Random variable A random variable is a variable whose value is unknown or function that assigns ~~varied~~ values to each of an experiment's outcomes.

- either discrete or continous
- used to quantify outcomes of random occurrences.

It's a mathematical function that maps outcomes of a random experiment to numerical values.

~~Deterministic~~

Discrete random variable : takes on a countable number of distinct values.

eg: no. of heads obtained

Continous random variable :

A continous random variable can take any value within a given range

eg: height, weight or time taken to complete a task

Deterministic variable : ~~A determi~~ is a variable also known as deterministic processes or phenomenon, is a variable in which the the outcome is entirely predictable or can be determined by rules or eqns.

Probability distributions (~~Discrete~~)

Probability distribution is a mathematical function or a description that defines the likelihood of various outcomes or values that a random variable can take on.

Discrete Probability distributh

A discrete PD is associated with a discrete random variable

Continous random variable :

is associated with a continous random variable, which can take on any value within a given range or interval.

Discrete Probability distribution :

1. PMF
2. Binominal distributh
3. Bernouli distributh

Continous Probability distribution :

1. PDF
2. Cumulative distributh function
3. Uniform distribution
4. Normal distribution
5. Chi-squared distribution

~~uniform~~ distribud

Bernoulli random variable :-

Any random variable whose ~~variables~~ values are 0 and 1 is called a ~~random~~ Bernoulli Random variable.

Probability Mass Function (PMF) :

PMF is a mathematical function that defines the probabilities associated with each possible value of a discrete random variable, which helps to know how likely each outcome is.

Probability Density Function (PDF) :

PDF is also a mathematical function that defines the probability density (likelihood per unit length) associated with each value of a continous random variable.

Binomial distribution : is a discrete probability distribution that models the number of successes in a fixed number of independent Bernoulli trials, where trial has two possible outcomes :

success == 1

failure == 0

(1) outcomes are independent

(2) have a constant probability of success denoted

Binomial distribut^n allows us to calculate the probability of obtaining a specific number of success (k) out of a fixed number of trials (n) with constant probability of success (p)

Peak : $\mu = np$

Spread : larger n == narrower and taller distribution