Machine Learning

1. Machine Learning

Machine Learning , as the name is suggesting - ‘ ML (Machine learning) is a technology which enables the machine to learn . So we can say that ML is simply a way of achieving AI where machines imitating and adapting human like behavior.

Let us play a game , tell me what is the missing number -

2 , 4 , 8 , 16 , 32 , ?

And I am sure , you would answer 64 , but how did you come to 64 ???
That’s exactly kind of behavior that we are trying to teach to machines. We are trying to teach machines to “Learn from Experience”.
Some common applications of machine learning are -

- Your personal Assistant Siri or Google uses ML.
- Weather predictions for the next week comes using ML.
- Win Predictor in a sports tournament uses ML.
- Medical Diagnosis dominantly uses ML.
- And something you would be familiar with, ever wondered how come media sites shows you recommendations and ads matching closely to your interests? They as well use Machine Learning.

Activity :

Let us take up this activity to explain you the ML in detail :
Let us teach computer / robot to recognize - which foods are yummy and which are dull but computer doesn’t have a mouth to test the food. Instead , we need to teach it by showing it examples of foods (Labeled training data) – Yummy food (positive example) and dull food (negative example) . For each labeled example , we also provide the computers with the ways to describe the food :

Some positive examples labeled yummy: chocolate ice cream, pizza, strawberries.
Some negative examples labeled yucky: Bitter gourd, broccoli, Brussels sprouts.

In a real machine learning system, you’d want more training data, but three positive example and three negative example should be enough to communicate the concept.
Now we need some features. Here are three: sweet, salty, vegetable. Note that this are binary features: each food is assigned a value of “yes” or “no” for each feature.

	Food	Sweet	Salty	Crunchy	Vegetable	Label
1.	Ice cream	YES	NO	NO	NO	YUMMY
2.	Pizza	NO	YES	YES	NO	YUMMY
3.	Strawberries	YES	NO	NO	NO	YUMMY
4.	Anchovies	NO	YES	NO	NO	DULL
5.	Broccoli	NO	NO	NO	YES	DULL
6.	Brussels sprouts	NO	NO	NO	YES	DULL

Now that we have our training data, it's the computer's job is to learn a formula ("model") from it. That way, when the computer encounters a new food, it can use the model to decide whether the food is yummy or Dull.
One kind of model is a point system ("linear model"). For each feature, you get assigned a certain number of points ("weight") if it's a YES but no points if it's a NO. The model then adds up the points for a food to get a score. The model has a cut-off: if the score if above the cut-off, the model decides that the food is YUMMY; if the score is below the cut-off, the model decides that the food is DULL.

For example, the model might assign a weight of 3 for Sweet, 1 for Salty, 1 for Crunchy, and -1 for Vegetable. That would result in the following scores:

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ice cream: 3
pizza: 2
strawberries: 3
anchovies: 1
broccoli: -1
brussels sprouts: -1
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We won't always be able to find weights and a cut-off that classify all of the examples correctly. And even if we do, we might end up with a model that only works for our training data but doesn't work so well when we give it new examples ("overfitting"). What we want is a model that is right most of the time in the training data but still works well on new examples ("generalizes"). Usually simple models generalize better than complicated models
Hopefully this is enough to give a child an idea of what it means to "teach" a computer using machine learning.