

Inferential statistics

Probability :- Probability is the likelihood of the event.

$$Pr = \frac{\text{no. of way it can happen}}{\text{Total no. of outcome}}$$

$$\text{Coin} = H / T$$

$$\begin{aligned} Pr(H) &= \frac{1}{2} \\ &= 50\% \end{aligned}$$

$$\text{Dice} = 1, 2, 3, 4, 5, 6$$

$$\begin{aligned} Pr(5) &= \frac{1}{6} \\ &= 0.16 \\ &= 16\% \end{aligned}$$

Type of probability

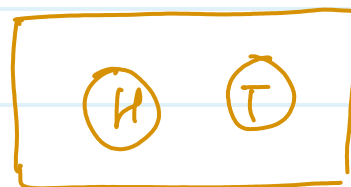
- ① mutually exclusive
- ② Non-mutually exclusive

① mutually exclusive -
(single outcome)

$$\text{Coin} = H/T$$

$$\text{Dice} = 1/2/3/4/5/6$$

$$T/F = 1/0$$

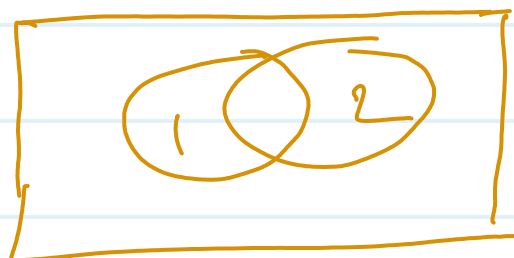


② Non-mutually exclusive
(more than one outcome)

Deck of card



K, J, Q, A, 2, 3 10



$$Pr(K) = \frac{4}{52}$$

$$Pr(K \text{ and } \Diamond) = \frac{4}{52} + \frac{13}{52}$$

Rule of Probability

- ① Additive rule
- ② multiplicative rule.

① Additive rule

Type-I mutually exclusive

$$P(A \text{ or } B) = P(A) + P(B)$$

Eg:- In a Dice probability of
2 and 5

$$p(2 \text{ or } 5) = p(2) + p(5)$$

$$= \frac{1}{6} + \frac{1}{6}$$

$$= \frac{2}{6}$$

$$= \frac{1}{3} \Rightarrow 0.33 \doteq 33\%$$

Type - II non-mutually exclusive

$$P(A + B) = P(A) + P(B) - P(A \text{ and } B)$$

eg:- calculate probability of king and club in cards.

$$\begin{aligned} P(K \text{ or } \clubsuit) &= P(K) + P(\text{club}) - P(K \text{ and club}) \\ &= \frac{4}{52} + \frac{13}{52} - \frac{1}{52} \\ &= \frac{16}{52} \\ &= \frac{4}{13} \\ &= 0.307 \\ &= 30.7\% \end{aligned}$$

② multiplicative rule

Type-I Independent even

$$P(A) \text{ or } P(B) = P(A) \cdot P(B)$$

Eg:- Coin (H) and Dice (4)

$$P(H) \text{ and } P(4) = \frac{1}{2} \times \frac{1}{6}$$

$$= \frac{1}{12}$$

$$= 0.08$$

$$= 8\%$$

Type-II Dependent event

$$P(A) \text{ or } P(B) = P(A) \cdot P(B/A)$$

Eg:- P(J) and P(K)

$$P(J) \text{ and } P(K) = \frac{4}{52} \times \frac{4}{51}$$

$$= \frac{4}{663}$$

$$= 0.006$$

$$= 0.6\%$$

① Combination

② Permutation