

Machine Learning Core

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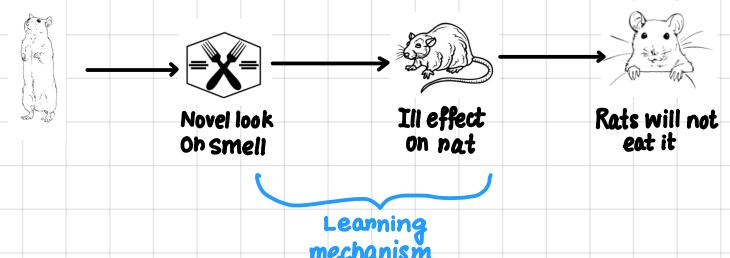
Introduction to Machine Learning

What is Learning?

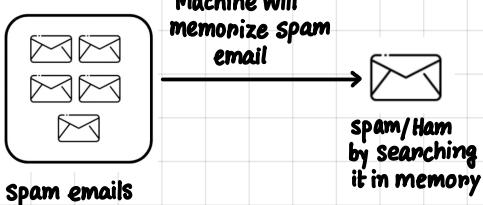
Model gets trained!



Rats Learning to avoid poisonous Baits



Learning by memorization approach



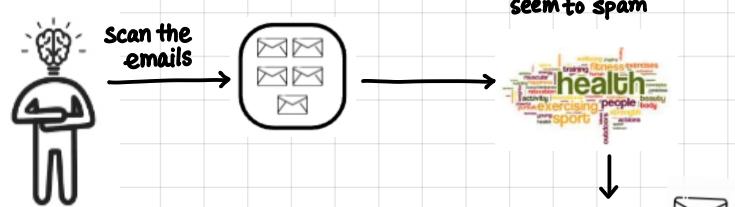
We need to Generalize it's called as Inductive Inference.

? What's the problem with this approach → Ability to label unseen emails!

Decide whether to eat this or not based on its smell.



Generalization - rat even able to decide on unseen examples which is similar to the bad food.



Here your system might be able to perform very well...

↓
Spam or not spam prediction by seeing Spamy words in emails.

BUT Inductive inference might lead us to false predictions, let's see how ?!



When food was delivered, pigeons were engaged in some activity.



Food given to them at regular intervals

The pigeons' association of the Delivery of the food with whatever chance actions they had been performing when it was first delivered.

So, pigeons started doing the same action in hope of food arrival

Prion knowledge inhenited from previous generations!

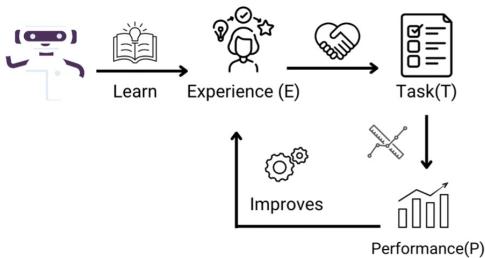


What is Machine Learning?

Machine learning is An artificial Intelligence domain where we extract patterns from the data and analyze the data and make intelligent predictions on the new data according to the pattern your machine has learnt.

How machines extract patterns? How we analyze the data? How machines make predictions?

There are sets of mathematical algorithms that will help us to extract patterns from the data, which we will study throughout the course.



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 by P, improves with experience E.

- Tom Mitchell.

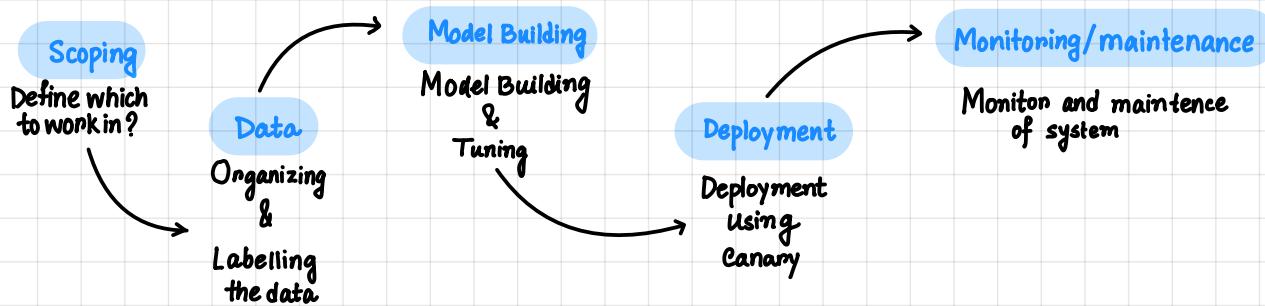
India House prediction System

Here your task (T) is to predict the house prices of Indian states, when you want to build any ML system, you need one of the key ingredient which is data.

You train your model system on the past data and here past data is your Experience (E),
The performance (P) is measured by how well your model is performing on new and unseen data.

Steps done by Machine Learning System

In High level overview, following are the steps done by your machine learning system:



scoping

Understand the problem statement



Key requirements for ML

Project

Data

Collect & Validate data



Cleaning & Processing

Data

Modelling

Research & Building
Algorithm



Select & Train the
model, Error analysis

Deployment

Deploy the model
in prod



Monitor and maintain
your system

Deployment & Maintenance

Data

Data is information contained in structured or un-structured format, below is example of data where we can make use of this data to build a house price predictor.

Price	Floor space	Rooms	Lot size	Appartement	Row house	Corner house	Detached
250000	71	4	92	0	1	0	0
209500	98	5	123	0	1	0	0
349500	128	6	114	0	1	0	0
250000	86	4	98	0	1	0	0
419000	173	6	99	0	1	0	0
225000	83	4	67	0	1	0	0
549500	165	6	110	0	1	0	0
240000	71	4	78	0	1	0	0
340000	116	6	115	0	1	0	0

Applications

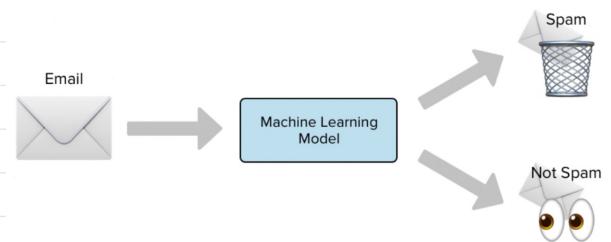
Loan Prediction System

Imagine you're working in a bank sector and bank provides loan to the customers who requires, When providing loans there is a risk whether the loan taken will repay the loan back or not with interests?



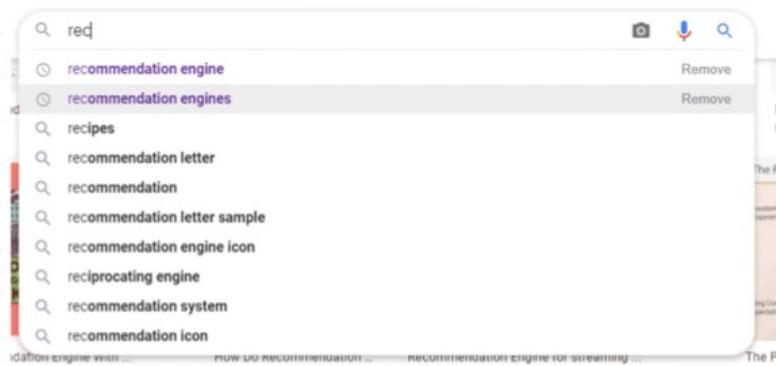
Email Spam/Ham Detection System

Spam Mail Detection (SMD) system is proposed which will classify email data into spam and ham emails.



Recommendation Engine

If you search, similar searches are shown as a recommendation for you.



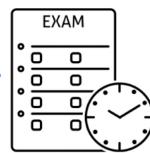
And a lot more....



Understand the concept
Do some examples



Get trained
from the examples,
trained from
exercises questions
with help of supervisors



You sit for
examination



Examples also have solutions,
Given - Question, Answer

supervised learning

If you were trained
well, then you will
perform well,
otherwise not.



Supervised learning

In Supervised learning, you've given the question as well as the answer so that your model learns it or get trained from it, and then on new examples, it should work well! So let's say you're building some house price prediction system.

THAT'S WHAT

Supervised learning

IS

Question:- Predict the house prices base on given features below for each examples.

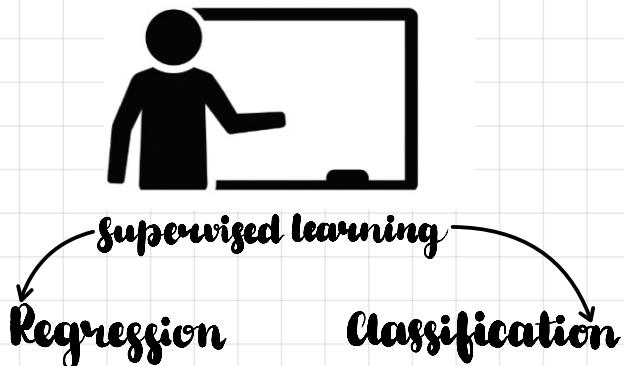
Solution/Target Variable

Price	Floor space	Rooms	Lot size	Appartment	Row house	Corner house	Detached
250000	71	4	92	0	1	0	0
209500	98	5	123	0	1	0	0
349500	128	6	114	0	1	0	0
250000	86	4	98	0	1	0	0
419000	173	6	99	0	1	0	0
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You give some features and based on that you have a target variable which is price and then your algorithm learns for this and then you give new examples, which will be without target or price feature and then your algorithms tries to predict it!

Supervised learning is the types of machine learning in which machines are trained using well "labelled" training data, machine predict the output.

Here we mean labelled means, let's say you're working on spam/ham prediction system. You will be given input feature which is a text as well as correct label of it so that your model learns from it.



Regression

Here the target variable which you want to predict is in continuous value...

Eg. Predicting house prices, revenue prediction etc.

Classification

Here the target variable which you want to predict is in discrete value....

Eg. Predicting of diabetes, cancer and etc.

Now I will introduce you to with the terms and terminologies, Let's get started with it!