Inferential Statistics

probability

It measures likelyhood of an event

eg: Dice $\{1, 2, 3, 4, 5, 6\}$.

$$P(x) = \frac{\text{No of favourable outcome}}{\text{total number of outcome}}$$

$$P(3) = \frac{1}{6}$$

$$P(2, 4, 5) = P(2) + P(4) + P(5)$$

$$= \frac{1}{6} + \frac{1}{6} + \frac{1}{6} = \frac{3}{6} = 1/2 = 0.5$$

Toss the 2 Coins

$\{HH, HT, TH, TT\}$

- what is the probability of getting only 1 head ?

$$\frac{2}{4} = \frac{1}{2} = 0.5$$

- probability of getting both tail ?

$$\frac{1}{4}$$

⇒ There are 2 rules in probability.

1) Addition rule : OR
2) Multiplication rule : AND.

Addition Rule

1) mutual exclusive event
2) Non mutual exclusive event.

1) Mutual exclusive Event

two different event never occur at the same time

it is called mutual exclusive event

eg If you toss the coin what is the probability of landing on heads or tails

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

$P(H \text{ or } T)$ $= P(H) + P(T)$

$= \frac{1}{2} + \frac{1}{2} = 1$

2) Non mutual exclusive Event

there multiple event can occur at the same time is called Non mee.

eg picking the Cards from the deck Cards

what is the probability of getting jack or heart

$(J \cap H) = P(J) + P(H)$

$(J \text{ or } H) = \frac{4}{52} + \frac{13}{52} - \frac{1}{52} =$

$0.07 + 0.25 - 0.01$

$= 0.31$

Multiplication rule

1) Independent Event (i.e. not affect each other)

there all the value have the same probability

after n number tosses also

or

1 event don't depend on another event

eg: 1st toss the Coin 2nd toss the Coin

$P(H) = \frac{1}{2}$ $P(H) = \frac{1}{2}$

what is the probability of dice rolling and getting a 5 and then 4

$P(A \text{ and } B)$ $P(A) \times P(B)$

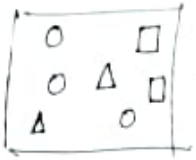
$P(5 \text{ and } 4)$ $P(5) \times P(4)$

$= \frac{1}{6} \times \frac{1}{6} = 0.021$

2.1%

2) Dependent Event

present event is depend on the previous event



1st time $P(\bigcirc) = 3/7 = 0.43$

2nd time $P(\triangle) = 2/6 = 0.3$

3rd time $P(\square) = 2/5 = 0.4$

If from a deck of cards what is the probability getting a king and then a?

$P(A \text{ and } B) \quad p(A) * P\left(\frac{B}{A}\right)$ → second dependent on previous

$P(K \text{ and } a) \quad p(K)$

$= 4/52 * 4/51$

$= 0.07 = 7\%$

→ order matters → order does not matter