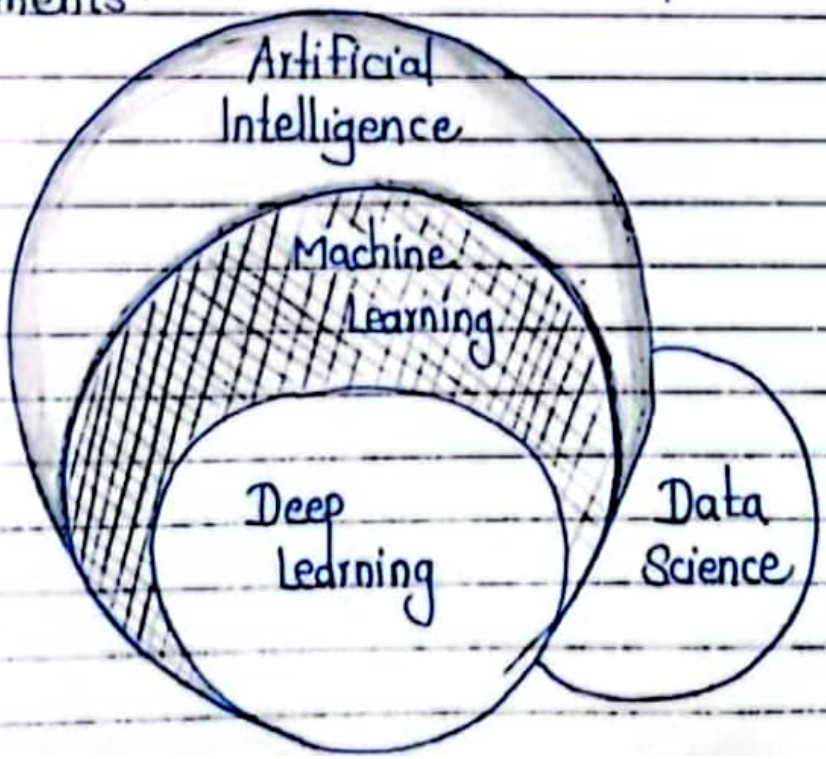
1. Introduction to Machine Learning

1.1 What is Machine Learning ?

Machine learning is a branch of artificial Intelligence that develops algorithms by learning the hidden patterns of the datasets used it to make predictions on new similar type data, without being explicitly programmed for each task.

Traditional machine learning combines data with statistical tools to predict an output that can be used to make actionable insights.

Machine learning is used in many different applications, from image and speech recognition to natural language processing recommendation systems, fraud detection, portfolio optimization, automated risk and so on. Machine learning models are also used to power autonomous vehicles, drones and robots, making them more intelligent and adaptable to changing environments.



Machine learning LifeCycle:

The lifecycle of a machine learning project involves a series of steps that include:

1. Study the problems:

The first step is to study the problem. This step involves understanding the business problem and defining the objectives of the model.

2. Data Collection:

When the problem is well-defined, we can collect the relevant data required for the model. The data could come from various sources such as databases, APIs, or web scraping.

3. Data Preparation:

When our problem-related data is collected. then it is a good idea to check the data properly and make it in the desired format so that it can be used by the model to find the hidden patterns. This can be done in the following steps:

1) Data cleaning
2) Data Transformation
3) Explanatory Data Analysis
4) Split the dataset for traing and testing.

Date

4. Model Selection:

The next step is to select the appropriate machine learning algorithm that is suitable for our problem. This step requires knowledge of the strengths and weakness of different algorithms. Sometimes we use multiple models and compare their results and select the best model as per our requirements.

5. Model building and Training:

After selecting the algorithm, we have to build the model.

1. In the case of traditional machine learning building mode is easy it is just a few hyperparameter turings.
2. In the case of deep learning, we have to define layer-wise architecture along with input and output size, number of nodes in each layer, loss function, gradient descent optimizer, etc
3. After that model is trained using the preprocessed dataset.

6. Model Evaluation

Once the model is trained, it can be evaluated on the test dataset to determine its accuracy and performance This involves tweaking the hyperparameters of the model.

7. Deployment:

Once the model is trained and tuned, it can be deployed in a production environment to make prediction

on new data. This step requires integrating the model into an existing software system or creating a new system for an model.

8. Monitoring and Maintainance:

finally it is essential to monitor the model's performance in the production environment and perform maintainance tasks as required. This involves monitoring for data drift, retraining the model if

1) Supervised machine learning
2) Unsupervised machine learning
3) Reinforcement machine learning.

Machine learning is important because it allows computers to learn from data and improve their performance on specific tasks without being explicitly programmed. This ability to learn from data and adapt to new situations makes machine learning particularly useful for tasks that involves large amounts of data, complex decision-making, and dynamic environments.

Machine learning can be used to build predictive

Date :

Index