**1. Machine Learning**

i. Uses of ML: make predictions, automate tasks

ii. History Of ML

**2. AI/ML/DL**

a. AI:  it involves creating intelligent system that can mimic human intelligent like Creativity, Imagination (Emotional Intelligent)

b. Ml: We will use statistical techniques to find patterns in the data.

c. DL: It is a class of algorithms. It is used when we have a large number of data points and It is used when we have a complex problem of ml.

**3. Types of ML**

i. Supervised: It is the type of ML where algorithms learn from labeled data, which means we will provide input data and the model will make predictions.

a. Linear Regression: Numerical output data (0-9)

b. Classification: Categorical Output data(yes/no)

ii. Unsupervised: It is the opposite of supervised learning; there is no labeled output data.

a. Clustering

b. Anomaly Detection

c. Dimensionality Reduction

d. Association Rule Learning.

iii. Semi supervised.: It is partially supervised and unsupervised. It will use classification and clustering. [https://www.datarobot.com/blog/semi-supervised-learning] . Let's suppose we are doing image recognition (cat or dog). We don’t have any output. We will have to provide some output for data, and it will give other images' labels

iv. Reinforcement: In reinforcement learning, you don’t have any data; it will learn slowly, like human beings. Like Self Driving Car

**4. Offline vs Online Learning**

i. Offline Learning: If we have to upgrade our model on the server after deploying, we have to fit new data from the starting point if we get any new data. Let's take an example of a classification problem where I have created a spam filtering classification model and deployed it into a server. After some days or months, the person who is sending mail will definitely know that pattern of data and use a new technique to send it. That's why we will have to find the mail that is being sent that is spam and implement that data into the model manually by adding that dataset table into the previously existing table to make our model predictions good. In offline learning, we must fit new data every time we get a new dataset, so it will be more expensive for computations.

ii. Online Learning: In online learning, we will fit the dataset using sklearn sgdregressor and use partially fit code to fit the model partially, and if we get new data, we will fit that data partially.

clf=linear\_model.SGDREgressor()

clf=partial\_fit(x,y)

 This is quite a new technology, and it can also cause anomalies in the data.

**5. Instance based vs model Based learning.**

i. Instance based.: It will remember the data when it needs to predict data for example KNN Algo.

ii. Model Based Learning: It will create decision boundaries that are difficult to predict. like linear regression, classification.