ESTIMATION OF A FUNCTION, PARAMETRIC AND NON PARAMETRIC TEST

Q) What is estimation of a function, F? And why do we estimate F?

Ans - Function f, connects the input variables to output variable.
f may involve more than one input variable.
- We estimate f because of 2 reasons : i) Prediction ii) Inference

Q) What do you mean by prediction?

Ans - Set of input variable is mapped by with output X. through function.

$$\hat{y} = f(x)$$

Example - Suppose x_1, x_2, x_3 are characteristics of a customer who will / invested in fixed deposit.

Accuracy of $\hat{y}$ depend on two quantities - i) Reducible error (bias error, varian error)
ii) Irreducible error.

- Irreducible error is something we cannot reduce. Quantity may contain unmeasurable variation. Suppose, while targeting customer who will invest in fixed deposit, corona virus happened and everything went into lockdown.

Q) What is Inference?

Ans - Relationship between our independent variable $(x_1, x_2, \dots x_n)$ to understand the effect on Y.

Few eg - i) Relationship between predictors (correlation) or can we say a relationship between Y and each predictor can be summarized using eqn.

Q) How do we estimate function f?

Ans - In order to find a function, f such that $\hat{y} = f(x)$ we have two characteristics - i) Parametric function ii) Non parametric function

Q) Difference between Parametric test/function with Non parametric test/fn.

PARAMETRIC TEST/FUNCTION	NON PARAMETRIC TEST/FUNCTION
i) Assume assumption about the population	i) Do not assume any assumption as it takes whole population (almost)
ii) Assume a regular bell shape/ normal distribution	ii) Don't need any distribution about the data.
iii) Results can be generalized to the whole population.	iii) Results cannot be generalized if we take another population.
iv) Small sample to draw conclusion.	iv) Large sample to draw conclusion.

9) Give example of parametric and non-parametric test.

CONDITION	PARAMETRIC	NON-PARAMETRIC
Compare 1 Median/Mean to specific value	z test, 1 sample t test	Wilcoxn signed test
Compare 2 Median/Mean to specific value	Paired sample t test	
Compare 2 independent median/mean	2 sample t test	Mann-Whitney
Compare 3 or more median/mean, 1 variable	1 way Annova	Krushkal Wallis
Compare 3 or more median/mean, 2 variable	2 way Annova.	Fredman
Treat 2 categorical variable of Independence	None	chi-square test of Independence.

Parametric test uses mean as center of distribution.

Non parametric test uses median as center of distribution