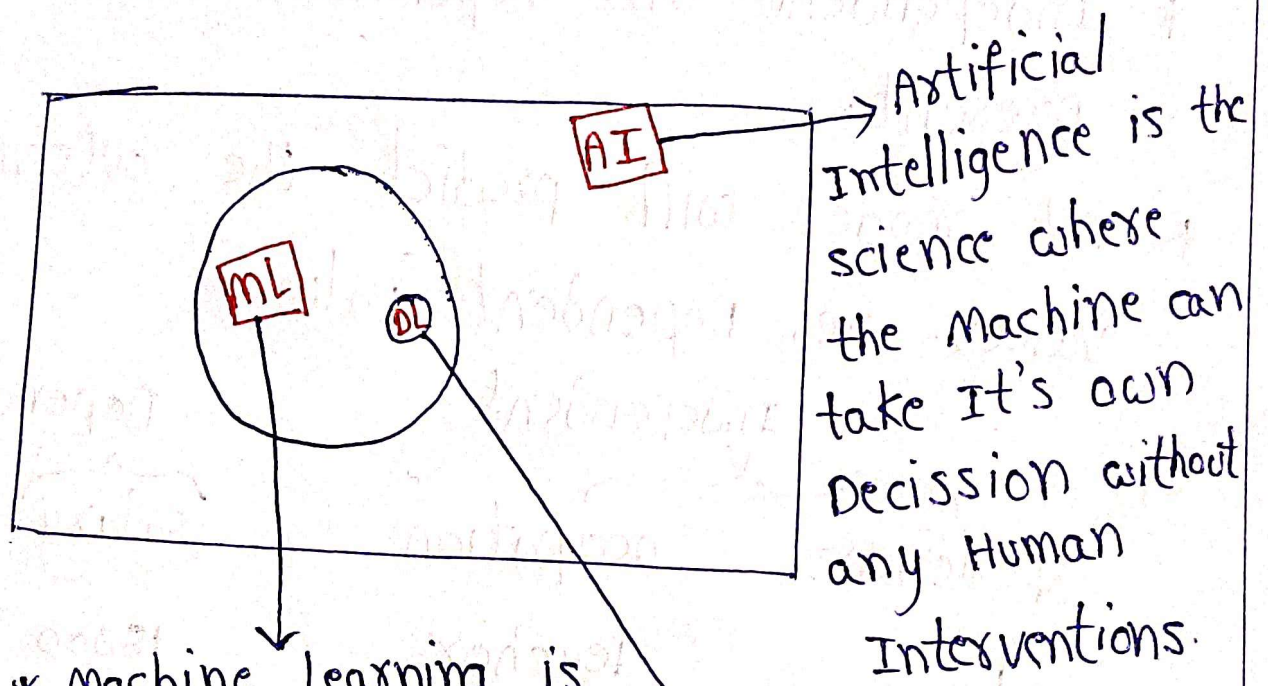


Introduction to Machine Learning

AI vs ML vs DL vs DS:



* Machine Learning is used to make models which can be used to predict outcomes.

* Deep Learning will give the human mimic to ML models

* The combination of AI, ML and DL is called Data science.

Types of Machine Learning:

* supervised:

* Independent and Dependent values were present.

* ML model will predict the outcome values. i.e, Dependent value.

eg:

| | Independent | Dependent |
|---|-------------|-----------|
| | Experience | salary |
| 1 | Teacher | 15000 |
| 2 | software | 40000 |
| 3 | Teacher | 16000 |
| 4 | Plumber | 20000 |
| 5 | Plumber | 2000 |

* ML model will take Independent values and predict salary.

* unsupervised:

* Independent values were present

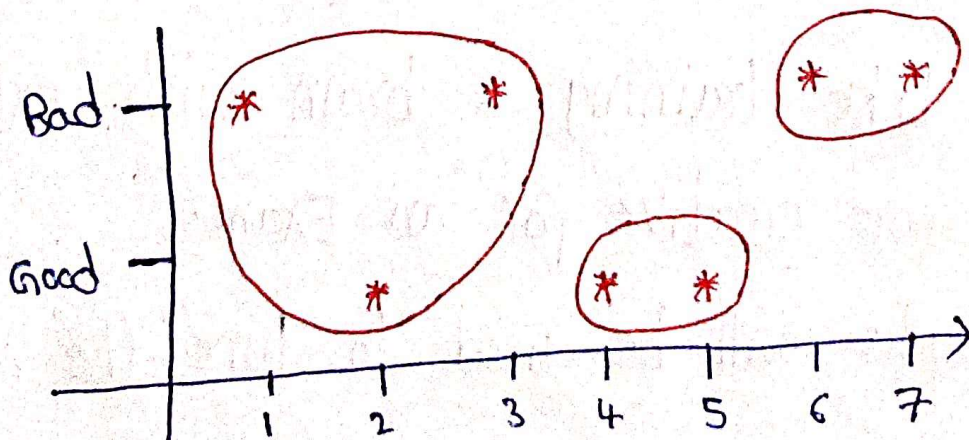
* we will form clusters and divide given data into groups.

eg:

Time spent in hrs. Review

| | |
|---|------|
| 1 | Bad |
| 2 | good |
| 3 | Bad |
| 4 | good |
| 5 | good |
| 6 | Bad |
| 7 | Bad |

clusters:



Reinforcement Learning:

* In this process, the model will learn from its mistakes and improve its performance.

eg: * Humans were best example, As a child they will learn things from mistakes and improve themselves.

Data splitting:

* Train:

→ It's like training a brain to be ready for an Exam.

→ The data will be used to train the model.

* validate:

→ It's like training a brain with extra books to be more creative for an Exam.

→ This data will be used to tune the model.

*Test:

- It's like sitting in Exam hall to write Exam.
- This data is used to test our training and validate data and check how well model is trained.

overfitting:

- * Train Data accuracy - 95%
Test Data accuracy - 65% } This is ~~under~~ overfitting, as
Train Data accuracy is more than Test Data accuracy.

Here Train accuracy is More, so we have Low Bias.

Test accuracy is Less, so we have High ~~Bias~~ variance

- * Generally Train accuracy is inversely proportional to Bias
Test accuracy is inversely proportional to variance.

underfitting:

* Both T_{train} and Test accuracy are low

$T_{\text{train}} \rightarrow 55\% \Rightarrow$ High Bias.

Test $\rightarrow 50\% \Rightarrow$ High Variance.

Generalised Model:

* Here, Both T_{train} and Test accuracy will be High.

$T_{\text{train}} \rightarrow 86\% \Rightarrow$ Low Bias

Test $\rightarrow 87\% \Rightarrow$ Low Variance.