

Conditional Probability –

- Two events are there a and b
- We need to find the probability of event 'a' happening with a given condition that event b has already occurred.
- Eg : - event 'a' is India winning the tournament , event 'b' is virat kohli scoring three centuries.
- $P(a|b) = p(a \cap b)/p(b)$

Example –

- In one class 40 students like apples - a
- 30 students like oranges - b
- 20 students likes both apple and orange

As per the formula –

- $P(b) = 30/100 = 0.3$
- $P(a \cap b) = 20/100 = 0.2$
- $p(a \cap b)/p(b) = 0.2/0.3 = 0.67$

Bayes Theorem –

- Bayes theorem suggests that probability of event a happening given that event b has occurred is equal with (probability of event b given that event a has occurred , multiplied with probability of event a divided by probability of event b happening.
- $P(a|b) = p(b|a).p(a)/p(b)$
- In bayes theorem a is called as hypothesis ,
- b is called as evidence/data
- $p(a|b)$ is called posterior
- $p(b|a)$ is called likelihood
- $p(a)$ is called prior
- $p(b)$ is called marginal.

Example –

- Finding the probability of a card being king given it's a face card from 52 cards in the pack
- King is a here
- Face is b here.

Naïve Bayes Classifier –

Fruit	Yellow	Sweet	Long	Total
Orange	350	450	0	650
Banana	400	300	350	400
Others	50	100	50	150
Total	800	850	400	1200

Q – finding the probability of a fruit being yellow (a) given it's orange (b)

Q – finding the probability of a fruit being yellow (a) given it's sweet b)

Q – finding the probability of a fruit being yellow (a) given it's long (b)