Practical No. 2

Classification of Analytical Approaches

Descriptive, Diagnostic, Predictive & Prescriptive Analytics

Aim:

To study and practically implement the four types of analytics using a Sales Dataset and understand how data-driven decision-making supports business growth.

Objectives:

- Understand the analytics lifecycle.
- Perform descriptive statistical analysis.
- Identify root causes using diagnostic analytics.
- Build a simple predictive model using Linear Regression.
- Recommend business actions using prescriptive analytics.

Tools & Dataset:

- Python (Jupyter Notebook / Anaconda)
- Libraries: Pandas, NumPy, Matplotlib, Seaborn, Scikit-learn
- Dataset Columns: Date, Region, Category, Sales, Advertising_Spend, Profit

Part A – Descriptive Analytics (What Happened?)

Descriptive analysis was performed to summarize historical sales performance. Total and average sales were calculated. Monthly sales and profit trends were analyzed to identify highest and lowest performing periods.

Part B – Diagnostic Analytics (Why Did It Happen?)

Region-wise and category-wise comparisons were conducted to determine performance differences. Correlation analysis was used to examine relationships between Advertising Spend, Sales, and Profit. Low-profit months were identified to diagnose possible causes such as high expenses or low revenue.

Part C – Predictive Analytics (What Will Happen?)

A Linear Regression model was developed to predict Sales based on Advertising Spend. The dataset was divided into training and testing sets. Model accuracy was evaluated using R^2 score.

Future sales were predicted for a planned advertising budget of ■6000.

Part D – Prescriptive Analytics (What Should Be Done?)

Based on predictive results and profit analysis, business recommendations were made. If predicted sales exceed average sales, increasing advertising budget is advised. Focus should be given to low-performing regions and high-profit product categories to improve overall profitability.

Conclusion:

This practical demonstrated the complete analytics workflow: Descriptive → Diagnostic → Predictive → Prescriptive. It highlights the importance of data analysis in supporting strategic and operational decisions in business.