# FINAL REPORT

## 1. INTRODUCTION

### 1.1 Project Overview

“Heritage Treasures” is a data analytics project that focuses on analyzing UNESCO World Heritage Sites using Tableau. The project explores the 2019 UNESCO dataset and transforms raw CSV data into meaningful visual insights. It provides interactive dashboards that display country-wise heritage distribution, endangered sites analysis, and regional inscription trends. The dashboard is further integrated into a Flask-based web application to make it accessible online.

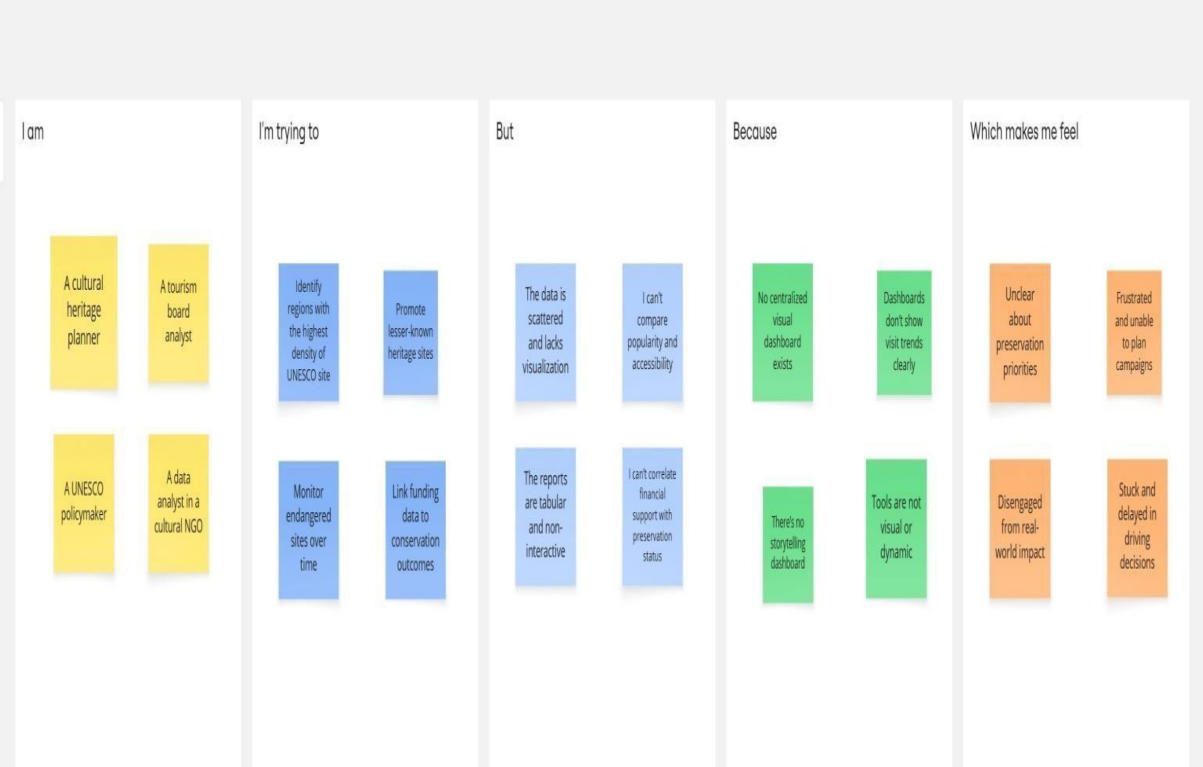
### 1.2 Purpose

The purpose of this project is to simplify complex UNESCO heritage data and present it in a visually understandable format. It helps researchers, government bodies, tourism boards, and NGOs make data-driven decisions for heritage preservation, risk management, and tourism development.

## 2. IDEATION PHASE

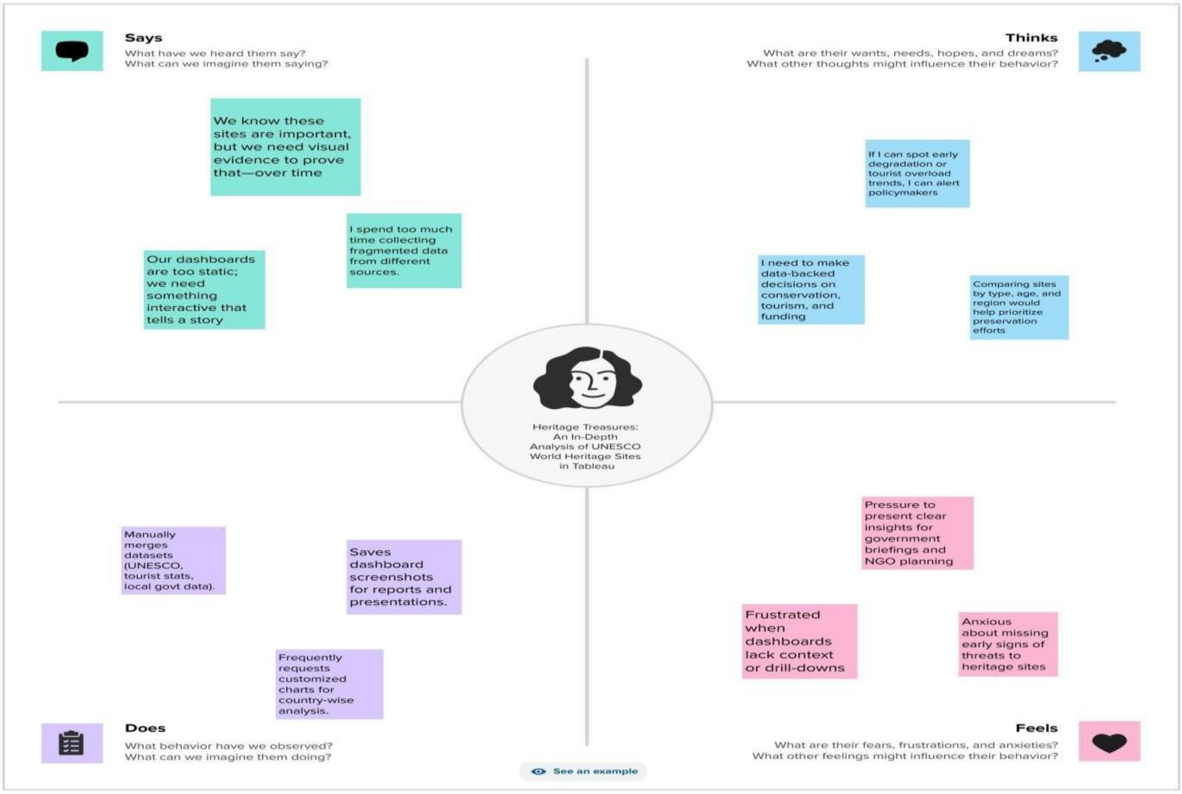
### 2.1 Problem Statement

UNESCO heritage data is available in raw format, which makes it difficult to analyze trends, identify endangered sites, and understand global distribution patterns. There is a need for an interactive visualization system that transforms raw data into actionable insights.



| I am | I'm trying to | But | Because | Which makes me feel |
|---|---|---|---|---|
| A cultural heritage planner | Identify regions with the highest density of UNESCO site | The data is scattered and lacks visualization | No centralized visual dashboard exists | Unclear about preservation priorities |
| A tourism board analyst | Promote lesser-known heritage sites | I can't compare popularity and accessibility | Dashboards don't show visit trends clearly | Frustrated and unable to plan campaigns |
| A UNESCO policymaker | Monitor endangered sites over time | The reports are tabular and non-interactive | There's no storytelling dashboard | Disengaged from real-world impact |
| A data analyst in a cultural NGO | Link funding data to conservation outcomes | I can't correlate financial support with preservation status | Tools are not visual or dynamic | Stuck and delayed in driving decisions |

## 2.2 Empathy Map Canvas



**Says**

What have we heard them say?
What can we imagine them saying?

We know these sites are important, but we need visual evidence to prove that—over time

I spend too much time collecting fragmented data from different sources.

Our dashboards are too static; we need something interactive that tells a story

**Thinks**

What are their wants, needs, hopes, and dreams?
What other thoughts might influence their behavior?

If I can spot early degradation or tourist overload trends, I can alert policymakers

I need to make data-backed decisions on conservation, tourism, and funding

Comparing sites by type, age, and region would help prioritize preservation efforts

Heritage Treasures: An In-Depth Analysis of UNESCO World Heritage Sites in Tableau

Manually merges datasets (UNESCO, tourist stats, local govt data).

Saves dashboard screenshots for reports and presentations.

Frequently requests customized charts for country-wise analysis.

**Does**

What behavior have we observed?
What can we imagine them doing?

Pressure to present clear insights for government briefings and NGO planning

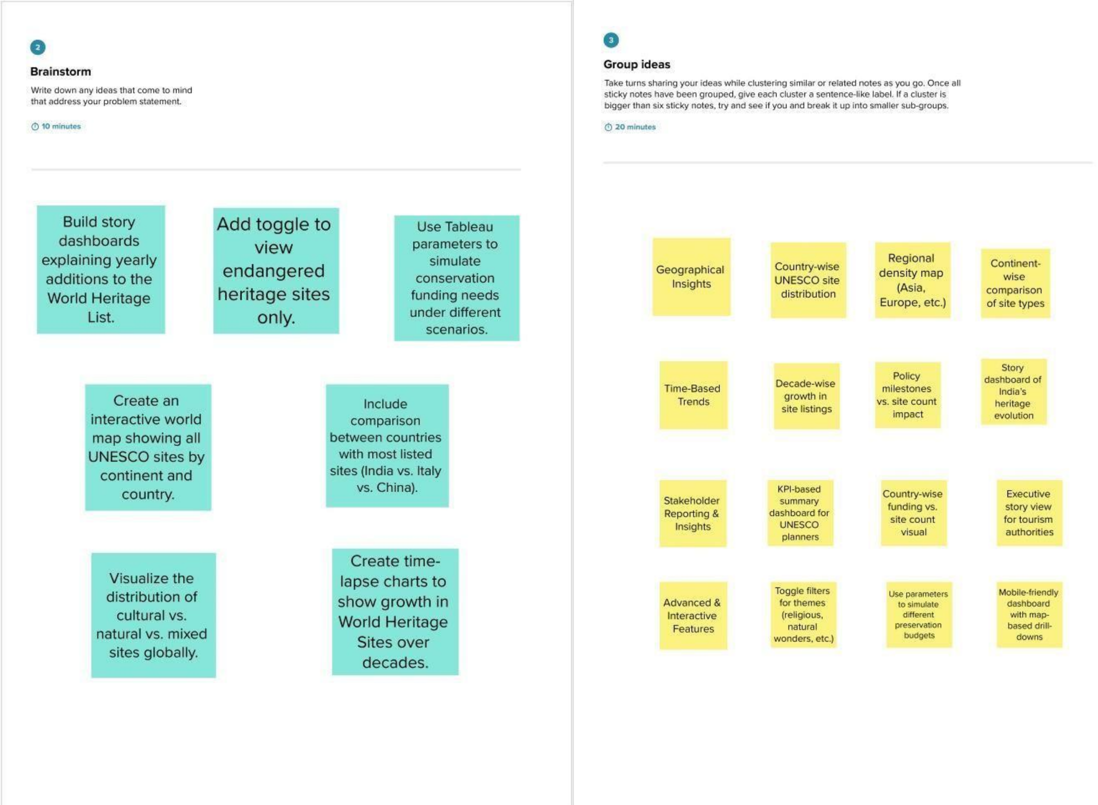
Frustrated when dashboards lack context or drill-downs

Anxious about missing early signs of threats to heritage sites

**Feels**

What are their fears, frustrations, and anxieties?
What other feelings might influence their behavior?

## 2.3 Brainstorming



2

**Brainstorm**

Write down any ideas that come to mind that address your problem statement.

10 minutes

Build story dashboards explaining yearly additions to the World Heritage List.

Add toggle to view endangered heritage sites only.

Use Tableau parameters to simulate conservation funding needs under different scenarios.

Create an interactive world map showing all UNESCO sites by continent and country.

Include comparison between countries with most listed sites (India vs. Italy vs. China).

Visualize the distribution of cultural vs. natural vs. mixed sites globally.

Create time-lapse charts to show growth in World Heritage Sites over decades.

3

**Group ideas**

Take turns sharing your ideas while clustering similar or related notes as you go. Once all sticky notes have been grouped, give each cluster a sentence-like label. If a cluster is bigger than six sticky notes, try and see if you and break it up into smaller sub-groups.

20 minutes

| | | | |
|---|---|---|---|
| Geographical Insights | Country-wise UNESCO site distribution | Regional density map (Asia, Europe, etc.) | Continent-wise comparison of site types |
| Time-Based Trends | Decade-wise growth in site listings | Policy milestones vs. site count impact | Story dashboard of India's heritage evolution |
| Stakeholder Reporting & Insights | KPI-based summary dashboard for UNESCO planners | Country-wise funding vs. site count visual | Executive story view for tourism authorities |
| Advanced & Interactive Features | Toggle filters for themes (religious, natural wonders, etc.) | Use parameters to simulate different preservation budgets | Mobile-friendly dashboard with map-based drill-downs |

# 3. REQUIREMENT ANALYSIS

## 3.1 Customer Journey Map

1. User visits web application.
2. User logs in.
3. User explores dashboard.
4. User applies filters (Country, Region, Year).
5. User analyzes trends.
6. User downloads report.

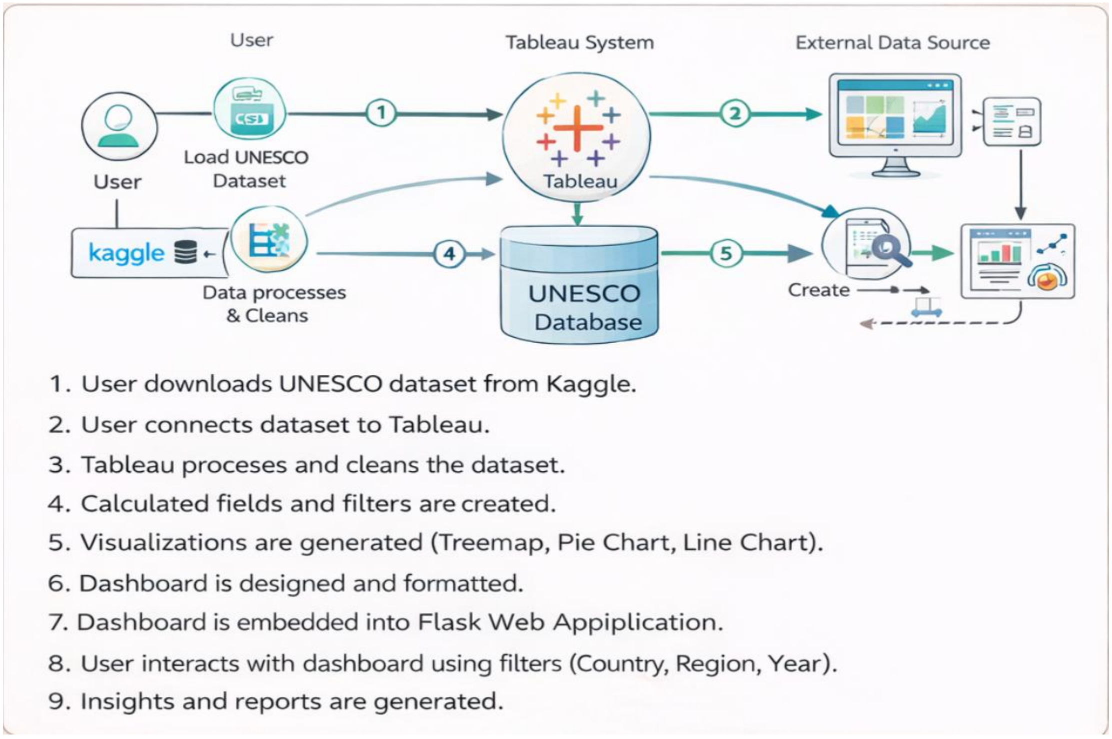
### 3.2 Solution Requirement

| FR No. | Functional Requirement (Epic) | Sub Requirement (Story / Sub-Task) |
|---|---|---|
| FR-1 | User Registration | Registration through form Registration through Gmail Registration through LinkedIn |
| FR-2 | User Confirmation | Confirmation via Email Confirmation via OTP |
| FR-3 | Dashboard & Visualization | View Heritage Sites by Country (Treemap) View Sites at Risk (Pie Chart) View Regional Inscription Trends (Line Chart) Apply filters (Country, Region, Year, Category) |
| FR-4 | Data Management & Reports | Upload / Update UNESCO dataset Generate interactive dashboard Export reports (PDF/Image) Embed dashboard into Flask web application |
| FR-5 | Story & Insights | Create story with multiple scenes Display key insights and trends Highlight endangered sites analysis |
| FR-6 | User Interaction & Access | Secure login access Responsive dashboard (Web & Mobile) Search heritage sites by name |

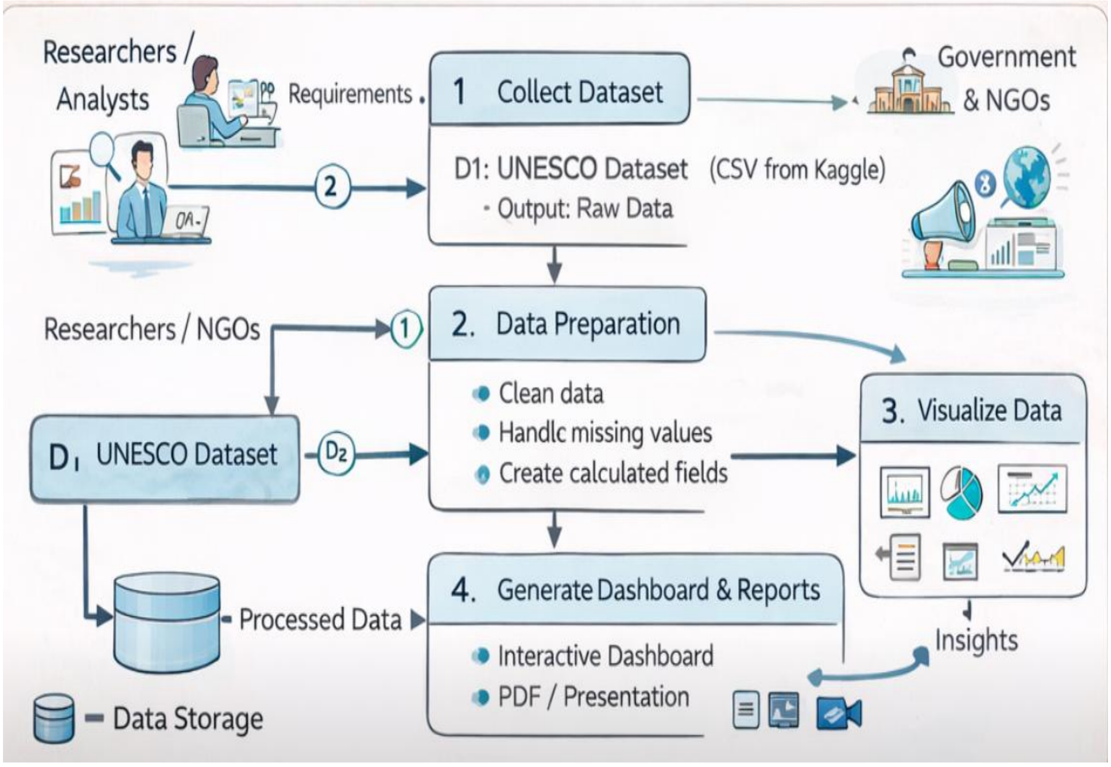
| NFR No. | Non-Functional Requirement | Description |
|---|---|---|
| NFR-1 | **Usability** | The dashboard should be easy to navigate with clear labels, filters, and user-friendly design. |
| NFR-2 | **Security** | The dataset and web application should be securely hosted and protected from unauthorized access. |
| NFR-3 | **Reliability** | The system should consistently display accurate data without crashes or errors. |
| NFR-4 | **Performance** | Dashboard should load within acceptable time and filters should respond quickly. |
| NFR-5 | **Availability** | The web-based dashboard should be accessible anytime with minimal downtime. |

| | | |
|---|---|---|
| NFR-6 | **Scalability** | The system should support updated datasets and handle larger future datasets efficiently. |

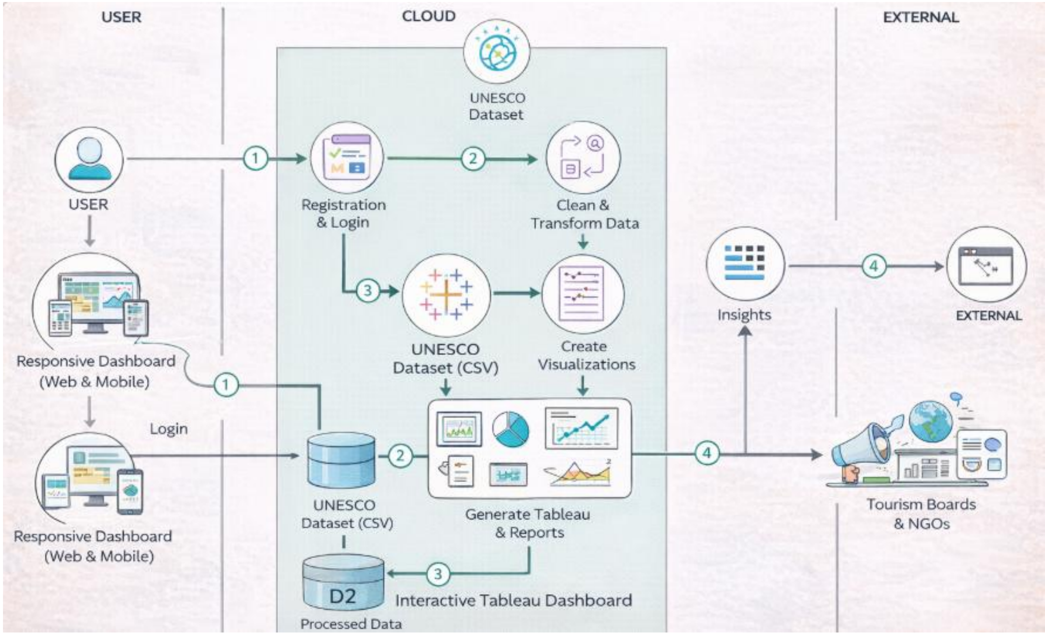
### 3.3 Data Flow Diagram



1. User downloads UNESCO dataset from Kaggle.
2. User connects dataset to Tableau.
3. Tableau proceses and cleans the dataset.
4. Calculated fields and filters are created.
5. Visualizations are generated (Treemap, Pie Chart, Line Chart).
6. Dashboard is designed and formatted.
7. Dashboard is embedded into Flask Web Appiplication.
8. User interacts with dashboard using filters (Country, Region, Year).
9. Insights and reports are generated.



### 3.4 Technology Stack



# 4. PROJECT DESIGN

## 4.1 Problem Solution Fit

The solution directly addresses the problem of complex raw data by converting it into interactive visual dashboards that provide quick insights and easy analysis.

Define CS, fit into CC
2. CUSTOMER SEGMENT(S)
CC
8. CUSTOMER CONSTRAINTS
CC
Peservasibility
Technical Skills
Time
Funding
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Limited Comanint dn ostumes avellable devices.
5. AVAILABLE SOLUTIONS
AS
Tn'Lilcral
Héstnfry Sites at Risk
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Toval
Tatorel
Floer
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Video Emtleridg
Internet Embortes
Docectmupe
Explore AS, differentiate
Focus on J&P, tap into BE, understand RC
3. JOBS-TO-BE-DONE / PROBLEMS
J&P
8. PROBLEM ROOT CAUSE
RC
8. BEHAVIOUR
BE
Focus on J&P, tap into BE, understand RC
Identify strong TR & EM
4. TRIGGERS
TR
3. EMOTIONS: BEFORE / AFTER
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BEFORE
BEFORE: Ovenlslmed, Curious,
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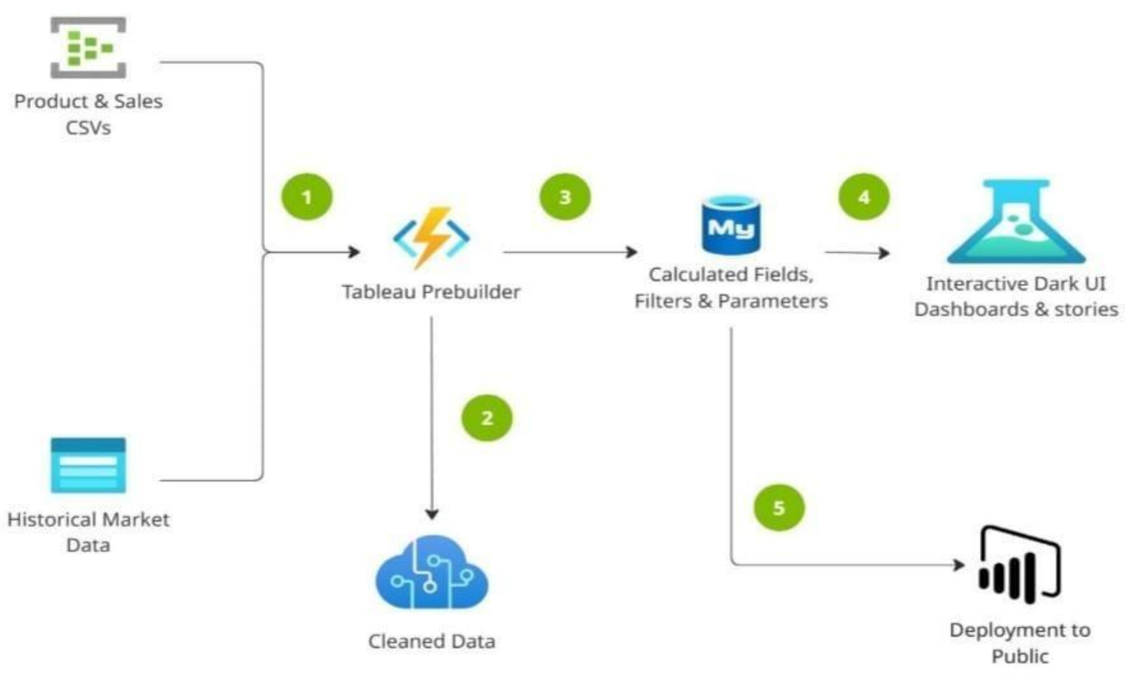
### 4.2 Proposed Solution

| S.No. | Parameter | Description |
|---|---|---|
| 1. | Problem Statement (Problem to be solved) | UNESCO World Heritage data is available in raw CSV format, which is difficult to interpret and analyze. Stakeholders face challenges in understanding site distribution, endangered sites, and regional trends. There is a lack of clear visual insights to support data-driven decisions for heritage preservation and policy making. |
| 2. | Idea / Solution description | The proposed solution is to develop an interactive Tableau dashboard that analyzes UNESCO World Heritage Sites (2019) data. The dashboard will visually represent country-wise heritage distribution, sites at risk, and regional inscription trends over the years. Interactive filters such as country, region, year, and category will allow users to explore data dynamically. The dashboard will also be embedded into a web application using Flask to ensure accessibility and better presentation. |
| 3. | Novelty / Uniqueness | The uniqueness of this project lies in its interactive visual storytelling approach using Tableau. It combines multiple visualization techniques like treemaps, pie charts, and line charts to provide multi-dimensional insights. The integration of Tableau with a Flask-based web interface enhances usability and presentation. Additionally, the focus on endangered heritage sites adds practical relevance and social importance to the analysis. |
| 4. | Social Impact / Customer Satisfaction | This project increases awareness about endangered UNESCO World Heritage Sites and supports governments, NGOs, and researchers in making informed preservation decisions. It promotes cultural heritage understanding and encourages data-driven tourism strategies. By transforming complex data into simple visual insights, it ensures better user satisfaction and accessibility. |
| 5. | Business Model (Revenue Model) | The solution can be offered as a subscription-based analytics platform for advanced heritage data insights. Government organizations, tourism boards, and research institutions can access customized dashboards for strategic planning. Academic institutions can use it for learning and research purposes through licensing models. |

|  |  |  |
|---|---|---|
| 6. | Scalability of the Solution | The solution is highly scalable as it can incorporate updated UNESCO datasets and expand to include real-time data integration. It can be developed into a full-scale web-based analytics platform with predictive risk assessment features. The system can also be extended to analyze other global cultural or environmental datasets, making it adaptable for broader applications. |

### 4.3 Solution Architecture



## 5. PROJECT PLANNING & SCHEDULING

### 5.1 Project Planning

| Sprint | Functional Requirement (Epic) | User Story Number | User Story / Task | Story Points | Priority | Team Members |
|---|---|---|---|---|---|---|
| Sprint-1 | Data Collection & Preparation | USN-1 | As a developer, I can collect the UNESCO dataset from Kaggle for analysis. | 3 | High | Team |
| Sprint-1 |  | USN-2 | As a developer, I can connect the dataset with Tableau. | 3 | High | Team |

| | | | | | | |
|---|---|---|---|---|---|---|
| Sprint-1 | | USN-3 | As a developer, I can clean and prepare the dataset for visualization. | 4 | High | Team |
| Sprint-1 | Dashboard – Heritage by Country | USN-4 | As a user, I can view country-wise heritage site distribution using a treemap. | 5 | High | Team |
| Sprint-1 | Login & Access | USN-5 | As a user, I can access the dashboard through secure login. | 2 | Medium | Team |
| Sprint-2 | Sites at Risk Visualization | USN-6 | As a user, I can view a pie chart showing sites in danger vs not in danger. | 4 | High | Team |
| Sprint-2 | Regional Trends | USN-7 | As a user, I can analyze regional inscription trends using a line chart. | 5 | High | Team |
| Sprint-2 | Filters | USN-8 | As a user, I can filter data by country, region, year, and category. | 4 | High | Team |
| Sprint-2 | Dashboard Design | USN-9 | As a user, I can view a responsive and well-designed dashboard. | 3 | Medium | Team |
| Sprint-3 | Story Creation | USN-10 | As a user, I can view a story with multiple scenes explaining insights. | 5 | High | Team |
| Sprint-3 | Performance Testing | USN-11 | As a developer, I can test dashboard performance and optimize loading time. | 4 | Medium | Team |
| Sprint-3 | Calculated Fields | USN-12 | As a developer, I can create calculated fields for advanced analysis. | 3 | Medium | Team |
| Sprint-4 | Web Integration | USN-13 | As a developer, I can embed the Tableau dashboard into a Flask web application. | 5 | High | Team |
| Sprint-4 | Documentation | USN-14 | As a developer, I can prepare step-by-step project documentation. | 4 | High | Team |
| Sprint-4 | Demo Video | USN-15 | As a developer, I can record and submit a project demonstration video. | 3 | Medium | Team |

## Project Tracker, Velocity & Burndown Chart:

| Sprint | Total Story Points | Duration | Sprint Start Date | Sprint End Date (Planned) | Story Points Completed (as on Planned End Date) | Sprint Release Date (Actual) |
|---|---|---|---|---|---|---|
| Sprint-1 | 20 | 15 Days | 12-12-2025 | 26-12-2025 | 20 | 26-12-2025 |
| Sprint-2 | 20 | 15 Days | 29-12-2025 | 12-01-2026 | 20 | 12-01-2026 |
| Sprint-3 | 20 | 15 Days | 15-01-2026 | 29-01-2026 | 20 | 29-01-2026 |
| Sprint-4 | 20 | 15 Days | 02-02-2026 | 16-02-2026 | 20 | 20-02-2026 |

## 6. FUNCTIONAL AND PERFORMANCE TESTING

### 6.1 Performance Testing

- Dashboard loading time measured.
- Filter response time checked.
- Data accuracy verified.
- Cross-device compatibility tested.
- Cloud deployment performance evaluated.

## 7. RESULTS

### 7.1 Output Screenshots

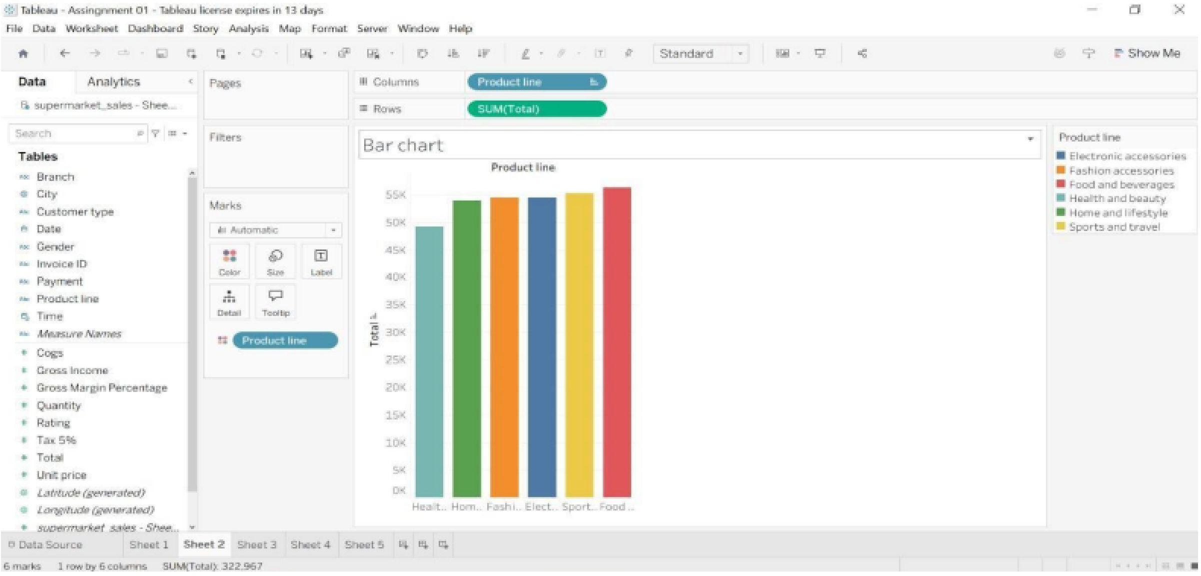


Tableau - Assingnment 01 - Tableau license expires in 13 days

Columns: Product line

Rows: SUM(Total)

Bar chart

6 marks 1 row by 6 columns SUM(Total): 322,967

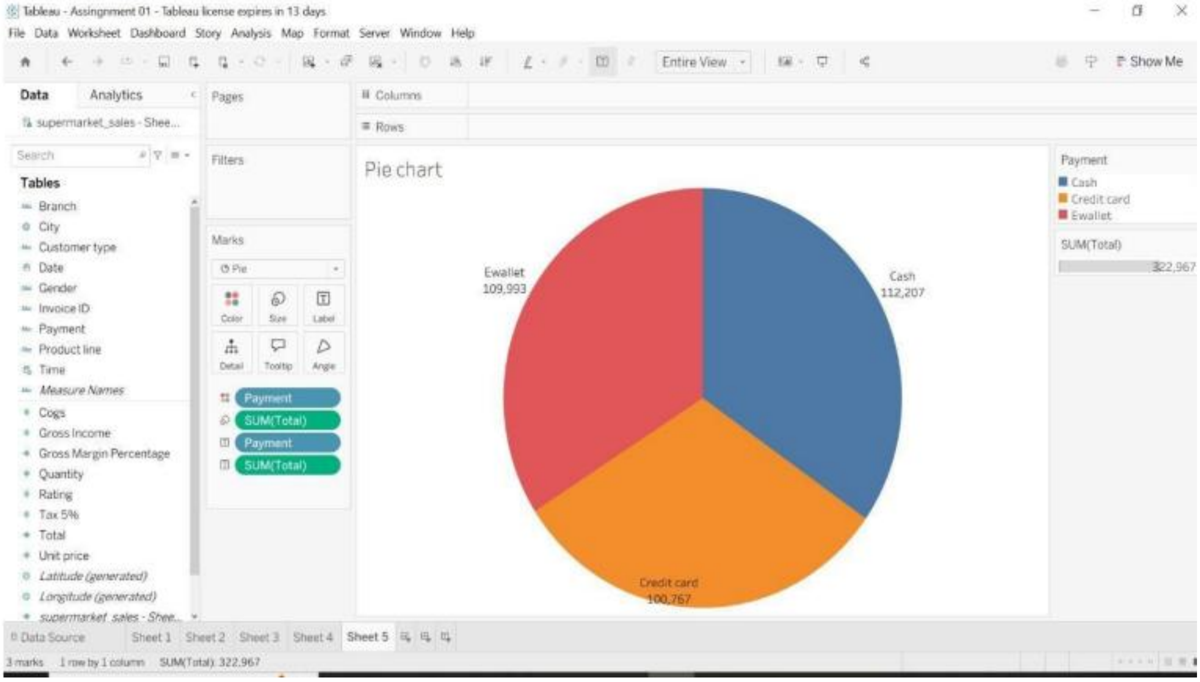


Tableau - Assingnment 01 - Tableau license expires in 13 days
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Entire View
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Pages
Columns
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Filters
Marks
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Label
Detail
Tooltip
Angle
Payment
SUM(Total)
Payment
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City
Customer type
Date
Gender
Invoice ID
Payment
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Measure Names
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Pie chart
Ewallet
109,993
Cash
112,207
Credit card
100,767
Payment
Cash
Credit card
Ewallet
SUM(Total)
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Data Source
Sheet 1
Sheet 2
Sheet 3
Sheet 4
Sheet 5
3 marks 1 row by 1 column SUM(Total): 322,967

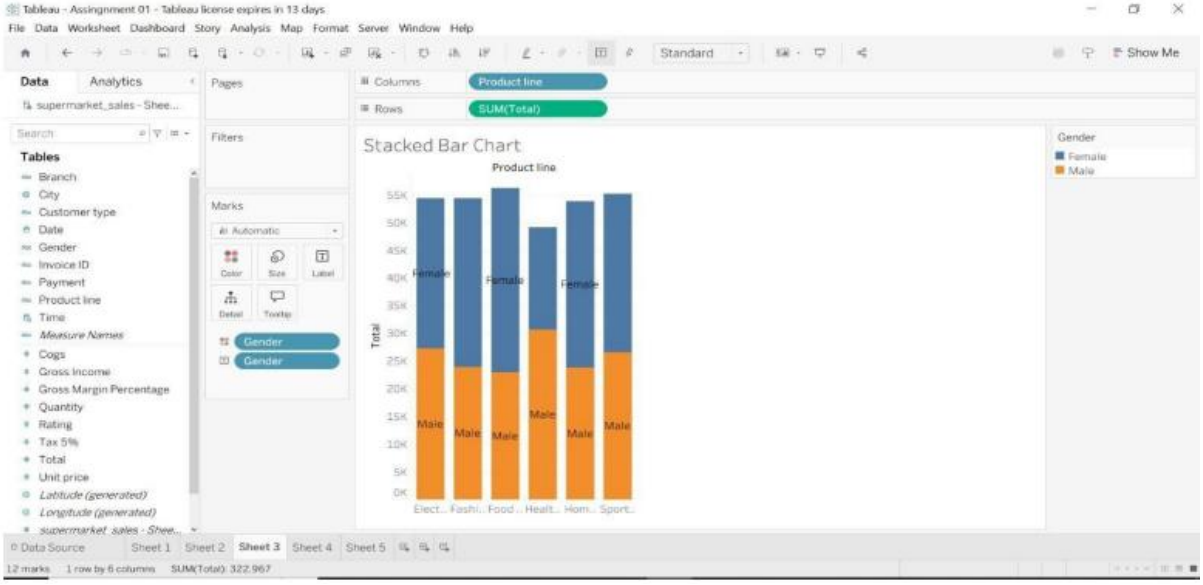
Tableau - Assingnment 01 - Tableau license expires in 13 days
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Standard
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Pages
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Gender
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Payment
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Data Source
Sheet 1
Sheet 2
Sheet 3
Sheet 4
Sheet 5
12 marks 1 row by 6 columns SUM(Total): 322,967

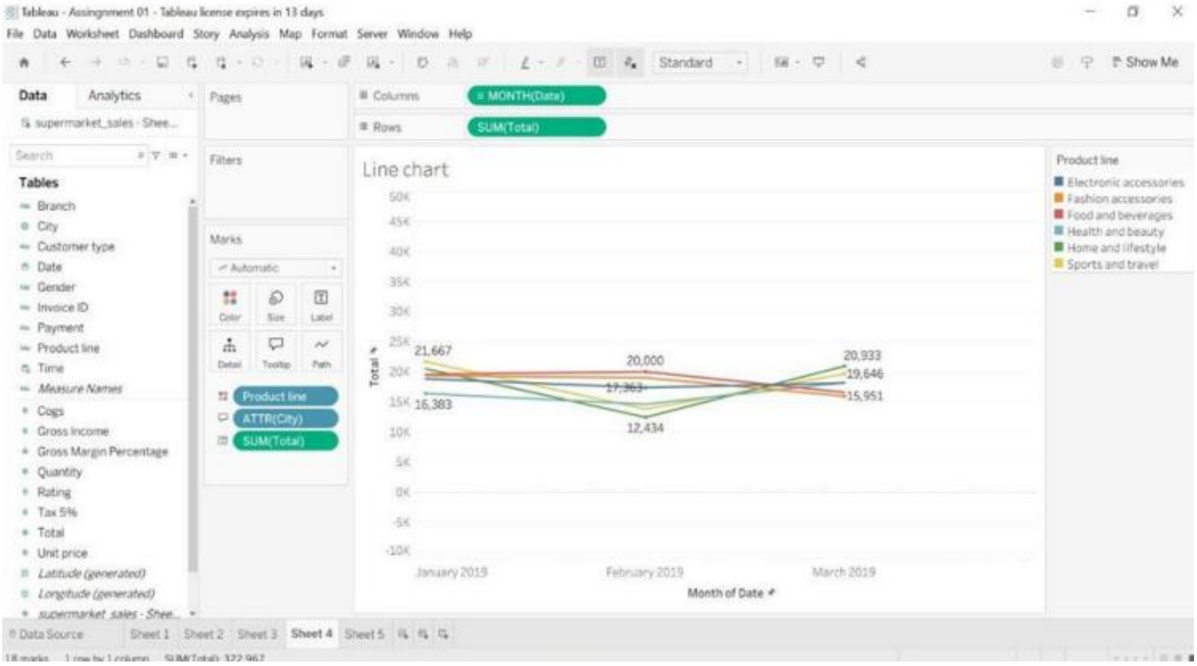


Tableau - Assingnment 01 - Tableau license expires in 13 days

Columns: MONTH(Date)

Rows: SUM(Total)

Marks: Automatic — Product line, ATTR(City), SUM(Total)

Line chart

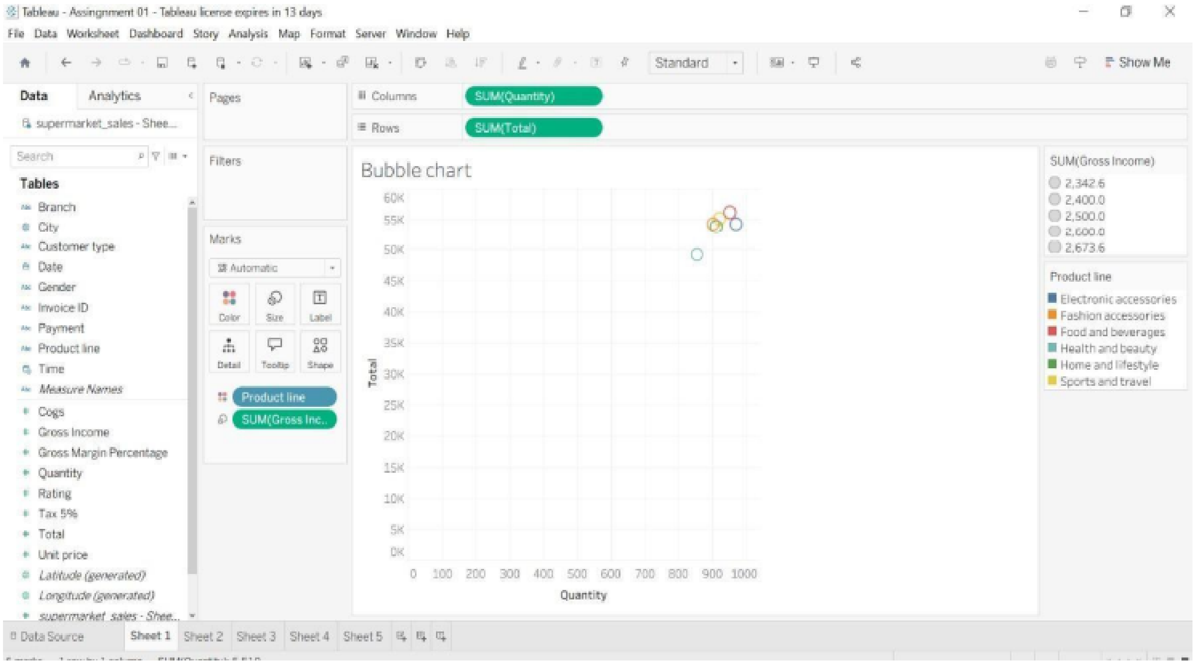


Tableau - Assingnment 01 - Tableau license expires in 13 days

Columns: SUM(Quantity)

Rows: SUM(Total)

Marks: Automatic — Product line, SUM(Gross Inc..

Bubble chart

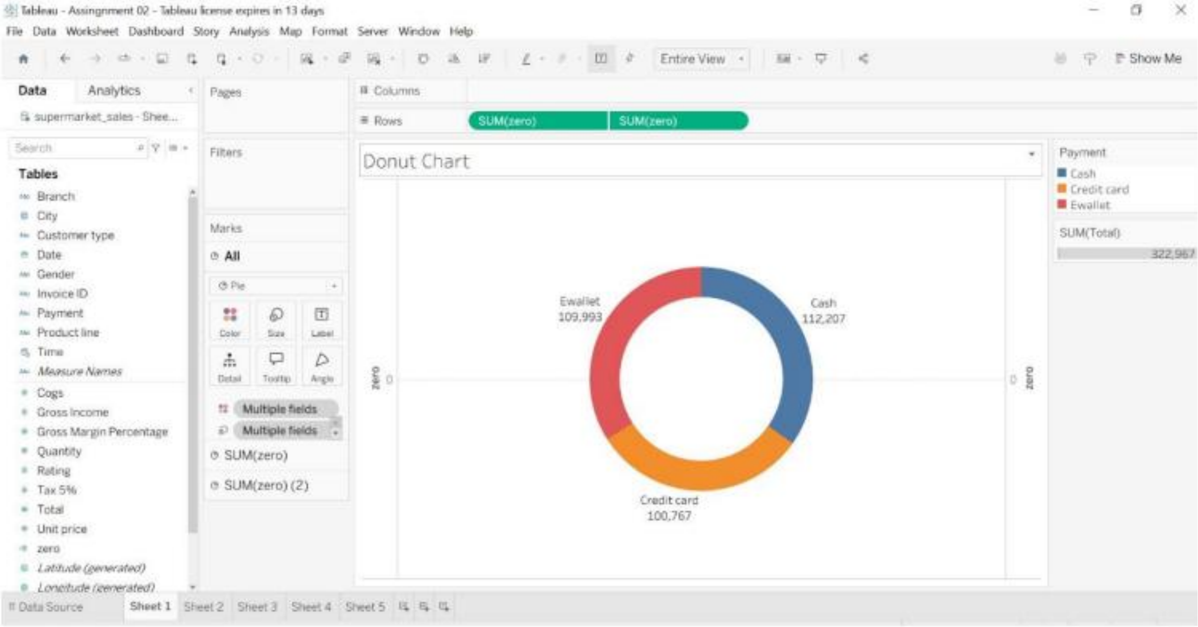


Tableau - Assingnment 02 - Tableau license expires in 13 days

Data source: supermarket_sales - Shee...

Columns:

Rows: SUM(zero) SUM(zero)

Marks: All — Pie

Multiple fields

Multiple fields

SUM(zero)

SUM(zero) (2)

Entire View

Donut Chart

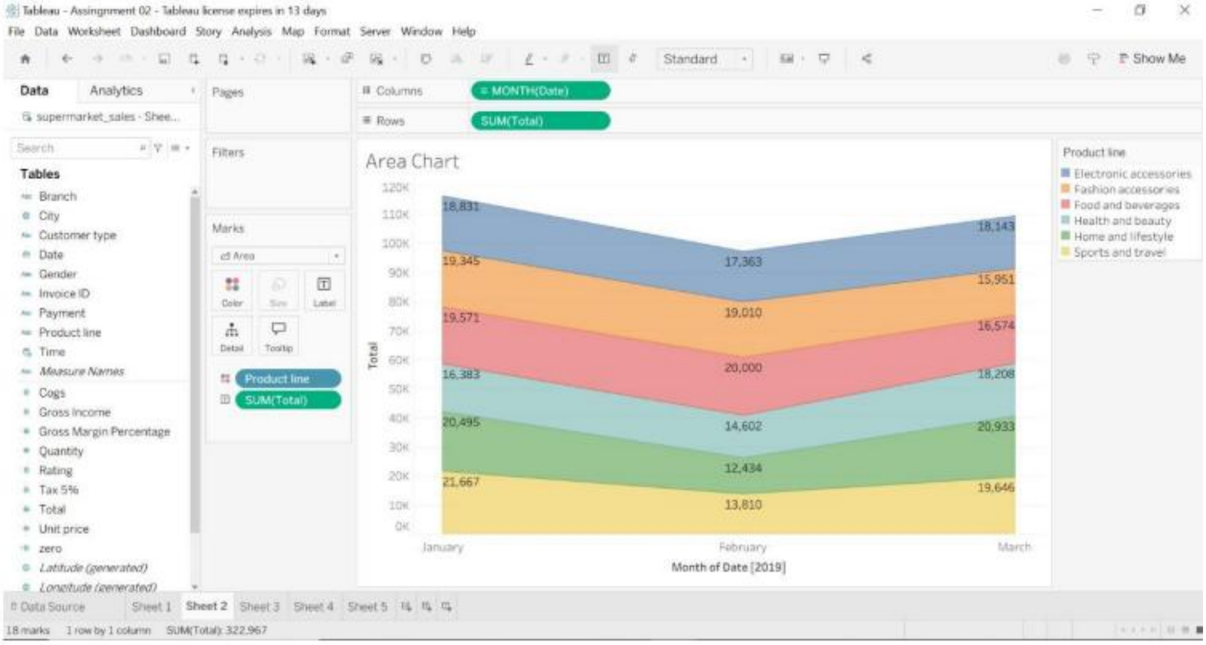


Tableau - Assingnment 02 - Tableau license expires in 13 days

Data source: supermarket_sales - Shee...

Columns: MONTH(Date)

Rows: SUM(Total)

Marks: Area

Product line

SUM(Total)

Standard

Area Chart

18 marks 1 row by 1 column SUM(Total): 322,967

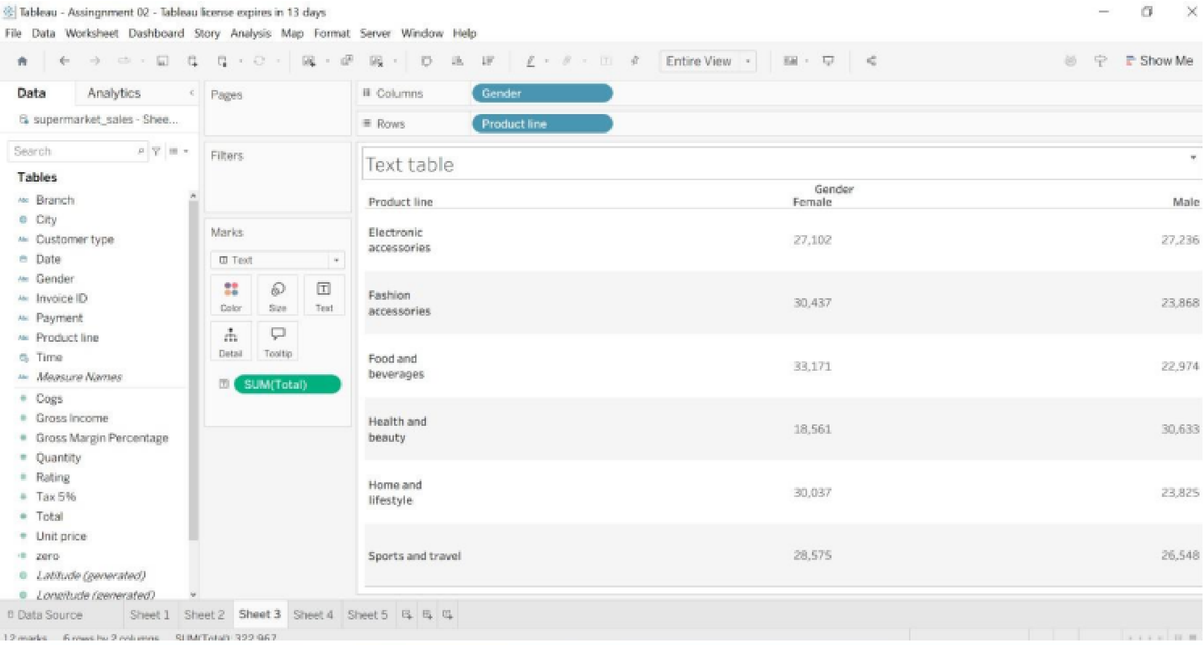


Tableau - Assingnment 02 - Tableau license expires in 13 days

Columns: Gender

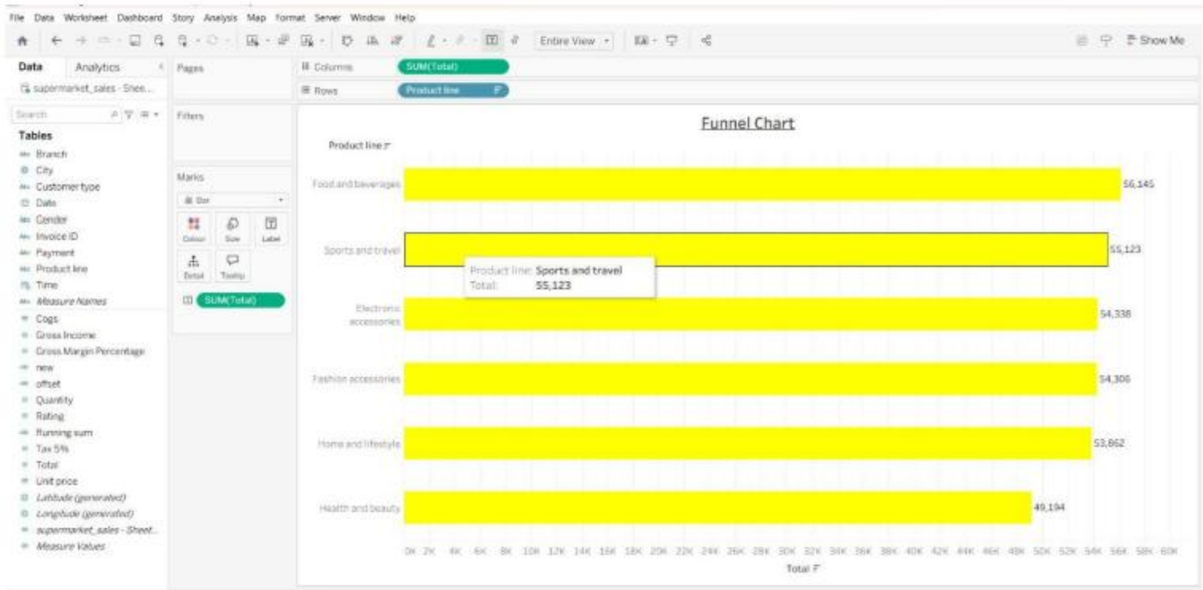
Rows: Product line

Marks: SUM(Total)

Text table

| Product line | Gender<br>Female | Male |
|---|---|---|
| Electronic accessories | 27,102 | 27,236 |
| Fashion accessories | 30,437 | 23,868 |
| Food and beverages | 33,171 | 22,974 |
| Health and beauty | 18,561 | 30,633 |
| Home and lifestyle | 30,037 | 23,825 |
| Sports and travel | 28,575 | 26,548 |

12 marks 6 rows by 2 columns SUM(Total): 322,967

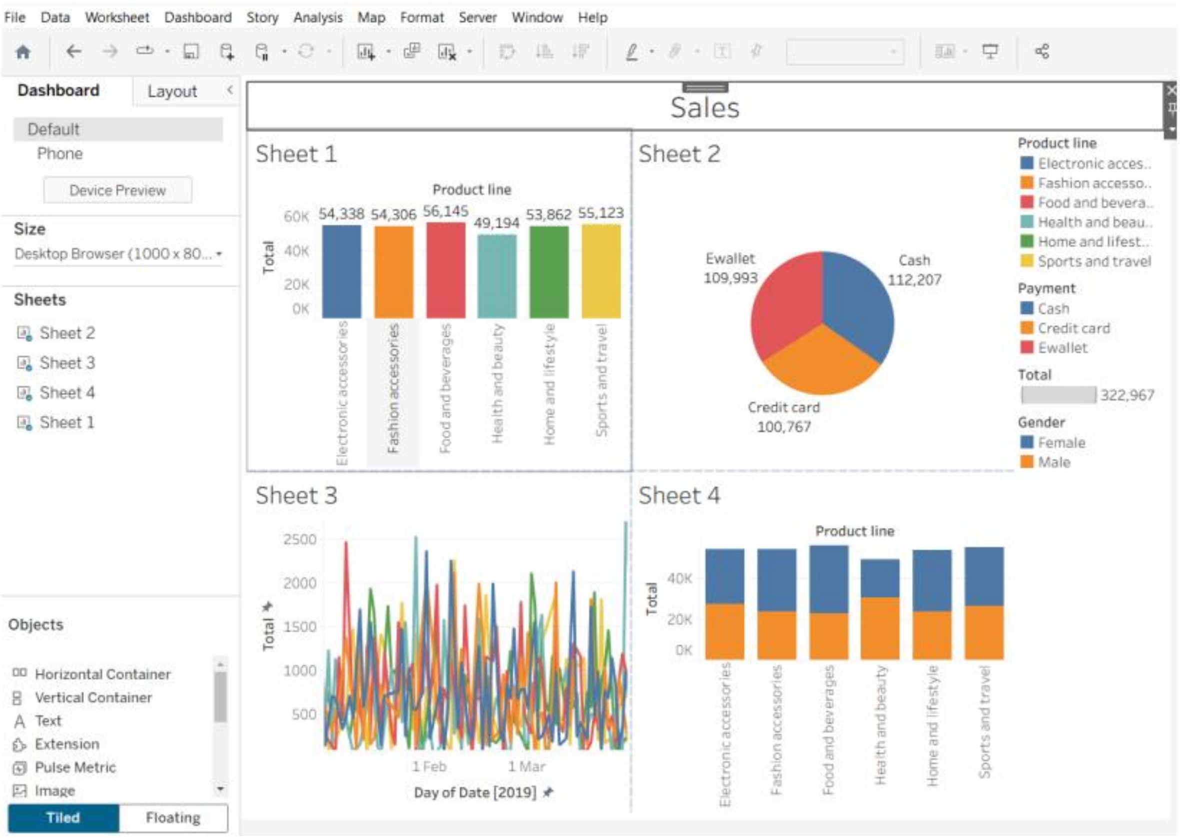


Columns: SUM(Total)

Rows: Product line

Marks: SUM(Total)

Funnel Chart



## 8. ADVANTAGES & DISADVANTAGES

### Advantages

- Easy data interpretation
- Interactive and user-friendly
- Supports decision making
- Scalable solution
- Web-accessible

### Disadvantages

- Dependent on dataset updates
- Limited predictive analysis
- Requires Tableau knowledge for modifications

## 9. CONCLUSION

The project successfully transforms raw UNESCO heritage data into interactive and insightful dashboards. It improves data understanding, supports preservation efforts, and enhances strategic decision-making using visualization techniques.

## 10. FUTURE SCOPE

- Integration with real-time UNESCO APIs
- Machine learning-based risk prediction
- Mobile application version
- Advanced analytics with AI integration
- Multi-year comparative analysis

## 11. APPENDIX

Source Code :

```
from flask import Flask, render_template, request, redirect, url_for, session, send_from_directory, jsonify

import os

import urllib.parse


app = Flask(__name__)

app.secret_key = os.environ.get('FLASK_SECRET', 'change-me-for-production')


# Temporary in-memory user storage (replace with DB in production)

users = {}


@app.route("/", methods=["GET", "POST"])

def login():

    if request.method == "POST":

        email = request.form["email"]

        password = request.form["password"]


        if email in users and users[email] == password:

            session['user'] = email

            return redirect(url_for("dashboard"))

        else:
            return "Invalid login. <a href='/'>Try again</a>"

    return render_template("Login.html")

@app.route("/signup", methods=["GET", "POST"])
def signup():
    if request.method == "POST":
        email = request.form["email"]
        password = request.form["password"]

        users[email] = password
        return redirect(url_for("login"))

    return render_template("Signup.html")

@app.route("/dashboard")
def dashboard():
    # Require authentication
    if not session.get('user'):
        return redirect(url_for('login'))

    # If you've added a static dashboard file (e.g. static/dashboard.html), serve it
    static_dashboard_path = os.path.join(app.static_folder or 'static', 'dashboard.html')
    if os.path.exists(static_dashboard_path):
        return send_from_directory(app.static_folder, 'dashboard.html')

    # Otherwise render the template-based dashboard and include images from
    # both `static/css` and `static/css/dashboards` so files placed in either
    # location are shown on the dashboard.
    search_paths = [
        os.path.join(app.static_folder or 'static', 'css'),
        os.path.join(app.static_folder or 'static', 'css', 'dashboards'),
        os.path.join(app.static_folder or 'static', 'pic')
    ]

    images = []
    seen = set()
    for base in search_paths:
        if os.path.isdir(base):
            rel_base = os.path.relpath(base, app.static_folder or 'static').replace('\\','/')
            for fn in sorted(os.listdir(base)):
                if fn.lower().endswith(('.png', '.jpg', '.jpeg', '.gif', '.webp')):
                    rel_path = f"{rel_base}/{fn}" if rel_base != '.' else fn
                    # avoid duplicates when same filename exists in both dirs
                    if rel_path not in seen:
                        images.append(rel_path)
                        seen.add(rel_path)

    # Choose a featured image: prefer the first image found, if any
    featured = images[0] if images else None

    return render_template("Dashboard.html", images=images, featured=featured)

@app.route('/debug-images')
def debug_images():
    """Return JSON list of the static URLs for dashboard images (helps debug 404s)."""
    urls = []
    search_paths = [
        os.path.join(app.static_folder or 'static', 'css'),
        os.path.join(app.static_folder or 'static', 'css', 'dashboards'),
        os.path.join(app.static_folder or 'static', 'pic')
    ]
    seen = set()
    for base in search_paths:
        if os.path.isdir(base):
            rel_base = os.path.relpath(base, app.static_folder or 'static').replace('\\','/')
            for fn in sorted(os.listdir(base)):
                if fn.lower().endswith(('.png', '.jpg', '.jpeg', '.gif', '.webp')):
                    rel_path = f"{rel_base}/{fn}" if rel_base != '.' else fn
                    if rel_path not in seen:
                        urls.append(url_for('static', filename=rel_path))
                        seen.add(rel_path)
    return jsonify(urls)

@app.route('/logout')
def logout():
    session.pop('user', None)
    return redirect(url_for('login'))

if __name__ == "__main__":
    app.run(debug=True)
=True)
```

Dataset Link:
https://www.kaggle.com/datasets/ujwalkandi/unesco-world-heritage-sites/data?select=whc-sites-2019.csv

GitHub & Project Demo Link:
GitHub : https://github.com/Nageswari87/Heritage-Treasures-An-In-Depth-Analysis-of-UNESCO-World-Heritage-Sites-in-Tableau
Demo link : https://drive.google.com/drive/u/0/folders/1CZP8XtQkLL3P70z-MHqE6VCozKC6Fr8z