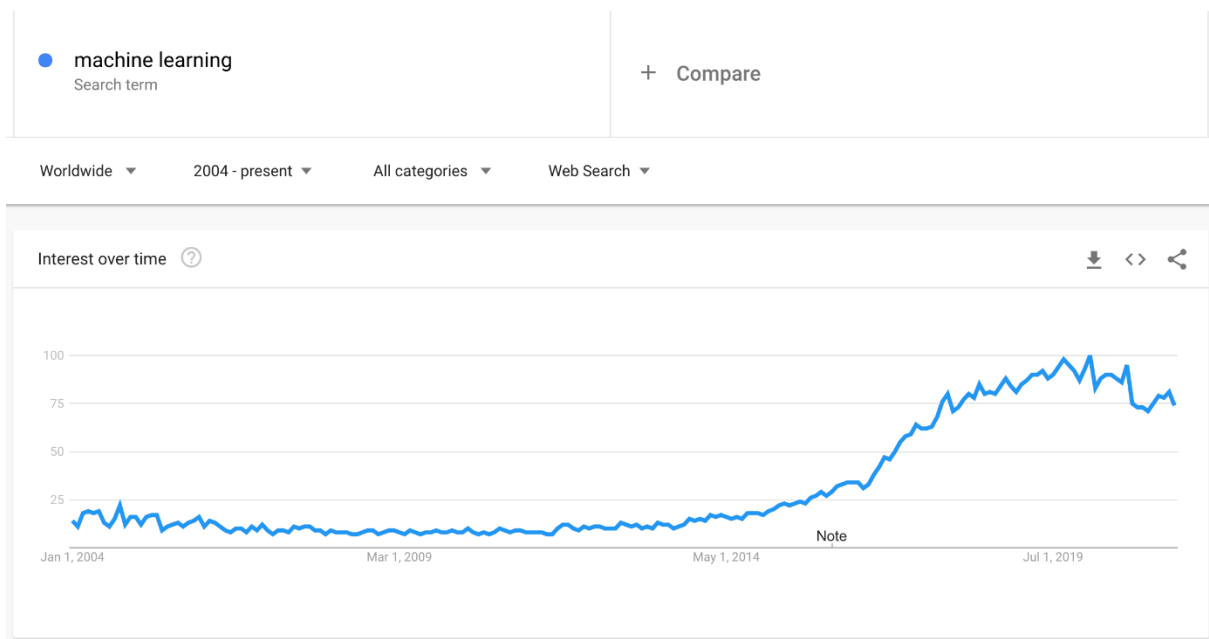
Compare and contrast traditional programming approaches with machine learning, highlighting the advantages and limitations of each.

Conclusion



What is machine learning? :

The term 'machine learning' is one of the most popular and frequently used terms of today. There is a nontrivial possibility that you have heard this term at least once if you have some sort of familiarity with technology, no matter what domain you work in. The mechanics of machine learning, however, are a mystery to most people. For a machine learning beginner, the subject can sometimes feel overwhelming. Therefore, it is important to understand what machine learning actually is, and to learn about it step by step, through practical examples.



A child's brain :

A child's brain and senses perceive the facts of their surroundings and gradually learn the hidden patterns of life which help the child to craft logical rules to identify learned patterns. The learning process of the human brain makes humans the most sophisticated living creature of this world. Learning continuously by discovering hidden patterns and then innovating on those patterns enables us to make ourselves better and better throughout our lifetime. Superficially, we can draw some motivational similarities between the learning process of the human brain and the concepts of machine learning. (ML)

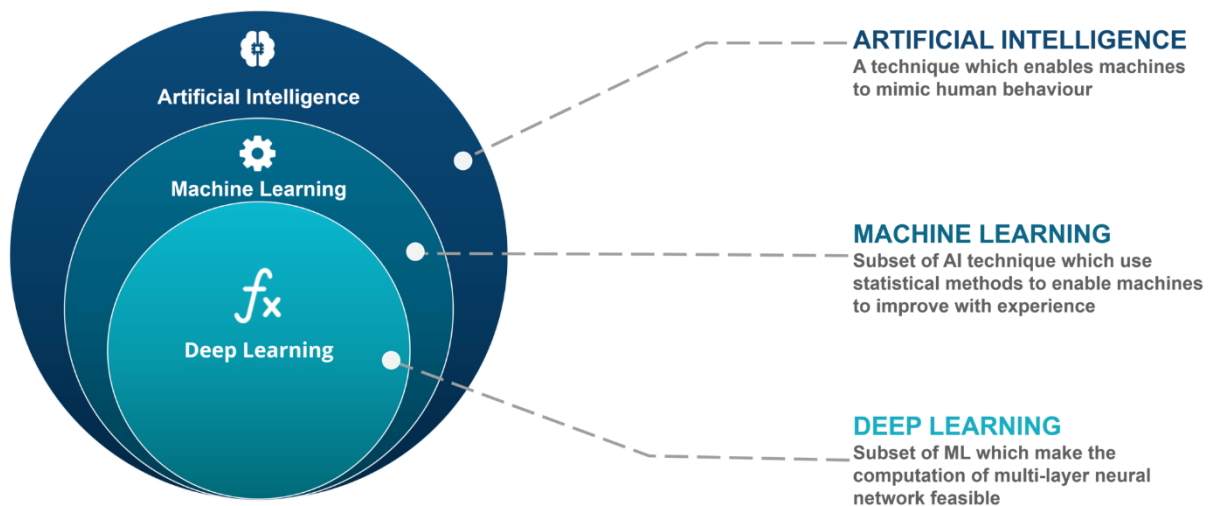
A human brain :

The human brain perceives things from the real world, processes the perceived information, makes rational decisions, and performs certain actions based on



circumstances. This is what we called behaving intelligently. When we program a facsimile of the intelligent behavioral process to a machine, it is called artificial intelligence (AI).

A diagram showing the relationships between AI, ML, deep learning, and data science:



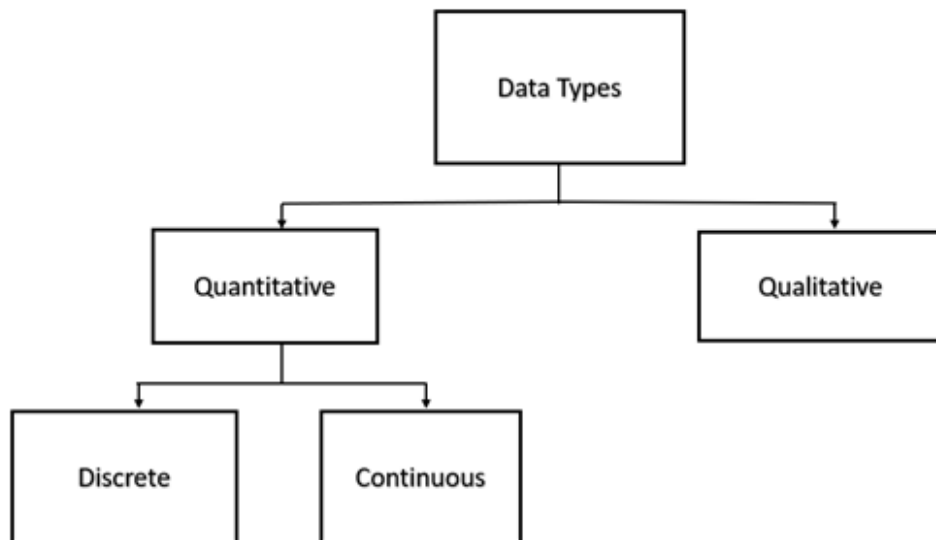
Machine learning application :

You can use machine learning in many ways: To predict the likelihood of disease from a patient's medical history or reports. To leverage weather data to predict weather events. To understand the sentiment of a text. To detect fake news to stop the spread of propaganda. Finance, economics, earth science, space exploration, biomedical engineering, cognitive science, and even fields in the humanities have adapted machine learning to solve the arduous, data-processing heavy problems of their domain.

Data Types In Machine Learning :

Data Types Are A Way Of Classification That Specifies Which Type Of Value A Variable Can Store And What Type Of Mathematical Operations, Relational, Or Logical Operations Can Be Applied To The Variable Without Causing An Error. In Machine Learning, It Is Very Important To Know Appropriate Datatypes Of Independent And Dependent Variable. As It Provides The Basis For Selecting Classification Or Regression Models. Incorrect Identification Of Data Types Leads To Incorrect Modeling Which In Turn Leads To An Incorrect Solution. Here we Will Be Discussing Different Types Of Data Types With Suitable Examples. Different Types Of Data Types The Data Type Is Broadly Classified Into : 1-Quantitative 2-Qualitative





1. Quantitative Data Type: –

This Type Of Data Type Consists Of Numerical Values. Anything Which Is Measured By Numbers. E.G., Profit, Quantity Sold, Height, Weight, Temperature, Etc. This Is Again Of Two Types

A.) Discrete Data Type: –

The Numeric Data Which Have Discrete Values Or Whole Numbers. This Type Of Variable Value If Expressed In Decimal Format Will Have No Proper Meaning. Their Values Can Be Counted.

E.G.: – No. Of Cars You Have, No. Of Marbles In Containers, Students In A Class, Etc.

B.) Continuous Data Type: –

The Numerical Measures Which Can Take The Value Within A Certain Range. This Type Of Variable Value If

Expressed In Decimal Format Has True Meaning. Their Values Can Not Be Counted But Measured. The Value Can Be Infinite.

E.G.: – Height, Weight, Time, Area, Distance, Measurement Of Rainfall, Etc.

2. Qualitative Data Type: –

These Are The Data Types That Cannot Be Expressed In Numbers. This Describes Categories Or Groups And Is Hence Known As The Categorical Data Type. This Can Be Divided Into:-



A. Structured Data:

This Type Of Data Is Either Number Or Words. This Can Take Numerical Values But Mathematical Operations Cannot Be

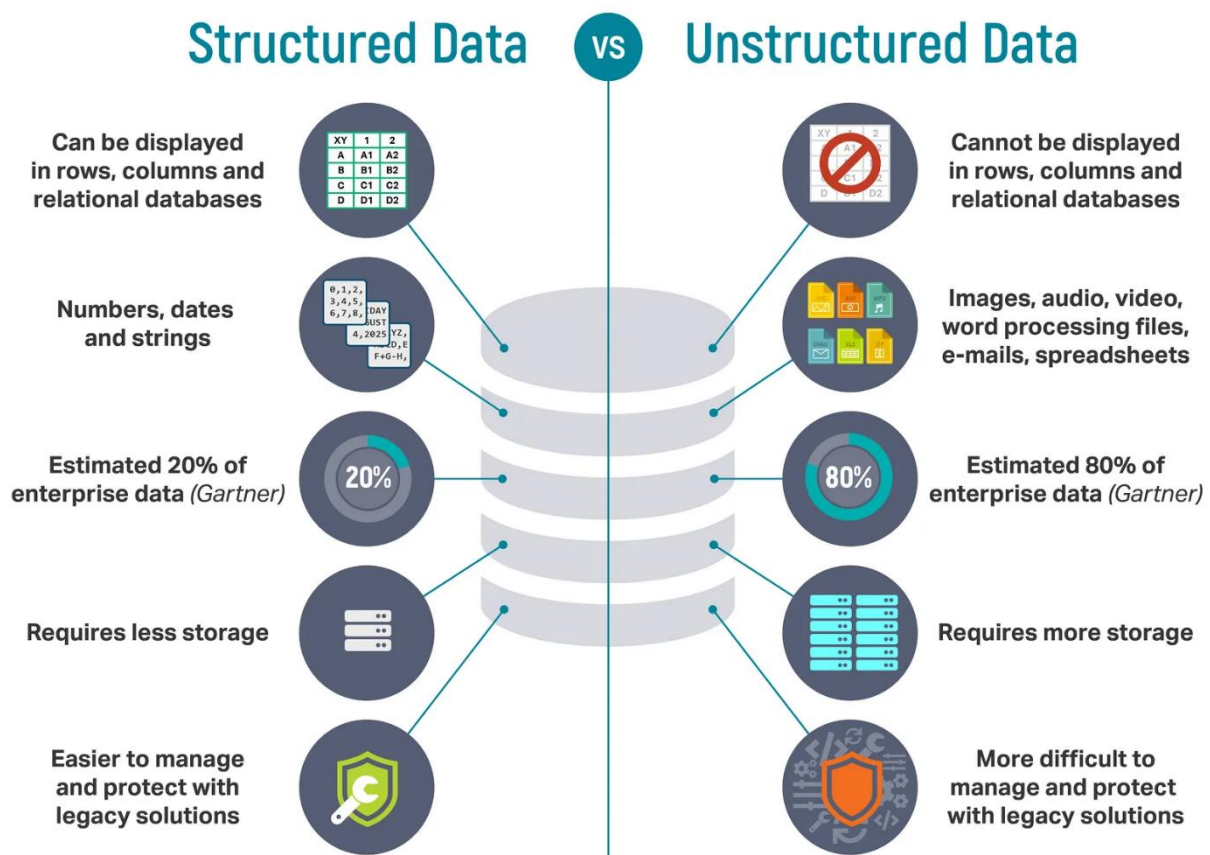
Performed On It. This Type Of Data Is Expressed In Tabular Format.

E.G.) Sunny=1, Cloudy=2, Windy=3 Or Binary Form Data Like 0 Or 1, Good Or Bad, Etc.

B. Unstructured Data:

This Type Of Data Does Not Have The Proper Format And Therefore Known As Unstructured Data. This Comprises Textual

Data, Sounds, Images, Videos, Etc.

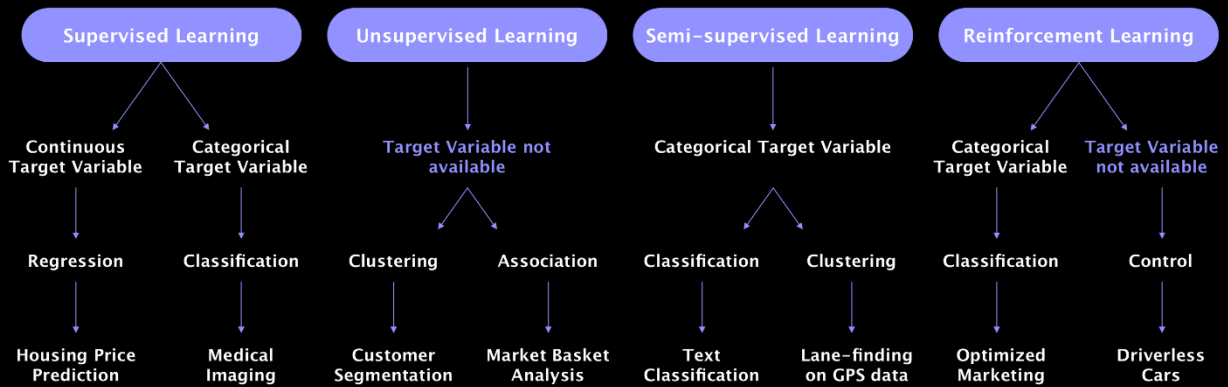


Machine learning types :

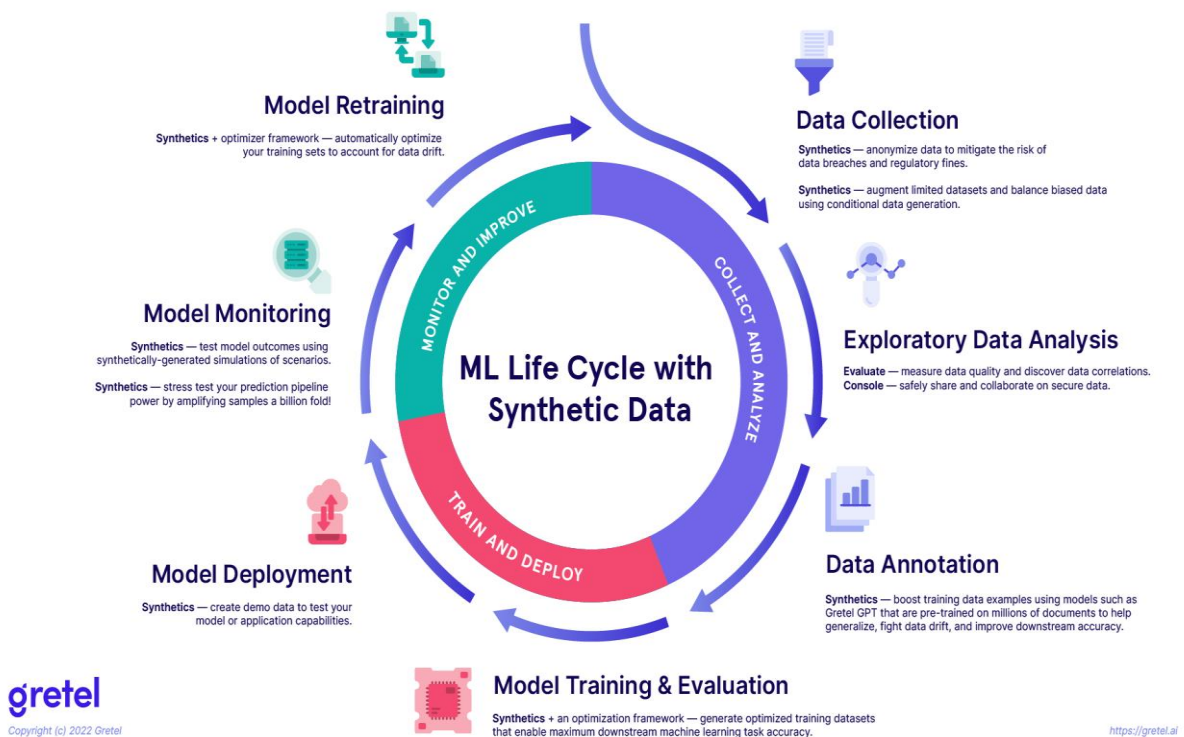
These ML algorithms help to solve different business problems like Regression, Classification, Forecasting, Clustering, and Associations, etc. Based on the methods and way of learning, machine learning is divided into mainly four types, which are: Supervised Machine Learning Unsupervised Machine Learning Semi-Supervised Machine Learning Reinforcement Learning



Machine Learning Types

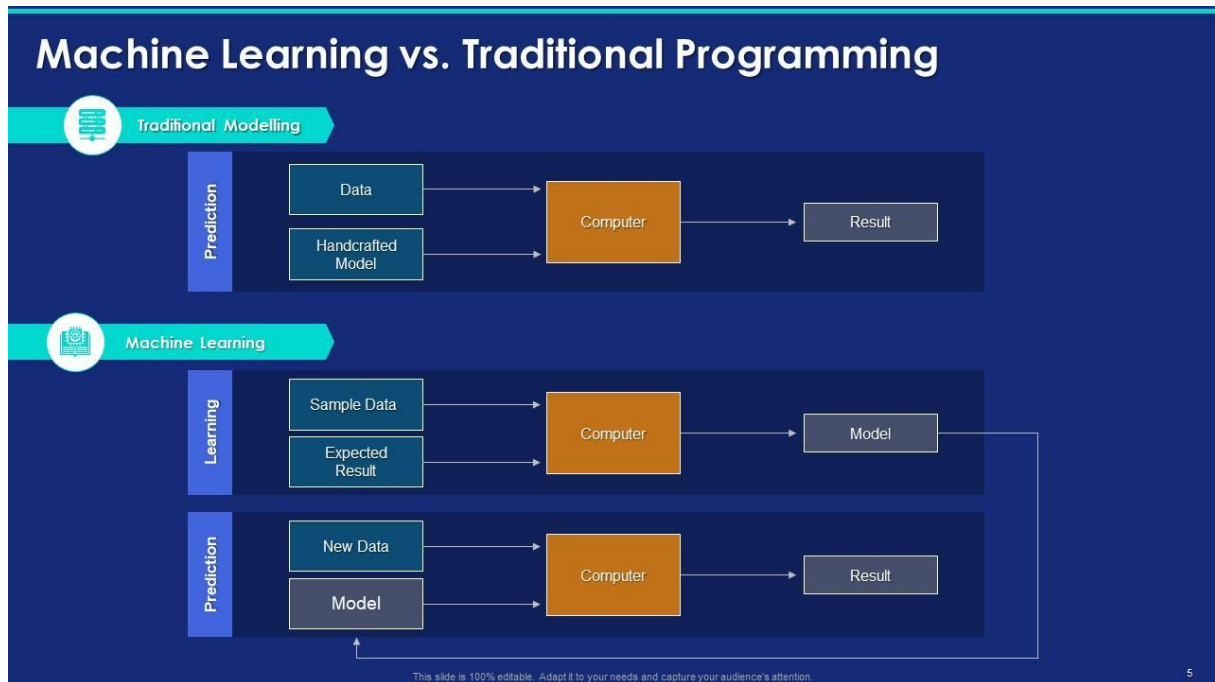


Machine learning lifecycle :



Machine learning vs traditional programming :

Traditional programming is a manual process—meaning a person (programmer) creates the program. But without anyone programming the logic, one has to manually formulate or code rules. In machine learning, on the other hand, the algorithm automatically formulates the rules from the data.



conclusion :

By the end of this session, our GDSC members should have a solid understanding of the fundamental concepts of machine learning, its various types, and its practical applications. This knowledge will lay the groundwork for more in-depth exploration in subsequent sessions. We're excited to continue this learning journey with you in our upcoming sessions. See you next time <3

