Vishwakarma Institute Of Information Technology, Pune.
Department Computer Engineering (Software Engineering)
(Data Warehouse and Data Analytics Lab)
EXPERIMENT NO – 02
Aim : Perform Visual analytics using PowerBI/tableau . Plot various graph like table plot, histogram, boxplot for the suitable data and create a dashboard for the same also find out user defined Measures (Mean,Median,Mode) etc

Objective: To perform visual analytics using Power BI or Tableau, creating various visualizations and a comprehensive dashboard to gain insights from a given dataset.

Tools Used :

Power Bi Desktop

Power Bi Services

Theory :
 Dataset:

1. **Data Acquisition:** Obtain a dataset suitable for visual analysis. You can use a dataset you find online (e.g., from Kaggle, UCI Machine Learning Repository, or other data repositories) or one you create yourself. If using an external dataset, provide a link to the source in your submission. The dataset should have a mix of data types (numerical, categorical, date/time) to allow for diverse visualizations.
2. **Data Description:** Provide a brief description of the dataset, including:
   o The source of the data.
   o The number of rows and columns.
   o The types of data in each column (e.g., numerical, categorical, date/time).
   o The business questions or insights you aim to extract from the data.

Tasks:

1. **Data Loading and Exploration:**
   o Load the data into your chosen tool (Power BI or Tableau).
   o Perform basic exploratory data analysis (EDA) using the tool. This might include:
     ▪ Viewing the data.
     ▪ Checking for data quality issues (missing values, duplicates, inconsistencies).
     ▪ Calculating basic statistics (mean, median, mode, min, max) for numerical variables.
     ▪ Exploring the distribution of variables using histograms and other visualizations.
2. **Visualization Creation:** Create the following visualizations using your chosen tool:
   o **Table Plot:** Create a table to display key data points. Explore different table formatting options.
   o **Histogram:** Create histograms to visualize the distribution of numerical variables. Analyze the shape and skewness of the distributions.

- **Box Plot:** Create box plots to compare the distribution of numerical variables across different categories. Identify outliers.
- **Scatter Plot:** Create scatter plots to explore the relationship between two numerical variables. Identify correlations.
- **Line Chart:** Create line charts to visualize trends over time (if your data includes a date/time variable).
- **Bar Chart:** Create bar charts to compare categorical variables.
- **Pie Chart:** Create pie charts to show the proportion of different categories (use sparingly and only when appropriate).
- **Map (if applicable):** If your data includes geographic information, create a map to visualize data spatially.
- **Other relevant visualizations:** Create any other visualizations that you think are appropriate for your data and the insights you want to extract.

3. **User-Defined Measures (Calculated Fields):**
   - Create user-defined measures (calculated fields) in your chosen tool to calculate:
     - Mean, Median, and Mode for relevant numerical variables. (Power BI has built-in functions; in Tableau, you might use table calculations or LOD expressions).
     - Other custom metrics relevant to your analysis (e.g., percentage change, growth rate).
     - Clearly label these measures.

4. **Dashboard Creation:**
   - Create a cohesive and interactive dashboard that combines the visualizations you created.
   - Arrange the visualizations logically to tell a story about the data.
   - Use filters and interactivity to allow users to explore the data.
   - Include titles, labels, and annotations to make the dashboard easy to understand.
   - Ensure the dashboard is visually appealing and user-friendly.

5. **Insights and Analysis:**
   - Write a brief analysis of the insights you gained from your visualizations and dashboard.
   - Answer the business questions or address the objectives you defined at the beginning of the assignment.
   - Highlight any interesting trends, patterns, or anomalies you discovered in the data.

Power BI Dashboard

Power BI dashboards are single-page documents, often referred to as canvas, which illustrate a story through visualizations. A well-designed dashboard consists only of the highlights of a story. This is due to the fact that it is limited to one page. For more information, readers can view related reports. Power BI is the only service that offers dashboards.

A single page visualization with multiple charts and graphs to tell a story is called a Power BI dashboard. This one-page visualization in a dashboard is also known as a Canvas. The Power BI dashboard is a feature only available in Power BI Service. Since a Power BI dashboard is limited to one page, it only contains the highlights of a story. You cannot create a dashboard on Power BI Desktop.

In a dashboard, visualizations are generated from reports, and each report is based on one dataset. The visualizations present on the dashboard are called tiles, and report designers pin these tiles to the dashboard.
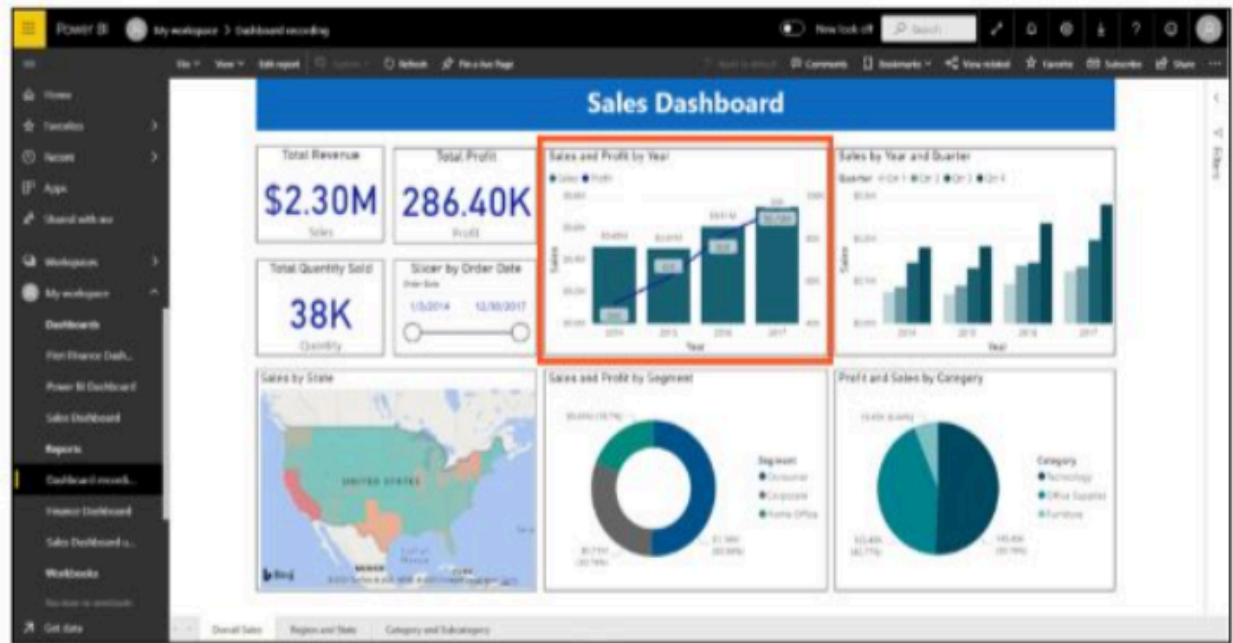
Advantages of a Power BI dashboard

- A Power BI dashboard enables users to analyze reports and view all important metrics at a glance.

- Using a Power BI dashboard, users can create visualizations from multiple datasets or multiple reports.

- You can customize dashboards to meet the requirements of any enterprise.

- Power BI dashboards can be embedded into applications to provide a unified user experience.

- You can instantly share a dashboard with other colleagues in your organization.

Conclusion : Hence we have successfully created Power BI Dashboard.

RESULT

1. **Objective:**

To explore and analyze health, diet, and food-related behaviors of students using visual analytics techniques in Power BI. This includes plotting various visual graphs, creating dashboards, and calculating user-defined statistical measures.
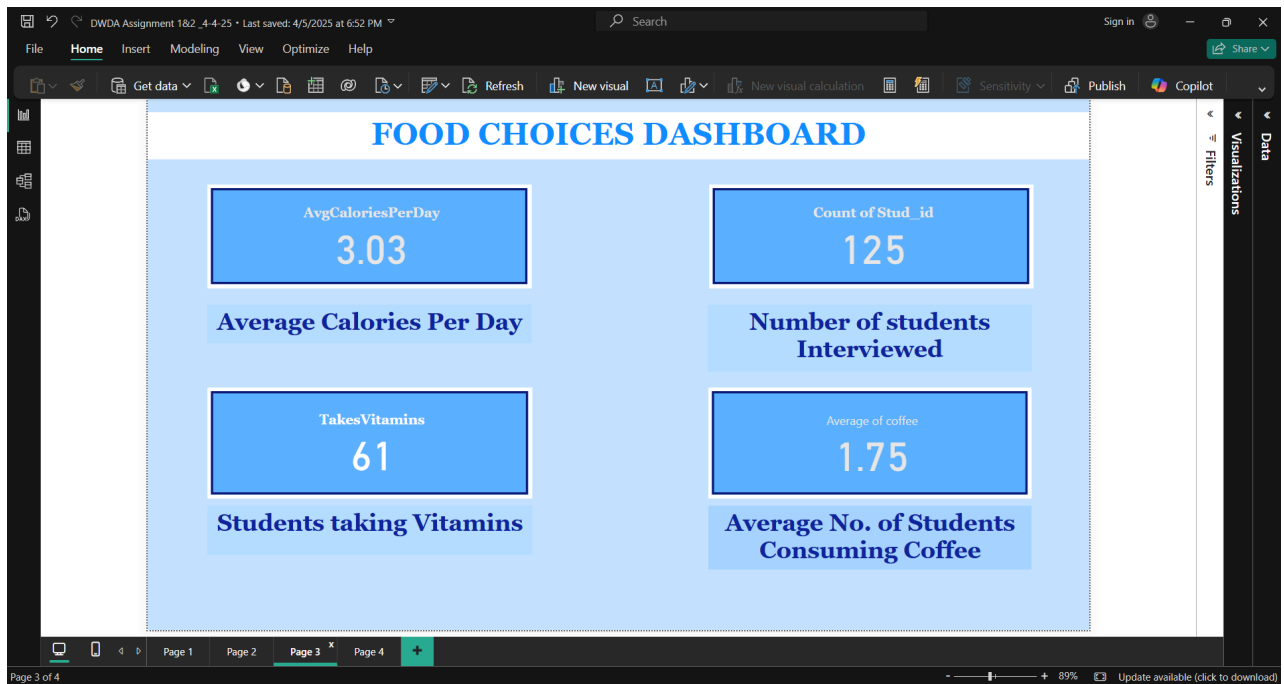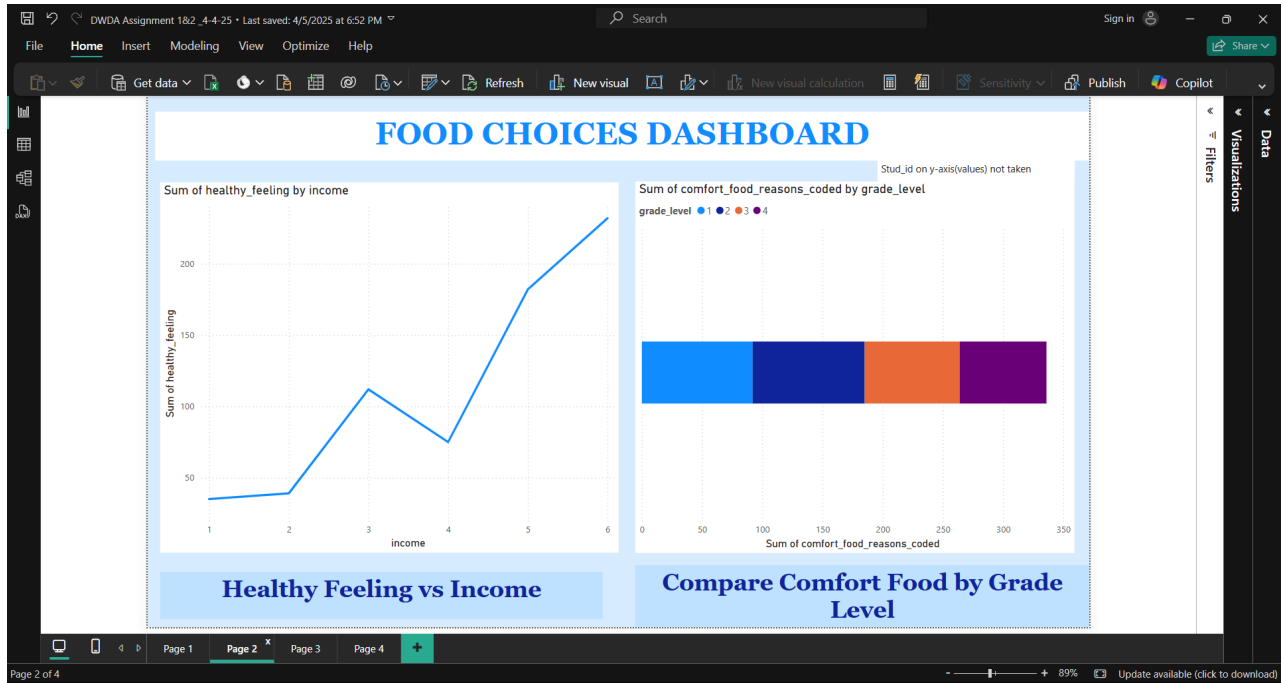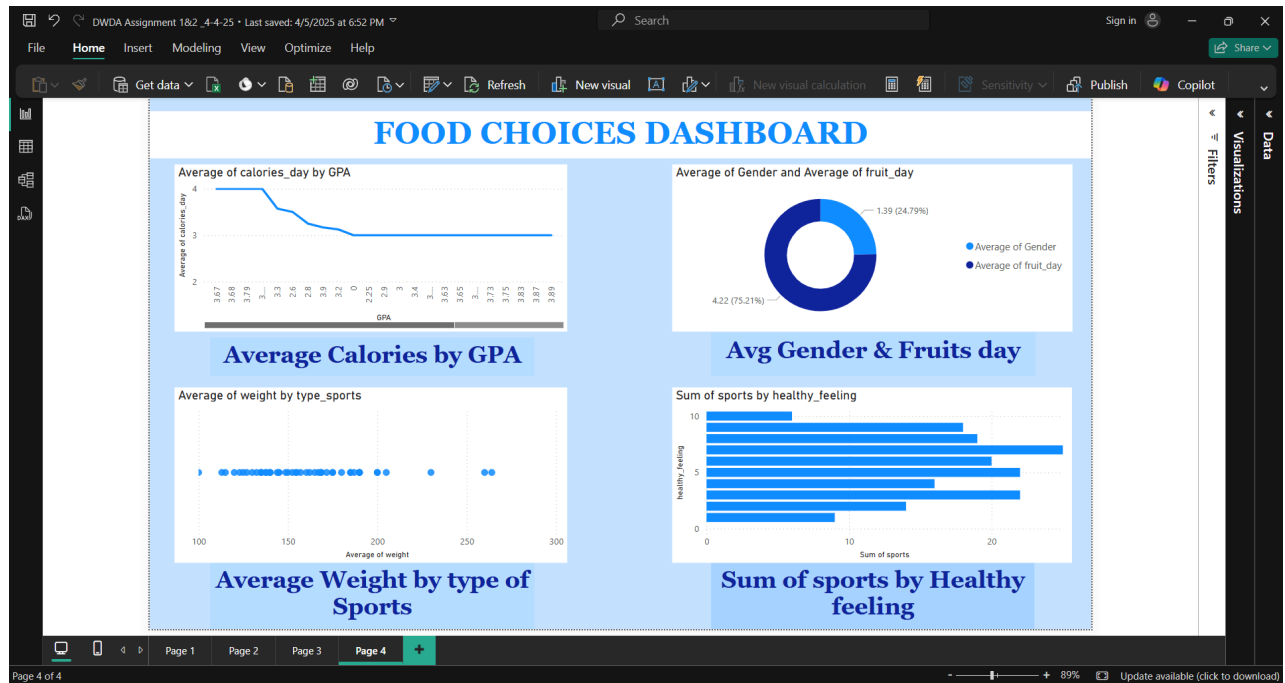
2. **Data Used:**

Food Choices dataset containing details on student demographics, eating habits, cuisines, calories, lifestyle choices, and health perceptions.

3. **Visualizations Created:**
   I. **Pie Chart –** Distribution of Favorite Cuisines among students.
   II. **Clustered Column Chart –** Average Daily Calorie Intake by Gender, highlighting differences in consumption.
   III. **Line Chart –** Relationship between Healthy Feeling and Income, showing health perception across economic levels.
   IV. **Stacked Bar Chart –** Comfort Food by Grade Level to compare emotional eating trends across academic levels.
   V. **KPI Cards –** Displayed key metrics like:
      ● Average Calories per Day
      ● Number of Students Interviewed
      ● Students Taking Vitamins
      ● Average Students Consuming Coffee
   VI. **Line Chart –** Average Calories by GPA, uncovering any academic-performance-related health patterns.
   VII. **Donut Charts –** Showed Average Gender Distribution and Average Fruit Intake per Day.
   VIII. **Scatter Chart –** Analyzed Average Weight by Type of Sports played.
   IX. **Stacked Bar Chart –** Visualized Sum of Sports Participation by Healthy Feeling.

FOOD CHOICES DASHBOARD

Sum of healthy_feeling by income

Healthy Feeling vs Income

Stud_id on y-axis(values) not taken

Sum of comfort_food_reasons_coded by grade_level

grade_level ● 1 ● 2 ● 3 ● 4

Compare Comfort Food by Grade Level

FOOD CHOICES DASHBOARD

AvgCaloriesPerDay

3.03

Average Calories Per Day

Count of Stud_id

125

Number of students Interviewed

TakesVitamins

61

Students taking Vitamins

Average of coffee

1.75

Average No. of Students Consuming Coffee

4. Outcome

The dashboard allows interactive exploration through various charts (e.g., Gender, Grade Level, Income) and provides a comprehensive view of how student's background and habits influence their food and health decisions.