Data Analytics With Tableau

Project Documentation

1.Introduction:

Project Title:

Comprehensive Analysis and Dietary Strategies with Tableau: A College Food Choices Case Study

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1.1 Project Overview:

This project focuses on analyzing the food choices and dietary habits of college students using Tableau. The dataset consists of 126 student records including information such as GPA, exercise habits, vegetable consumption, breakfast frequency, comfort food preferences, income level, and lifestyle behaviors.

The project aims to identify patterns between dietary habits and student health, academic performance, and lifestyle. Interactive dashboards are created to visualize insights and support better decision-making.

1.2 Purpose

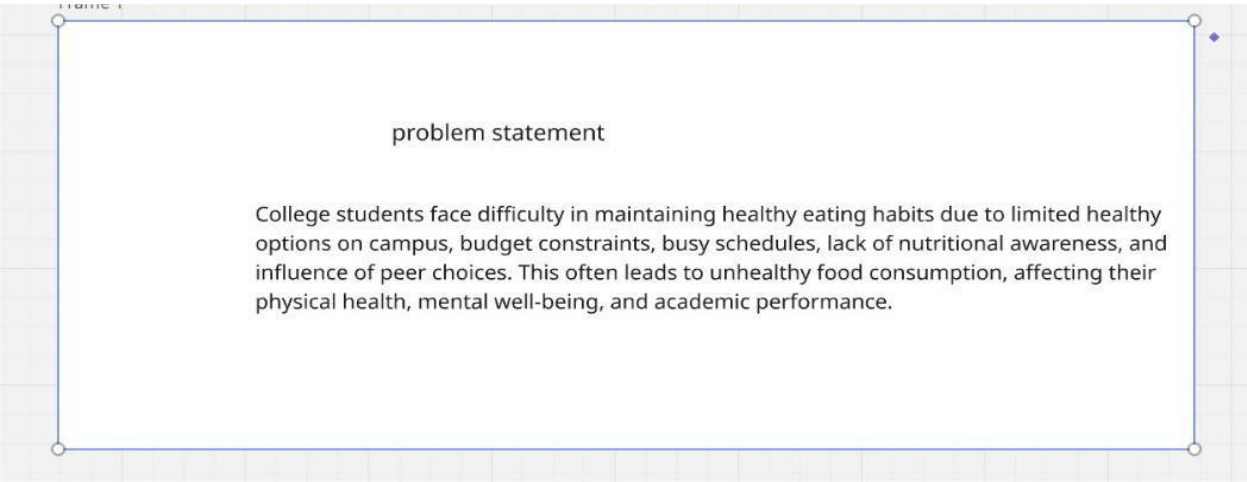
The purpose of this project is:

- To analyze dietary habits of college students
- To understand relationship between food habits and GPA
- To study lifestyle and health impact
- To provide data-driven dietary strategies
- To create interactive dashboards using Tableau

2. IDEATION PHASE

2.1 Problem Statement

College students often follow unhealthy eating patterns due to busy schedules, stress, and lifestyle habits. There is a need to analyze student food choices and identify patterns that impact their health and academic performance.



2.2 Empathy Map Canvas

Student Thinks:

- I don’t have time to cook.
- Fast food is convenient.
- I want to maintain good GPA.

Student Feels:

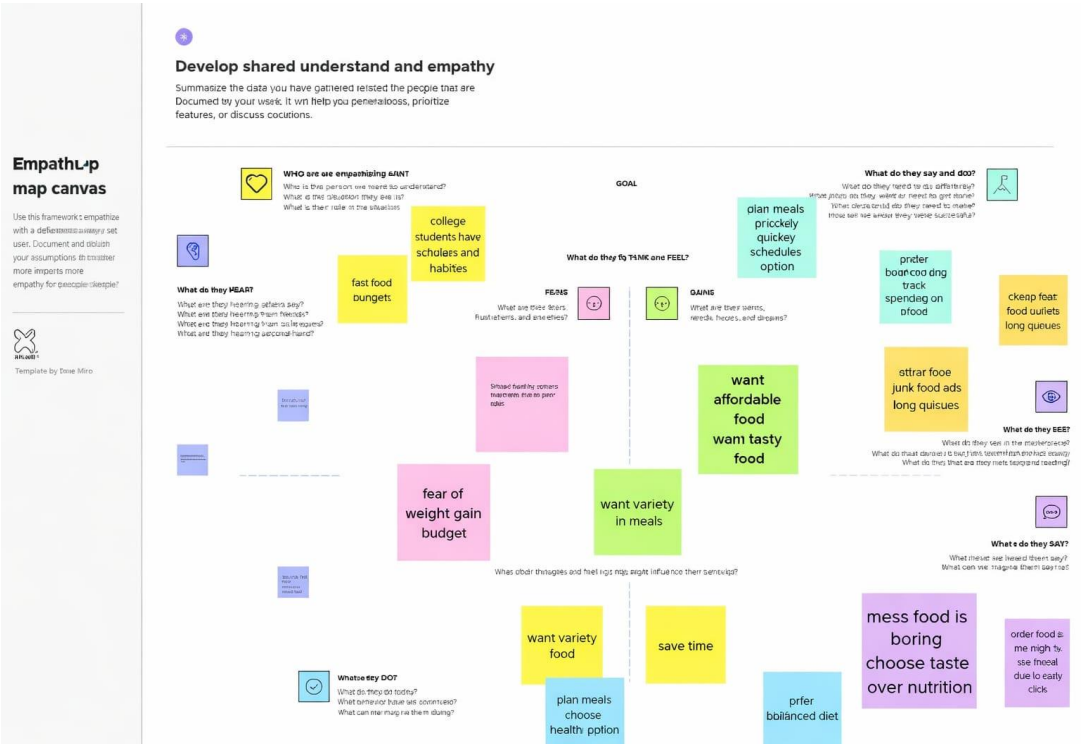
- Stressed during exams
- Concerned about weight gain
- Tired due to irregular meals

Student Says:

- “I skip breakfast often.”
- “I eat comfort food when stressed.”

Student Does:

- Orders fast food
- Skips meals
- Exercises occasionally



2.3 Brainstorming

Ideas Generated:

- Compare GPA with breakfast frequency
- Analyze vegetable consumption
- Study exercise vs weight
- Identify comfort food reasons
- Suggest healthy alternatives

Selected Idea:
Data-driven dietary strategy recommendation using Tableau dashboards.

3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

1. Student data collected
2. Data cleaned and processed
3. Data visualized in Tableau
4. Insights generated
5. Strategies recommended

3.2 Solution Requirement

The solution requirements define the functional and non-functional expectations of the proposed system. These requirements ensure that the Tableau-based dashboard system effectively analyzes student dietary habits and generates meaningful insights.

The requirements are categorized into Functional Requirements and Non-Functional Requirements.

Functional Requirements

Functional requirements describe what the system should do.

1. Data Import and Management

The system must allow importing the student dietary dataset (CSV format) into Tableau.

It should correctly recognize data types and render all 126 records without loss.

2. Data Preprocessing

The system must support cleaning operations such as removing null values, correcting data types, organizing fields, and creating calculated fields for advanced analysis.

3. Dashboard Creation

- The system should enable development of interactive dashboards including:
- Dietary Habits & Preferences
- Health & Nutrition Analysis
- Lifestyle & Eating Behaviour
- Each dashboard should contain appropriate visualizations and filters.

4. Data Visualization

- The system must provide various chart types such as:
- Bar Charts
- Pie Charts
- Scatter Plots
- Donut Charts
- These visualizations should represent relationships between GPA, exercise, food habits, and lifestyle patterns.

5. Filter and Interaction Support

- The system must support dynamic filtering based on:
- Gender
- GPA
- Exercise Level
- Breakfast Frequency

6. Story Presentation

- The system should combine multiple dashboards into a structured story view to present insights logically.

Non-Functional Requirements

Non-functional requirements define system quality attributes.

1. Usability

The dashboard should be user-friendly, easy to navigate, and visually clear.

2. Performance

The system should load 126 records quickly without delay.

3. Reliability

All visualizations and calculated fields must provide accurate and consistent results.

4. Scalability

The system should support addition of more student data in future.

5. Availability

The dashboard should be accessible online through Tableau Public.

Functional Requirements:

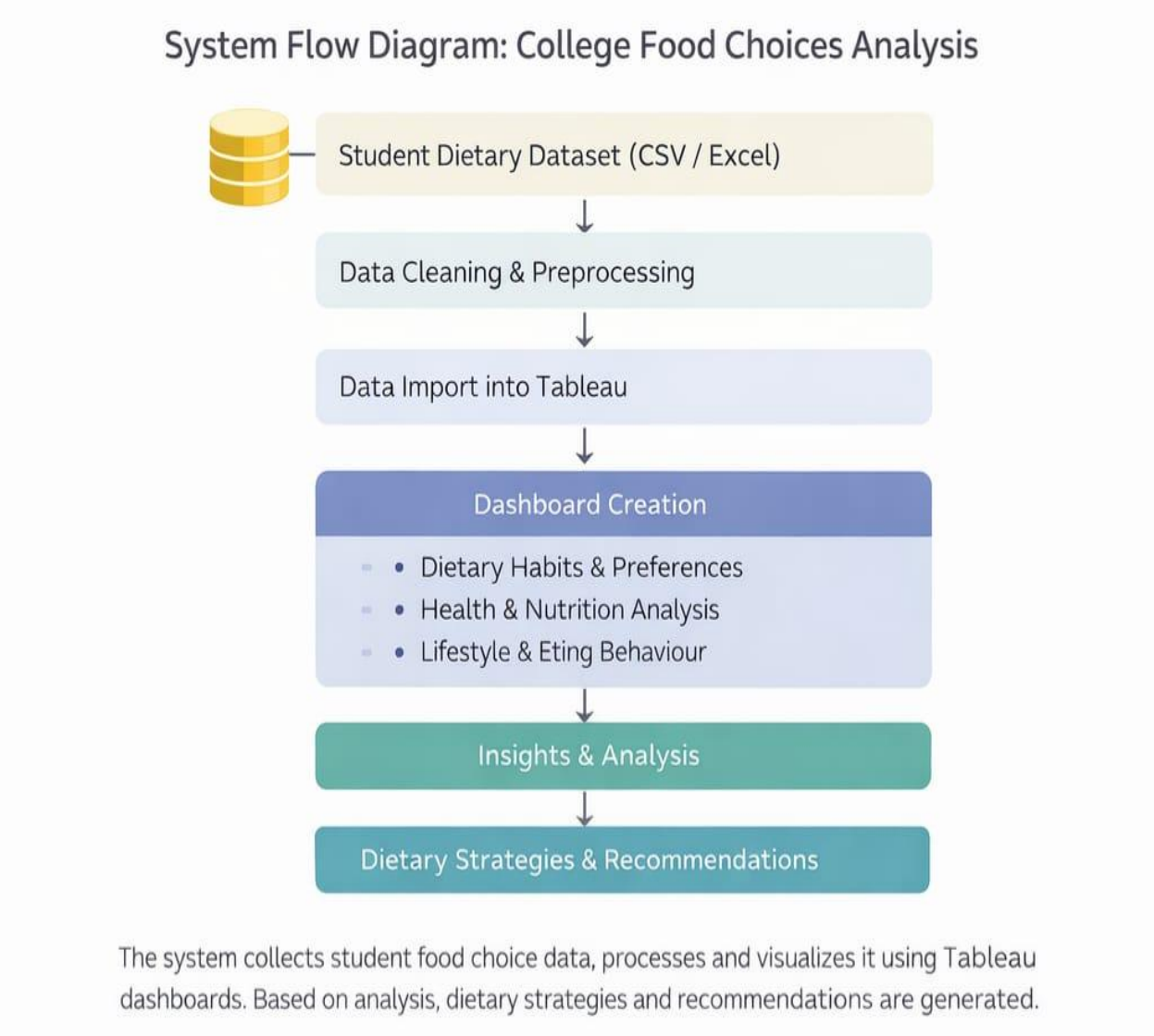
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Data Import & Management	Import dataset Refresh dataset Manage data fields
FR-2	Data Preprocessing	Remove null values Format data types Clean dataset Create calculated fields
FR-3	Dashboard Creation	Create Dietary dashboard Create Health dashboard Create Lifestyle dashboard Add filters
FR-4	Data Visualization & Insights	Generate charts Provide dietary strategies
FR-5	Reporting & Publishing	Publish to Tableau Public Generate PDF Share link

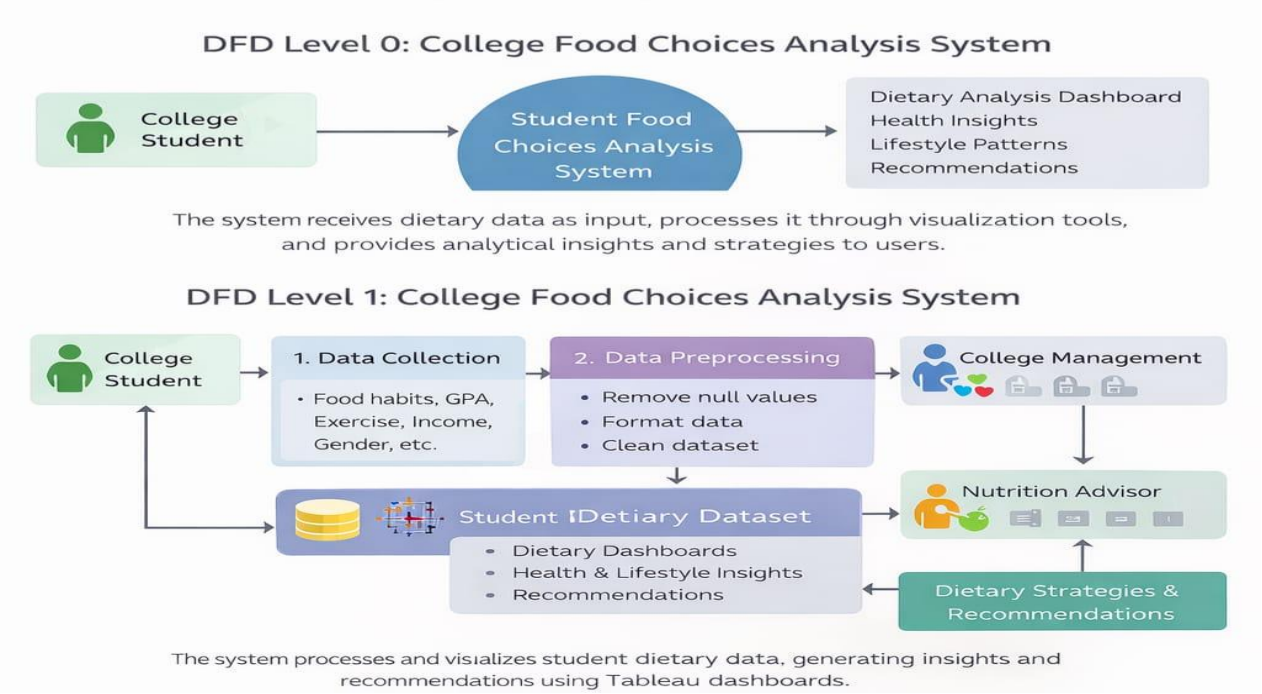
Non-Functional Requirements:

NFR No.	Non-Functional Requirement	Description
NFR-1	Usability	Dashboard should be simple and easy to navigate
NFR-2	Security	Dataset should be securely stored and protected
NFR-3	Reliability	Dashboard should function without errors
NFR-4	Performance	Visualizations should load quickly without delay
NFR-5	Availability	Dashboard should be accessible online via Tableau Public
NFR-6	Scalability	System should support future data additions

3.3 Data Flow Diagram

External Entity: Student
⬇
Data Collection
⬇
Data Preprocessing
⬇
Tableau Visualization
⬇
Dashboard Output
⬇
Dietary Strategies





3.4 Technology Stack

- Tool: Tableau Public
- Data Format: CSV
- Preprocessing: Tableau Calculated Fields
- Platform: Windows OS

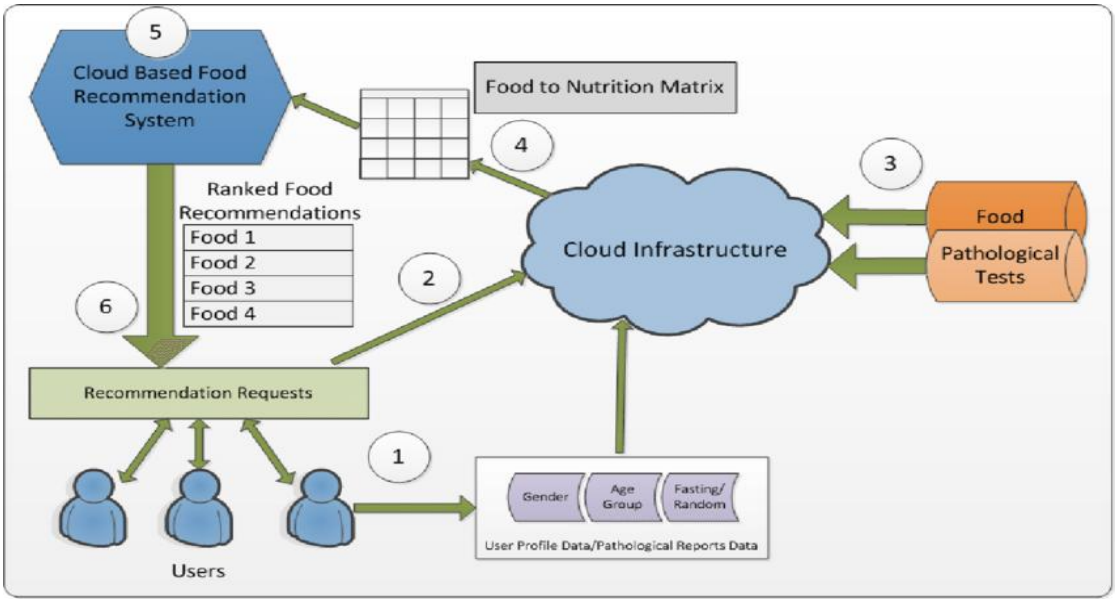


Table-1 : Components & Technologies:

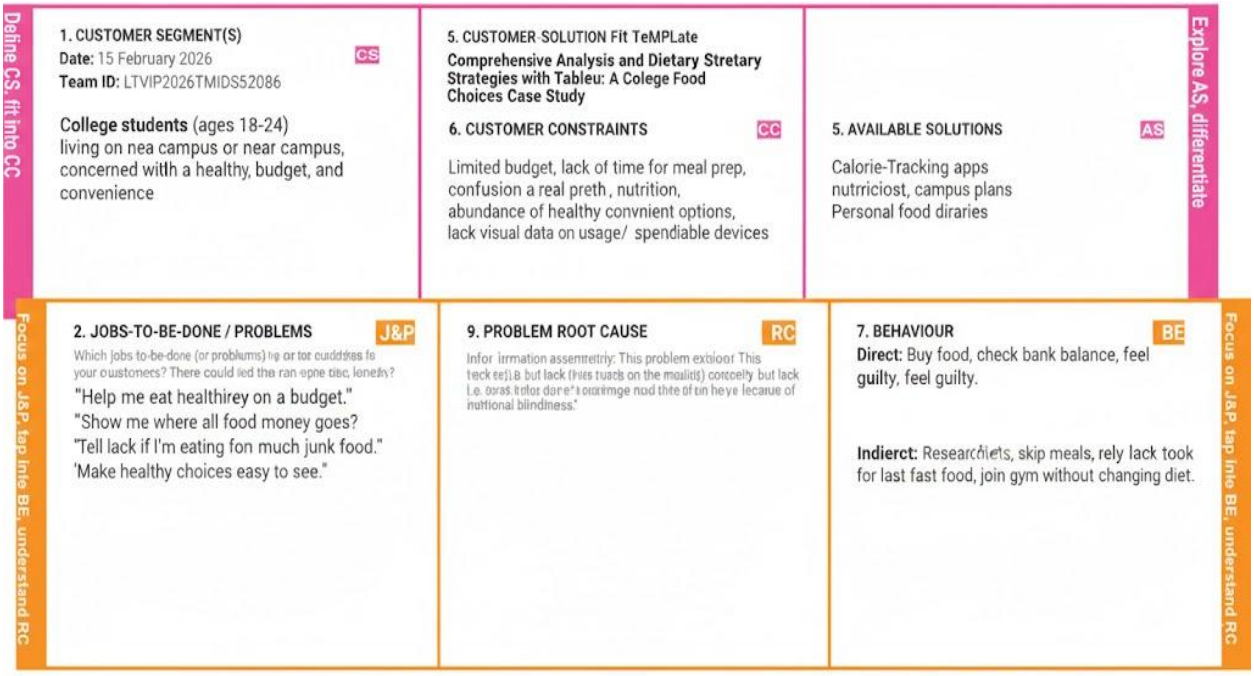
S.No	Component	Description	Technology
1.	User Interface	How users view dietary strategies and interact with filters.	Tableau Dashboard (Web-embedded)
2.	Application Logic-1	Calculations for nutritional trends and calorie/spend build-up	Tableau Calculated Fields / DAX-style logic
3.	Application Logic-2	Logic for identifying food popularity and ranking.	Tableau Sets & Groups
4.	Application Logic-3	Trend forecasting and statistical analysis.	Tableau Analytics Pane (Trend Lines)
5.	Database	Structured storage for college food choices data.	Microsoft Excel (XLSX)
6.	Cloud Database	Online data source for shared access.	Google Sheets / Tableau Cloud
7.	File Storage	Storage of raw transaction records.	Local Filesystem / CSV
8.	External API-1	Connecting to live nutritional databases (optional).	OData / Web Data Connector
9.	External API-2	Geolocation for city-wise analysis.	Tableau Map Service API
10.	Machine Learning Model	Identifying clusters of eating behaviors.	K-Means Clustering (Tableau Built-in)
11.	Infrastructure (Server / Cloud)	Deployment for student access.	Tableau Public / Cloud Foundry

4.

PROJECT DESIGN

4.1 Problem Solution Fit

The solution fits the problem by analyzing real student data and providing actionable dietary insights using interactive dashboards



4.2 Proposed Solution

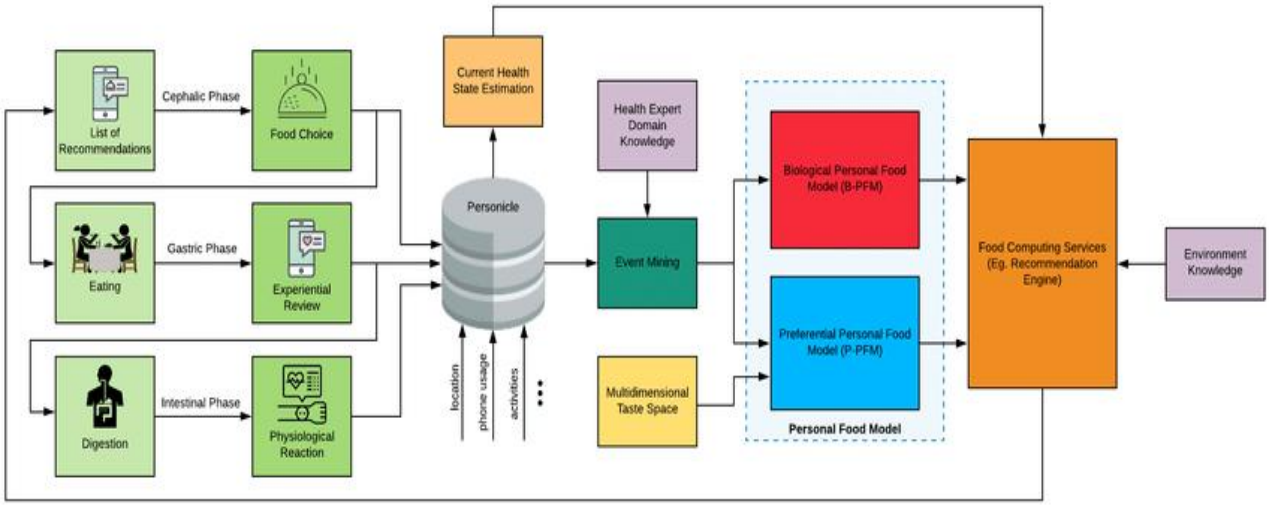
Develop an interactive Tableau dashboard system that:

- Visualizes food habits
- Analyzes health & academic relationship
- Suggests dietary improvements

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Many college students face "nutritional blindness," where they lack a clear understanding of their eating patterns, leading to poor health outcomes and low academic energy
2.	Idea / Solution description	An interactive Tableau dashboard suite that transforms daily food transaction data into visual insights. Key features include a Waterfall chart for cumulative spending/calories and a Funnel chart for food group prioritization
3.	Novelty / Uniqueness	This project applies high-level corporate data visualization techniques (like Highlight Tables and Word Clouds) to personal dietetics, making health data more engaging than traditional spreadsheets.
4.	Social Impact / Customer Satisfaction	Empowering students with data-driven dietary control improves community health literacy and increases student satisfaction with campus dining options.
5.	Business Model (Revenue Model)	A software-as-a-service (SaaS) model where universities pay a subscription fee to integrate this dashboard into their campus student portals.
6.	Scalability of the Solution	The logic can be scaled to any university globally by simply connecting new canteen data sources to the established Tableau workbook structure.

4.3 Solution Architecture

Student Dataset → Data Cleaning → Tableau → Dashboards → Insights → Recommendations



5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Project planning is a critical phase that ensures the successful execution of the project within the defined timeline and objectives. In this project, a structured planning approach was followed to systematically complete each stage of development.
The planning was divided into multiple phases including data collection, preprocessing, dashboard development, testing, and documentation. Each phase was assigned a specific timeline to ensure smooth workflow and avoid delays.

Phase 1: Dataset Collection & Understanding

Duration: Week 1

In this phase, the College Food Choices dataset containing 126 student records was collected and examined. The dataset included variables such as GPA, breakfast habits, vegetable consumption, exercise frequency, comfort food preferences, and income level.

The main objective of this phase was:

- To understand the structure of the dataset
- To identify missing values

- To analyze data types (categorical and numerical)
- To determine suitable visualization techniques

Phase 2: Data Cleaning & Preprocessing

Duration: Week 2

- This phase focused on improving data quality before visualization. The following tasks were performed:
- Removal of null and inconsistent values
- Formatting numerical and categorical fields
- Creating calculated fields such as Average GPA and BMI
- Organizing dataset for better analysis Proper preprocessing ensured accurate and meaningful insights in later stages.

Phase 3: Dashboard Design & Development

Duration: Week 3

- During this phase, interactive dashboards were created using Tableau Public. Three major dashboards were developed:
- Dietary Habits & Preferences Dashboard
- Health & Nutrition Analysis Dashboard
- Lifestyle & Eating Behaviour Dashboard
- Key tasks included:
- Selection of suitable chart types (bar, pie, scatter)
- Implementation of filters (Gender, GPA, Exercise Level, etc.)
- Applying consistent design layout
- Creating interactive story view
- This phase translated raw data into visual insights.

Phase 4: Testing & Validation

Duration: Week 4

- The dashboards were tested to ensure:
- All 126 records were properly rendered
- Filters functioned correctly
- Calculated fields produced accurate results
- Visualizations loaded efficiently

Performance testing ensured system reliability and usability.

Phase 5: Documentation & Final Submission

Duration: Final Week

- The final stage involved preparing project documentation including:
- Ideation Phase
- Requirement Analysis
- System Design
- Performance Testing
- Results & Conclusion
- All necessary screenshots and links were added before final submission.

6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

Performance testing was conducted to ensure that the Tableau dashboards function efficiently, accurately render data, and provide smooth user interaction. The testing phase verified system reliability, usability, and correctness of insights generated from the dataset.

The dataset consisted of 126 student records, and all records were successfully imported and visualized without data loss.

1. Data Rendering Testing

- The first step was to verify whether all dataset records were properly loaded into Tableau.
- Total Dataset Rows: 126
- Records Rendered in Tableau: 126
- Data Loss: None
- Loading Performance: Smooth

Result: All data was successfully rendered without missing values during visualization.

2. Data Preprocessing Validation

- The preprocessing stage was validated to ensure clean and structured data.
- Testing included:
- Checking removal of null values
- Verifying correct data type formatting
- Testing calculated fields
- Cross-verifying numerical accuracy

Result: Data preprocessing was successfully completed and calculations produced accurate outputs.

3. Filter Functionality Testing

- Filters were tested to ensure correct dynamic behavior.
- Filters Tested:
- Gender
- GPA
- Exercise Level
- Breakfast Frequency
- Comfort Food Reasons
- Income Level
- Each filter was applied individually and in combination to confirm that dashboards updated correctly.

Result: All filters functioned dynamically and accurately updated visualizations.

4. Calculated Field Testing

- Calculated fields were verified for mathematical correctness.
- Fields Tested:
- Average GPA
- BMI Calculation
- Total Vegetable Consumption
- Average Exercise Hours
- Each value was manually cross-checked with dataset values to ensure accuracy.

Result: All calculated fields displayed correct computed values.

5. Dashboard Performance Testing

- The dashboards were evaluated for:
- Visual clarity
- Layout consistency
- Interactivity
- Loading speed
- Responsiveness
- Dashboards Created: 3
- Total Visualizations: 12

Result: Dashboards loaded quickly and maintained consistent design and responsiveness.

6. Story View Testing

The story feature combining multiple dashboards was tested to ensure:

Proper navigation between views

Logical flow of insights

Smooth transition without errors

Result: Story navigation was smooth and structured logically.

- Dataset Rows: 126
- Dashboards Created: 3
- Visualizations: 12
- Filters Implemented: 6
- Calculated Fields: 4

7. RESULTS

The results of the project were obtained through detailed analysis of 126 student records using interactive Tableau dashboards. The visualizations provided clear insights into dietary habits, lifestyle behaviors, and their relationship with academic performance.

The dashboards successfully transformed raw dataset information into meaningful patterns and strategic insights.

1. Dietary Habits Analysis

- The analysis revealed that a significant number of students skip breakfast regularly. Students who consumed breakfast consistently showed relatively better GPA distribution compared to those who skipped meals frequently.
- Vegetable and fruit intake levels varied across students, indicating differences in nutritional awareness and food accessibility. Students with higher vegetable consumption demonstrated healthier overall eating patterns.
- Comfort food preferences were strongly associated with stress-related reasons. Many students reported consuming comfort food during academic pressure or emotional situations.

2. Health & Nutrition Insights

- The relationship between exercise frequency and health indicators showed that students who exercised moderately had more balanced lifestyle patterns.
- Students who rarely exercised displayed higher dependency on fast food and irregular eating habits.
- The BMI-related observations suggested that dietary balance and exercise both play an important role in maintaining healthy weight levels

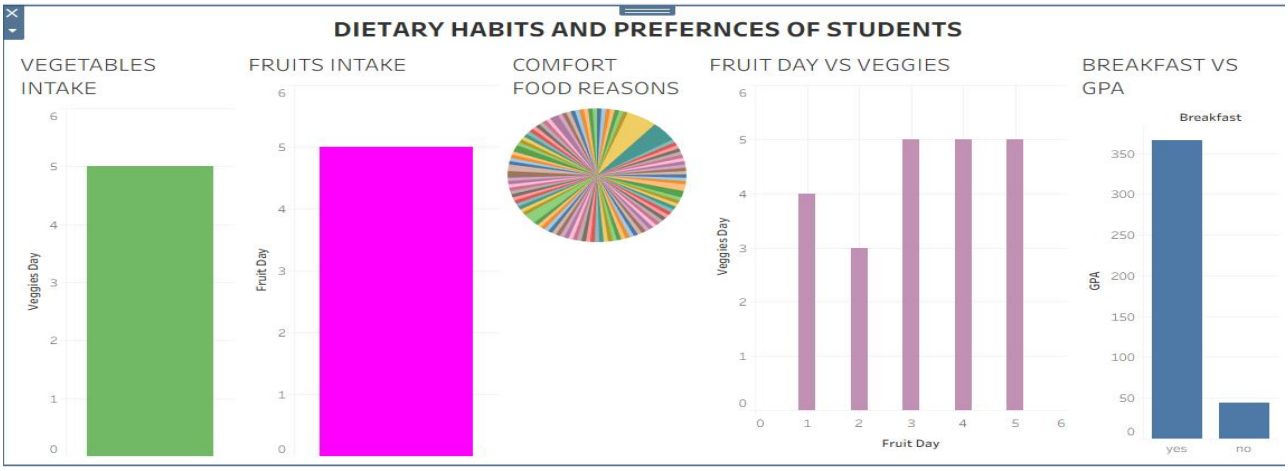
3. Academic Performance Correlation

- The scatter and comparison charts showed a slight positive correlation between healthy eating habits and GPA levels.
- Students who maintained regular meals and balanced diets were more likely to have stable academic performance.

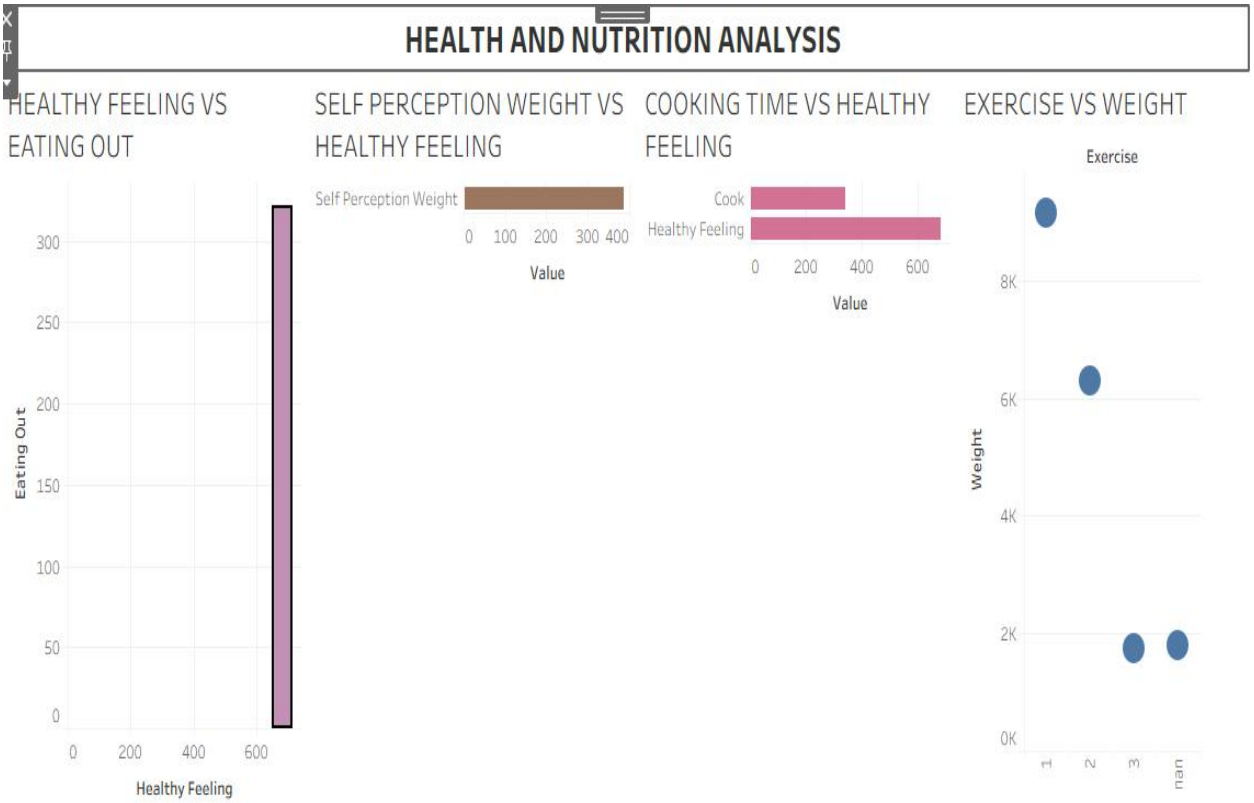
- However, academic performance was influenced by multiple factors, not solely diet, indicating that food habits are one of several contributing elements.

7.1 Output Screenshots

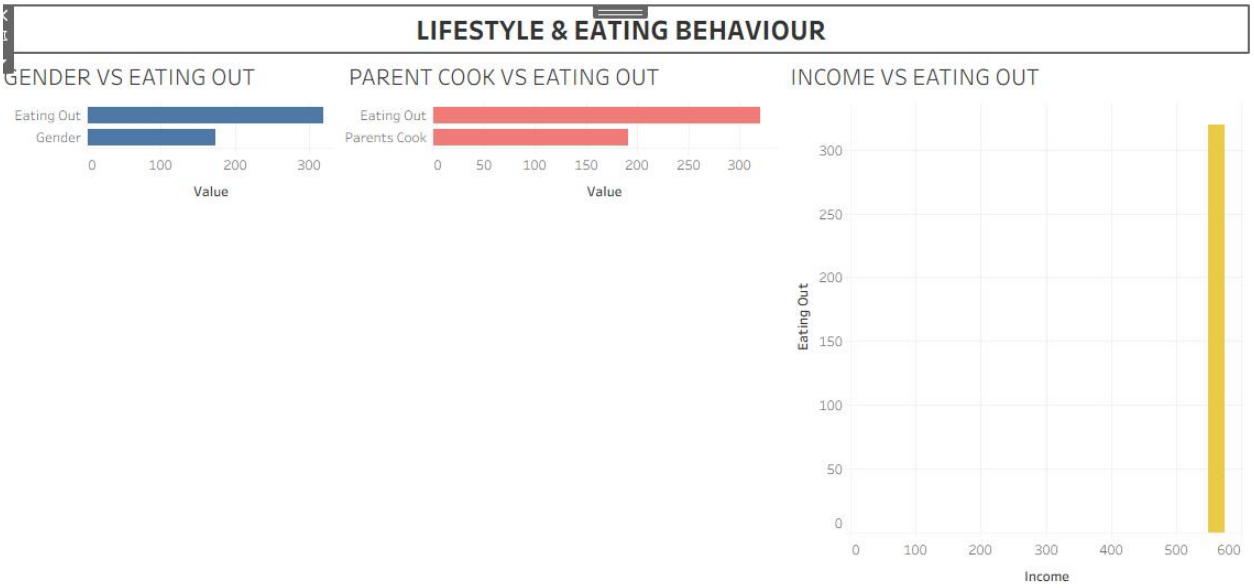
Dietary Dashboard



Health Dashboard



Lifestyle Dashboard



8.ADVANTAGES & DISADVANTAGES

8.1 Advantages

1. Clear Data Visualization

The project uses Tableau dashboards to visually represent complex dietary data in simple charts and graphs. This makes interpretation easy even for non-technical users.

2. Better Understanding of Student Food Habits

It helps identify patterns in food choices, lifestyle habits, exercise frequency, and health awareness among college students.

3. Supports Healthy Decision Making

The analysis highlights unhealthy eating trends and provides insights that can help students choose healthier dietary strategies.

4. Interactive and User-Friendly

The dashboard includes filters and interactive features, allowing users to explore data based on gender, GPA, exercise habits, and other parameters.

5. Real-Time Insights

Users can instantly view updated results when applying filters, making analysis faster and efficient.

6. Data-Driven Approach

The project relies on actual dataset (126 records), making conclusions evidence-based rather than assumption-based.

7. Scalability

The future without redesigning the entire system. More student data can be added in

8.2 Disadvantages

1. Limited Dataset Size

The dataset contains only 126 records, which may not fully represent the entire student population.

2. Self-Reported Data Bias

Food habits and lifestyle responses may not always be 100% accurate since they are based on self-reporting.

3. No Predictive Modeling

The project focuses on descriptive analysis and does not include machine learning or prediction models.

4. Dependency on Tableau

The system fully depends on Tableau software. Without Tableau access, analysis cannot be performed.

5. Limited Real-Time Data Collection

The project analyzes static dataset and does not support live data input from students.

9. CONCLUSION

The project titled “Comprehensive Analysis and Dietary Strategies with Tableau: A College Food Choices Case Study” successfully analyzed the dietary habits, lifestyle behaviors, and academic performance of college students using data visualization techniques.

By examining 126 student records, the study identified meaningful relationships between food choices, exercise patterns, breakfast consumption, and GPA. The interactive Tableau dashboards helped transform raw data into clear and understandable insights. The analysis revealed that regular breakfast consumption, balanced diet, and moderate exercise contribute to better health indicators and more stable academic performance.

The project demonstrated how data-driven approaches can be effectively used to understand real-world problems. Through proper preprocessing, visualization, and interpretation, valuable dietary strategies were identified that can help students improve their overall well-being.

Overall, the system achieved its objective of analyzing student food habits and providing actionable insights using Tableau dashboards. The project highlights the importance of healthy eating patterns and showcases the power of data visualization in decision-making and awareness creation.

10. FUTURE SCOPE

Although the project successfully analyzes student dietary habits using data visualization, there are several opportunities for future enhancement and expansion.

Larger Dataset Integration

Future work can include collecting data from multiple colleges to increase dataset size and improve accuracy of insights.

Real-Time Data Collection

The system can be upgraded to support live data input through online surveys or mobile applications, enabling real-time monitoring of student food habits.

Predictive Analytics Implementation

Machine learning models can be integrated to predict academic performance or health risks based on dietary patterns.

AI-Based Recommendation System

An intelligent recommendation system can be developed to provide personalized dietary suggestions to students based on their eating behavior and lifestyle.

Mobile Dashboard Application

The dashboards can be converted into a mobile-friendly application to allow easy access and monitoring.

Health Monitoring Integration

Future versions may integrate BMI tracking, calorie analysis, and nutrition score calculation for deeper health evaluation.

Automated Alerts and Notifications

The system can send alerts or suggestions to students when unhealthy eating patterns are detected.

11. APPENDIX

The appendix section provides supporting information and additional details related to the project implementation.

11.1 Dataset Details

Dataset Name: College Food Choices Dataset

Total Records: 126

Data Type: CSV Format

Attributes Included:

- GPA
- Gender
- Breakfast Frequency
- Vegetable Consumption
- Fruit Intake
- Exercise Frequency
- Comfort Food Preference
- Income Level
- Lifestyle Factors

The dataset was used to analyze dietary habits and their relationship with academic performance and health behavior.

11.2 Tools and Technologies Used

Visualization Tool: Tableau Public

Data Format: CSV

Operating System: Windows

Charts Used:

- Bar Chart
- Pie Chart
- Scatter Plot
- Donut Chart
- Story Dashboard

11.3 Dashboard Components

Total Dashboards Created: 3

Total Visualizations: 12

Filters Implemented: 6

Calculated Fields: 4

The dashboards include interactive filtering and structured story presentation for clear analysis.

Steps to Run Source code to get Dashboard:

Publish to Tableau Public

Step 1

In Tableau → File → Save to Tableau Public

Step 2

Login → Save project

Step 3

After saving, browser opens

Click Share → copy the Embed link / URL

Keep this link safe.

✅ NEXT STEP — Web Integration (Flask)

Now we will show this dashboard & story in a webpage.

You will create 2 files only.

🗀 Create a folder on Desktop

Name: tableau_web

Inside create:

File 1: app.py

Paste this:

Python

```
from flask import Flask, render_template
app = Flask(_name_)
@app.route('/')
def home():
    return render_template('index.html')
if _name_ == '_main_':
    app.run(debug=True)
```

File 2: Create folder templates

Inside it create file: index.html

Paste this and replace YOUR LINK:

HTML

Copy code

```
<!DOCTYPE html>
<html>
<head>
    <title>Food Choices Dashboard</title>
</head>
<body>
    <h1>College Food Choices Analysis</h1>

    <iframe
        src="PASTE_YOUR_TABLEAU_PUBLIC_LINK_HERE"
        width="100%"
        height="800">
```

```
    </iframe>
</body>
</html>
```

▶ Run Flask

Open command prompt in that folder:

pip install flask

python app.py

Open browser:

write

http://127.0.0.1:5000

Dataset Link:

https://www.kaggle.com/datasets/borapajo/food-choices?select=food_coded.csv

Dashboard Link:

https://public.tableau.com/app/profile/mekala.bhavyasri/viz/p_9_17706430358980/Story1?publish=yes

Project Demo Link:

https://drive.google.com/file/d/1YH-lm7Gi2j4Ih--QUumEx8k9nhaa2Gvs/view?usp=drivesdk