**What is logistic Regression?**

Logistic Regression is a supervised machine learning algorithm that predicts the continuous probability with a range from 0 to 1 for sample data belonging to specific class.

Based on that probability, the sample data is classified as belonging to the more probable class.

*When an email lands in your inbox, how does your email service know whether it’s a real email or spam? This evaluation is made billions of times per day, and one way it can be done is with* ***Logistic Regression.***

In spam filtering process, Logistic Regression algorithm predict the probability of an incoming e-mail for being spam or not.

Assuming the positive class as spam with label 1 and negative class as ham (real e-mail) with label 0.

If the predicted probability is greater than or equal to 0.5, e-mail is classified as spam else classified as ham.

Some other examples of what we can classify with Logistic Regression include:

1. Disease survival – Will a patient after treatment for a disease still be alive or not?
2. Customer subscription – Will a customer after using free trial plan still purchases subscription plan or not?
3. Winning team prediction – Will team win the competition or not?

**Types of Logistic Regression**

There are three types of logistic regression:

1. Binomial
2. Multinomial
3. Ordinal

1. **Binomial**: Target variable or label can have only 2 possible type class with value either “0” or “1”.

This may represent labels in classification problems as “win” vs “loss”, “pass” vs “fail”, “dead” vs “alive”, etc.

2. **Multinomial**: Target variables or labels can have 3 or more possible type class which are not ordered (i.e. types have no quantitative significance).

This may represent labels in classification problem as “disease A” vs “disease B” vs “disease C” for a diagnosis of a patient.

3. **Ordinal:** It deals with target variables or labels with ordered categories. For example, a test score can be categorized as: “very poor”, “poor”, “good”, “very good”. Here, each category can be given a score like 0, 1, 2, 3.