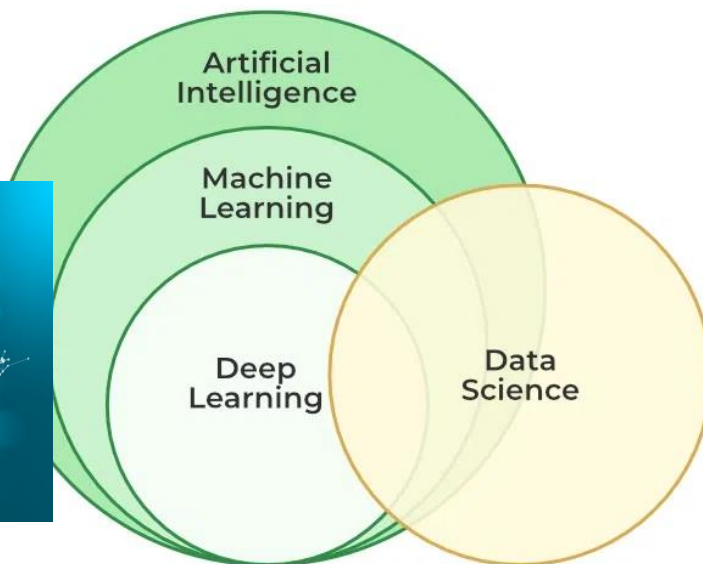**SNS College of Engineering**
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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

UNIT - 2

SUPERVISED LEARNING

Prepared by
Dr.M.Sudha
Associate Professor, ECE
SNSCE

Classification Types- Algorithms

Classification algorithms are used **when the output variable is categorical,** which means there are two classes such as Yes-No, Male-Female, True-false, etc.

Types:

- K-nearest neighbor

- Random Forest

- Decision Trees

- Logistic Regression

- Support vector Machines

https://www.youtube.com/watch?v=lTWB3qqA2mE

Logistic Regression:

- Logistic regression is another supervised learning algorithm which is used to solve the classification problems. In **classification problems**, we have dependent variables in a binary or discrete format such as 0 or 1.

- Logistic regression algorithm works with the categorical variable such as 0 or 1, Yes or No, True or False, Spam or not spam, etc.

- It is a predictive analysis algorithm which works on the concept of probability.

- Logistic regression is a type of regression, but it is different from the linear regression algorithm in the term how they are used.
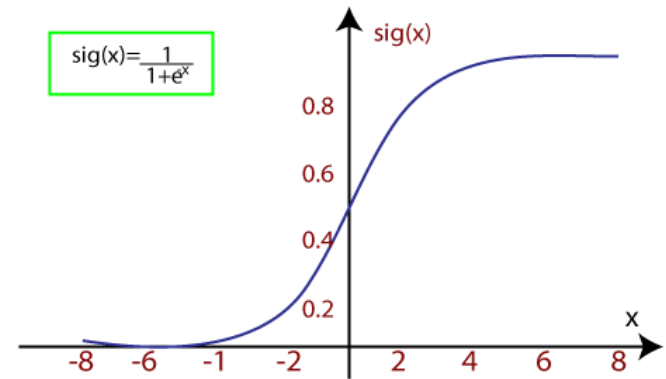
Classification - Logistic Regression

Logistic Regression:

• Logistic regression uses **sigmoid function** or logistic function which is a complex cost function. This sigmoid function is used to model the data in logistic regression. The function can be represented as:

$$f(x) = \frac{1}{1 + e^{-x}}$$

•f(x)= Output between the 0 and 1 value.

•x= input to the function

•e= base of natural logarithm.

When we provide the input values (data) to the function, it gives the S-curve as follows:

Classification - Logistic Regression

It uses the concept of threshold levels, values above the threshold level are rounded up to 1, and values below the threshold level are rounded up to 0.

There are three types of logistic regression:

•**Binary(0/1, pass/fail)**

•**Multi(cats, dogs, lions)**

•**Ordinal(low, medium, high)**

19EC503/ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING/Dr.M.Sudha, ASP,ECE