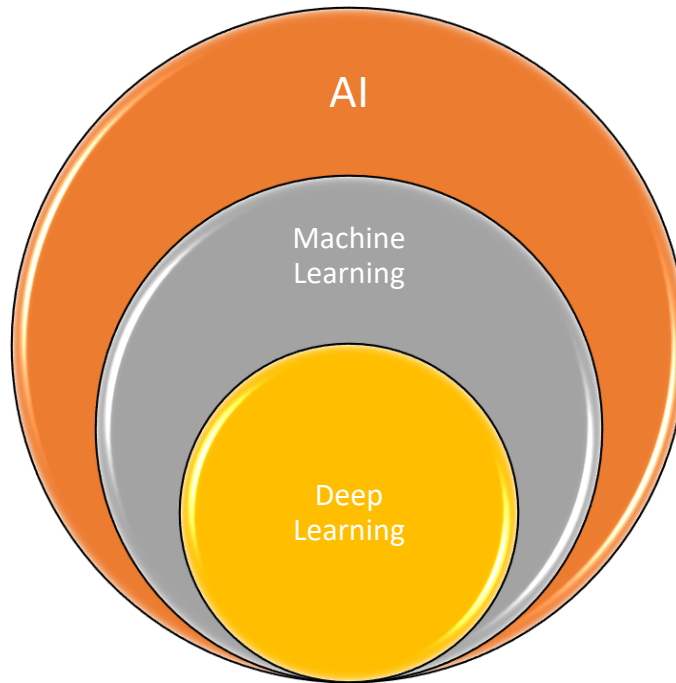


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# MACHINE LEARNING NOTES

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## Machine Learning Definition :

Arthur Samuel in 1959 defined, Machine Learning as a field of study that gives computers the ability to learn without being explicitly programmed.

Tom Mitchell in 1998 defined Machine Learning as, Well-posed Learning Problem : A computer program is said to learn from experience  $E$  with respect to some task  $T$  and some performance measure  $P$ , if its performance on  $T$ , as measured as  $P$ , improves with experience  $E$ .

Example: Suppose your email program watches which emails you do or do not mark as spam and based on that learns how to better filter spam.

In the above example:

Task  $T$  : is the classifying emails as spam or not,

Experience  $E$  : is watching you label emails as spam or not and

Performance P : is the number of emails correctly classified as spam or not.

### Machine Learning Algorithms :

1. Supervised Learning
2. Unsupervised Learning
3. Others : Reinforcement learning, Recommender Systems.

1. **Supervised Learning** : In this we are given dataset and already know what our correct output should look like, having the idea that there is a relationship between the input and output, it is of 2 types,

1.1. **Regression**: Predicts *continuous* valued output, in this we train the model using labelled data where the labels are continuous quantities to predict labels for new data.

1.2. **Classification** : Predicts *discrete* valued output, in this we train the model using categorically labelled data to predict labels for new data.

**Example**: We have a large data set on weather forecasting, if we want to predict the temperature for next 7 days, we use Regression model.

For the same data, if want to predict whether it will rain on the next day, we use Classification Model.

2. **Unsupervised Learning** : In this we have a very little or no idea on how our output should look like, here we will find the relation between the data given using Clustering techniques.

**Example** : Given a set of articles, group them into set of articles about the same story.