A Project Report on

“Algorhythm Tech-Fest Dashboard”

Submitted in partial fulfillment of the requirement for
the award of the degree of

Bachelor of Science (Computer Science)

ACADEMIC YEAR 2024-2025

By

Atharva Bhau Shelar

Roll No: 247521

Under The Guidance Of

Ms.Deepali Patil

Department Of Computer Science

Rayat Shikshan Sanstha's

Karmaveer Bhaurao Patil College, Vashi
(Empowered Autonomous)

Accredited by NAAC with Grade A++(CGPA 3.51) | ISO 9001:2015 certified institute

PKC Road,Sec.15-A Juhu Nagar , Vashi Navi Mumbai
Maharashtra – 407003

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PKC Road,Sec.15-A Juhu Nagar , Vashi Navi Mumbai

Maharashtra - 400703

CERTIFICATE

This is to certify that the work contained in this project report entitled

"Algorhythm Tech-fest Dashboard"

submitted by

"Atharva Bhau Shelar"

"Roll No: 247521"

In partial fulfillment of the B.Sc(Computer Science) Degree **Semester VI** Examination in the academic year **2024-2025** to the Karmaveer Bhaurao Patil College, Navi Mumbai and has not been submitted for any other examination and does not form part of any other course undergone by the candidate. It is further certified that he/she has completed all the required phases of the Project.

External Examiner Internal Examiner

Project Guide

Head of Department Principal

Acknowledgement

I have taken efforts in this project research. It would not have been possible without the kind support and help of many individual and organization. I would like to express my sincere gratitude to the people who helped me in completing the project. I heartily thank my project guide, **Ms.Deepali Patil**, for her valuable guidance, co-operation, encouragement and time spent for this project work. I also thank her for showing faith in me throughout the course of the project. I extend my sincere thanks to the principal of our college and all faculty members of BSc Computer Science department who tuned my knowledge in the field of Computer Science. I am also grateful to my family members for constantly supporting me and all those who guided me directly or indirectly during my project, encouraging me to put my best efforts for continual improvement of the project.

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CHAPTER 1 :
INTRODUCTION

INTRODUCTION

1.1 BACKGROUND :

The Power BI dashboard developed for the **Algorhythm fest** aims to provide insightful analysis of sponsorship, expenses, and participation trends across different years. This documentation serves as a comprehensive guide, detailing the architecture, technology, design, and implementation of the dashboard.

By utilizing advanced data visualization techniques, the dashboard enables stakeholders to monitor financial growth, track sponsorships, analyze participation trends, and optimize event management. The interactive features allow dynamic exploration of key performance indicators (KPIs), ensuring informed decision-making for event organizers.

Algorhythm is an **annual technical fest** that serves as a **dynamic platform** for students, sponsors, and industry professionals to engage in a wide range of **technical and non-technical** events. The fest fosters innovation, learning, and networking through **workshops, hackathons, coding competitions, robotics challenges, technical paper presentations, guest lectures, and cultural performances**. With each passing year, the fest has witnessed **a significant increase in participation and sponsorship**, contributing to its growing popularity and success.

As the **scale of the event expands**, effectively managing **sponsorships, expenses, and participant data** has become increasingly complex. The financial transactions, sponsorship commitments, and participation records generate a **large volume of data**, making it difficult for event organizers to **manually track, analyze, and optimize resource allocation**. Relying on **traditional data management methods**, such as Excel spreadsheets or manual bookkeeping, is **time-consuming, error-prone, and inefficient**, often leading to **delayed decision-making and inaccurate financial assessments**.

Moreover, with the **growing number of sponsors and stakeholders involved**, maintaining **financial transparency and accountability** has become crucial. Sponsors expect **detailed reports on fund utilization, event reach, and overall impact**, making it imperative to adopt a **more structured and automated** data analysis approach.

To address these challenges, the **Power BI dashboard** has been introduced as a **robust analytical tool** to provide deeper insights into **financial trends, sponsorship growth, and participant engagement** over multiple years. This dashboard **simplifies data management**, ensures **real-time financial tracking**, and assists in **forecasting future growth patterns**. By leveraging **interactive visualizations and business intelligence techniques**, the dashboard helps organizers **identify trends, optimize budget allocations, and enhance strategic planning** for future editions of the fest.

Additionally, the integration of **data analytics** into event management not only improves **operational efficiency** but also **enhances stakeholder communication**. Sponsors and event organizers can access **data-driven reports**, ensuring **transparency in financial transactions and effective resource allocation**.

Thus, the implementation of the **Power BI dashboard** marks a **significant step** toward **modernizing event management**, providing **automated, real-time insights** that enhance the **sustainability and scalability** of **Algorhythm**.

1.2 OBJECTIVE :

The primary objective of this Power BI dashboard is to facilitate effective decision-making through data-driven insights. The specific objectives include:

Financial Analysis: To analyze sponsorships and expenses over different years, identifying trends and financial health.

Performance Evaluation: To assess the performance of various sub-events based on revenue and participation

Trend Visualization: To provide clear and interactive visual representations of key event metrics.

Comparative Analysis: To compare year-wise performance and track event growth.

Efficiency Improvement: To optimize sponsorship acquisition and budget allocation through data insights.

Stakeholder Engagement: To provide sponsors, organizers, and management with a transparent and structured view of financial data.

Data Accuracy: To ensure error-free and real-time analysis, reducing manual calculation efforts.

1.3 PURPOSE AND SCOPE :

1.3.1 PURPOSE

The purpose of this dashboard is to offer a centralized platform where all financial and event-related data can be visualized and analyzed efficiently. By consolidating historical and real-time data, the dashboard provides meaningful insights that support strategic planning and operational improvements for the Algorhythm fest.

The Power BI dashboard enables stakeholders to:

Gain real-time visibility into sponsorship contributions and overall revenue.

Monitor expenses efficiently and identify cost-saving opportunities.

Evaluate the performance of different sub-events based on participation and financial contributions.

Track year-over-year growth and make data-backed decisions for future events.

1.3.2 SCOPE

The scope of this documentation and dashboard implementation covers:

Data Collection & Integration: Data from past and current editions of Algorhythm is compiled, cleaned, and processed for analysis.

Visualization & Analysis: Various Power BI charts, including Stacked Bar Charts, Doughnut Charts, KPIs, Line Charts, and Treemaps, are utilized to display trends and insights.

DAX Queries: Implementation of DAX queries to compute metrics such as total revenue, expenses, sponsorship contributions, and event growth percentage.

Interactivity & Navigation: The dashboard includes filters, slicers, and navigation elements to enable users to explore different aspects of the event's performance.

Stakeholder Access: Designed for event organizers, sponsors, and college management to facilitate transparency and decision-making.

Future Enhancements: The dashboard architecture allows for future scalability, enabling the integration of additional features like predictive analytics and AI-driven insights.

In summary, this Power BI dashboard serves as a comprehensive tool for managing and analyzing the financial aspects of Algorhythm. By leveraging data visualization and analytical capabilities, it ensures transparency, accuracy, and efficiency in event planning and execution.

CHAPTER 2 : SURVEY AND TECHNOLOGY

SURVEY AND TECHNOLOGIES

2.1 Survey of Existing Systems

Event management and financial tracking have traditionally been handled using **spreadsheet-based solutions**, manual bookkeeping, or basic database systems. While these methods serve as fundamental tools for organizing data, they have **significant limitations**, especially when dealing with **large-scale events** like Algorhythm, where financial transactions, sponsorship data, and participation records grow exponentially each year.

Challenges with Existing Systems:

1. Lack of Real-Time Insights

1. Most existing systems, such as Excel-based financial tracking, do not offer real-time data updates.
2. Any changes in sponsorships, expenses, or revenue require manual entry, which increases the chances of errors.
3. Stakeholders do not have immediate access to updated financial reports.

2. Static and Non-Interactive Reports

1. Traditional spreadsheets provide static reports that require manual filtering and sorting to extract insights.
2. There is no interactive dashboard where stakeholders can **dynamically filter data**, analyze trends, and compare statistics over different years.

3.Inefficiency with Large Datasets

1. As data accumulates over multiple years, spreadsheets become **slow and cumbersome**.
2. Complex calculations, such as cumulative revenue tracking and growth percentage analysis, require **manual formulas**, which can lead to inconsistencies.

4.Limited Customization and Automation

1. Existing tools do not provide **customized KPIs (Key Performance Indicators)** based on event-specific metrics.
2. There is no built-in automation to generate reports or alerts when financial thresholds are met or exceeded.

5.Data Integration Challenges

1. Events often collect data from multiple sources, such as **sponsorship databases, participant registrations, and vendor expenses**.
2. Without a centralized system, merging and analyzing these datasets becomes a manual and time-consuming task.

To overcome these challenges, the **Power BI dashboard** was introduced as a **modern, automated, and data-driven solution** to improve the efficiency and accuracy of financial tracking and event analysis.

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2.2 Technology Used

The development of the **Algorhythm Power BI dashboard** involves a combination of **business intelligence tools, data analytics techniques, and scripting languages** to ensure a smooth, efficient, and insightful user experience. Below are the key technologies used:
One of the most critical functions of the back end is face encoding and recognition. The system utilizes the face_recognition library to generate unique encodings for each student's face. These encodings are pre-computed and stored in a pickle (.p) file for quick access during attendance verification. When a face is detected, the system compares it with stored encodings and identifies the student with the lowest face distance score.

1. Power BI Free Version

- Power BI is a **business intelligence and data visualization tool** developed by Microsoft.
- The free version of Power BI enables users to create interactive dashboards and reports.
- It allows integration with **Excel, databases, and other data sources** to create **custom visualizations**.
- Provides **drag-and-drop** functionality for easy report creation and supports various chart types such as **stacked bar charts, line charts, treemaps, and KPIs**.

2. DAX (Data Analysis Expressions)

- DAX is a **formula language** used in Power BI for **creating calculated columns, measures, and custom aggregations**.
- It is used for advanced calculations such as:
    - **Cumulative Revenue Tracking**
    - **Growth Percentage Analysis**
    - **Ranking Sub-Events Based on Sponsorships**
- DAX formulas improve the analytical power of Power BI, allowing dynamic calculations based on user selections.

3. Python Scripts

- Python is used for **data preprocessing, transformations, and automation**.
- Power BI allows Python integration to execute **data cleaning operations** and perform **advanced statistical analysis**.
- Python can be used for **automating repetitive tasks**, such as merging multiple Excel files into a single dataset.

4. Excel Sheets (Data Storage and Import Source)

- Excel files serve as the **primary data source** for the dashboard.
- Event financial data, sponsorship records, and expense reports are stored in Excel and imported into Power BI.
- Power BI can automatically **refresh and update data** when changes are made in the Excel sheets.

5. PBIX File (Power BI Report File)

- PBIX is the **Power BI project file** that contains all **datasets, visualizations, and DAX calculations**.
- The PBIX file is used for **storing and sharing the final dashboard** among stakeholders.
- It ensures that the dashboard retains all interactive elements, allowing users to explore different financial aspects of Algorhythm.

CHAPTER 3 : REQUIREMENT AND ANALYSIS

REQUIREMENT AND ANALYSIS

3.1 Introduction

The Power BI dashboard for **Algorhythm** is designed to address the challenges associated with **financial tracking, sponsorship management, and participation analysis**. To ensure an efficient and user-friendly system, it is essential to define both **functional and non-functional requirements** while considering the **data sources** that feed into the dashboard.

This chapter outlines the **functional capabilities** the system must provide, the **performance expectations**, and the **data sources** required for generating accurate insights. A well-defined requirement analysis ensures that the dashboard meets the needs of **event organizers, stakeholders, and sponsors**, allowing them to make **informed decisions** based on real-time data.

3.2 Functional Requirements

Functional requirements define the **core features and capabilities** of the Power BI dashboard. These requirements ensure that the system effectively meets the expectations of event organizers and stakeholders.

1. Display Sponsorship and Expense Data

- The dashboard must **visually represent sponsorship revenue and expenses** for different years.
- Data should be categorized into **sponsorship tiers**, event-specific expenses, and overall revenue.
- Sponsorship details should be **segmented** based on type (gold, silver, bronze, etc.), and expenses should be categorized into **venue, logistics, marketing, and miscellaneous costs**.

2. Provide Interactive Insights Through Slicers

- Users should be able to **filter and analyze data** using **slicers**.
- Slicers should allow filtering by:
    - **Year** (2023, 2024, etc.)
    - **Sponsorship Type** (Platinum, Gold, Silver, Bronze)
    - **Expense Category** (Marketing, Venue, Logistics, etc.)
    - **Sub-Event Name** (Hackathons, Coding Competitions, Guest Lectures, etc.)
- Users should be able to **combine multiple slicers** for deeper insights, such as analyzing **specific expense categories in a particular year**.

3. Show Cumulative Revenue and Expenses

- The dashboard should display **cumulative revenue and expense growth over time**.
- It should include:
    - **Total revenue received** from sponsorships.
    - **Total expenditure** for each year.
    - **Year-over-year growth comparison**.
    - A **trend line** to visualize financial performance across multiple years.
- Cumulative values should be **automatically updated** as new data is added.

4. Rank Sub-Events Based on Participation

- A ranking system should be implemented to show **which sub-events had the highest participation**.
- Rankings should be based on **attendance numbers, sponsorship interest, and engagement levels**.

- The dashboard should allow users to **view rankings for different years**.
- This data will help event organizers make **better planning decisions** for future editions of the fest.

5. Allow Year-Wise Comparison of Sponsorship Growth

- The dashboard should include **comparative charts** showing sponsorship growth across different years.
- Users should be able to compare:
    - **Total sponsorship revenue per year**.
    - **Changes in sponsorship tiers** (e.g., increase in platinum sponsors, decrease in silver sponsors).
    - **Growth percentage analysis** for each category.

Line charts, bar charts, and KPI indicators should help visualize these trends effectively.

3.3 Non-Functional Requirements

Non-functional requirements define the **performance, usability, and security aspects** of the system. These ensure that the dashboard is **fast, reliable, scalable, and easy to use**.

1. Fast Data Processing

- The dashboard should process **large datasets efficiently** without performance lags.
- Power BI's data model optimization techniques, such as **DAX calculations and aggregations**, should be used to improve performance.
- Queries should be structured to **fetch results in real-time** without causing delays.

2. User-Friendly Navigation

- The dashboard should have **clear and intuitive navigation** so that **non-technical users** can easily interact with it.
- Navigation should include:
    - **Separate pages/tabs** for sponsorships, expenses, participation, and comparisons.
    - A **home page with key insights** and quick navigation buttons.
    - **Well-labeled charts, slicers, and filters** for ease of understanding.
- The design should be clean, using **consistent color schemes and tooltips** for better readability.

3. Secure Data Handling

- The system should ensure **data security and privacy**, preventing unauthorized access to sensitive financial data.
- Measures should be implemented to:
    - Restrict **editing rights** to authorized users only.
    - Prevent accidental **data loss or modifications**.
    - Use **Power BI's role-based access control** (if upgraded in the future).

4. Scalability for Future Years

- The system should be **scalable** to accommodate **new data for future Algorhythm editions**.
- Data models should be designed to allow **seamless addition of new years, new sponsors, and changing event structures**.
- The dashboard should support:
    - **Dynamic visualizations** that automatically adjust when new data is added.
    - **Expandable datasets** without the need for major redesigns.
    - The ability to **integrate additional features** like **predictive analytics** in future versions.

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3.4 Data Sources

To generate **accurate financial insights and participation trends**, the dashboard integrates multiple **data sources**. These datasets contain **raw information** that is processed, analyzed, and visualized within Power BI.

1. Sponsorship Details (Excel Dataset)

- Contains information about **sponsors, sponsorship amounts, and sponsorship tiers**.
- Includes:
  - **Sponsor Name**
  - **Sponsorship Category** (Platinum, Gold, Silver, Bronze)
  - **Amount Sponsored**
  - **Year of Sponsorship**
- Helps analyze **sponsorship trends, financial growth, and sponsor retention rates**.

2. Expense Reports (Excel Dataset)

- Includes details about **all expenditures made for organizing the fest**.
- Contains:
  - **Expense Category** (Venue, Marketing, Logistics, Miscellaneous, etc.)
  - **Amount Spent**
  - **Date of Expense**
  - **Year of Event**
- Helps track **total expenditure** and compare expenses across different years.

3. Participant Information (Excel Dataset)

- Contains data about **student and professional participation in different sub-events**.
- Includes:
  - **Participant Name**
  - **Sub-Event Name** (Hackathon, Coding Contest, etc.)
  - **College/Company Affiliation**
  - **Year of Participation**
- Helps rank **popular events based on engagement levels**.

3.5 Planning and Scheduling

Effective **planning and scheduling** are crucial for the successful development and implementation of the **Algorhythm Power BI dashboard**. The project follows a structured timeline to ensure timely completion while maintaining high accuracy and efficiency in data analysis.

The development is divided into **several phases**, each focusing on a specific aspect, from **data collection and processing** to **dashboard design, testing, and deployment**. The timeline is represented using a **Gantt Chart**, which provides a visual overview of tasks, dependencies, and deadlines.

3.5.1 Project Phases

Phase 1: Requirement Gathering and Analysis (Week 1 - Week 2)

- Identify key requirements, including functional and non-functional needs.
- Collect and analyze existing event data (sponsorships, expenses, participation records).

- Define key metrics and KPIs to be included in the dashboard.

Phase 2: Data Collection and Preprocessing (Week 3 - Week 4)

- Collect data from Excel sheets containing sponsorship, expense, and participation details.
- Clean and preprocess data to ensure consistency and accuracy.
- Structure the dataset for integration with Power BI.

Phase 3: Power BI Dashboard Design (Week 5 - Week 6)

- Set up **data models** in Power BI.
- Create **visualizations** (bar charts, line charts, KPIs, slicers, treemaps, etc.).
- Implement **interactive elements** like slicers and filters.

Phase 4: DAX Implementation and Advanced Analytics (Week 7 - Week 8)

- Write **DAX queries** for calculated fields such as **cumulative revenue, sponsorship growth, and ranked sub-events**.
- Ensure real-time calculations for financial trends.
- Validate calculations to ensure accuracy.

Phase 5: Testing and Validation (Week 9 - Week 10)

- Perform **unit testing** to check individual components.
- Conduct **integration testing** to verify the accuracy of linked data models.
- Gather feedback from stakeholders and make necessary refinements.

Phase 6: Deployment and Documentation (Week 11 - Week 12)

- Finalize the **PBIX file** and prepare the dashboard for stakeholders.
- Create documentation explaining **dashboard features, functionalities, and usage guidelines**.
- Provide training or walkthroughs to event organizers.

The following Gannt chart shows the project schedule, showing task dependencies and timeframes.

3.5 HARDWARE REQUIREMENTS

- **Processor:** Intel Core i5/i7 (10th Gen or later) / AMD Ryzen 5 or better
- **RAM:** 8 GB or higher (for large datasets and smooth performance)
- **Storage:** SSD with at least 50 GB free space
- **Graphics:** Dedicated GPU for better rendering (optional)
- **Display:** Full HD (1920 × 1080) resolution
- **Internet Connection:** High-speed broadband for Power BI cloud integration

Hardware Justification:

- A **multi-core processor** speeds up data processing and visualization rendering.
- Higher **RAM** ensures smooth handling of large datasets.
- **SSD storage** improves the performance of loading and saving Power BI files.
- A **high-resolution display** enhances the user experience when analyzing charts and reports.

3.6 SOFTWARE REQUIREMENTS

Software	Version	Purpose
Windows OS	Windows 10/11 (64-bit)	Compatible with Power BI
Power BI	Power BI Desktop (Free Version)	Dashboard development and visualization
Microsoft Excel	Office 2016 or later	Data storage and pre-processing
Python	3.x	Advanced data transformation and scripting
Pandas & Matplotlib	Latest	Python-based data manipulation & visualization
DAX (Data Analysis Expressions)	Built-in in Power BI	Creating calculated measures and KPIs

Software Justification:

- **Power BI Desktop** is used for developing and managing the dashboard.
- **Microsoft Excel** is the primary data source for sponsorship and expense records.
- **Python with Pandas** enables advanced data transformation.
- **DAX (Data Analysis Expressions)** is required for advanced calculations within Power BI.

CHAPTER 4 :
SYSTEM DESIGN

SYSTEM DESIGN

The Power BI dashboard for the **Algorhythm** fest is designed to provide a comprehensive and interactive experience for stakeholders, including event organizers, sponsors, and participants. This system enables users to analyze sponsorship trends, track expenses, monitor revenue growth, and evaluate event performance through **interactive visualizations** and **data analytics**.

4.1 Dashboard Components

The Power BI dashboard consists of multiple components that work together to create an **intuitive and user-friendly** interface. Each component serves a specific purpose in presenting data insights in a structured and meaningful way.

4.1.1 Navigation for Pages

The Power BI dashboard consists of multiple pages, each containing different types of **visualizations and reports**. To ensure a seamless user experience, the navigation system includes **buttons, bookmarks, and page tabs**, allowing users to quickly switch between different sections.

Home Page

- Serves as the **landing page** of the dashboard.
- Provides a **summary** of key financial metrics, including **total sponsorship, total expenses, and revenue growth trends**.
- Includes **navigation buttons** to other pages for easy access.

Tech Fest Insights Page

- Presents a **comprehensive overview** of sponsorship trends, expenses, and participation.
- Uses **interactive slicers** to filter data by year, event category, and sponsorship type.
- Includes **stacked bar charts, line charts, and KPIs** to showcase insights.

Sub-Event Breakdown Page

- Analyzes **individual sub-events** (workshops, hackathons, competitions, etc.).
- Displays **event-wise sponsorship distribution and participation trends**.
- Uses **clustered bar charts** to compare participation numbers across different sub-events.

Date-wise Revenue Insights Page

- Tracks **revenue inflows on specific dates** to identify peak sponsorship periods.
- Displays **line charts and date slicers** for dynamic analysis.
- Helps in **understanding sponsorship acquisition trends** over time.

Financial Growth Insights Page

- Focuses on **year-over-year financial performance** of the fest.
- Uses **line and stacked column charts** to compare revenue and expenses across different years.
- Includes **growth % calculations and trend analysis** using DAX measures.

Navigation System Overview:

- **Buttons & Bookmarks:** Ensure quick transitions between pages.

- **Slicers & Filters:** Allow users to refine data views dynamically.
- **Page Tabs:** Enable easy switching between different reports.

This structured navigation system enhances **usability**, making it easier for event organizers to analyze sponsorship trends, expenses, and participation data efficiently.

4.2 Charts & Visualizations

To present financial and event-related data effectively, various visualization techniques have been used. These charts and visual elements enhance decision-making by providing clear and interactive insights.

4.2.1 Stacked Bar Chart (Sponsorships and Expenses Comparison)

Purpose:

- Displays the comparison between sponsorship revenue and event expenses.
- Helps analyze the financial balance of the event over different years.

Example Usage:

- Comparing sponsorship funding vs. costs for different years.

Dashboard Page:

- Tech Fest Insights Page

4.2.2 Doughnut Chart (Sponsorship Share Distribution)

Purpose:

- Represents the percentage contribution of different sponsors in a circular format.
- Provides a visual breakdown of sponsors based on total funding received.

Example Usage:

- Identifying the top contributors to the fest.

Dashboard Page:

- Financial Growth Insights Page

4.2.3 KPIs (Key Performance Indicators)

Purpose:

- Displays important financial metrics at a glance.
- Includes Total Sponsorship, Total Expenses, Net Profit, and Growth %.

Example Usage:

- Instantly evaluating event performance.

Dashboard Page:

- Home Page

4.2.4 Line Chart (Revenue Growth Over Time)

Purpose:

- Tracks sponsorship revenue trends over multiple years.
- Helps in identifying financial growth patterns and fluctuations.

Example Usage:

- Analyzing revenue growth trends over past editions of the fest.

Dashboard Page:

- Date-wise Revenue Insights Page

4.2.5 Slicers (Filters for Dynamic Data Selection)

Purpose:

- Allows users to filter data based on various parameters such as:
    - Year (2023, 2024, etc.)
    - Event Type (Technical, Non-Technical, Workshop, etc.)
    - Sponsorship Category (Gold, Silver, Bronze)

Example Usage:

- Viewing sponsorships for a specific event category in 2024.

Dashboard Page:

- Available on all pages for filtering data dynamically.

4.2.6 Treemap (Sponsorship Contribution by Institute)

Purpose:

- Displays contributions from different sponsors/institutes in a hierarchical format.
- The size of each block represents the amount contributed by a sponsor.

Example Usage:

- Identifying which institutions provided the most sponsorship.

Dashboard Page:

- Tech Fest Insights Page

4.2.7 Cards (Key Financial Highlights)

Purpose:

- Displays total revenue, total expenses, net profit, and other metrics as simple cards.
- Helps in getting an at-a-glance view of financial performance.

Example Usage:

- Instantly viewing key financial figures for the latest event.

Dashboard Page:

- Home Page

4.2.8 Clustered Bar Chart (Participation Trends)

Purpose:

- Analyzes event participation data for different years.
- Compares the number of participants across technical and non-technical events.

Example Usage:

- Identifying the most popular event categories.

Dashboard Page:

- Tech Fest Insights Page

4.2.9 Line and Stacked Column Chart (Comparison of Revenue and Expenses)

Purpose:

- Combines a line chart (for revenue trends) with a stacked column chart (for expenses).
- Helps in understanding the relationship between revenue and expenses.

Example Usage:

- Checking if event revenue consistently covers expenses.

Dashboard Page:

- Financial Growth Insights Page

4.2.10 Table (Detailed Breakdown of Transactions)

Purpose:

- Displays detailed financial data in a tabular format.
- Includes columns for sponsor names, amount contributed, expense categories, and more.

Example Usage:

- Viewing itemized sponsorship and expense records for auditing.

Dashboard Page:

- Date-wise Revenue Insights Page

4.2.11 Python Script (Advanced Analytics for Revenue Prediction)

Purpose:

- Uses Python scripts within Power BI for advanced data analysis and predictive modeling.
- Can predict future sponsorship growth trends based on historical data.

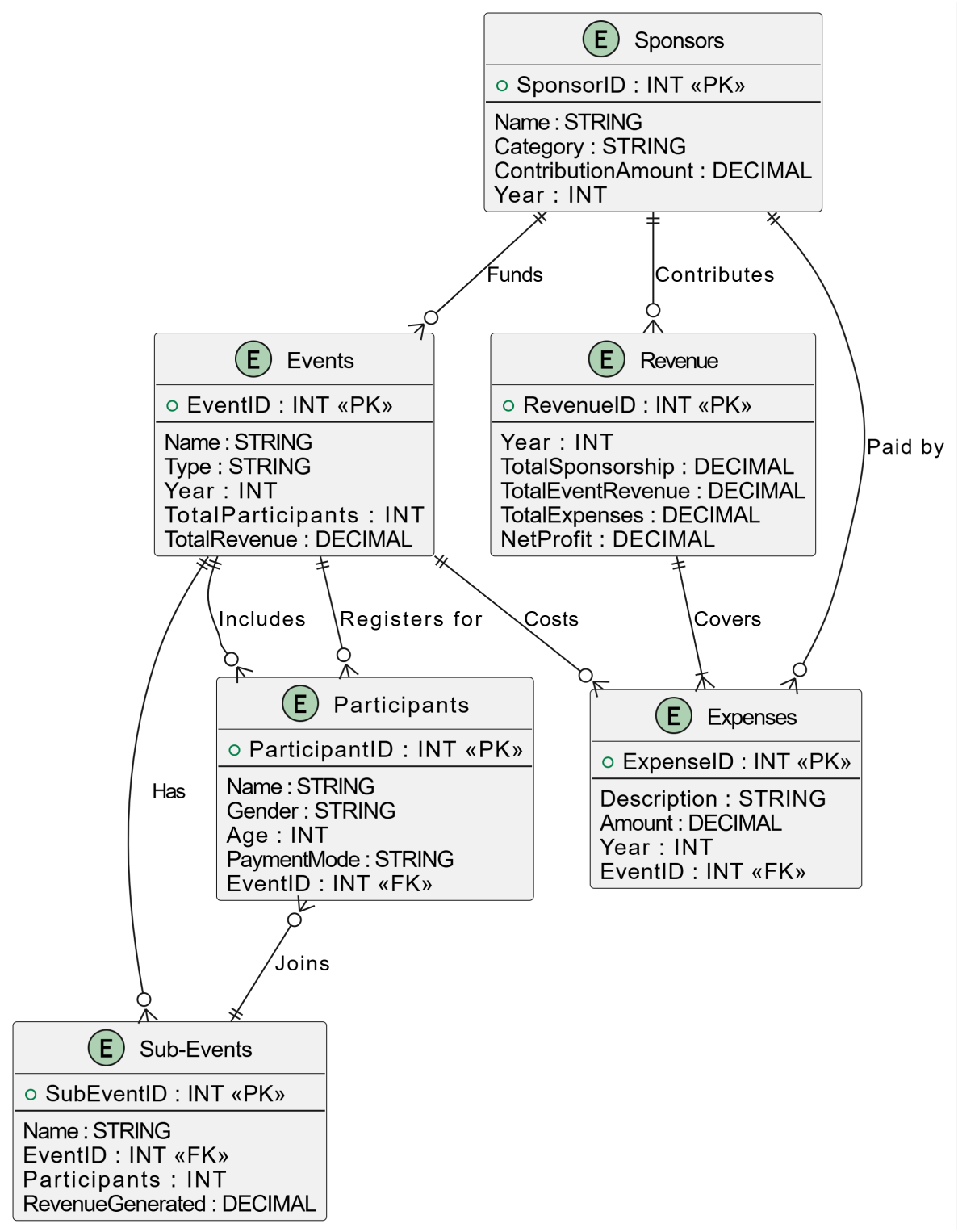
Example Usage:

- Forecasting sponsorship trends for upcoming years.

Dashboard Page:

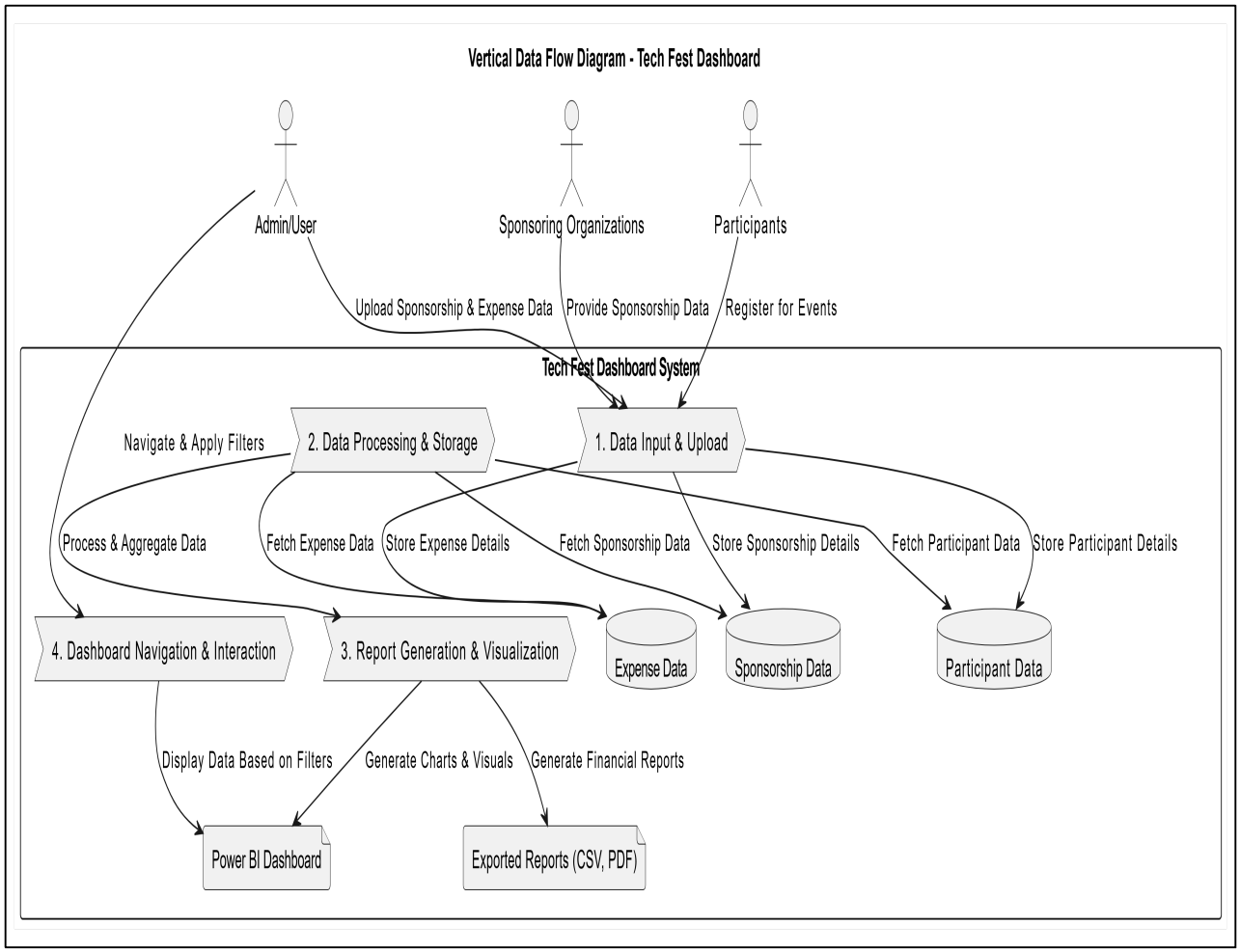
- Financial Growth Insights Page

4.1.1 ENTITY RELATIONSHIP DIAGRAM



4.1.2 DATA FLOW DIAGRAM / UML DIAGRAMS

DATA FLOW DIAGRAM :



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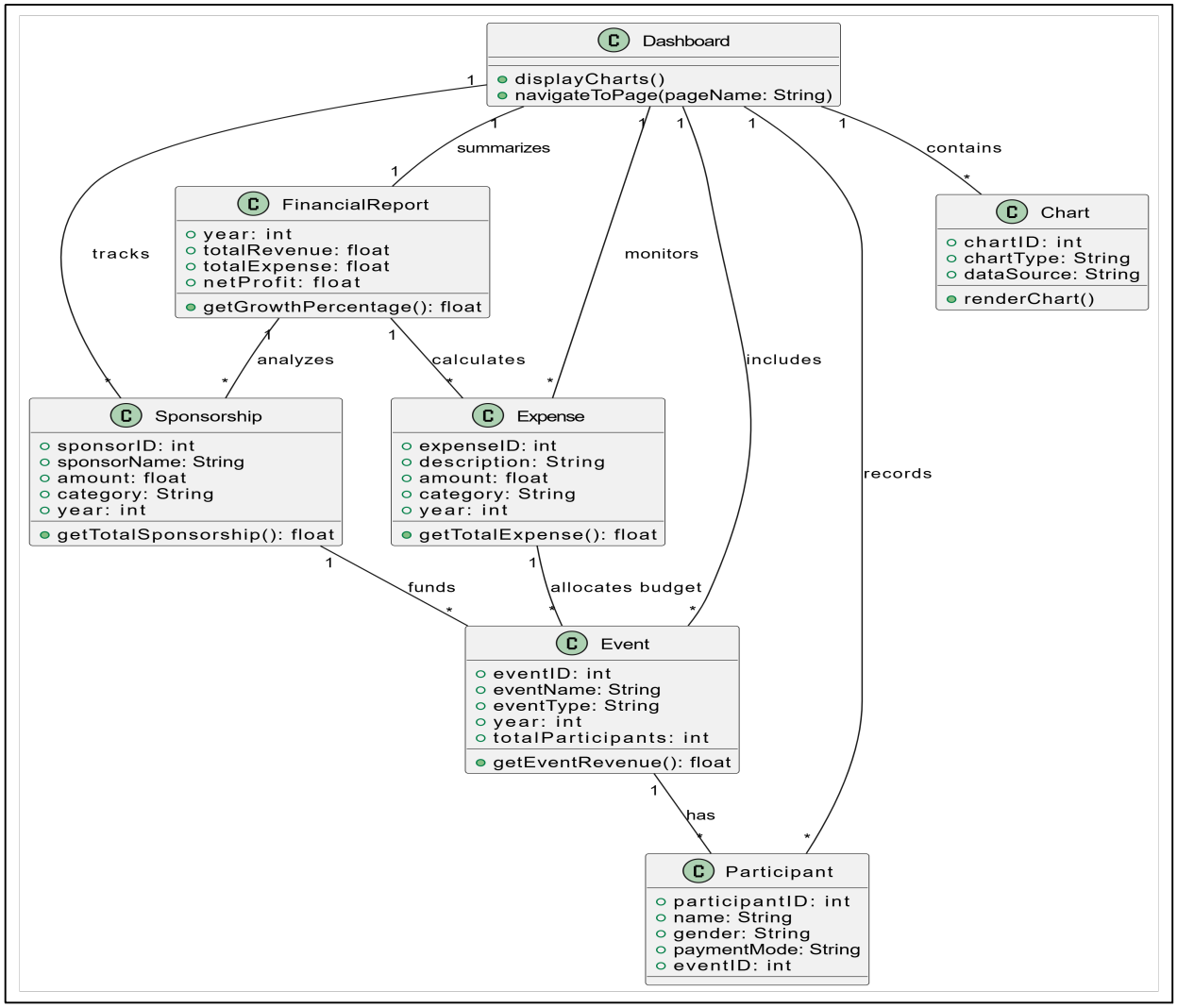
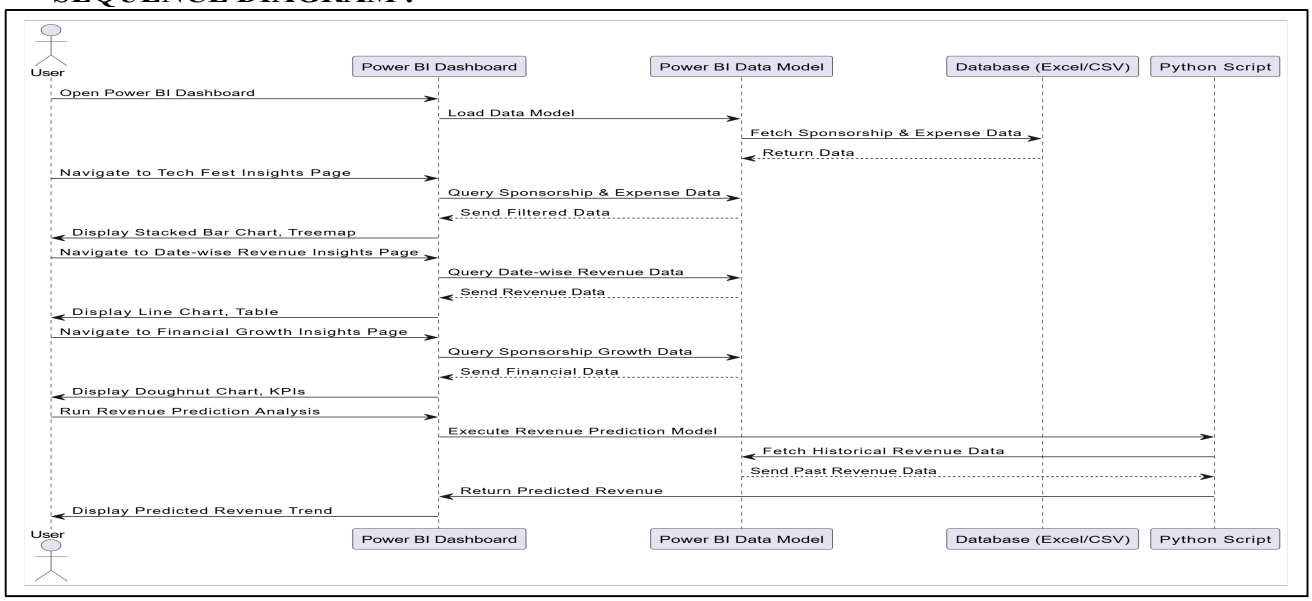
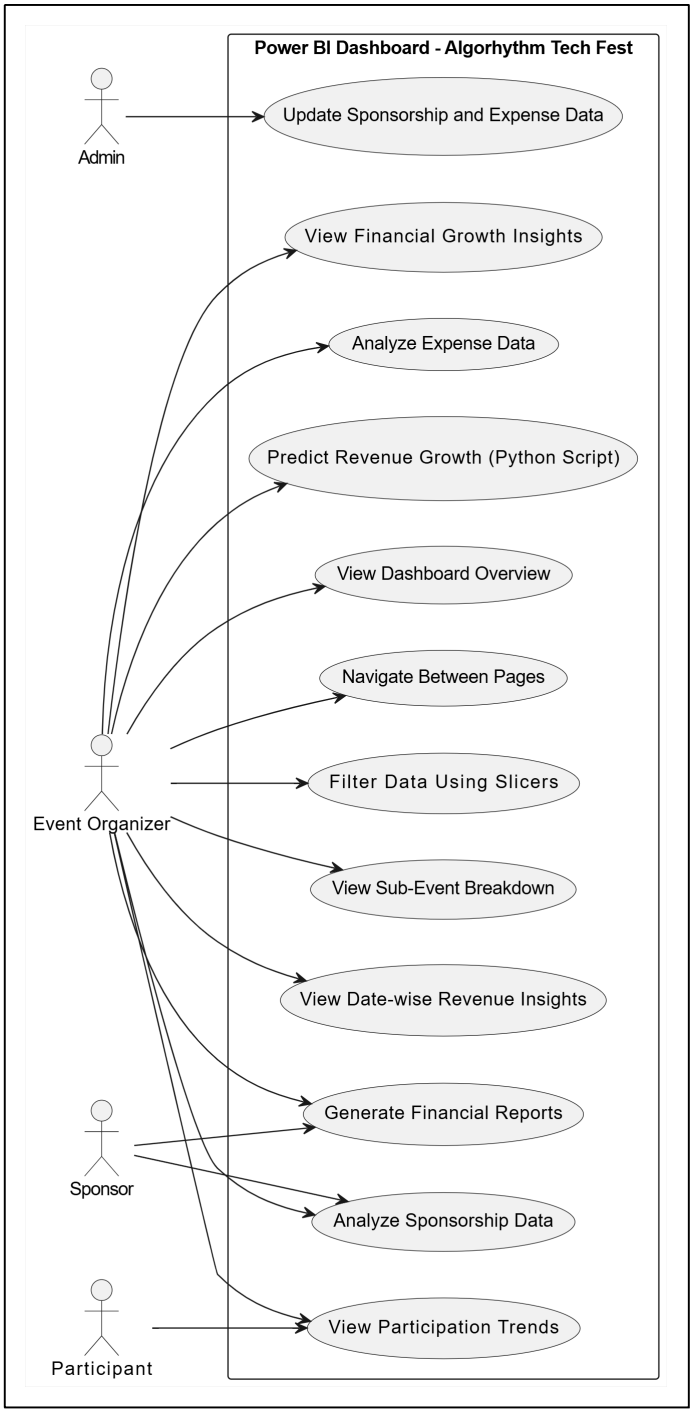


SEQUENCE DIAGRAM :



USE CASE DIAGRAM



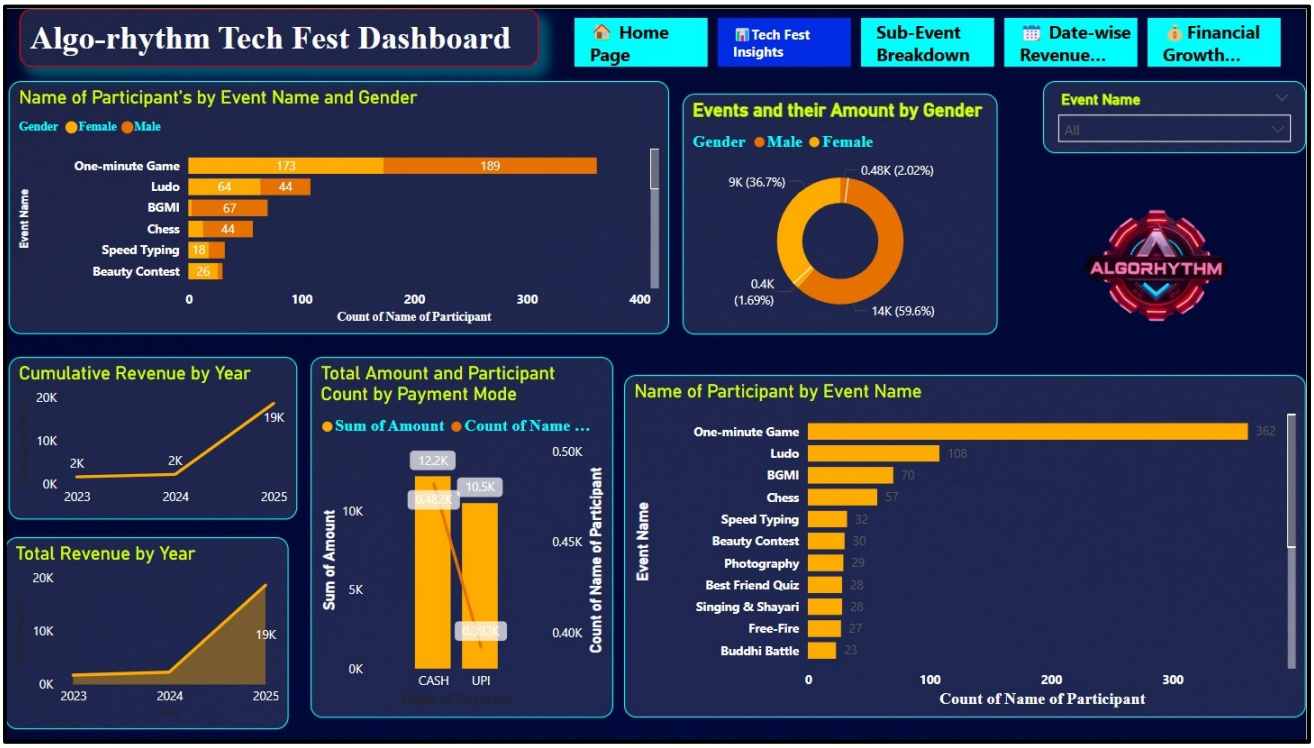
CHAPTER 5 :

IMPLEMENTATION AND TESTING

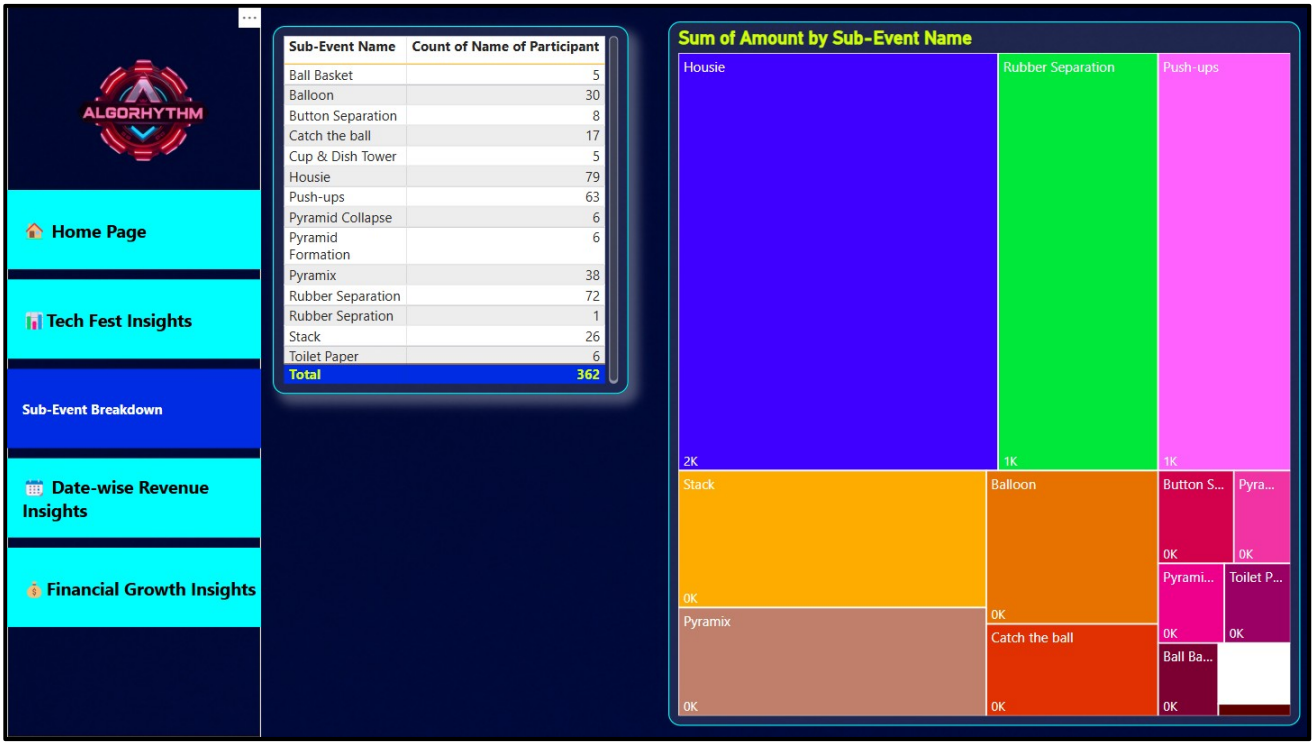
IMPLEMENTATION AND TESTING

5.0 Home Page :

5.0.1 Tech Fest Insights :



5.0.2 Sub-Event Breakdown :



5.0.3 Date-wise Revenue Insights :

5.0.4 Financial Growth Insights :

Comprehensive Implementation of the Algorhythm Tech Fest Dashboard

I. Overall Dashboard Structure:

- **Consistent Navigation:**
  - A vertical left navigation panel is used across all pages, providing easy access to:
    - Home Page
    - Tech Fest Insights
    - Sub-Event Breakdown
    - Date-wise Revenue Insights
    - Financial Growth Insights
  - A top navigation bar is used for the date-wise revenue insights page.
  - Navigation elements are highlighted to indicate the currently active page.
- **Unified Design:**
  - A consistent dark theme with blue highlights is applied across all pages.
  - The "ALGORHYTHM" logo is present on each page for branding.
  - Consistent font sizes, colors, and borders are used for all visuals.
- **Data Modeling:**
  - Ensure proper data modeling with appropriate relationships between tables (e.g., sponsorships, participants, expenses).
  - Optimize data for performance.

II. Page-Specific Implementation:

- **Home Page:**

- Displays key performance indicators (KPIs) such as Total Revenue, Total Participants, and Year-over-Year Growth.
- Provides a visual summary of overall revenue trends and top sub-events.
- Serves as the central hub for navigation.

- **Tech Fest Insights:**

  - Visualizes participant demographics using clustered bar charts (Name of Participants by Event Name and Gender) and donut/stacked bar charts (Events and Their Amount by Gender).
  - Includes a slicer to filter by event name.
  - Displays a table showing the ammount of male and female per event.

- **Sub-Event Breakdown:**

  - Ranks sub-events by participant count or revenue using bar charts and tables.
  - Uses a treemap to visualize the sum of amounts (revenue or sponsorship) for each sub-event.
  - Includes a table showing the count of participants per sub-event.

- **Date-wise Revenue Insights:**

  - Tracks revenue trends over time using line charts (Cumulative Revenue by Year) and bar charts (Total Revenue by Year).
  - Includes gender and date range slicers to filter data.
  - Displays KPI cards of the sum of amount, sum of st. no, cumulative revenue, and total revenue.

- **Financial Growth Insights:**

  - Analyzes financial health using a triangle graphic to visualize progress towards sponsorship goals.
  - Compares total sponsorship and total expense over the years using a line chart.
  - Shows the distribution of payments by mode using a bar chart.
  - Includes year and institute/organization slicers.
  - Includes a growth percentage value per payment method.

III. Common Implementation Practices:

- **DAX Measures:**

  - Create DAX measures to calculate KPIs, rankings, growth percentages, and other metrics.
  - Optimize DAX queries for performance.

- **Slicers and Filters:**

  - Use slicers to enable interactive filtering of data.
  - Configure slicers to cross-filter related visuals.

- **Visualizations:**

  - Choose appropriate visualizations to represent data effectively.
  - Format visuals for clarity and consistency.
  - Use tooltips to provide additional information.

- **Interactivity:**

- Enable interactivity between visuals (e.g., clicking on a bar in a chart to filter another chart).

- **Testing:**

  - Perform thorough unit testing of DAX measures.
  - Conduct integration testing to ensure that all components work together seamlessly.
  - Gather user feedback and iterate on the design.

IV. Data Source and Considerations:

- **Data Integration:**

  - Integrate data from various sources (sponsorships, participants, expenses) into a single data model.

- **Data Quality:**

  - Ensure data accuracy and consistency.
  - Implement data validation and cleaning processes.

- **Data Security:**

  - Implement appropriate security measures to protect sensitive data.

V. Deployment and Maintenance:

- **Deployment:**

  - Publish the dashboard to Power BI Service for easy access and sharing.

- **Maintenance:**

  - Regularly update the dashboard with new data.
  - Monitor performance and address any issues.
  - Gather user feedback and make improvements as needed.

By adhering to these comprehensive implementation guidelines, you can create a robust and insightful Algorhythm Tech Fest Dashboard that effectively communicates key metrics and supports data-driven decision-making.

5.1 DAX Queries Used in Power BI

DAX (Data Analysis Expressions) is a powerful formula language used in Power BI for creating calculated columns, measures, and custom aggregations. Below are the key DAX queries used in the **Algorhythm Tech Fest Dashboard** to compute financial metrics and rankings.

5.1.1 Cumulative Revenue
DAX Query:

```
CALCULATE(
   SUM(ALGO_Parti2k24[Amount]),
   FILTER(ALL(ALGO_Parti2k24[Date]), ALGO_Parti2k24[Date] <= MAX(ALGO_Parti2k24[Date]))
)
```

Explanation:

- This query **calculates the running total** of revenue over time.
- SUM(ALGO_Parti2k24[Amount]) sums up all revenue amounts.
- FILTER(ALL(ALGO_Parti2k24[Date]), ALGO_Parti2k24[Date] <= MAX(ALGO_Parti2k24[Date])) ensures that all records up to the current date are included.
- This helps **track accumulated sponsorship revenue** at any given point.

Use Case:

- Useful in the **Date-wise Revenue Insights** page to show how revenue grows over time.

5.1.2 Ranked Sub-Events

DAX Query:

```
RANKX(
    ALL(ALGO_Parti2k24[Sub-Event Name]),
    COUNT(ALGO_Parti2k24[Name of Participant]),
    ,
    DESC,
    DENSE
)
```

Explanation:

- RANKX assigns **rankings** to sub-events based on the number of participants.
- ALL(ALGO_Parti2k24[Sub-Event Name]) ensures all sub-events are considered.
- COUNT(ALGO_Parti2k24[Name of Participant]) counts participants in each event.
- DESC, DENSE ensures ranking is in **descending order** (higher participant count = higher rank).

Use Case:

- Displayed on the **Sub-Event Breakdown** page to highlight the **most popular sub-events.**

5.1.3 Total Revenue
DAX Query:

```
SUM(ALGO_Parti2k24[Amount])
```

Explanation:

- Directly sums up the **total revenue** from sponsorships and participation fees.

Use Case:

- Displayed as a **KPI card** on multiple pages, such as **Financial Growth Insights**.

5.1.4 Total Expense
DAX Query:

```
SUM('Expense'[EXPENSE_AMOUNT])
```

Explanation:

- Sums up all recorded **expenses** associated with the event.

Use Case:

- Used in the **Financial Growth Insights** page to compare expenses against revenue.

5.1.5 Growth Percentage
DAX Query:

```
VAR LastYear = CALCULATE(SUM('Sponsors'[Amount]), 'Sponsors'[Year] = 2023)
VAR CurrentYear = CALCULATE(SUM('Sponsors'[Amount]), 'Sponsors'[Year] = 2024)
RETURN DIVIDE(CurrentYear - LastYear, LastYear, 0) * 100
```

Explanation:

- Calculates the **year-over-year growth rate** in sponsorship revenue.
- VAR LastYear stores the total sponsorship amount for 2023.
- VAR CurrentYear stores the total sponsorship amount for 2024.
- DIVIDE(CurrentYear - LastYear, LastYear, 0) * 100 computes the **percentage increase**.

Use Case:

- Used in **Financial Growth Insights** to measure **sponsorship growth trends**.

5.1.6 Python Script for Sponsorship & Expense Trend Analysis

In addition to DAX queries, **Python scripting** in Power BI allows for **advanced data visualization** and statistical analysis. The following Python script is used to generate a **line chart** that compares **Total Sponsorship and Total Expense over the years**.

Python Script:

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Ensure dataset is cleaned
dataset = dataset.dropna()
dataset["Year"] = dataset["Year"].astype(int)

# Sort data by Year
dataset = dataset.sort_values(by="Year")

# Set style
sns.set_theme(style="whitegrid")

# Create a figure
plt.figure(figsize=(10, 6))

# Plot using seaborn
sns.lineplot(data=dataset, x="Year", y="Total Expense", marker="o", linewidth=2, label="Total
Expense")
sns.lineplot(data=dataset, x="Year", y="Total Sponsorship", marker="s", linewidth=2,
label="Total Sponsorship")

# Titles and labels
plt.title("Sponsorship & Expense Over Years", fontsize=14)
plt.xlabel("Year", fontsize=12)
plt.ylabel("Amount", fontsize=12)
plt.legend()

# Display the plot (this ensures it appears in Power BI)
plt.show()
```

Explanation of the Script:

1.Cleaning the Data:

1. dataset.dropna(): Removes missing values to ensure a clean dataset.
2. dataset["Year"] = dataset["Year"].astype(int): Ensures that the **Year** column is of integer type.

2.Sorting the Data:

1. dataset.sort_values(by="Year"): Arranges data in chronological order to ensure a smooth trend in the line chart.

3. Setting the Visual Style:

1. sns.set_theme(style="whitegrid"): Applies a professional **white grid theme** to the visualization.

4. Creating the Line Chart:

1. sns.lineplot(...) is used to plot **Total Expense** and **Total Sponsorship** over different years.
2. marker="o" and marker="s" differentiate the **Expense** and **Sponsorship** data points.
3. linewidth=2 ensures the **lines are clearly visible**.

5.Adding Titles and Labels:

1. plt.title(), plt.xlabel(), and plt.ylabel() provide meaningful descriptions.

6. Displaying the Plot in Power BI:

1. plt.show() ensures the plot is rendered correctly.

Use Case

- Used in **Financial Growth Insights** to provide a **visual representation** of how sponsorship and expenses have changed over the years.
- Helps event organizers **identify trends** and make **data-driven decisions**.

5.2 Testing Strategy

To ensure the reliability and accuracy of the Power BI dashboard, the following testing approaches were applied:

5.2.1 Unit Testing
Objective:

- To **validate individual DAX calculations** to ensure correctness.

Process:

- Each **DAX formula** was tested by applying different filters and cross-verifying against **raw data**.
- Edge cases were checked (e.g., **zero sponsorship**, **missing expense records**, etc.).
- The results were compared with **manual calculations in Excel**.

Outcome:

- Ensured that **each metric (revenue, expenses, growth rate, etc.) is computed accurately**.

5.2.2 Integration Testing
Objective:

- To verify that **all visual components interact correctly** with data sources.

Process:

- Checked whether **filters (slicers) affected related charts properly**.
- Ensured **page navigation** did not break any calculated values.
- Validated that **different datasets (sponsorships, expenses, participation)** are properly linked.

Outcome:

- Ensured a **seamless user experience**, with no broken links between visuals.

5.2.3 User Testing
Objective:

- To gather feedback from **event organizers and sponsors** on usability.

Process:

- The dashboard was tested by a **sample group of stakeholders**.
- Users were asked to **perform key tasks** (e.g., check top sponsors, view revenue trends).
- Feedback was collected to improve the **user interface and interaction**.

Outcome:

- Improvements were made to **visual design, navigation, and interactivity**.

CHAPTER 6 : CONCLUSION AND FURTHER WORK

CONCLUSION AND FURTHER WORK

6.1 Conclusion

The development and implementation of the **Power BI dashboard** for the **Algorhythm Tech Fest** has successfully provided a **comprehensive data visualization platform** to track sponsorships, expenses, and participation trends. This project has demonstrated the significance of **data-driven decision-making** in event management by consolidating financial data into an **interactive and insightful dashboard**.

The **primary objectives** of the dashboard were:

1. **To provide clear insights** into financial aspects, including **sponsorship revenue, expenses, and overall profit/loss.**
2. **To analyze trends** across different years to help in better event planning and execution.
3. **To improve transparency** by ensuring all financial transactions and sponsorship details are well-documented and visually represented.
4. **To offer interactive and user-friendly navigation** for organizing committee members to explore data dynamically through slicers, charts, and KPIs.

The Power BI dashboard, through its **various visualizations and analytical tools**, enables event organizers to:

- **Compare sponsorship contributions** across different years and sponsors.
- **Monitor financial health** by tracking expenses and revenue trends.
- **Identify participation trends** across various sub-events.
- **Detect anomalies and optimize event budget allocations.**

The **successful implementation** of this project highlights how **data analytics** can significantly **enhance decision-making, efficiency, and financial planning** for large-scale events. The ability to **track sponsorships, expenses, and revenue in real-time** ensures that event organizers can make **quick adjustments** and improve the overall management of resources.

However, despite its success, there is still **scope for improvement and expansion**, which is discussed in the next section.

6.2 Further Work

While the current Power BI dashboard offers **strong analytical capabilities**, certain **enhancements** can further improve its functionality, usability, and effectiveness. The following areas outline the **future improvements** and potential expansions:

6.2.1 Integration of Real-Time Data

Current Limitation:

- The existing dashboard relies on **manually updated data**, which can cause delays in decision-making and **lack of real-time insights**.

Proposed Solution:

- Implement **real-time data fetching** from integrated sources such as **Google Sheets, SQL databases, or live APIs**.
- Use **Power BI Service with automatic refresh schedules** to ensure **up-to-date sponsorship and expense records**.
- Connect **payment gateways and accounting tools** to fetch live transactions into the dashboard.

Impact:

- Organizers can track **funds received in real time**.
- Immediate updates on **expense tracking** will allow better control over event budgets.
- Reduces the risk of **data discrepancies** due to outdated manual entries.

6.2.2 Enhanced AI-Based Predictions

Current Limitation:

- The dashboard currently offers **historical data analysis** but lacks **predictive insights** into future sponsorship trends and participation rates.

Proposed Solution:

- Integrate **Machine Learning (ML) models** to predict **future sponsorship revenue and expenses** based on historical trends.
- Use **Python scripts** within Power BI to implement **forecasting models** such as:
    - **Linear Regression** for sponsorship trend analysis.
    - **Time-Series Forecasting (ARIMA, Prophet Model)** to predict future revenue growth.
    - **Clustering Algorithms** to group sponsors based on contribution levels.

Impact:

- Helps organizers set **realistic sponsorship targets** for upcoming events.
- Predicts **high-cost areas** and helps in **budget optimization**.
- Provides insights into which **sub-events attract more sponsors** for better event structuring.

6.2.3 Automated Report Generation

Current Limitation:

- Reports and summaries currently need to be manually exported and formatted, which is **time-consuming**.

Proposed Solution:

- Implement **automated PDF/Excel report generation** with scheduled exports.
- Use **Power Automate and Power BI Service** to generate **weekly/monthly financial summaries**.
- Create **custom report templates** for different stakeholders:
    - **Finance Team:** Detailed expense breakdown reports.
    - **Sponsorship Team:** Sponsor contribution reports.
    - **Event Heads:** Participation and revenue reports.

Impact:

- Saves time in **manual reporting** and reduces errors.
- Ensures that **stakeholders receive periodic updates** without manual intervention.
- Improves **financial transparency** by keeping a **documented history of all transactions**.

6.2.4 Mobile Compatibility & Power BI Service Deployment

Current Limitation:

- The dashboard is primarily used on **desktop and laptop screens**, making it less accessible during **on-the-go decision-making**.

Proposed Solution:

- Deploy the Power BI dashboard to **Power BI Service**, allowing access via **mobile devices**.
- Optimize dashboard design for **mobile responsiveness**, ensuring key metrics (KPI cards, revenue insights) are easily viewable on smaller screens.
- Implement **push notifications** for critical updates, such as **low sponsorship alerts** or **high expenses exceeding budget thresholds**.

Impact:

- Organizers can monitor event finances **from anywhere, anytime**.
- Ensures **faster decision-making** even during the event.

6.2.5 Advanced User Access Control

Current Limitation:

- Currently, all users with access to the dashboard can **view all financial data**, which may not be ideal for security and privacy.

Proposed Solution:

- Implement **role-based access control** using **Row-Level Security (RLS) in Power BI**.
- Assign different access levels:

- **Admin Access:** Full control over all financial and event-related data.
- **Finance Team:** Access to only **financial transactions and sponsorship details**.
- **Event Coordinators:** Access to **participant data and sub-event breakdowns**.

Impact:

- Protects **sensitive financial data** by restricting access.
- Ensures **different teams see only relevant insights** without data overload.

6.2.6 Expansion to Multi-Event Analysis

Current Limitation:

- The current dashboard is **designed for a single event (Algorhythm Fest).**

Proposed Solution:

- Modify the dashboard to **support multiple events** and compare financials across different editions.
- Implement an **Event Selector Slicer** to dynamically switch between different years/events.
- Store historical data to **analyze long-term trends in sponsorship and expenses**.

Impact:

- Organizers can track **financial growth across multiple event editions**.
- Helps in **benchmarking performance** against previous events.

6.3 Final Thoughts

The **Power BI dashboard** developed for the **Algorhythm Tech Fest** has significantly improved **financial tracking and event insights**. With **interactive charts, dynamic filters, and KPIs**, stakeholders can make **data-backed decisions** to ensure the event runs efficiently.

However, by implementing **real-time data updates, AI-based predictions, automated reporting, mobile accessibility, and enhanced security**, the dashboard can be **further improved to provide even deeper insights and convenience**.

By continuously refining and expanding the **Power BI analytics system**, the event management team can **streamline operations, increase sponsorship revenue, optimize expenses, and ultimately make the Algorhythm Tech Fest even more successful in future editions.**

Chapter 7:
REFERENCES

7.1 Introduction

References play a crucial role in ensuring the accuracy, reliability, and credibility of any project. This chapter provides a list of sources that were consulted during the development of the **Power BI dashboard for Algorhythm Tech Fest**. The references include official documentation, expert blogs, research papers, and technical resources that guided the implementation of **Power BI visualizations, DAX calculations, Python integration, and event management analytics.**

By leveraging these resources, the project was able to incorporate best practices, optimize performance, and ensure accurate data representation for **financial tracking, sponsorship monitoring, and event insights.**

7.2 Power BI Documentation (Microsoft)

Source: Power BI Official Documentation - Microsoft

Description:
Microsoft provides comprehensive documentation covering all aspects of **Power BI, including data modeling, report creation, visualization techniques, and DAX functions**. This resource was extensively used to understand:

- **Data connectivity and transformation** using Power Query.
- **Best practices in dashboard design** for effective data storytelling.
- **DAX formulas and expressions** for advanced calculations.
- **Performance optimization techniques** for handling large datasets.

Relevance to Project:

- Helped in designing **interactive reports** using **Stacked Bar Charts, Line Charts, KPIs, and Treemaps.**
- Guided the integration of **Slicers and Navigation Buttons** for smooth user experience.
- Provided insights on **publishing and sharing reports** using Power BI Service.

7.3 DAX Guide (SQLBI)

Source: DAX Guide - SQLBI

Description:
SQLBI is one of the **most authoritative sources for understanding DAX (Data Analysis Expressions)**, which is essential for calculations in Power BI. This guide provides:

- Detailed explanations of **DAX functions, operators, and expressions.**
- Use cases for **filtering, aggregations, ranking, and time intelligence.**
- Performance optimization tips for **writing efficient DAX queries.**

Relevance to Project:

- Used to implement **Cumulative Revenue, Ranked Sub-Events, and Growth Percentage DAX queries.**
- Helped in designing **Year-over-Year comparisons** for financial growth analysis.
- Provided guidance on handling **dynamic calculations and filtering contexts.**

7.4 Python Integration in Power BI (Microsoft Community & Blogs)

Source: Python in Power BI - Microsoft Community

Description:
Python integration in Power BI allows **advanced data manipulation and visualization** beyond the default Power BI capabilities. This resource provides:

- Guidelines for **importing Python scripts into Power BI** for enhanced analytics.
- Examples of **Matplotlib and Seaborn visualizations** in Power BI.
- Performance considerations and **data transformation techniques.**

Relevance to Project:

- Helped in integrating **custom Python scripts** to visualize **Sponsorship vs. Expense Growth.**
- Provided methods to **clean and preprocess data** before visualization.
- Enabled implementation of **trend analysis using Seaborn line plots.**

7.5 Event Management Reports and Analytics (Various Sources)

Source:

- **"Event Management: Data-Driven Decision Making" - Research Papers & Industry Reports**
- **Harvard Business Review articles on Event Sponsorship Analysis**
- **Forbes articles on Financial Planning for Events**

Description:
These sources provide insights into:

- **Event sponsorship trends** and how data analytics improves sponsor retention.
- **Financial planning strategies** for large-scale events.
- **Use of business intelligence tools** in event management.

Relevance to Project:

- Helped structure the **Financial Growth Insights** section of the dashboard.
- Provided best practices for **visualizing sponsorship and expense trends.**
- Offered techniques to **forecast event financials** using historical data.

7.6 Additional Technical Resources

7.6.1 Microsoft Learn - Power BI Courses

- **Source:** Microsoft Learn - Power BI
- **Relevance:** Provided structured learning paths for **Power BI modeling, DAX, and visualization best practices.**

7.6.2 Power BI YouTube Channels & Webinars

- **Source:** YouTube Channels like **Guy in a Cube, Enterprise DNA, and Curbal.**

- **Relevance:** Helped in understanding **practical use cases, dashboard storytelling, and performance optimization.**

7.6.3 Kaggle & GitHub - Power BI & Python Projects

- **Source:** Kaggle datasets and GitHub repositories on Power BI & Python analytics.
- **Relevance:** Provided **real-world datasets and scripts** for financial trend analysis.

7.7 Conclusion

This chapter has outlined the key references that played a significant role in the **successful development of the Power BI dashboard for Algorhythm Tech Fest**. By leveraging official documentation, technical guides, and industry reports, the project was able to **ensure accuracy, optimize performance, and implement best practices in financial tracking and event insights.**

These resources will also serve as **valuable learning materials for future enhancements**, ensuring that the dashboard continues to evolve with **real-time analytics, AI-driven predictions, and automated reporting.**