Topic 1: Probability Intro

Two thery Probability

Frequentist vs Bayesian

1. Frequentist --> what is observed so far and finding probability

\* Depends on proportion of event in infinite sample space

\* Objective measure

2. Bayesian --> more than 50% probability

\* Measures degree of belief

Mathematics of resulting probabilities works same for both theorim

P1=0.1

P2=0.2

P1\*P2=.02

Definition:

1. Random Experiment:

Experiment that results in different outcomes despite being seemingly similar conditions.

Ex: Tossing of a coin, throwing of a dice, rainfall amount

2. Sample space - set of all possible outcomes of a random experiment.

Ex: Tossing a coin. S={H,T}

Coint twice S={HH,HT,TH,TT}

\* The sample space we choose depends on the purpose of analysis

S=R^+={x|>0}OR

S={low,medium,high)OR

S={satisfactory, unsatisfactory}

Random variable:

\* Useful to denote outcomes of random experiments by number

\* Can be done even for cateforical outcomes

\* The variable that assocaites a number with an outcome of a random experiment is called a random variable -->R,Z

Notation - The random variable is denoted by a capital letter(e.g, X) and its value is denoted by a small letter (e.g, x)

Probability Distributions:

A probability distribution tells us how likely a random variable is to take each of its possible states.

Two types of PD:

1. Discrete Random variable(RV)

\* has finite or countable range

\* Ex: no of typographical errors, no of diagnostic erros, etc

\* Probability measured by Probability Mass Function (PMF)

Continous Random Variable(RV)

\* Has real number interval for its range

\* Ex: Temperature, pressure, voltage, height, current, etc

\* Probability measured by Probability Density Function(PDF)

PMF:

\*List of possibble values with their probabilities

\* P should have some value for each output

\* Whole sample must be covered

\* 0<=P(X=x)<=1

\* Summasion of x in X P(X=x under i)=1=1/k (i is 1,2,3...k)

PDF:

\* Probability per unit length

\* Like a distributed load

\* Normalized instagram approximates a probability density function