BUSINESS STATISTICS & ANALYTICS

Unit 5

MBA/BBA/B.com /B.Tech /UGC Net

By

Dr. Anand Vyas

Concept of Business Analytics-

•Specifically, business analytics refers to: **Taking in and processing historical business data**. Analyzing that data to identify trends, patterns, and root causes. Making data-driven business decisions based on those insights.

Types of Business Analytics

- There are three types of analytics that businesses use to drive their decision making; descriptive analytics, which tell us what has already happened; predictive analytics, which show us what could happen, and finally, prescriptive analytics, which inform us what should happen in the future.

Application of Business Analytics

- Business Analytics can help you in **supply chain management, inventory management, measure performance of targets, risk mitigation plans, improve efficiency in the basis of product data**, etc. For example: The Manager wants information on performance of a machinery which has been used past 10 years.

Decision Tree

- A Decision Tree is **an algorithm used for supervised learning problems such as classification or regression**. A decision tree or a classification tree is a tree in which each internal (nonleaf) node is labeled with an input feature.

Decision Tree Question

	Growing	Decline
Stock	70	-13
Mutual Fund	53	-5
Bond	20	20
Probability	0.4	0.6

Hypothesis Testing: Null and Alternative Hypotheses;

- In statistical hypothesis testing, **the null hypothesis of a test always predicts no effect or no relationship between variables, while the alternative hypothesis states your research prediction of an effect or relationship**.

Type I and Type II errors

In statistics, **a Type I error means rejecting the null hypothesis when it's actually true, while a Type II error means failing to reject the null hypothesis when it's actually false**

	H_0 rejected	Fail to reject H_0
H_0 false	Correct	Type II error
H_0 true	Type I error	correct

Alpha (α) = Prob (Type I error)

Beta (β) = Prob (Type II error)

Power = $1 - \beta$

Testing of Hypothesis: Large Sample Tests, Small Sample test

- The basic difference is that **big sample have more number of sample while the small sample only restricted to few**. There less changes of error in big sample result while in case of small sample the original may variate

t, F, Z Test and Chi Square Test

Test statistic	Associated test	Sample size	Information given	Distribution	Test question
z-score	z-test	Two populations or large samples ($n > 30$)	• Standard deviation of the population (this will be given as σ) • Population mean or proportion	Normal	Do these two populations differ?
t-statistic	t-test	Two small samples ($n < 30$)	• Standard deviation of the sample (this will be given as s) • Sample mean	Normal	Do these two samples differ?
f-statistic	ANOVA	Three or more samples	• Group sizes • Group means • Group standard deviations	Normal	Do any of these three or more samples differ from each other?
chi-squared	chi-squared test	Two samples	• Number of observations for each categorical variable	Any	Are these two categorical variables independent?