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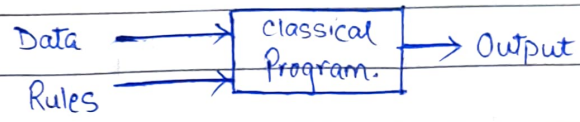
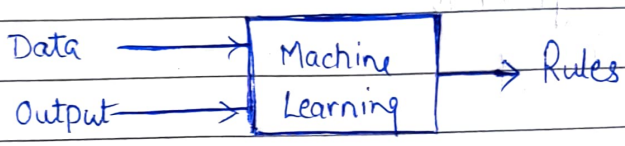
Machine Learning - Tensorflow 2.0

Introduction

* **Artificial Intelligence** - Automate intellectual tasks normally performed by humans.

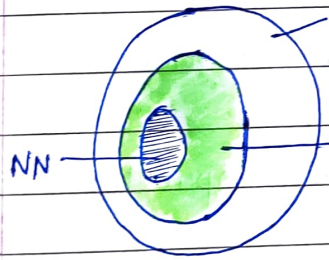
* **Machine Learning** - Subset of AI. It basically tries to find the rules, given the input and the output data.





Goal → Increase accuracy as high as possible

* **Neural Networks** - Form of machine learning which uses layered representation of data. (ML has 2 layers - Input and Output. NN has more number of layers).



* **Features** : Information (Input) to ML model.
* **Label** : What we are trying to find.

→ **Machine Learning**

1. **Supervised Learning** (We have both features and labels). for training

2. **Unsupervised Learning** : Here we are given a bunch of features and no labels. The model is supposed to come out with labels based just on the features.

Vaishnavi

Avishkar

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3. Reinforcement Learning :- Unlike other types of ML methods, it has agent, environment and reward.

x ——— x ——— x ——— x ——— x ——— x ——— x ——— x ———

Tensorflow Intro

→ Tensorflow :- Open source machine learning platform by Google. Can be used for :-

- Image Classification
- Data Clustering
- Regression
- Reinforcement Learning
- Natural Language Processing

It has two parts :-

→ Graphs (Defined computations. It is simply the way of defining operations that have been written in code.

→ Session (Start executing the computations defined in graphs.

Tensor :- Vector generalized to potentially higher dimensions. Tensorflow represents tensors as n-dimensional arrays of data-types. Each tensor defines/represents a partially defined computation that will eventually produce a value. Graphs are built from Tensor
→ objects. Each tensor has :-

1. Data Type :- float32, int32, string ...
2. Shape :- The dimensions of data

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→ **Scalars** – Hold only one value.

string = tf.variable ("this is something", tf.string)

→ **Rank / Degree** – It represents the number of dimensions involved in a tensor. A scalar has a rank of zero.

rank1_tensor = tf.Variable (["A", "BC", "D"], tf.string)

rank2_tensor = tf.Variable ([["A"], ["B", "CD"]], tf.string) ← Not valid (must be rectangular)

⇝ To get rank = tf.rank (tensor)

→ **Shape of Tensors** = Amount of elements in each dimens

t1 = tf.Variable ([["1", "2", "3"], ["4", "5", "6"]], tf.string)

t1.shape ⇝ ([2, 3])

* **Tensors Reshaping**

t1 = tf.ones ([1, 2, 3]) → creates tensor will value as 1 throughout and [1, 2, 3] as shape

t2 = tf.reshape (t1, [2, 3, 1])

t3 = tf.reshape (t2, [3, -1]) → Tells the tensor to calculate the size of the dimension in place of -1

→ **Types of Tensors**

- Variable → Mutable
- Constant
- Placeholder
- SparseTensor

} Immutable