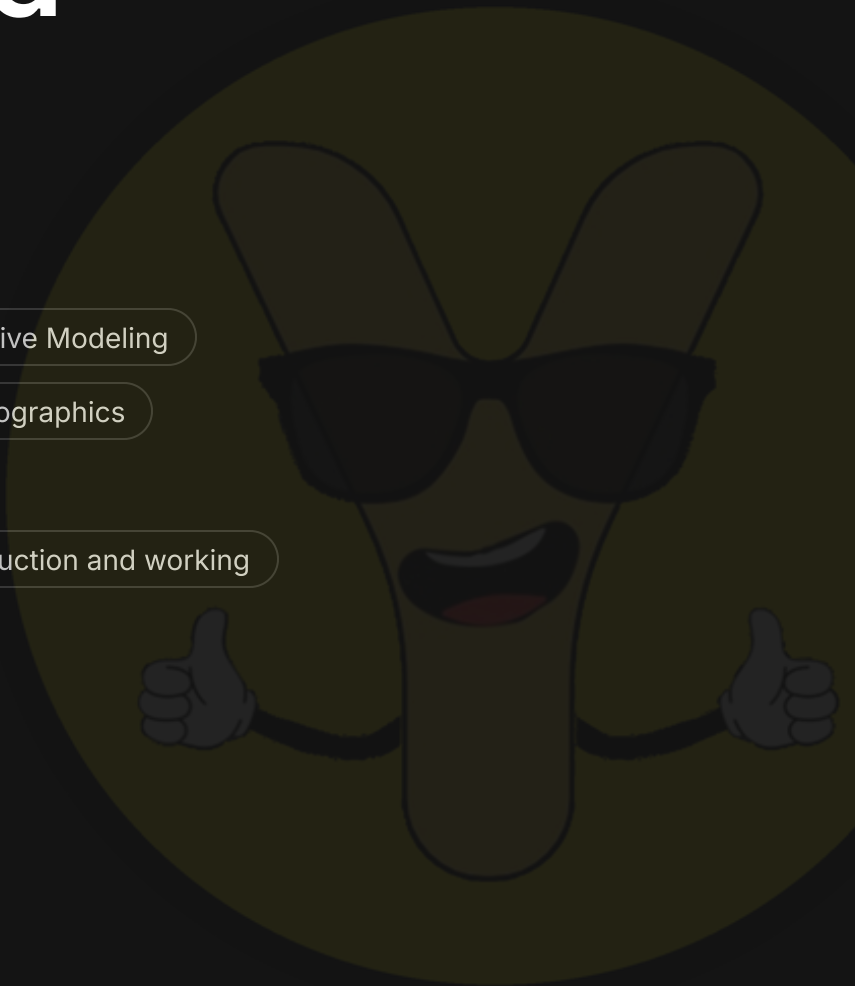
AKTU · 3RD YEAR · SEMESTER 6 · BCAM061

Social Media Analytics and Data Analysis

Unit 4 — Social Network and Modelling

- Social Contexts: Affiliation and Identity
- Social capital
- Structural holes
- Structural balance
- Predictive Modeling
- Descriptive Modeling
- Community/ anomaly detection
- Facebook Analytics: Introduction, parameters, demographics
- Analyzing page audience
- Reach and Engagement analysis
- Google Analytics: Brief Implementation Technology, Limitations, Performance Concerns, Privacy Issues
- Introduction and working



DECODED BY

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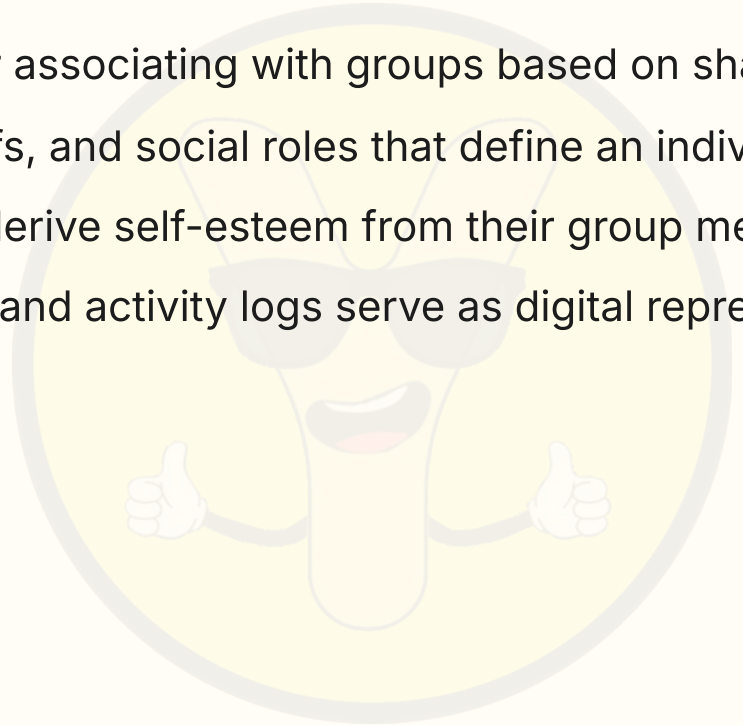
Founder, Ycotes · Gold Medalist in Artificial Intelligence, IIT Madras · taught 10,000+ students

Social Contexts: Affiliation and Identity

Understanding how individuals connect and define themselves within social networks.

- Affiliation: The process of joining or associating with groups based on shared interests or goals.
- Identity: The set of attributes, beliefs, and social roles that define an individual's self-perception.
- Social Identity Theory: Individuals derive self-esteem from their group memberships.
- Identity in Networks: Profiles, bios, and activity logs serve as digital representations of real-world identity.



Social Capital

SOCIAL CAPITAL

The value derived from social networks, including resources, information, and support accessed through relationships.

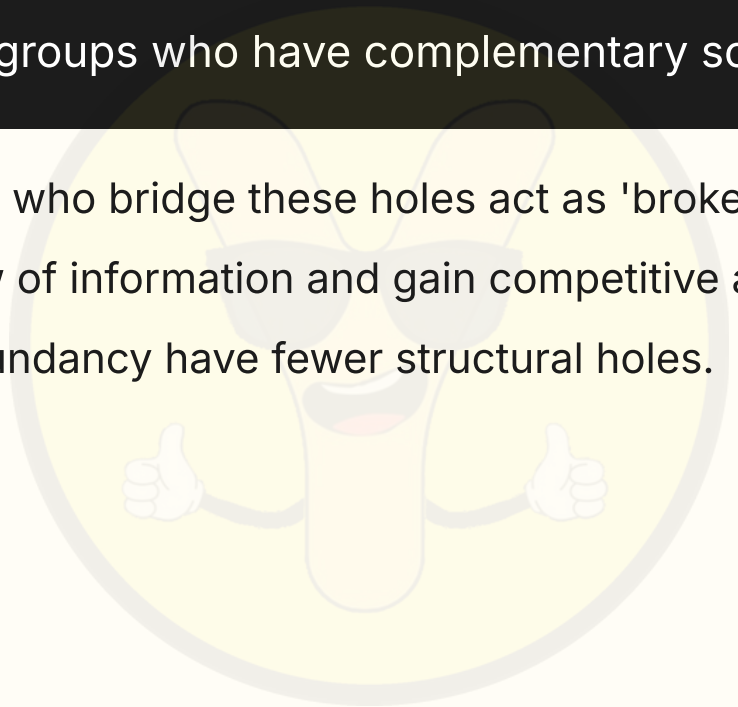
- Bonding Social Capital: Strong ties within homogeneous groups (family, close friends).
- Bridging Social Capital: Weak ties across heterogeneous groups (acquaintances, professional networks).
- Main benefit: Provides access to non-redundant information and opportunities.

Structural Holes

STRUCTURAL HOLE

A gap between two individuals or groups who have complementary sources of information.

- Concept by Ronald Burt: Individuals who bridge these holes act as 'brokers'.
- Advantage: Brokers control the flow of information and gain competitive advantages.
- Constraint: Networks with high redundancy have fewer structural holes.



Structural Balance

STRUCTURAL BALANCE THEORY

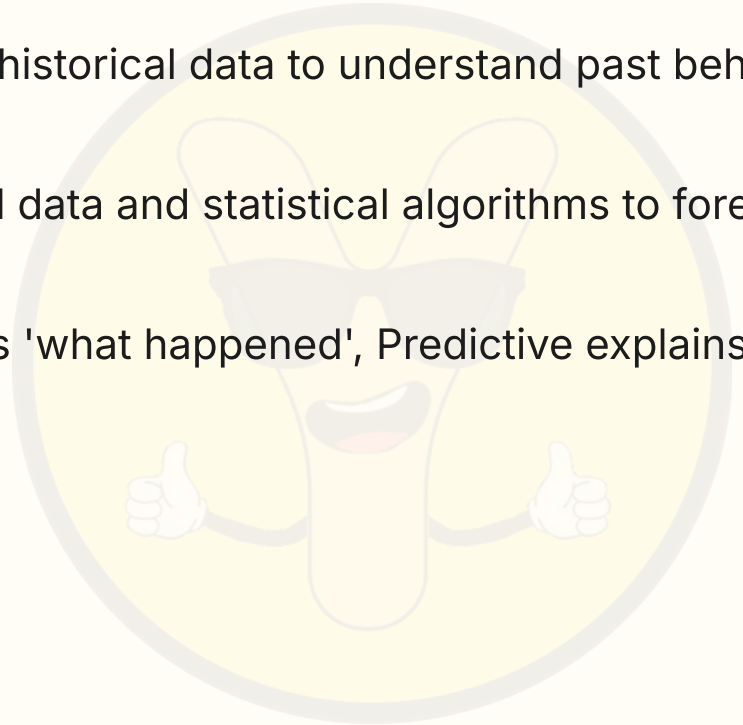
A theory describing the stability of social relationships based on the principle of 'the friend of my friend is my friend'.

- Balanced Triad: All relationships are positive or two are negative and one is positive.
- Unbalanced Triad: Two positive and one negative relationship (creates psychological tension).
- Heider's Law: Networks tend to evolve toward a balanced state over time.

Predictive vs. Descriptive Modeling

Two primary approaches to analyzing social network data.

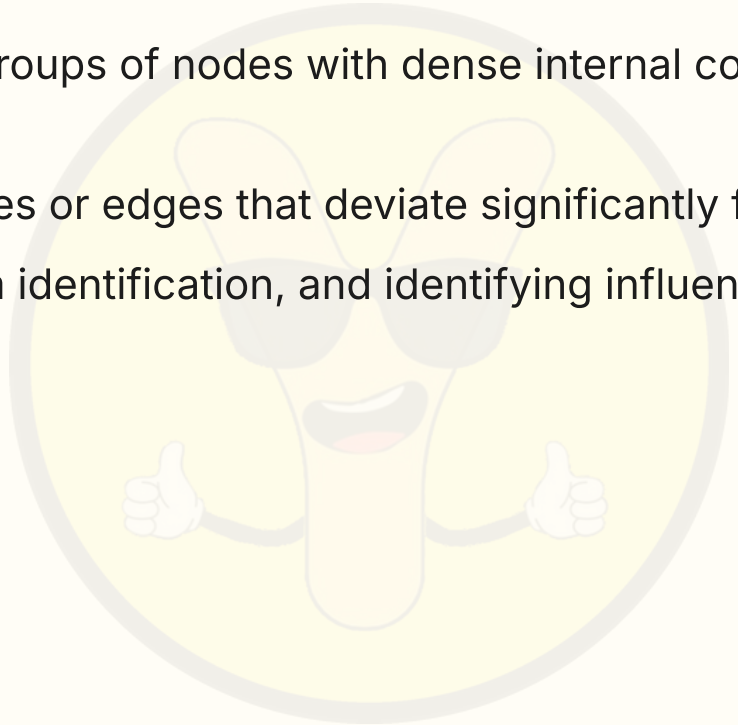
- Descriptive Modeling: Summarizes historical data to understand past behavior (e.g., clustering, graph visualization).
- Predictive Modeling: Uses historical data and statistical algorithms to forecast future outcomes (e.g., link prediction, churn analysis).
- Key Difference: Descriptive explains 'what happened', Predictive explains 'what will happen'.



Community and Anomaly Detection

Identifying patterns and outliers in large-scale networks.

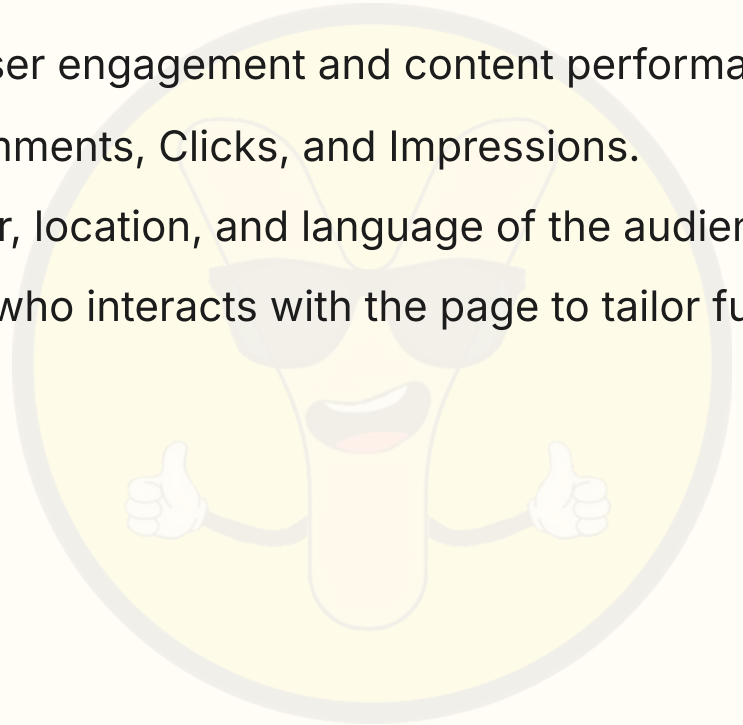
- Community Detection: Identifying groups of nodes with dense internal connections (e.g., Girvan-Newman algorithm).
- Anomaly Detection: Identifying nodes or edges that deviate significantly from the norm.
- Applications: Fraud detection, spam identification, and identifying influential network members.



Facebook Analytics: Introduction

Tools provided by Facebook to measure performance and audience behavior.

- Purpose: Helps businesses track user engagement and content performance.
- Key Parameters: Likes, Shares, Comments, Clicks, and Impressions.
- Demographics: Data on age, gender, location, and language of the audience.
- Audience Analysis: Understanding who interacts with the page to tailor future content.



Reach and Engagement Analysis

Core metrics for evaluating Facebook content success.

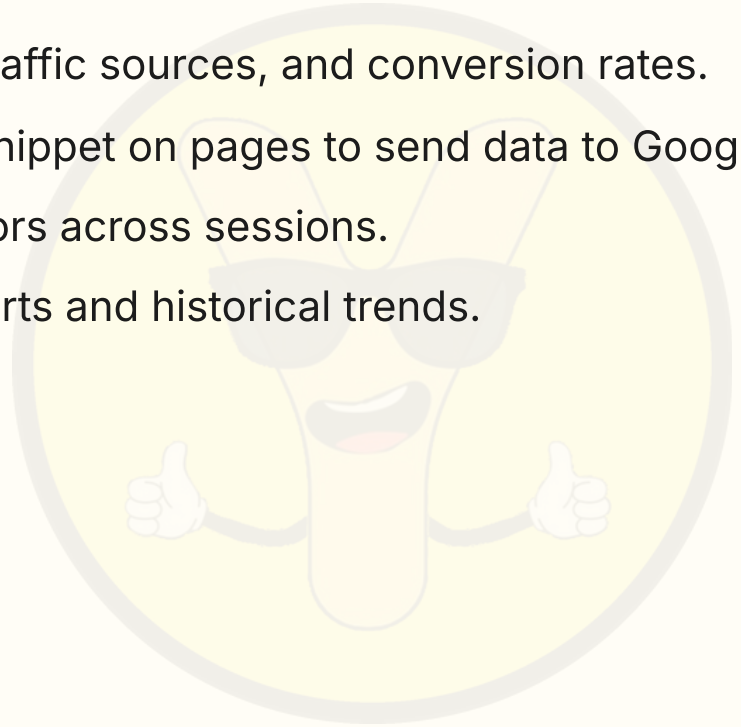
- Reach: The number of unique users who saw your content.
- Engagement: The total number of interactions (likes, comments, shares).
- Engagement Rate: $(TotalEngagement/TotalReach) \times 100$.
- Importance: High engagement indicates content relevance and brand loyalty.



Google Analytics: Introduction

A web analytics service that tracks and reports website traffic.

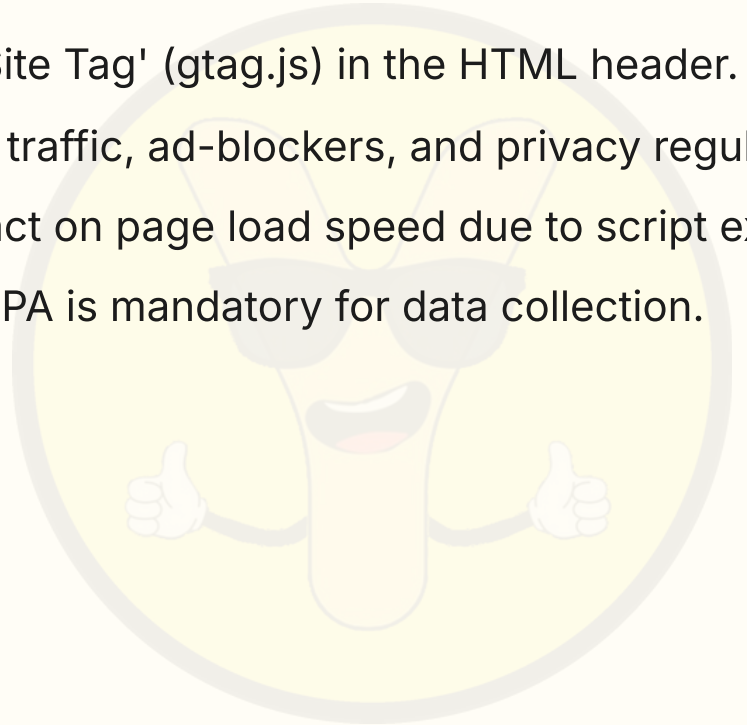
- Function: Monitors user behavior, traffic sources, and conversion rates.
- Working: Uses a small JavaScript snippet on pages to send data to Google servers.
- Cookies: Used to track unique visitors across sessions.
- Dashboard: Provides real-time reports and historical trends.



Google Analytics: Implementation & Tech

How Google Analytics integrates with websites.

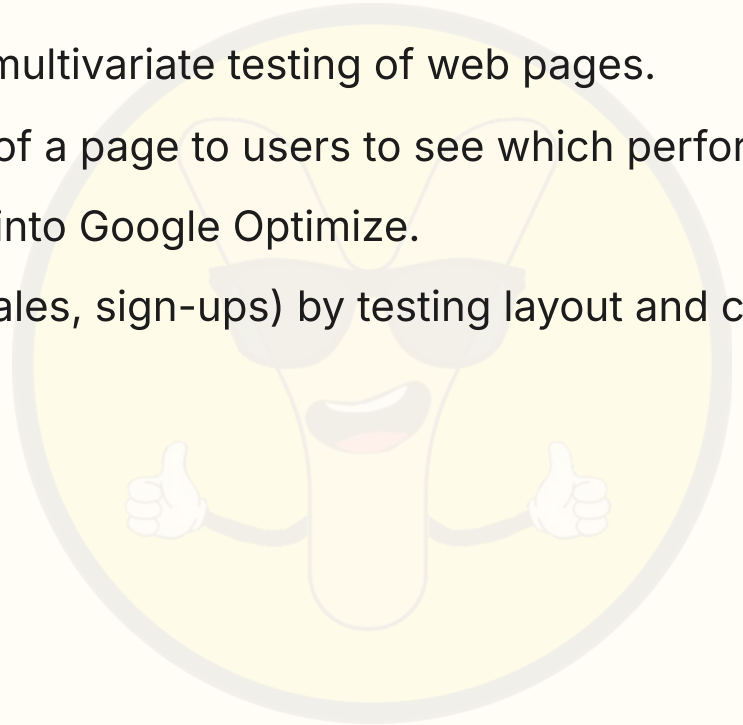
- Implementation: Insert the 'Global Site Tag' (gtag.js) in the HTML header.
- Limitations: Data sampling for large traffic, ad-blockers, and privacy regulations.
- Performance Concerns: Minor impact on page load speed due to script execution.
- Privacy: Compliance with GDPR/CCPA is mandatory for data collection.



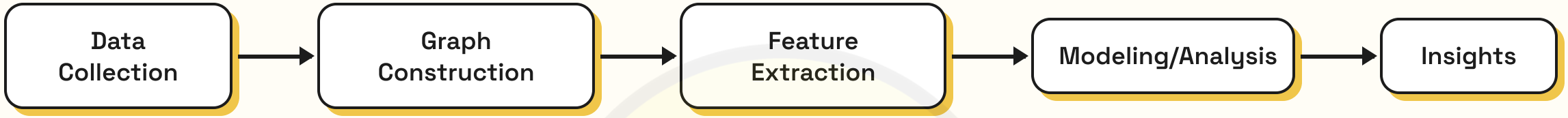
Google Website Optimizer

A tool focused on conversion rate optimization.

- Purpose: Used for A/B testing and multivariate testing of web pages.
- Working: Serves different versions of a page to users to see which performs better.
- Integration: Now largely integrated into Google Optimize.
- Goal: Maximize conversion rates (sales, sign-ups) by testing layout and content variations.



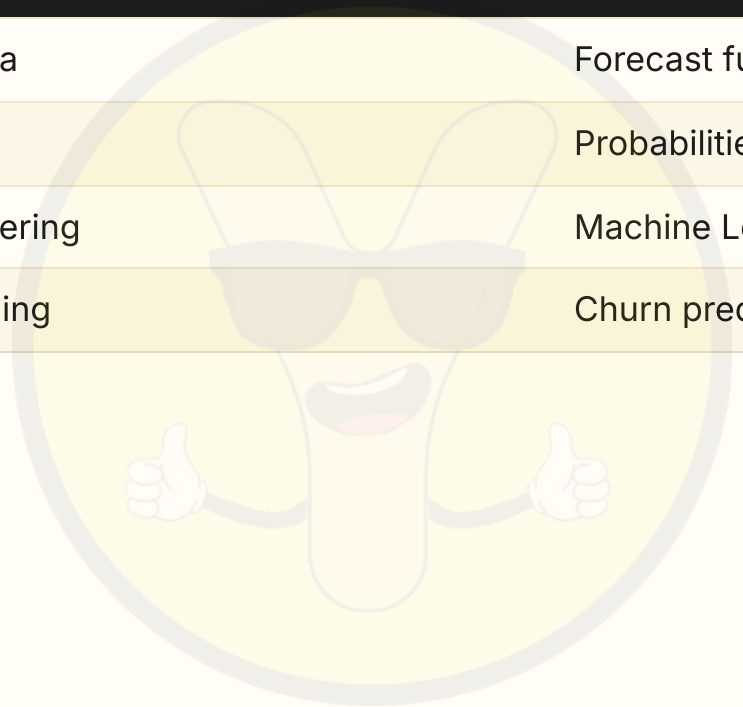
Social Network Analysis Flow



The standard pipeline for social network data analysis.

Comparison: Predictive vs Descriptive

Feature	Descriptive	Predictive
Goal	Summarize data	Forecast future
Output	Reports/Charts	Probabilities/Predictions
Technique	Statistics/Clustering	Machine Learning
Use Case	Audience profiling	Churn prediction



Exam corner

- **Q1** Explain the concept of Structural Holes and their role in information brokerage.
- **Q2** Define Social Capital. Distinguish between bridging and bonding social capital.
- **Q3** Describe the Structural Balance Theory with a suitable diagram.
- **Q4** What is the difference between Reach and Engagement? Provide the formula for engagement rate.
- **Q5** Explain the working mechanism of Google Analytics.
- **Q6** Discuss the limitations and privacy concerns associated with web analytics tools.
- **Q7** How does A/B testing in Google Website Optimizer help in business growth?

Unit 4 done. You are exam-ready.

Revise the Exam corner once more, then open Unit 5 on theycotes.com. Every AKTU subject, unit by unit, free. Notes by Chirag Jain, Ycotes.

