

## Q1: summarizing Chapter 1

**Machine learning:** it is the science (and art) of teaching computers to learn from data.

**Example:** knowing if the email is spam or ham.

**Types of Machine Learning:** there are supervised learning, unsupervised learning, semi-supervised learning, self-supervised learning, and reinforcement learning.

**Supervised learning:** the algorithms learn from labeled data, such as spam or ham email.

**Unsupervised learning:** it learns from unlabeled data, such as knowing the visitors to your blog.

**Semi-supervised learning:** working with both labeled and unlabeled data, such as Google Photos.

**Self-supervised learning:** creating a fully labeled dataset from one that is completely unlabeled, knowing some parts from an unlabeled photo from a labeled photo.

**Reinforcement learning:** In this setting, the learning system referred to as an agent can perceive its surroundings, choose, and carry out actions, and receive rewards in exchange, such as knowing if it is a banana or apple in a factory.

**Batch learning:** the system cannot learn progressively while utilizing batch learning; instead, it must be taught using all the available data. This is usually done offline because it will require a significant amount of time and computational power.

**Online learning:** it involves delivering data examples to the system one after the other, either singly or in small groups known as mini-batches, to train the system progressively. Because each learning phase is quick and inexpensive, the system can quickly absorb new data as it becomes available.

**Some Challenges in Machine Learning:** one of these challenges is the quality of data as it will affect the model. Moreover, nonrepresentative training data. Furthermore, biases in the data also affect the model, if there is a high bias in the data, it will only predict the data on that one for example, if there is a bias in the model toward females, it will always give males in the prediction. Also, if we have poor-quality data, this will not help us in the model as well. Moreover, overfitting is another problem in machine learning, where the model is complex and performs well in the training data but not on the testing data, it is just like memorizing in the exam, for example, if a student memorizes the book and goes to the exam if he sees anything in exam like the book, he will answer it right, but if the teacher change the question a bit or put it differently, the student will not be able to answer it, as he is memorizing it and is not understand it. Also, underfitting is where the model does not perform well in both training and testing data as it is very simple.

**Testing and evaluating the model:** after building the model we want to see if the model did well or not, we want to test it. So, in this case, we evaluate it and see how well it is. To do so, we

have to split the data first before building the model into training data and testing data to use the testing data in the evaluation step.

## **Q2: What is Machine Learning in my view?**

Machine Learning is driving meaning from data, where the model learns from historical data to find the pattern from it to be able to predict.

## **Q3: An idea that I can use ML to do it.**

I have a lot of ideas that we can use ML to do it, but I am going to talk about one of them of course. I am very interested in languages and other cultures, and each time I see a foreign person, I want to know where is that person, so I start to see his or her face and English accent to know where they are from, and because I am learning different languages, some times I can guess where that person from, but I want to create a model that can predict where that person from by taking his or her photo from the exam, how they are speaking and so on. So, I want to predict or find out where that person is from by using ML, so I can continue with his or her in their language if I know it.