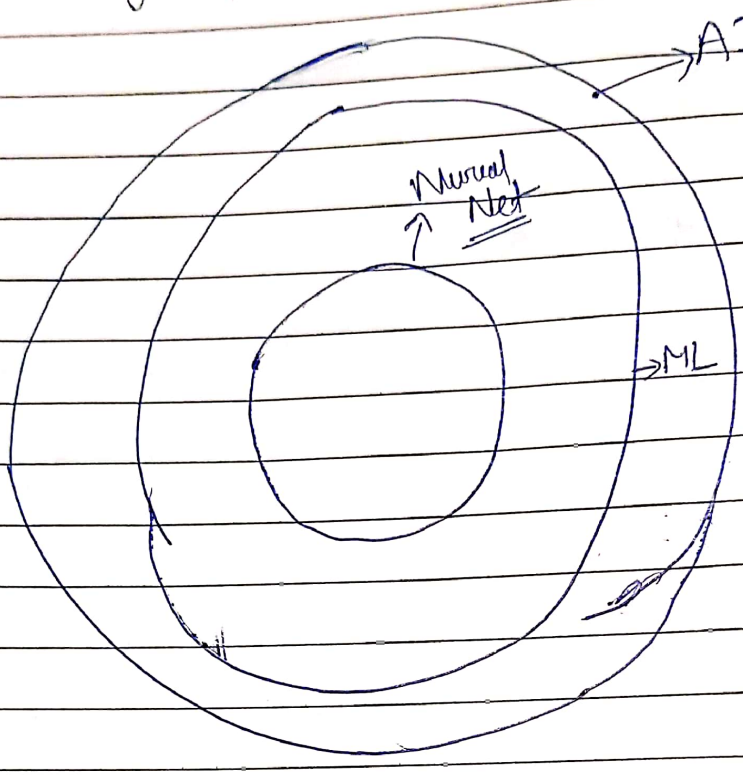
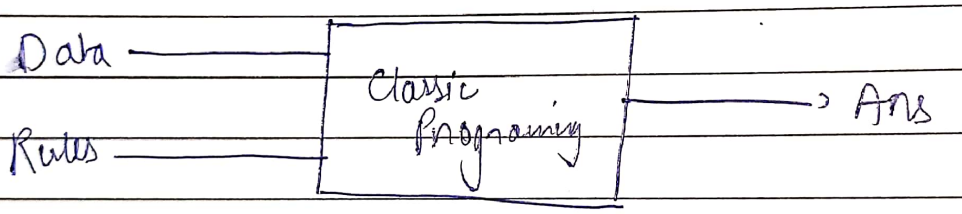
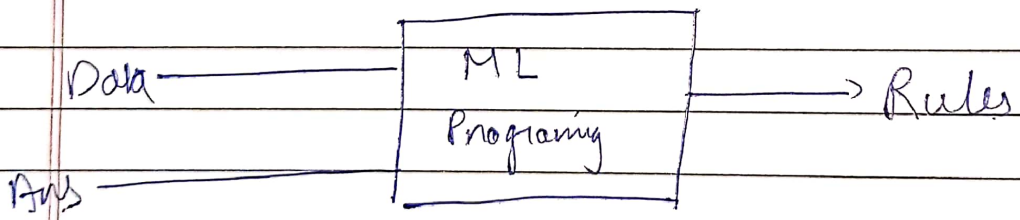
Artificial Intelligence (Personal study)

Agent: Anything that can be viewed as perceiving its environment through the sensors and acting upon that environment through actuators




Neural Net → layered

Machine learning → figures out the rules for a given input and output

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# Data

Ex Table. (for detection of Mid term2 grade)

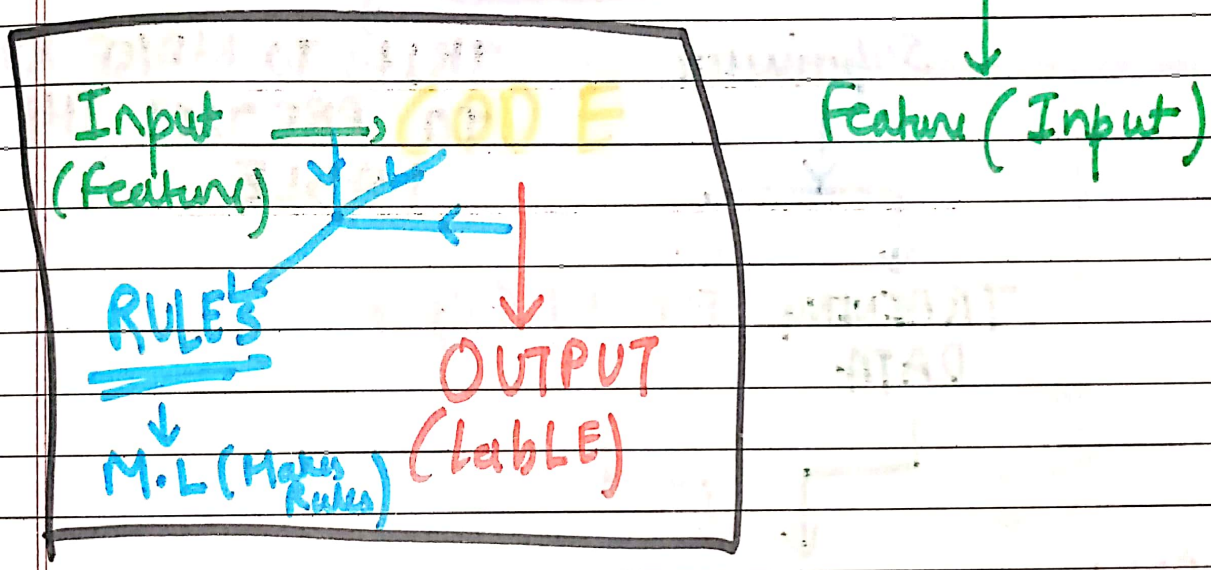
| | Mid term1 | Mid term2 | Final |
|---|---|---|---|
| 1. | 70 | 80 | 77 |
| 2. | 60 | 90 | 84 |
| 3. | 40 | 50 | 38 |

Feature

Feature (Input)

Lable (OUTPUT)

Feature (Input)



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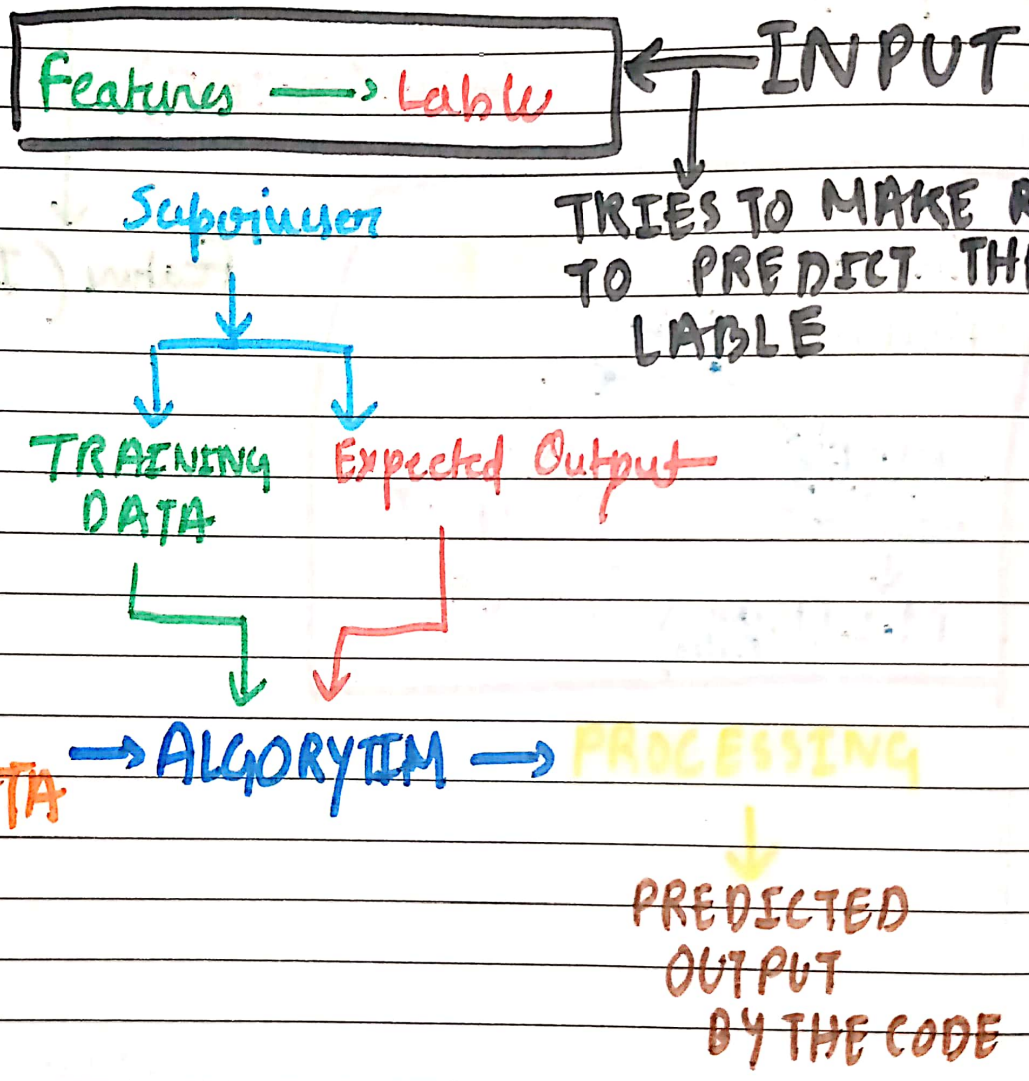
Different types of M.L

→ Unsupervised learning
→ Supervised learning
→ Reinforcement learning

# Supervised LEARNING



IF,

PREDICTED OUTPUT != Expected OUTPUT

Tweaks Made by the Supervisor to get the correct output

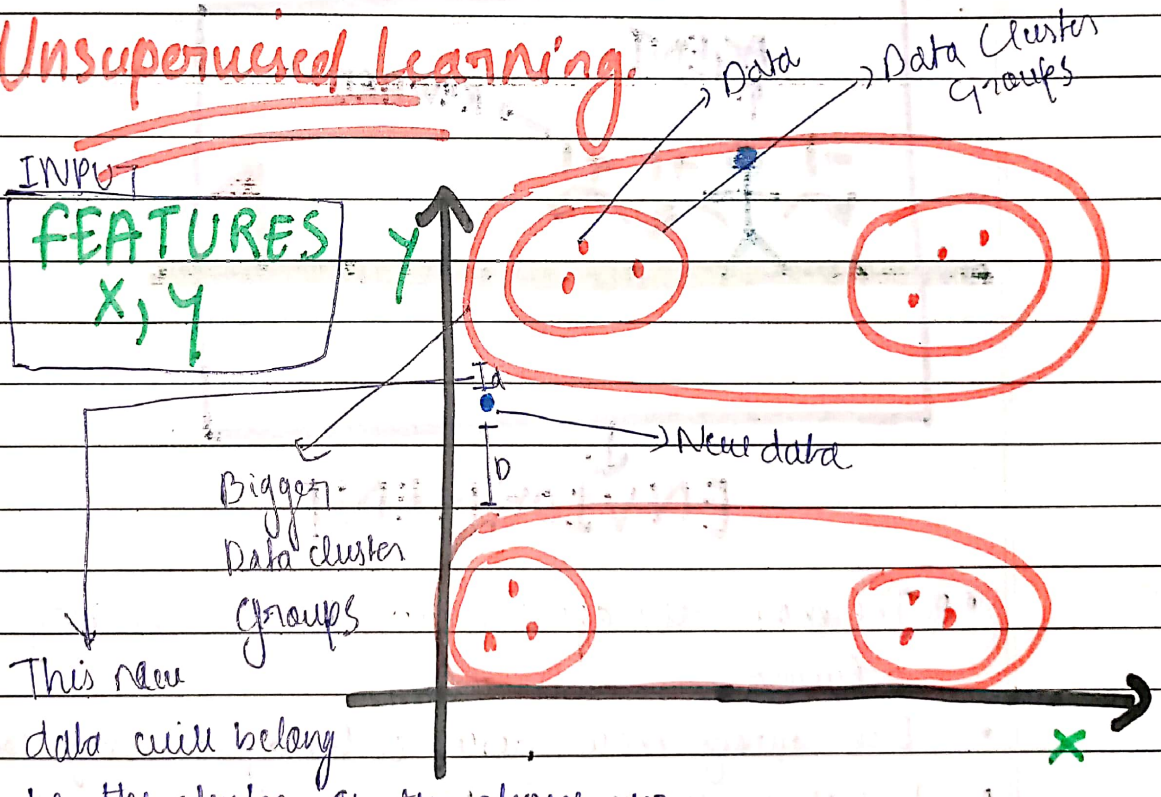
THIS IS REAPEATED UNTIL,

PREDICTED OUTPUT == Expected OUTPUT

## Unsupervised Learning.

INPUT

FEATURES X, Y



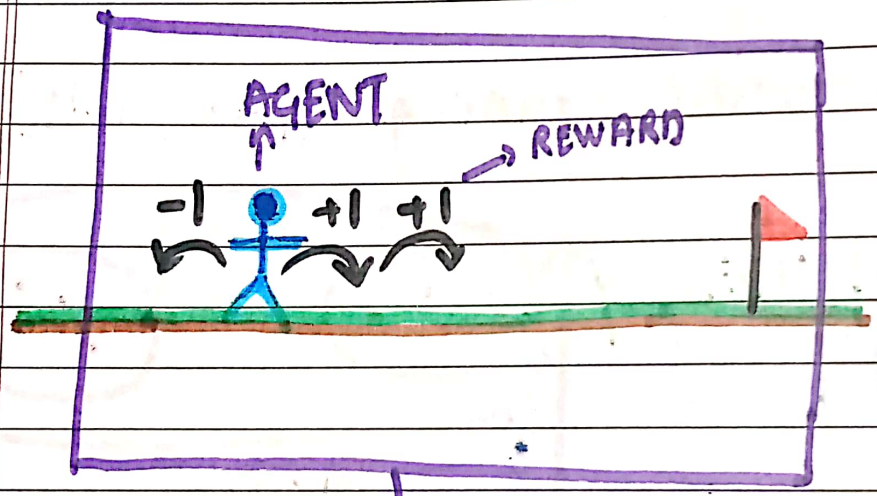

This new data will belong to the cluster on the above as the data is nearest to the top cluster.

→ Escencially groups data and data clusters and figures out where new data will go

# REINFORCEMENT LEARNING

- NO DATA
- You ONLY have a AGENT
- An Environment

For example (goal is to reach the flag)




- The more the agent moves towards the flag it gets a Reward
- Each wrong move results in the agent loosing some reward
- The goal of the agent is to get maximum reward which can be only done by reaching the goal.

***GOAL OF THE AGENT IS TO GET MAXIMUM REWARD**

Import Tensorflow as tf

# INTRODUCTION TO TENSOR Flow

>>> pip install TENSORFlow

↓

A collection of Data

↓

Making Math easy.

↓

for our.

ai

Tensor :→ Vector generalised in higher dimentions

↓ ↓

Datatypes Represent dimensi of the data

↓

float32, int32, string etc.

## How to create tensors

Example

string = tf.Variable("this is a string", tf.string)

number = tf.Variable(324, tf.int16)

floating = tf.Variable(3.567, tf.float64)

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Rank and/Degree of tensor.

# RANK/DEGREE

↓

# DIMENTION

1D ← or scalar — rank0_tensor = tf.Variable("Str", tf.string)

2D ← rank1_tensor = tf.Variable(["Hey", "Hello"], tf.string)

3D ← rank2_tensor = tf.Variable([["test"]], tf.string)

Dimentions can be known by counting the number of nested list

To find the Rank we can use :-

```
tf.rank(rank2_tensor)
```

OUTPUT

<tf.Tensor: shape=(), dtype=int32, numpy=2>

Rank ←

Example = tf.Variable([["A", "B"], ["C", "D"]])

Shape

2D

Demention

# Shape of a tensor

- Simply No. elements in each demention

To get shape we use:

Example.shape

OUTPUT

TensorShape([2, 2])

2 elements in 2nd elimation.

2 elements in first Dimation

## Reshaping a tensor

tensor1 = tf.ones([1, 2, 3])

Step1

[ ]

Makes big list

Fills two lil list with 3 ones

3, [[1. 1. 1] [1. 1. 1]]

Step 3

Step2

Makes two lil list inside big list

[[ ], [ ]]

tensor2 = tf.reshape(tensor1, [2, 3, 1])

Takes tensor1

Before reshape

[[1.1.1], [1.1.1]]

Reshapes it to [2, 3, 1] shape

After reshape [2, 3, 1] shape

[ [1.], [1.], [1.] ] [ [1.], [1.], [1.] ]

2 big list

3 inside list

[2, 3, 1]

1 element each inside

No fist value will be taken as 1

```
tensor3 = tf.reshape(tensor2, [3, -1])
```

-1 tells tensor to calculat the data Demention

$[3, -1] = [3, 3-1] = [3, 2]$

Tensor2 before modification

$[[1.] [1.] [1.]] [[1.], [1.], [1.]]$

New Tensor3

$[[1. 1.] [1. 1.] [1. 1.]]$

# Types of Tensor:

- Variable → Mutable
- Constant
- Placeholder → Immutable
- SparseTensor

## Evaluating a tensor

Get value of a tensor (uses a graph)

↓

we need sessions to eval tensor

```
With tf.session() as sess:
    tensor.eval()
```

↓

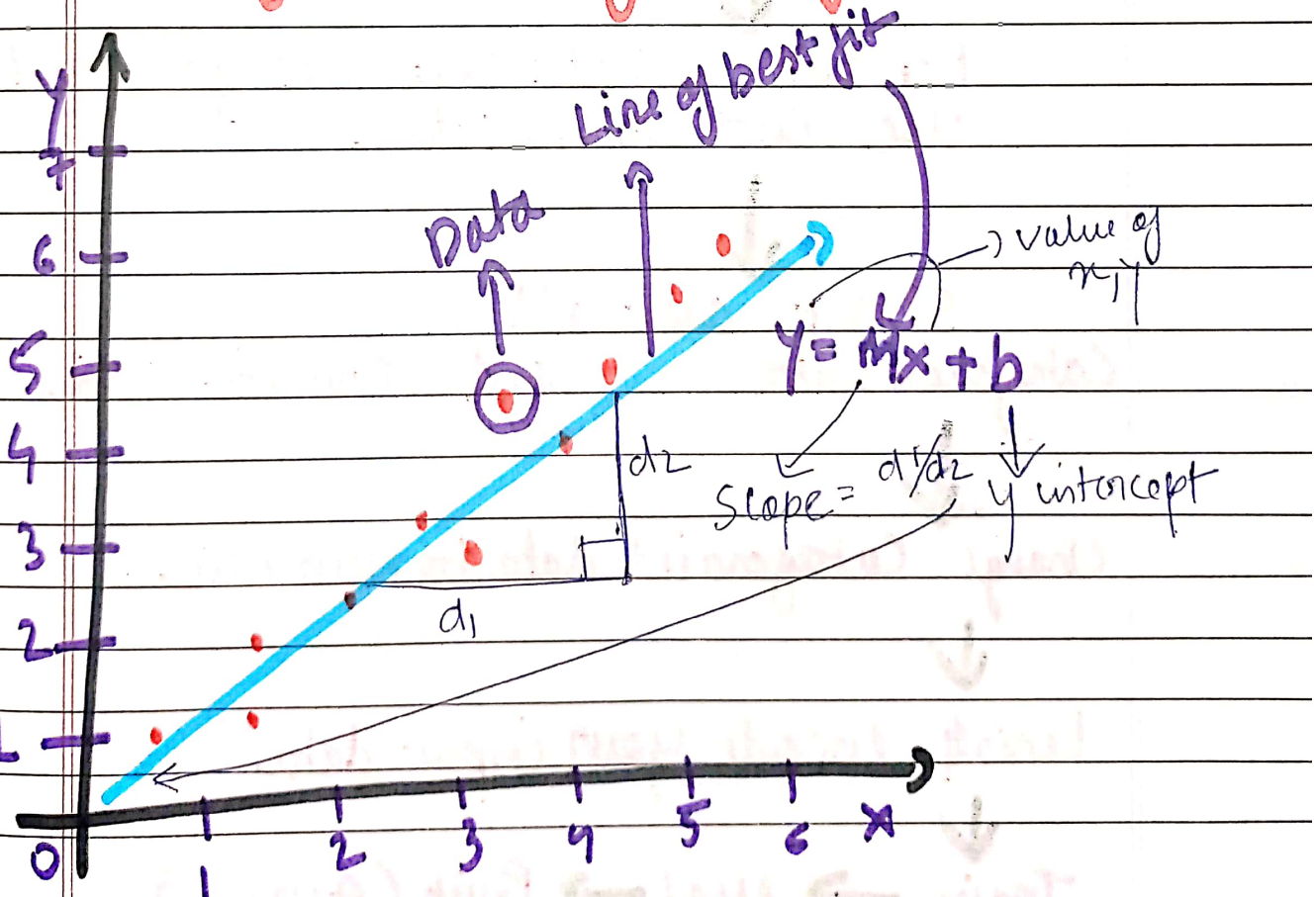
Name of tensor

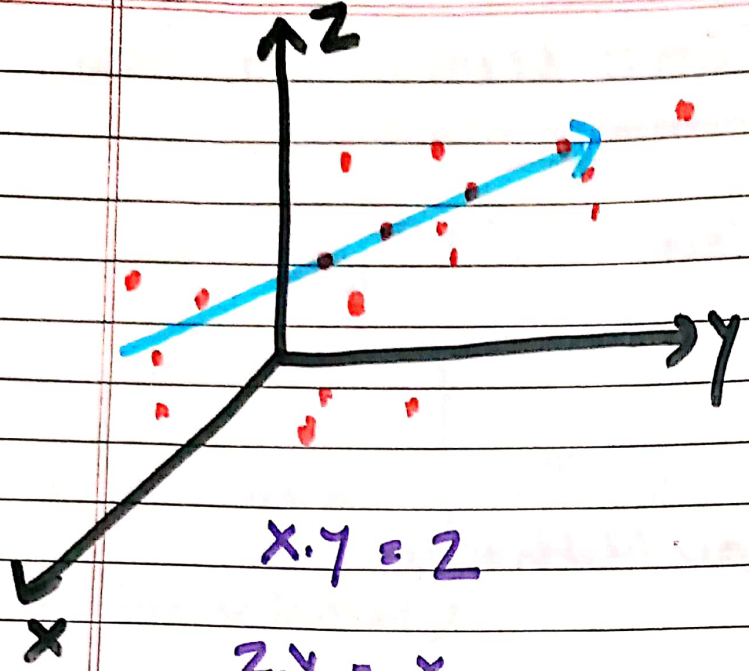
# Tensorflow CORE learning algorithms

- Linear Regression
- Classification
- Clustering
- Hidden Markov Methods

## Linear Regression

Takes linearly correlated Data to find the line of Best fit and predict using the line of best fit






$x.y = z$

$z.y = x$

## In CODE

Take a .csv (datasheet)

↓

Pop out all the elements you need to use into a variable

↓

Short out all Categorical Data and Numeric data.

↓

change Categorical data to numeric.

↓

Label encode your input data.

↓

Train → Test → Print (Accuracy)