WEEK 5 REPORT

Topic: Visualization Basics, Data Types, Data Modeling

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Internship Domain: Data Analytics / Data Science
Tool Used: Power BI
Focus: Understanding Visualization Basics and data modeling

Data Visualization & Data Modeling Basics

1. What is Data Visualization?

Data visualization is the graphical representation of data using charts, graphs, maps, and other visual elements. It helps transform complex datasets into an easy-to-understand visual format.

2. Why is Data Visualization Important?

- Makes complex data easy to understand
- Helps identify patterns, trends, and relationships
- Supports better decision-making
- Improves communication of insights
- Enables quick comparison of data

3. Types of Data

A. Categorical Data

Categorical data represents categories or groups. It describes qualities or characteristics.
Examples: Gender, State, Product Category, Incident Type.

Suitable Visualizations for Categorical Data

- Bar Chart
- Pie Chart / Donut Chart
- Count Plot
- Stacked Bar Chart

B. Numerical Data

Numerical data represents measurable quantities and numbers.
Examples: Revenue, Age, Temperature, Disaster Count.

Suitable Visualizations for Numerical Data

- Histogram
- Box Plot
- Scatter Plot
- Line Chart

C. Time Series Data

Time series data represents values recorded over time.
Examples: Sales per Month, Disasters per Year, Stock Prices.

Suitable Visualizations for Time Series Data

- Line Chart
- Area Chart
- Time Series Bar Chart
- Trend Chart

4. What is Data Modeling?

Data modeling is the process of organizing and structuring data to define how data is stored, connected, and accessed in a database or analytics system.

5. Why is Data Modeling Important?

- Improves data accuracy and consistency
- Enhances performance of reports and dashboards
- Makes relationships between data clear
- Supports efficient querying and analysis
- Reduces redundancy

6. Fact Table

A fact table contains measurable, quantitative data used for analysis. It usually includes numeric values and foreign keys that connect to dimension tables.
Examples: Sales Amount, Disaster Count, Revenue.

7. Dimension Table

A dimension table contains descriptive information that provides context to the facts.
Examples: Customer Name, State, Date, Product Category.

8. Relationships in Data Modeling

One-to-Many (1:M)

One record in a table is related to multiple records in another table.
Example: One State → Many Disaster Records.

Many-to-One (M:1)

Multiple records in one table relate to a single record in another table.
Example: Many Sales → One Product.

One-to-One (1:1)

One record in a table relates to only one record in another table.
Example: One Person → One Passport.

Cardinality (Basic Concept)

Cardinality defines the uniqueness of relationships between tables.
Types include:
- One-to-One
- One-to-Many
- Many-to-One
- Many-to-Many