Project Report

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

Team ID : LTVIP2026TMIDS91063

Team Size :4

Team Leader : Bommidi Hemanth

Team member : Gollapalli Jyothi Sai

Team member : Doddi Venkata Mahendra Reddy

Team member : Yaswanth Krishna Murthy Nakka

1. INTRODUCTION

1.1 Project Overview

The UNESCO World Heritage Sites Dashboard is a data visualization project that analyses global heritage sites using interactive charts and maps. The project presents insights about site distribution by region, country, category (Cultural, Natural, Mixed), year of inscription, area (hectares), and danger status.

The dashboard is developed using Tableau for visualization and integrated into a Flask-based web application, providing an interactive and user-friendly platform for exploring UNESCO heritage data.

1.2 Purpose

The purpose of this project is to:

- Analyse and visualize UNESCO World Heritage Sites data.
- Identify regional and country-wise distribution patterns.
- Understand trends in site inscriptions over the years.
- Examine the status of sites (In Danger vs Not in Danger).
- Provide an interactive tool for academic and analytical use.

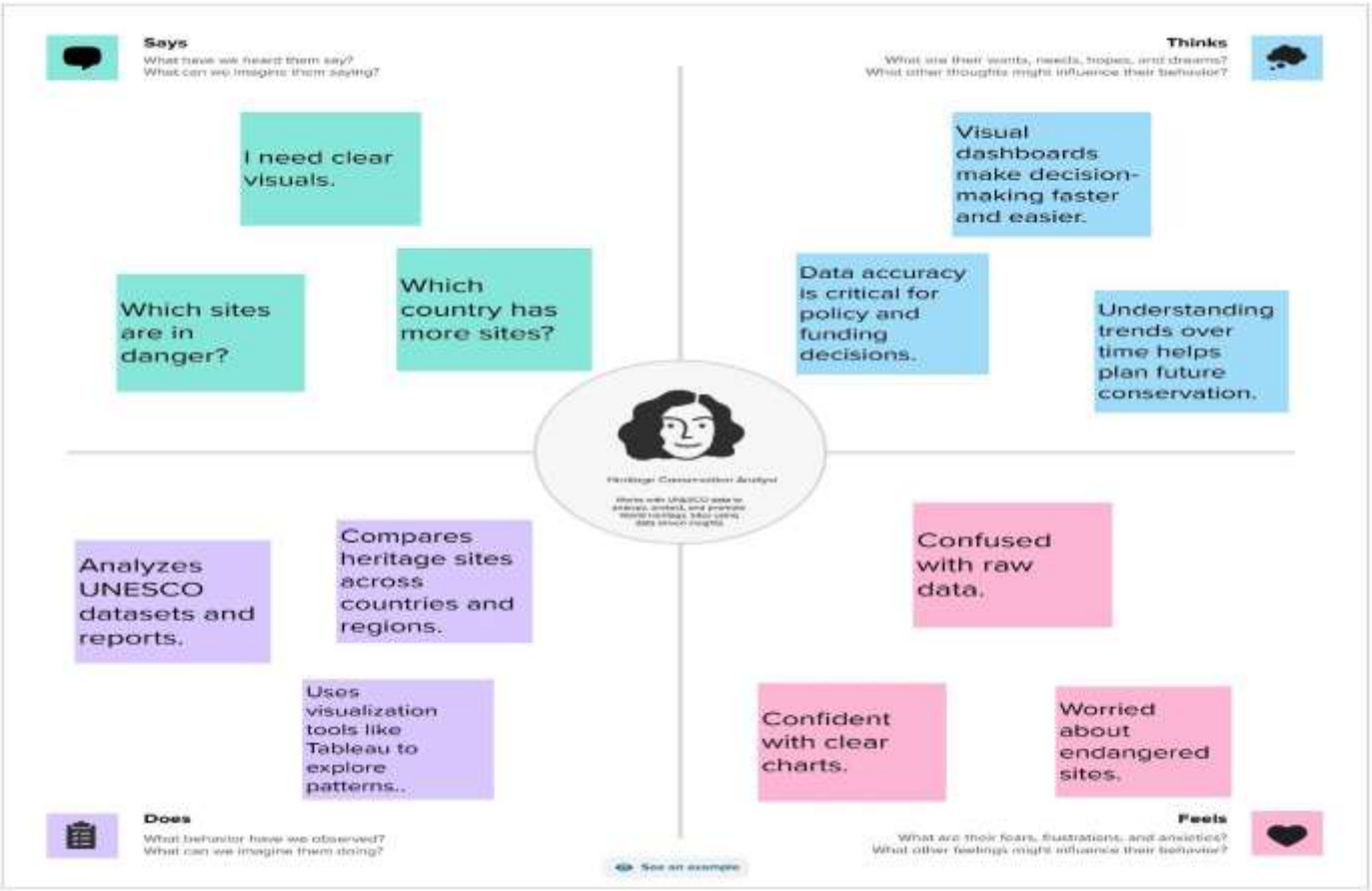
2. IDEATION PHASE

2.1 Problem Statement

Problem Statement (PS)	I am (Customer)	I'm trying to	But	Because	Which makes me feel
PS-1	**I am** a heritage conservation researcher and policymaker.	**I'm trying to** understand how UNESCO World Heritage Sites are distributed across different countries.	**But** the raw data is complex and spread across large datasets without clear visual representation .	**Because** it is difficult to quickly identify which countries have the highest concentration of heritage sites.	**Which makes me feel** overwhelmed and limits my ability to prioritize preservation and cultural promotion efforts effectively.
PS-2	**I am** a UNESCO stakeholder and heritage management authority.	**I'm trying to** identify World Heritage Sites that are at risk and analyse regional trends in site inscriptions over time.	**But** the information is not presented in an intuitive or comparative visual format.	**Because** assessing endangered sites and long-term regional conservation trends requires manual analysis of raw data.	**Which makes me feel** uncertain about where to focus immediate conservation actions and future heritage planning strategies.

2.2 Empathy Map Canvas

Empathy Map for the project title: Heritage Treasures: An In-Depth Analysis of UNESCO World Heritage Sites in Tableau



2.3 Brainstorming

4

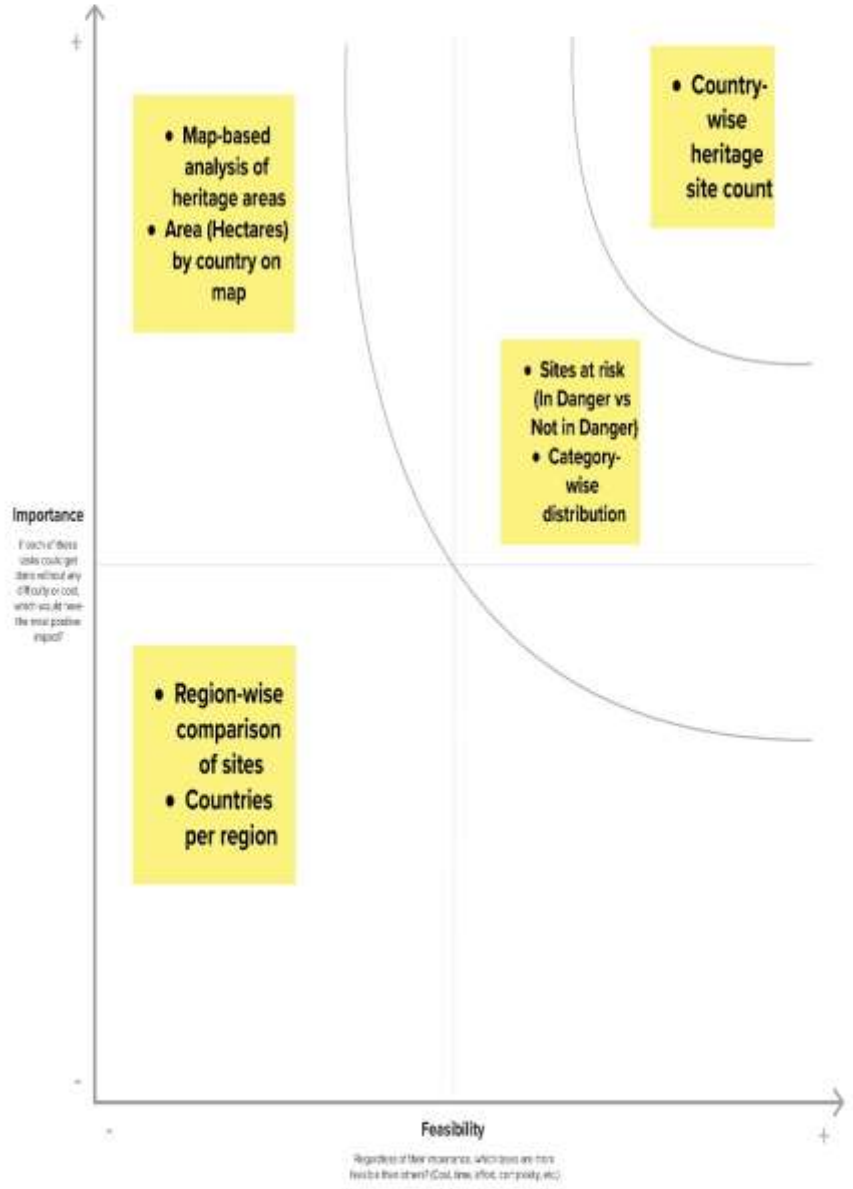
Prioritize

Your team should all be on the same page about what's important moving forward. Place your ideas on this grid to determine which ideas are important and which are feasible.

20 minutes

TIP

Participants can use their cursors to point at where sticky notes should go on the grid. The facilitator can confirm the spot by using the laser pointer holding the **M key** on the keyboard.



After you collaborate

You can export the mural as an image or pdf to share with members of your company who might find it helpful.

Quick add-ons

4 **Share the mural**
Share a view link to the mural with stakeholders to keep them in the loop about the outcomes of the session.

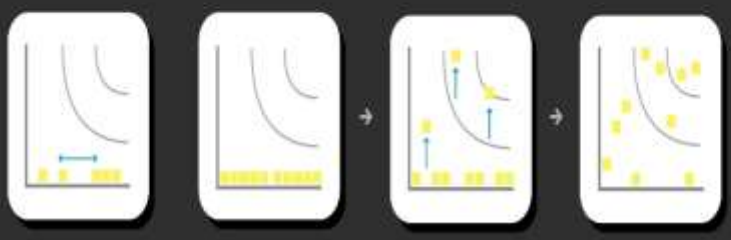
5 **Export the mural**
Export a copy of the mural as a PNG or PDF to attach to emails, include in slides, or save in your drive.

Keep moving forward

Strategy blueprint
Define the components of a new idea or strategy.
Open the template →

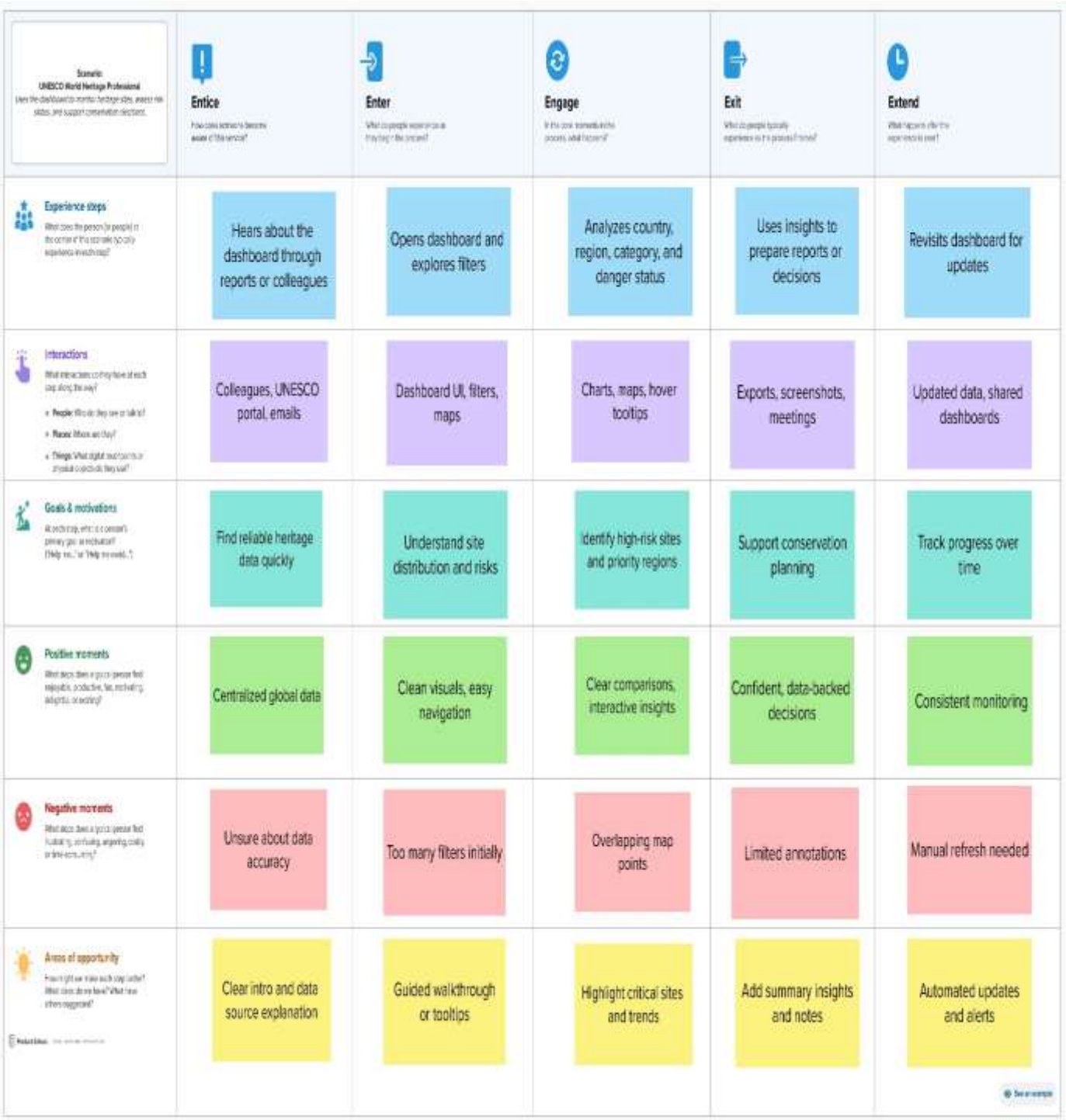
Customer experience journey map
Understand customer needs, motivations, and obstacles for an experience.
Open the template →

Strengths, weaknesses, opportunities & threats
Identify strengths, weaknesses, opportunities, and threats (SWOT) to develop a plan.
Open the template →



3. REQUIREMENT ANALYSIS

3.1 Customer Journey map



3.2 Solution Requirement

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	Data Visualization	Display UNESCO World Heritage Sites data using charts and maps
FR-2	Country Analysis	Show number of heritage sites by country
FR-3	Regional Analysis	Display site distribution across regions
FR-4	Category Analysis	Visualize Cultural, Natural, and Mixed site categories
FR-5	Trend Analysis	Show year-wise inscription trends using line charts
FR-6	Risk Analysis	Display sites at risk (In Danger vs Not in Danger)
FR-7	Interactive Filters	Filter data by Year, Region, Country, and Category
FR-8	Map Visualization	Show geographical distribution of sites on maps

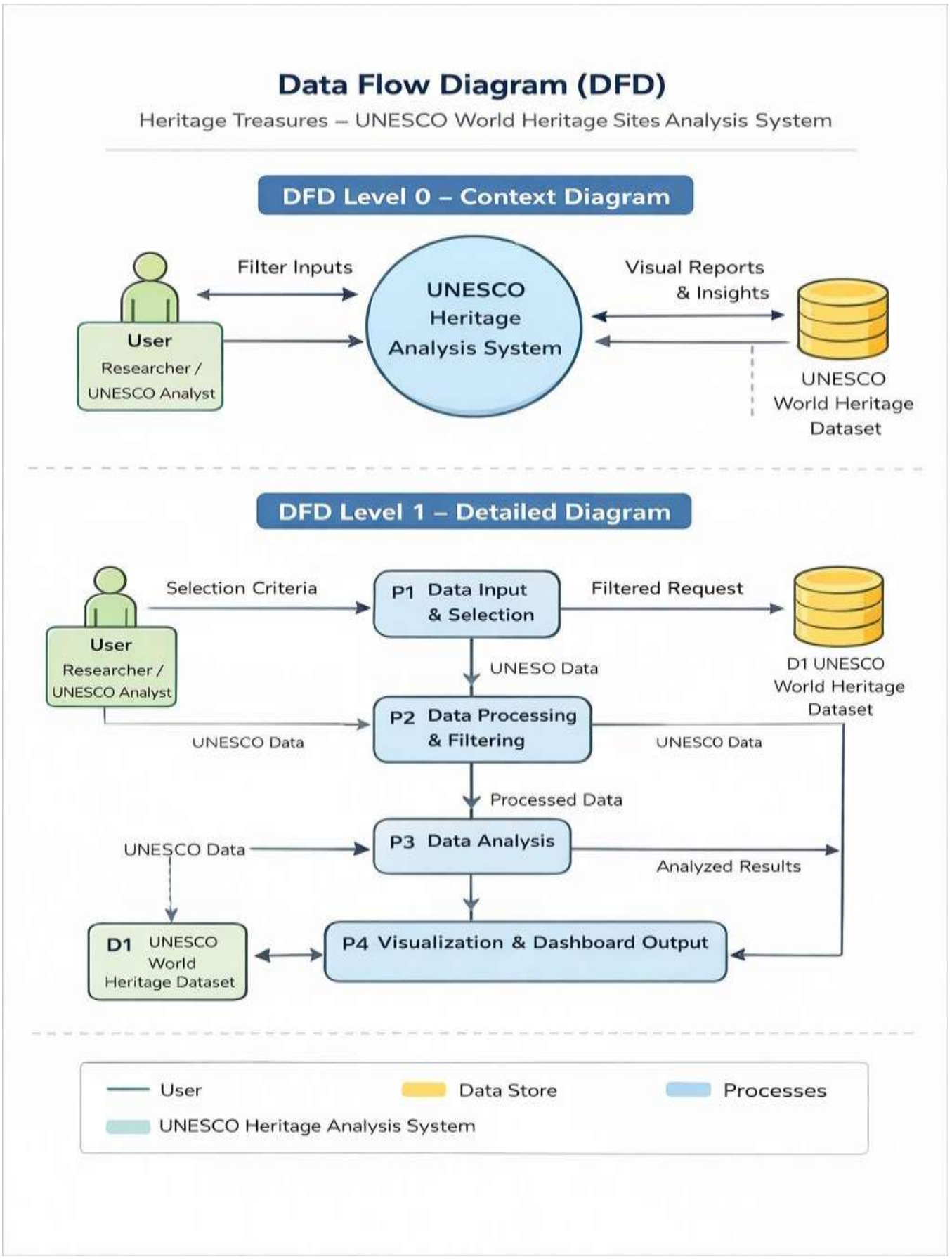
Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The dashboard should be simple, intuitive, and easy to navigate for all users.
NFR-2	**Security**	The dashboard should ensure data integrity and prevent unauthorized modification of data.
NFR-3	**Reliability**	The dashboard should consistently display accurate and correct information without errors.
NFR-4	**Performance**	The dashboard should load quickly and respond smoothly to filters and interactions.
NFR-5	**Availability**	The dashboard should be accessible whenever required without downtime.
NFR-6	**Scalability**	The dashboard should handle increasing data size without performance degradation.

3.3 Data Flow Diagram

Data Flow Diagrams:



User Stories

Use the below template to list all the user stories for the product.

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
UNESCO Professional	Login	USN-1	As a UNESCO professional, I can log in to access the dashboard.	User can log in successfully	High	Sprint-1
UNESCO Professional	Dashboard Overview	USN-2	As a user, I can view total heritage sites by country and region.	Country & region counts are visible	High	Sprint-1
UNESCO Professional	Risk Monitoring	USN-3	As a user, I can see sites marked In Danger and Not in Danger.	Risk status charts display correctly	High	Sprint-1
UNESCO Professional	Category Analysis	USN-4	As a user, I can analyse sites by category (Cultural, Natural, Mixed).	Category-wise charts load	Medium	Sprint-1
UNESCO Professional	Trend Analysis	USN-5	As a user, I can view year-wise inscription trends.	Line chart shows yearly trends	Medium	Sprint-1
UNESCO Professional	Geographic Visualization	USN-6	As a user, I can view heritage sites on an interactive world map.	Map shows accurate locations	High	Sprint-2
UNESCO Professional	Area Comparison	USN-7	As a user, I can compare heritage site areas (hectares) by country.	Filled map displays area size	Low	Sprint-2
UNESCO Professional	Advanced Filters	USN-8	As a user, I can filter data by year, category, region, and country.	Filters update visuals dynamically	Medium	Sprint-2
UNESCO Professional	Insight Exploration	USN-9	As a user, I can explore less prominent countries with fewer sites.	Data is visible for all countries	Low	Sprint-3

3.4 Technology Stack

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2

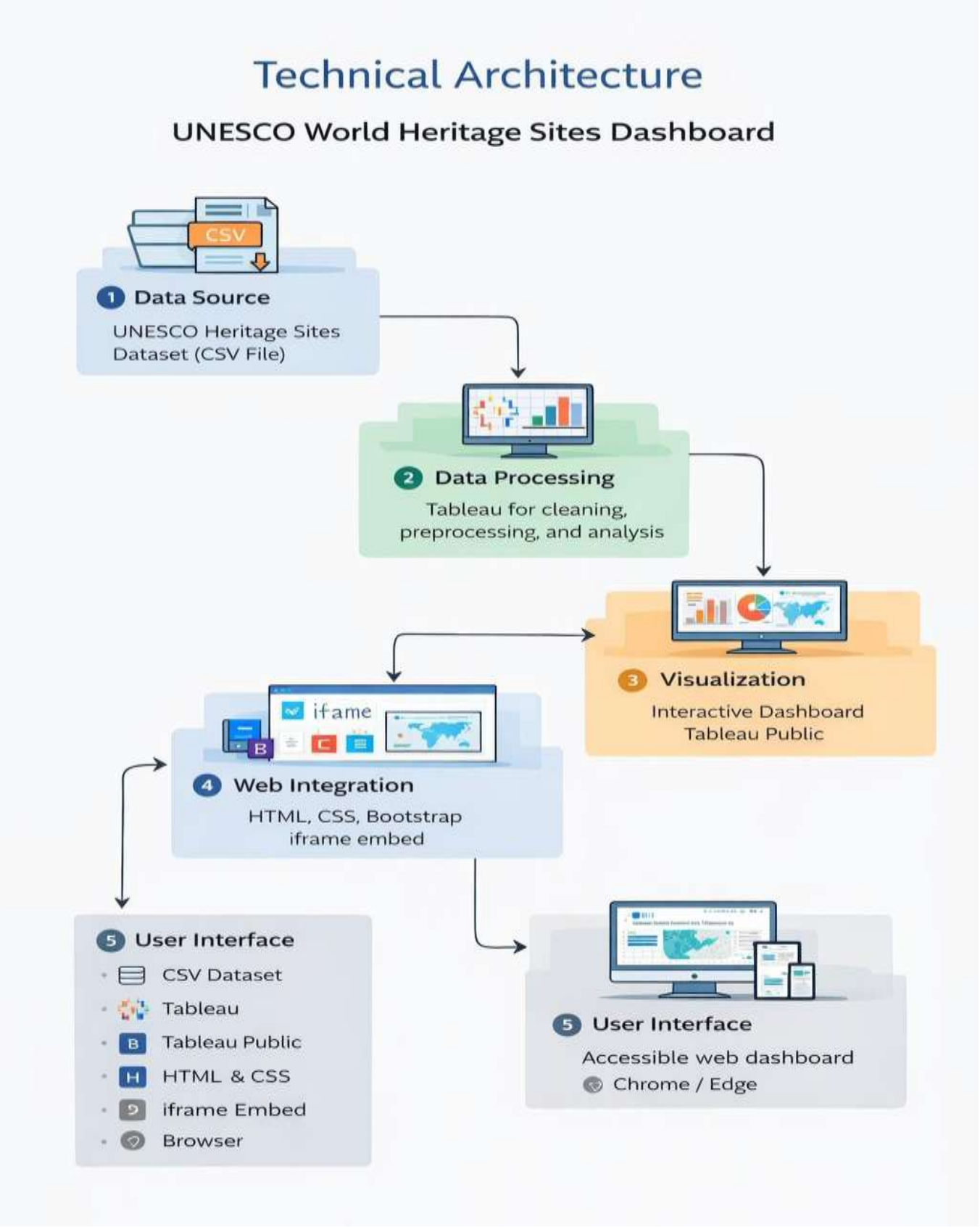


Table-1 : Components & Technologies:

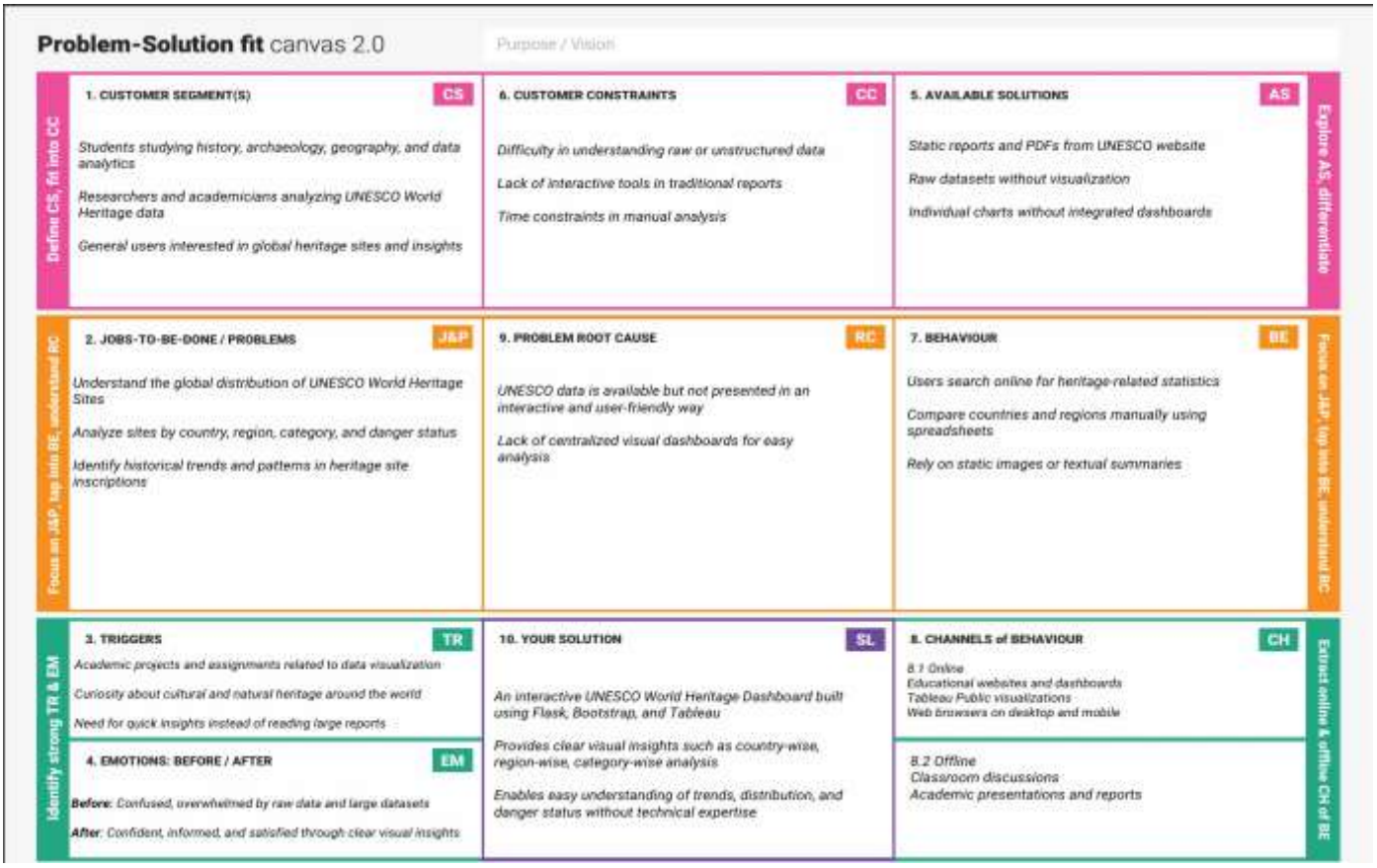
S.No	Component	Description	Technology
1.	User Interface	Web interface through which users view dashboards, stories, maps, and insights	HTML, CSS, JavaScript, Bootstrap
2.	Frontend Logic	Handles page navigation, UI interactions, responsiveness, and animations	JavaScript, Bootstrap JS
3.	Web Framework	Connects frontend with backend and manages routing and page rendering	Flask (Python)
4.	Application Logic	Controls application flow and serves embedded dashboards and static content	Python (Flask)
5.	Data Visualization Engine	Creates interactive charts, maps, dashboards, and stories	Tableau Public
6.	Data Processing Layer	Performs data cleaning, aggregation, filtering, and calculations	Tableau Calculated Fields
7.	Dataset	Stores UNESCO World Heritage data such as country, region, category, year, and danger status	CSV / Excel Dataset
8.	Embedding Layer	Embeds Tableau dashboards and stories into web pages	Tableau Embed
9.	Static Resource Management	Stores CSS, JS, images, icons, and template assets	Flask Static Folder
10.	Infrastructure (Server / Cloud)	Hosts and runs the Flask web application	Local System / Cloud Hosting

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Uses open-source frameworks and libraries for building the web interface and backend server	Flask (Python), Bootstrap, JavaScript
2.	Security Implementations	No user authentication is required. The application follows basic web security practices such as secure embedding and safe routing	HTTPS, Secure Embedding
3.	Scalable Architecture	Follows a layered architecture where frontend, backend, and visualization layers are loosely coupled, allowing easy scalability	Flask Backend, Tableau Public
4.	Availability	Application is accessible anytime as dashboards are hosted on Tableau Public and served through a Flask web server	Tableau Public Hosting, Flask Server
5.	Performance	Optimized by using pre-aggregated data in Tableau dashboards and lightweight frontend rendering	Tableau Optimized Views, Bootstrap

4. PROJECT DESIGN

4.1 Problem Solution Fit



4.2 Proposed Solution

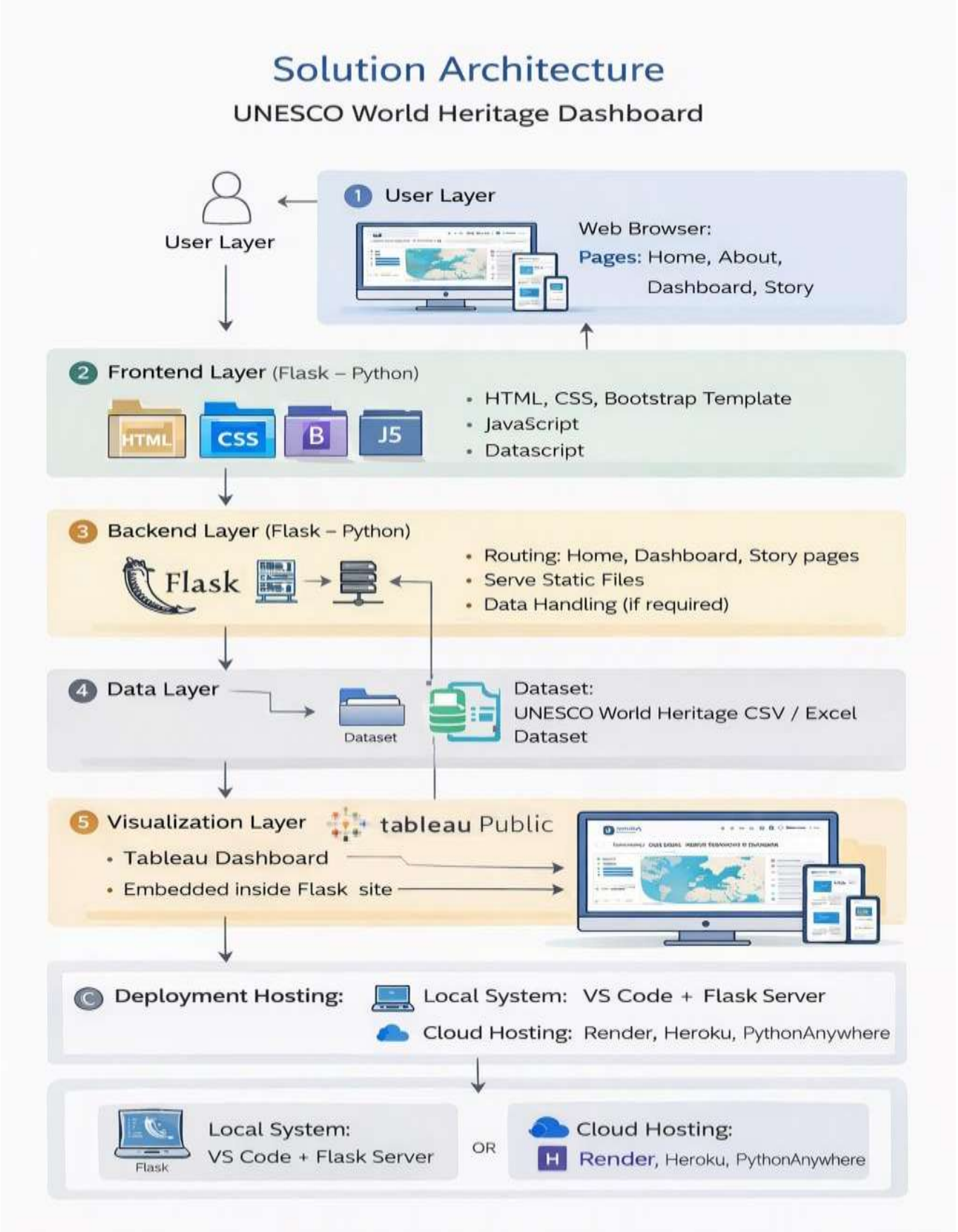
Proposed Solution Template:

Project team shall fill the following information in proposed solution template.

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	• UNESCO World Heritage data is available in raw and report formats, making it difficult for students and researchers to quickly analyse trends, regional distribution, categories, and danger status of heritage sites.
2.	Idea / Solution description	• Develop an interactive web-based dashboard using **Flask, Bootstrap, and Tableau** to visualize UNESCO World Heritage Sites data. The dashboard provides country-wise, region-wise, category-wise, year-wise, and danger status analysis in a simple and interactive format.
3.	Novelty / Uniqueness	• Combines **data visualization + storytelling** in one platform. • Converts complex heritage datasets into easy-to-understand visuals. • User-friendly academic dashboard without login requirement.
4.	Social Impact / Customer Satisfaction	• Helps students and researchers understand global cultural and natural heritage. • Encourages awareness about endangered heritage sites. • Supports academic learning and research projects.
5.	Business Model (Revenue Model)	• Academic and educational use (non-commercial). • Can be extended as a premium research analytics tool. • Potential integration with tourism analytics platforms.
6.	Scalability of the Solution	• Can be extended to include real-time UNESCO updates. • Can integrate more datasets (tourism data, environmental data). • Deployable on cloud platforms for large-scale usage.

4.3 Solution Architecture

Solution Architecture Diagram:



5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Product Backlog, Sprint Schedule, and Estimation:

Use the below template to create product backlog and sprint schedule

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Dataset Preparation	USN-1	As a user, I want cleaned UNESCO dataset so that I can analyse accurate information.	5	High	Team Leader
Sprint-1	Backend Setup (Flask)	USN-2	As a developer, I want to integrate Flask backend to serve dashboard pages.	5	High	Team Leader
Sprint-1	Dashboard Design	USN-3	As a user, I want an interactive dashboard showing country-wise site counts.	10	High	Team Leader
Sprint-2	Regional Analysis	USN-4	As a user, I want region-wise comparison of heritage sites.	8	High	Team Leader
Sprint-2	Category Analysis	USN-5	As a user, I want category-wise distribution (Cultural, Natural, Mixed).	4	Medium	Team Leader
Sprint-2	Danger Status Analysis	USN-6	As a user, I want to see sites in danger vs not in danger.	8	High	Team Leader
Sprint-3	Map Visualization	USN-7	As a user, I want a world map showing heritage site distribution.	6	High	Team Leader
Sprint-3	Year-wise Trend Analysis	USN-8	As a user, I want inscription trends over years.	4	Medium	Team Leader
Sprint-3	Web Integration	USN-9	As a user, I want the dashboard embedded in a responsive website.	10	High	Team Leader

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	5 Days	03 Feb 2026	07 Feb 2026	20	07 Feb 2026
Sprint-2	20	5 Days	08 Feb 2026	12 Feb 2026	20	12 Feb 2026
Sprint-3	20	5 Days	13 Feb 2026	17 Feb 2026	20	17 Feb 2026

Velocity:

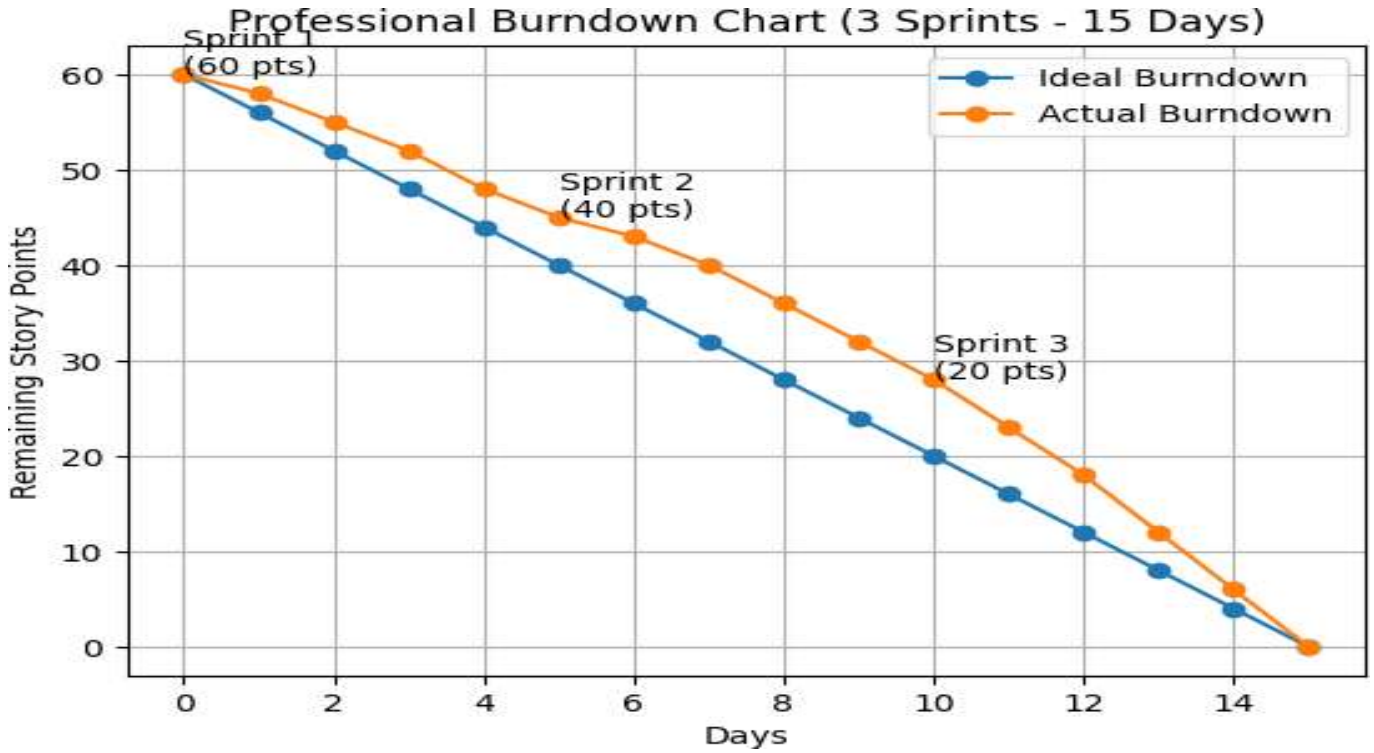
Velocity per Sprint: = 20 Story Points
Average Velocity: $(20 + 20 + 20) \div 3 = 20$

Velocity per Day: Team Velocity = 20 points per sprint
Each sprint = 5 days
$20 \div 5 = 4$

Average Velocity = **4** story points per day

Burndown Chart:

A burn down chart is a graphical representation of work left to do versus time. It is often used in agile software development methodologies such as Scrum. However, burn down charts can be applied to any project containing measurable progress over time.

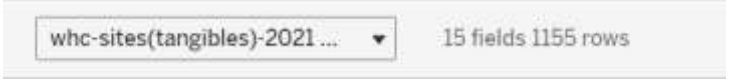


6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

Model Performance Testing:

Project team shall fill the following information in model performance testing template.

S.No.	Parameter	Screenshot / Values
1.	Data Rendered	  Data visualized using 6 interactive charts and 2 maps in the dashboard.

2.	Data Preprocessing	• Renamed dataset to **"UNESCO World Heritage Sites"**
		• Renamed columns for clarity:
		  ○ name → **Site_Name**
		  ○ country name → **Country**
		  ○ date_inscribed → **Year_Inscribed**
		  ○ danger → **Danger_Status**
		  ○ category_long → **Category**
		• Cleaned column headers using **Data Interpreter**
		• Fixed data types:
		  ○ **Site_Name** → String (Text)
		  ○ **Country** → String (Text)
		  ○ **Region** → String (Text)
		  ○ **Category** → String (Text)
		  ○ **Year_Inscribed** → Integer (Number)
		  ○ **Danger_Status** → NUmber(Whole)
		  ○ **Area_Hectares** → Number (Decimal)

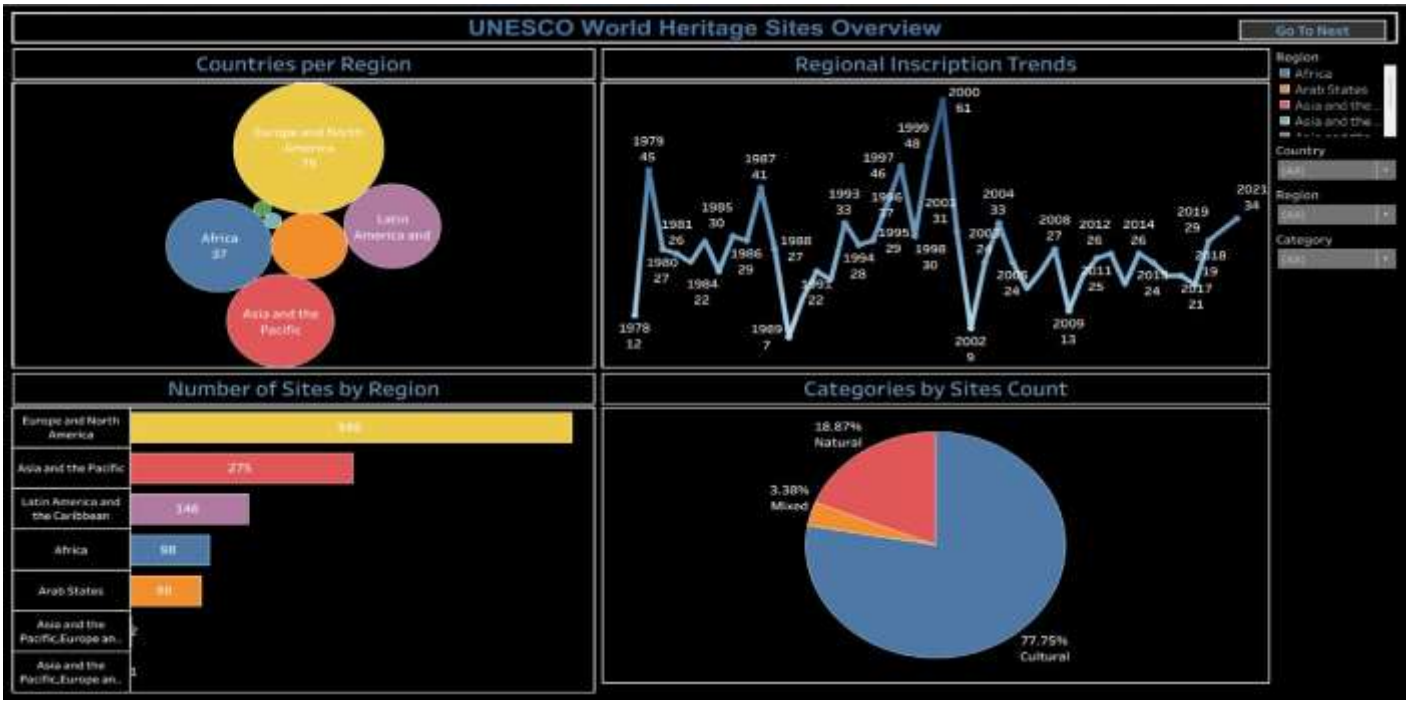
3.	Utilization of Filters	**Created Filters:** • Region Filter • Country Filter • Category Filter • Year (Action Filter) • Interactive navigation (Go to Next / Previous dashboard)
4.	Calculation fields Used	**Created Filters:** • Danger_Label • Site_Status • Transboundary_Label • Data End_Status
5.	Dashboard design	No of Visualizations / Graphs **– 8** **Dashboard_Page1:** • Countries per Region (Bubble Chart) • Regional Inscription Trends (Line Chart) • Number of Sites by Region (Horizontal Bar Chart) • Categories by Sites Count (Pie Chart) **Dashboard_Page2:** • Heritage Site Area(Hectares) by Country (Map) • Heritage Sites by Country (Tree map) • Danger Status by Category (Side-By-Side Bar Chart) • Category-Wise Distribution of UNESCO World Heritage Sites (Symbol Map)
6	Story Design	No of Visualizations / Graphs -**8** **Stories Created:** • Countries per Region (Bubble Chart) • Regional Inscription Trends (Line Chart) • Number of Sites by Region (Horizontal Bar Chart) • Categories by Sites Count (Pie Chart) • Heritage Site Area(Hectares) by Country (Map) • Heritage Sites by Country (Tree map)

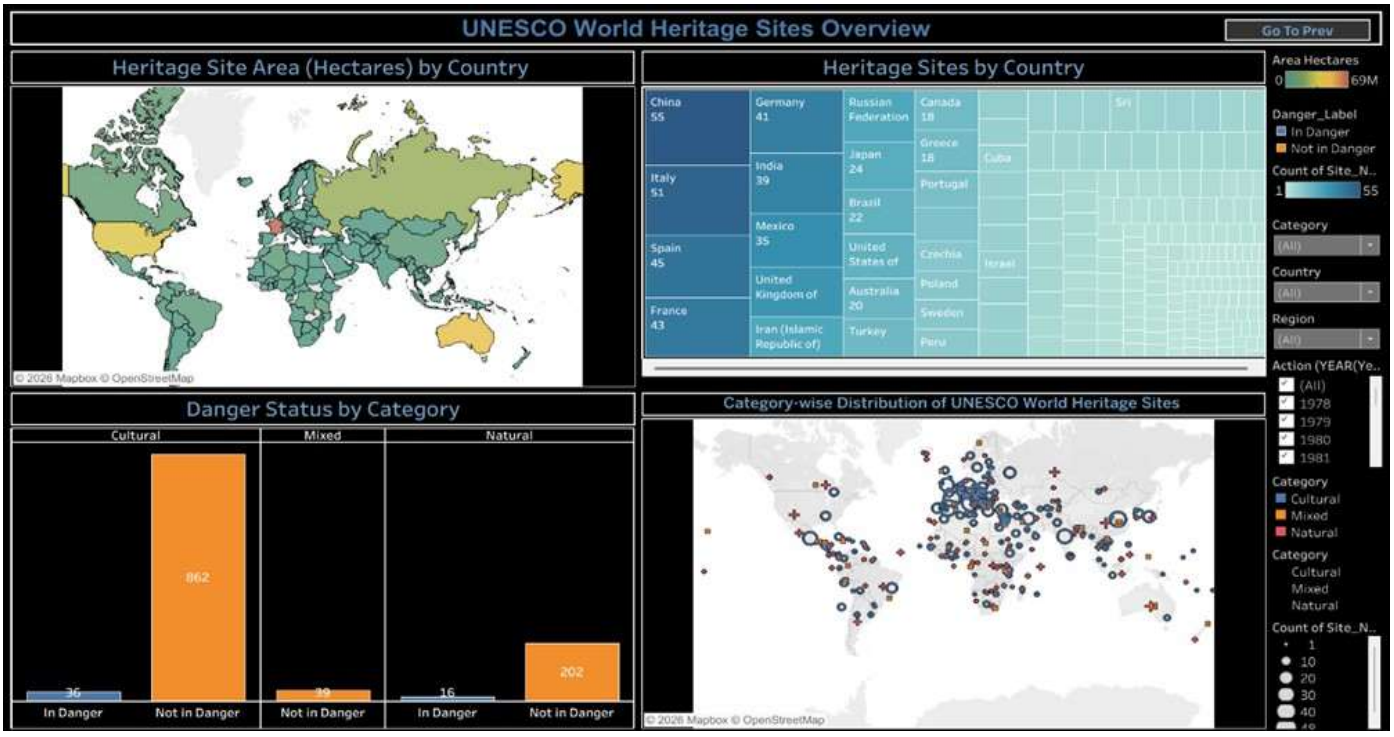
		• Danger Status by Category (Side-By-Side Bar Chart) • Category-Wise Distribution of UNESCO World Heritage Sites (Symbol Map)

7. RESULTS

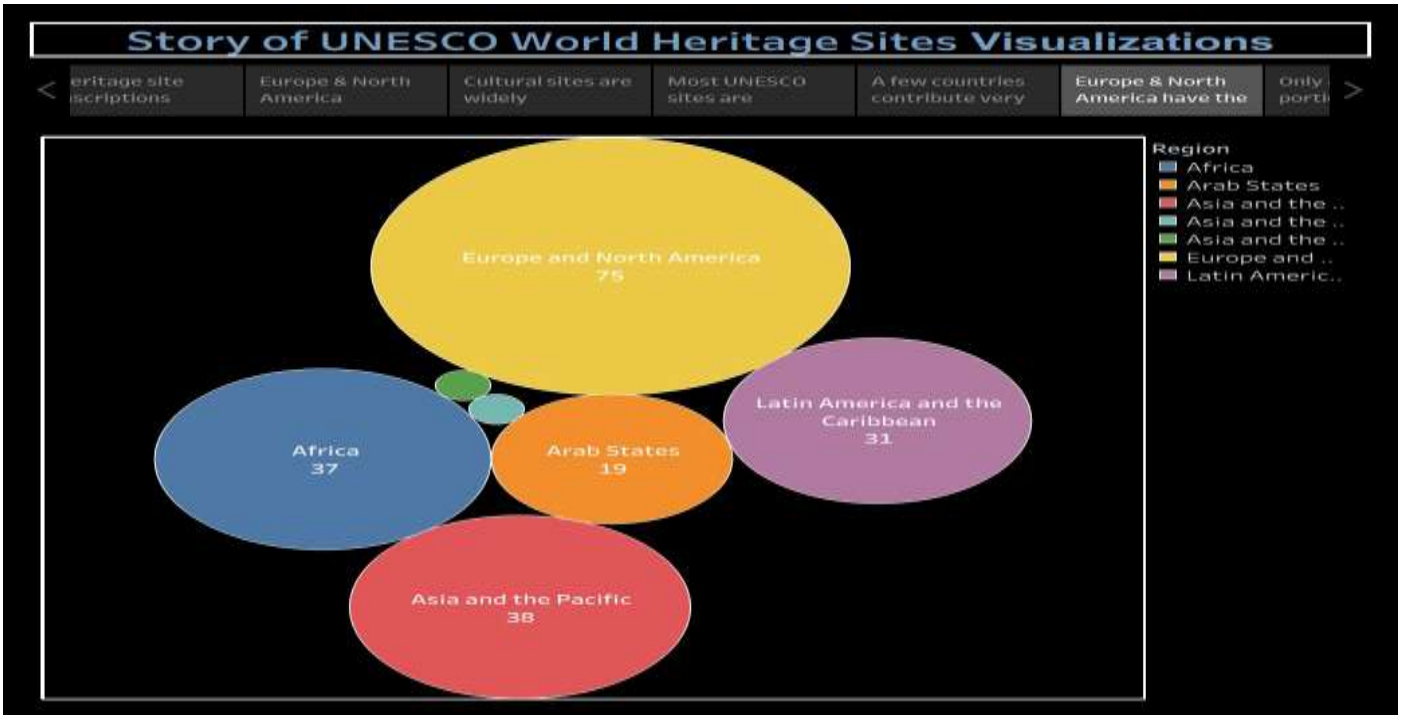
7.1 Output Screenshots

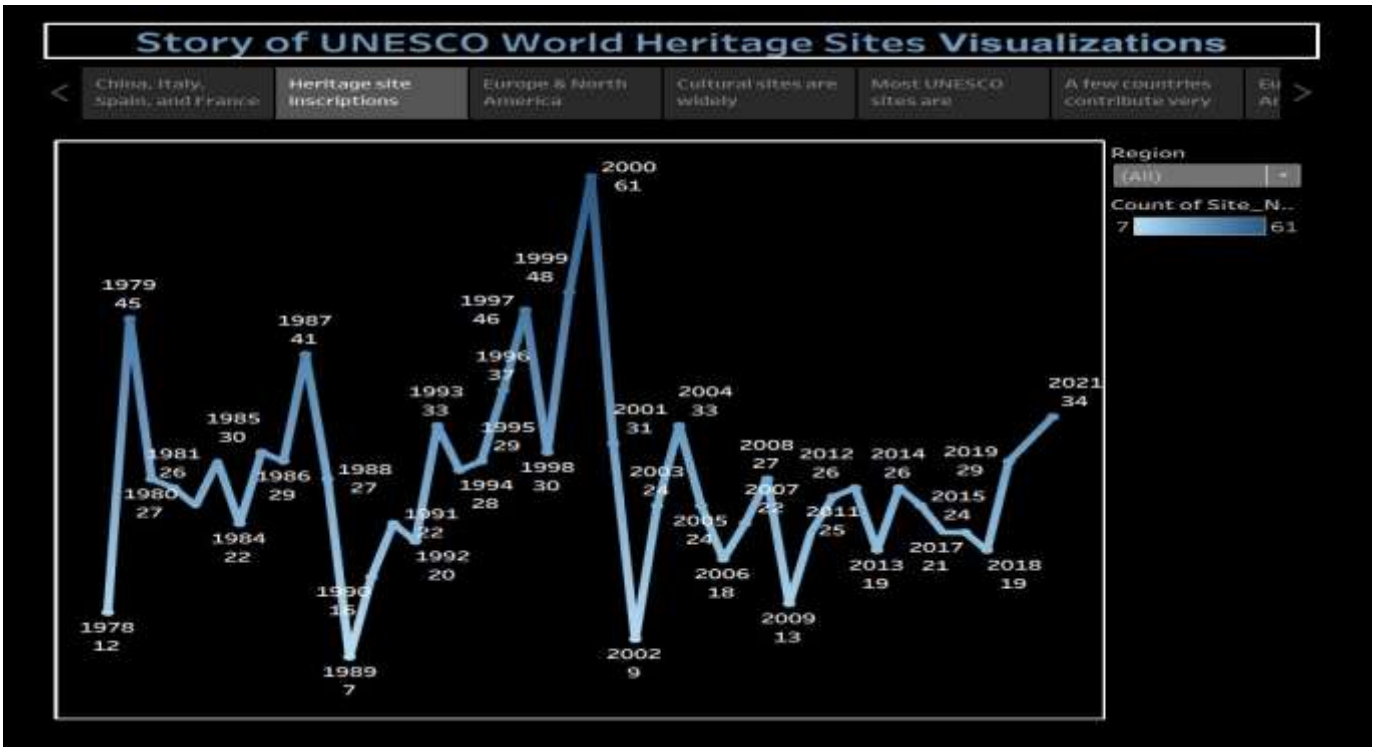
Dashboard Screenshots:

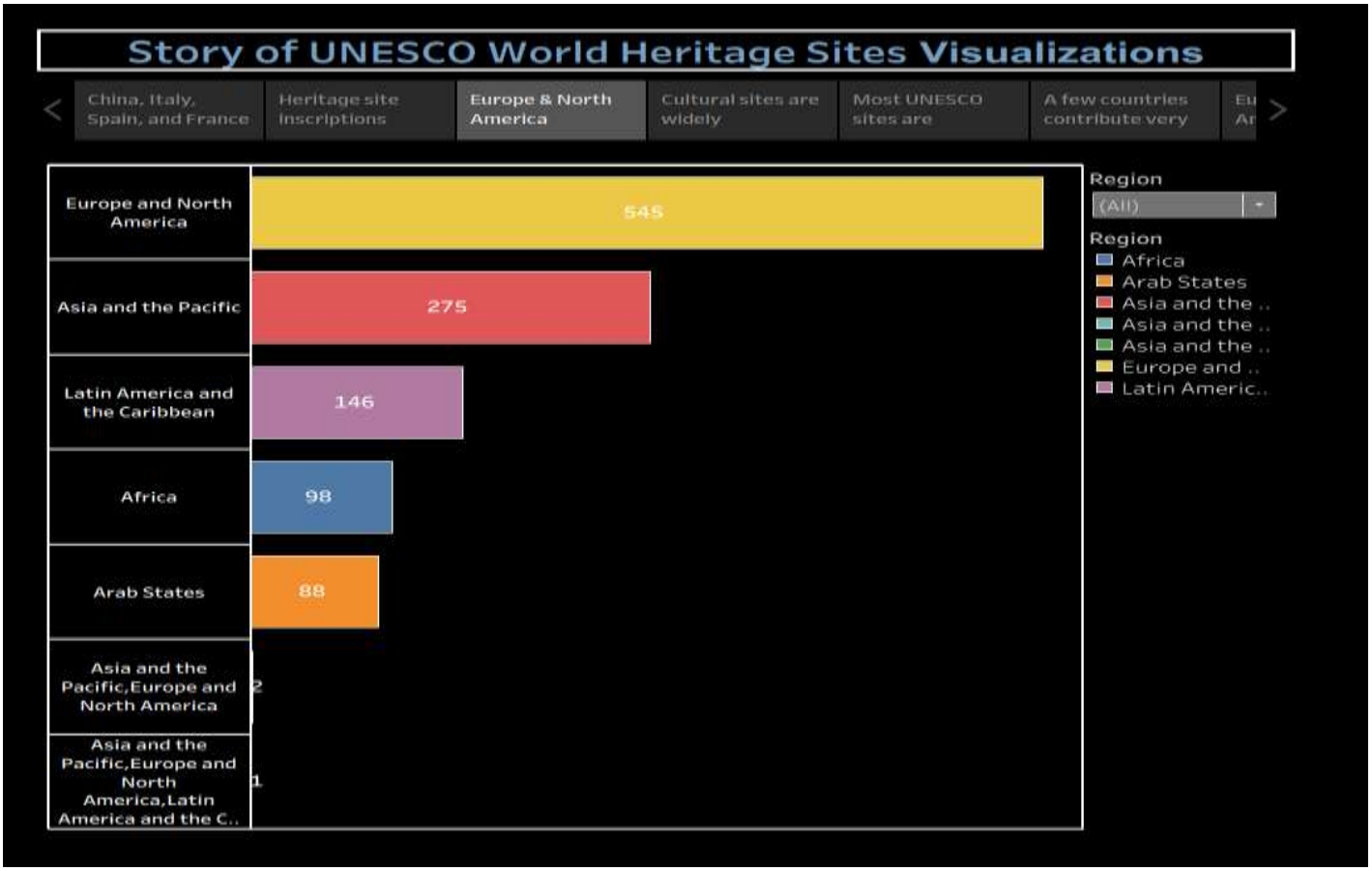


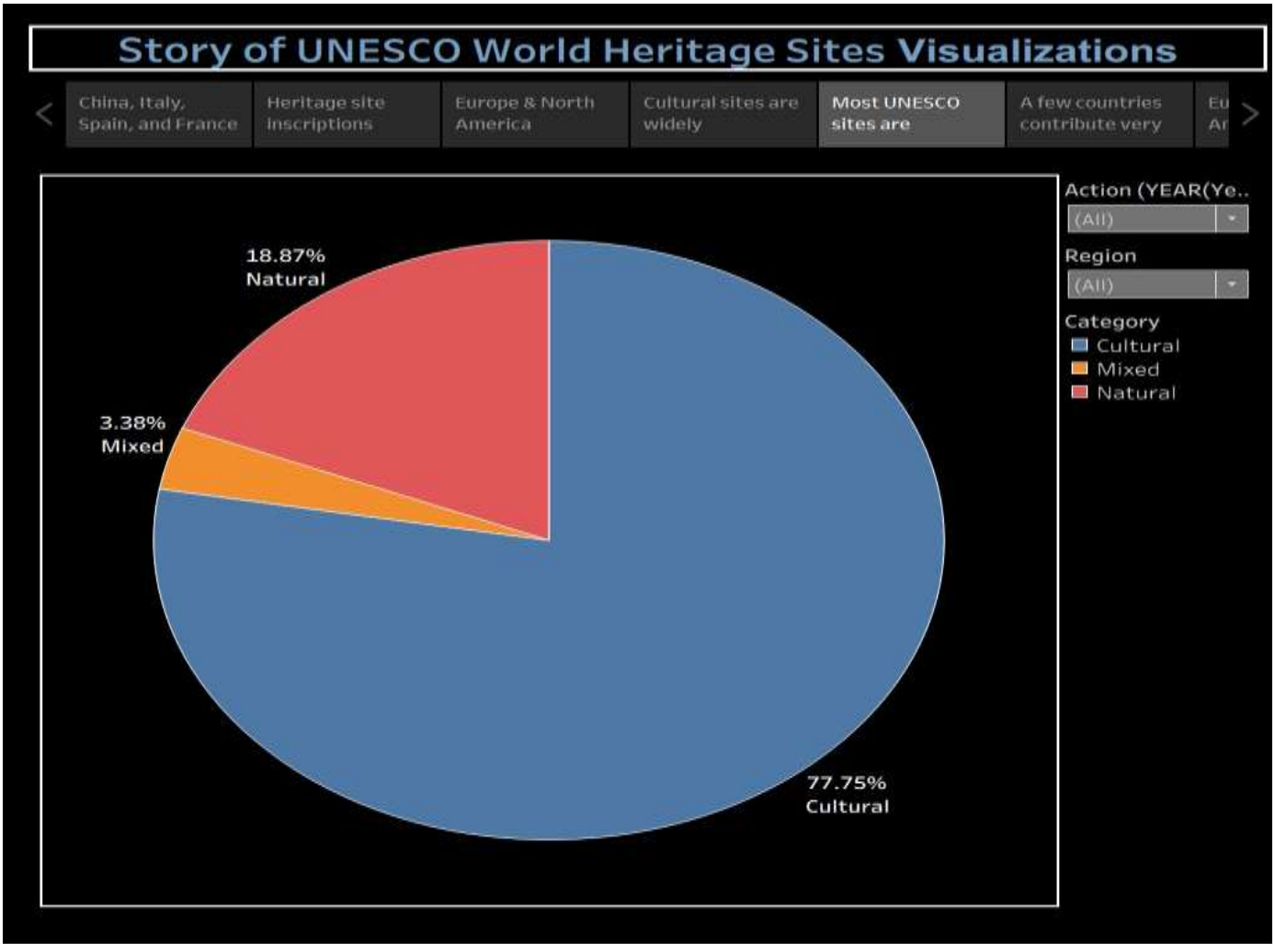


Story Screenshots:



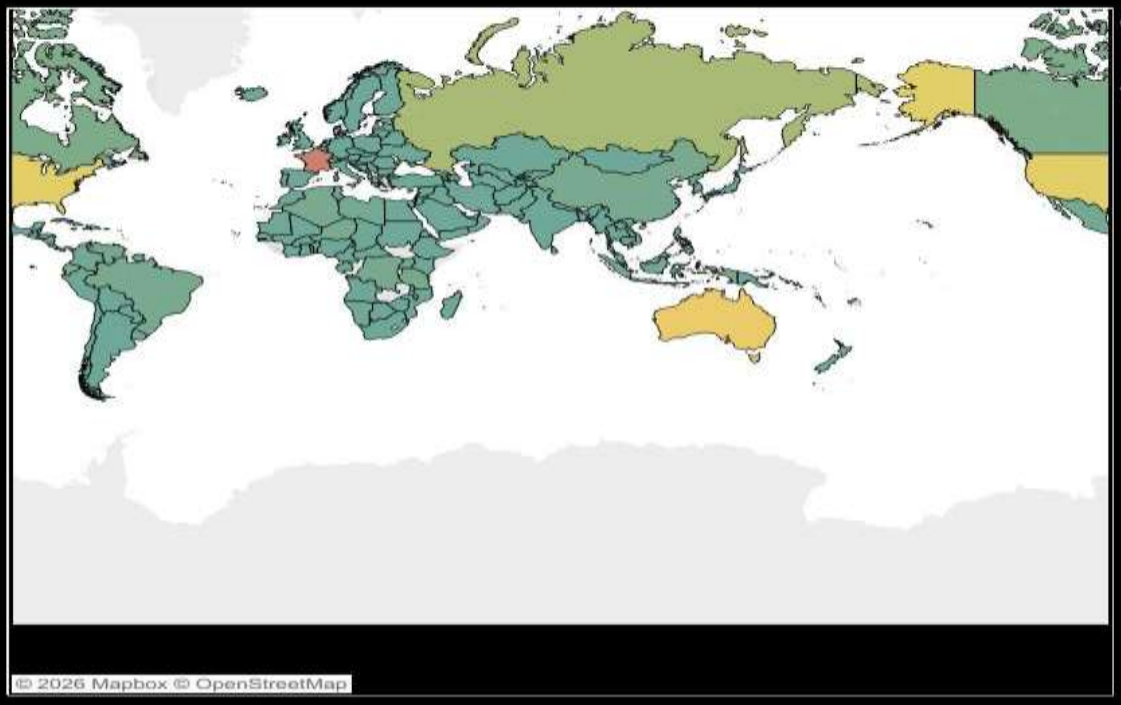



Story of UNESCO World Heritage Sites Visualizations
China, Italy, Spain, and France
Heritage site inscriptions
Europe & North America
Cultural sites are widely
Most UNESCO sites are
A few countries contribute very
Europe and North America
545
Asia and the Pacific
275
Latin America and the Caribbean
146
Africa
98
Arab States
88
Asia and the Pacific,Europe and North America
2
Asia and the Pacific,Europe and North America,Latin America and the C..
1
Region
(All)
Region
Africa
Arab States
Asia and the ..
Asia and the ..
Asia and the ..
Europe and ..
Latin Americ..


Story of UNESCO World Heritage Sites Visualizations
China, Italy, Spain, and France
Heritage site inscriptions
Europe & North America
Cultural sites are widely
Most UNESCO sites are
A few countries contribute very
18.87%
Natural
3.38%
Mixed
77.75%
Cultural
Action (YEAR(Ye..
(All)
Region
(All)
Category
Cultural
Mixed
Natural

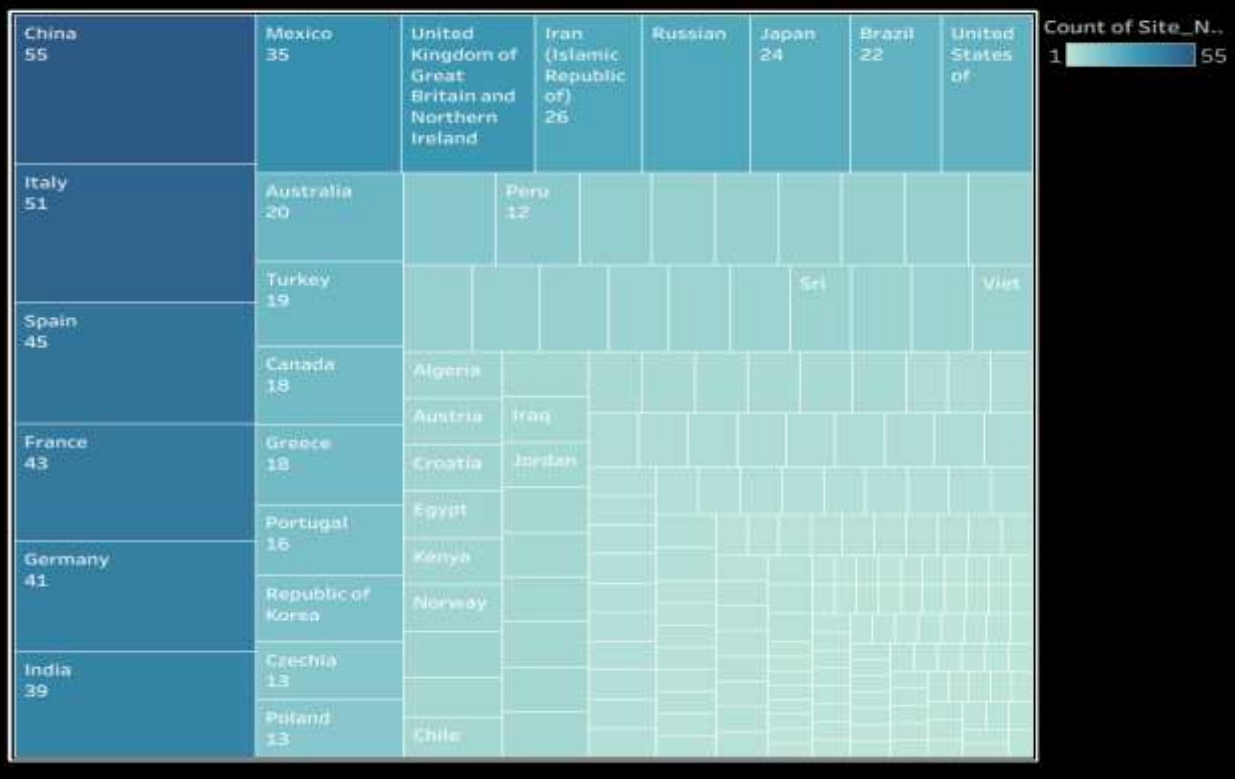
Story of UNESCO World Heritage Sites Visualizations

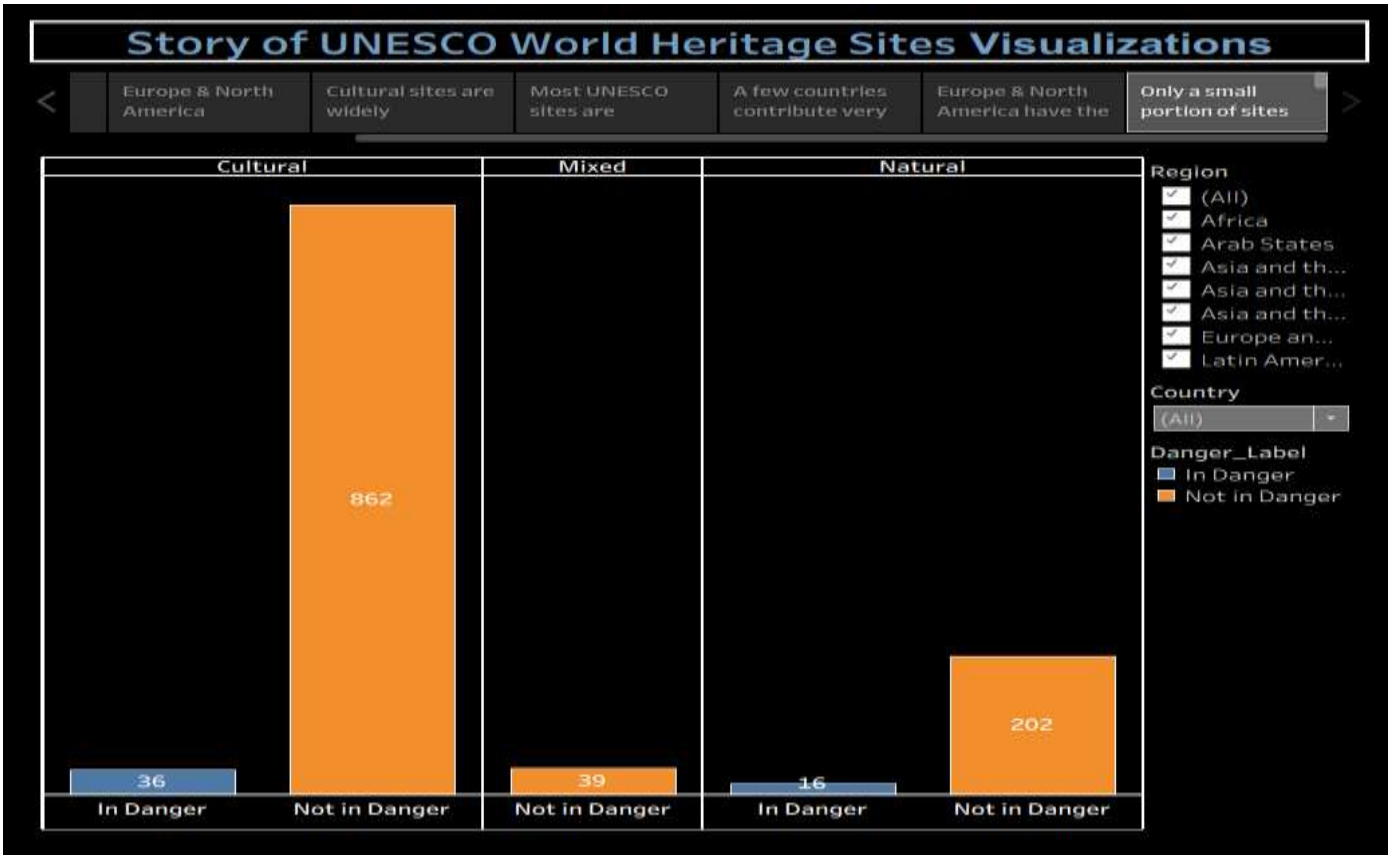
China, Italy, Spain, and France | Heritage site inscriptions | Europe & North America | Cultural sites are widely | Most UNESCO sites are | A few countries contribute very | Eu Ar

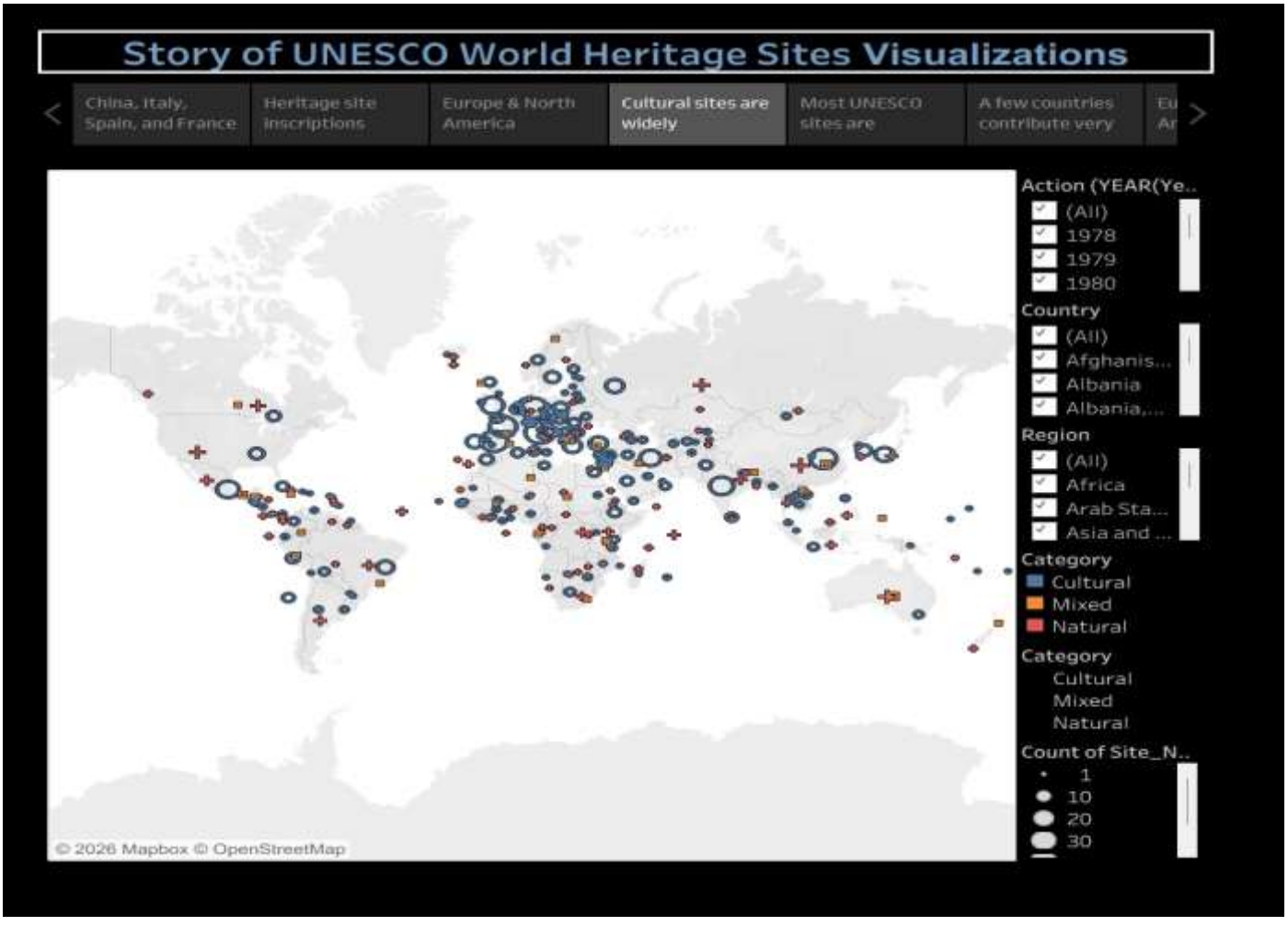


Story of UNESCO World Heritage Sites Visualizations

China, Italy, Spain, and France | Heritage site inscriptions | Europe & North America | Cultural sites are widely | Most UNESCO sites are | A few countries contribute very | Eu Ar




Story of UNESCO World Heritage Sites Visualizations
Europe & North America
Cultural sites are widely
Most UNESCO sites are
A few countries contribute very
Europe & North America have the
Only a small portion of sites
Cultural
Mixed
Natural
862
36
39
16
202
In Danger
Not in Danger
Not in Danger
In Danger
Not in Danger
Region
(All)
Africa
Arab States
Asia and th...
Asia and th...
Asia and th...
Europe an...
Latin Amer...
Country
(All)
Danger_Label
In Danger
Not in Danger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China, Italy, Spain, and France
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Europe & North America
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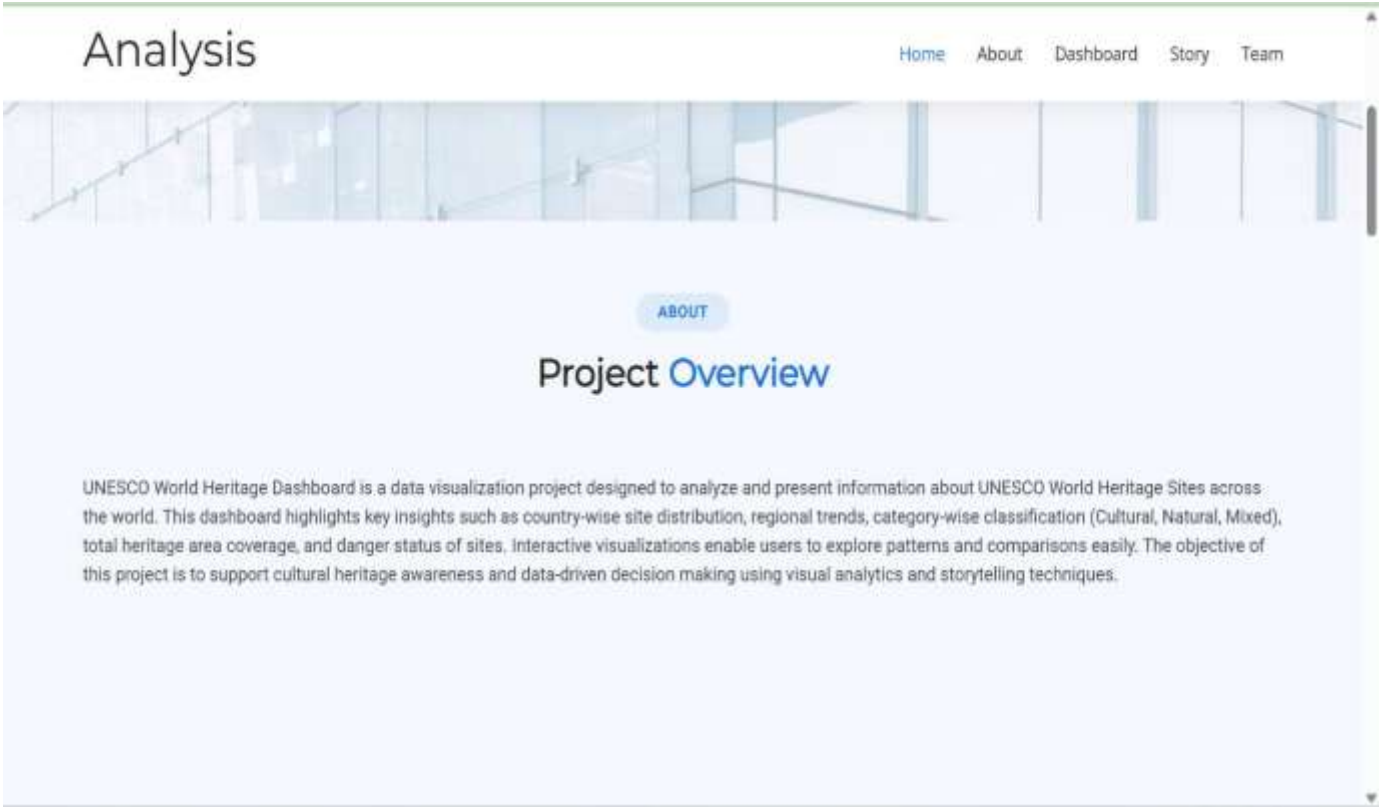
A few countries contribute very
Action (YEAR(Ye..
(All)
1978
1979
1980
Country
(All)
Afghanis...
Albania
Albania,...
Region
(All)
Africa
Arab Sta...
Asia and ...
Category
Cultural
Mixed
Natural
Category
Cultural
Mixed
Natural
Count of Site_N..
1
10
20
30
© 2026 Mapbox © OpenStreetMap

Web Page Screenshots:

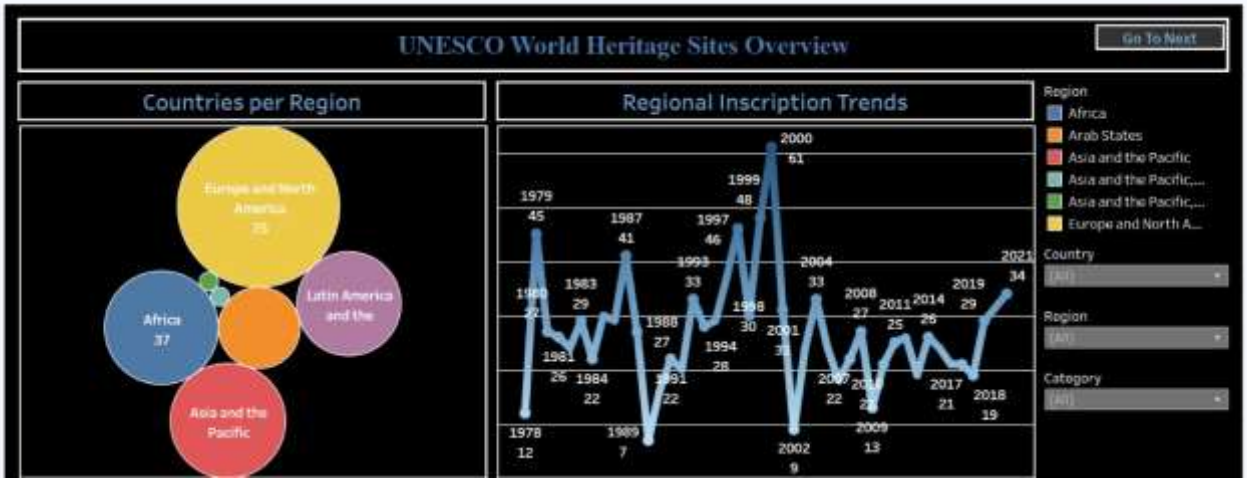


Analysis

Home About Dashboard Story Team

DASHBOARD

Interactive Visual Analysis

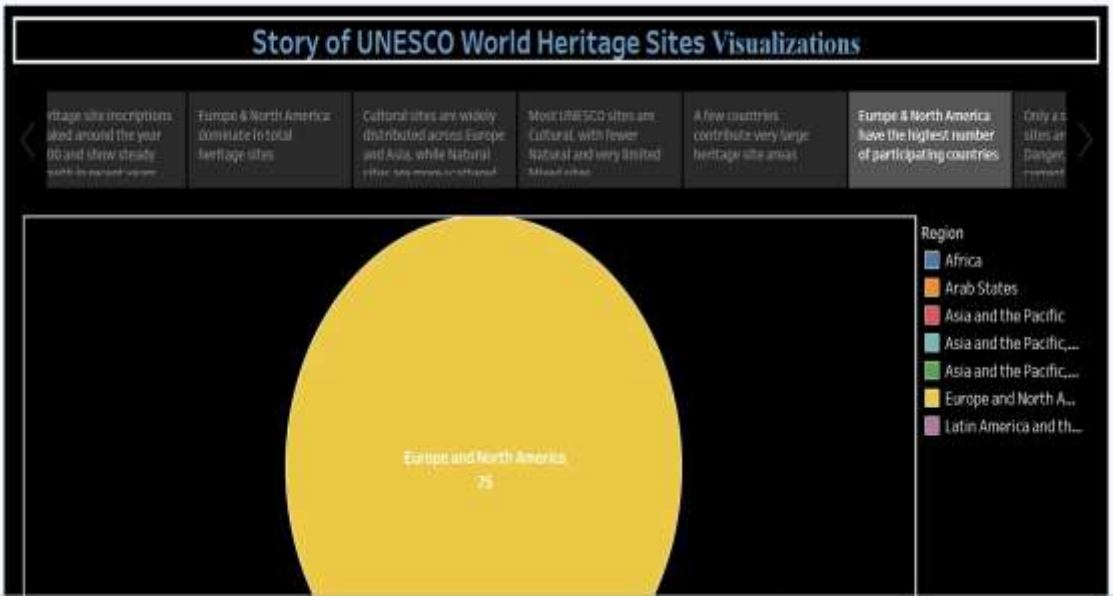


Analysis

Home About Dashboard Story Team

DATA STORY

Dashboard Insights



Analysis

Home About Dashboard Story Team

TEAM

Project Team Members

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Team Leader

B. Tech – Electronics & Communication Technology

Sri Vasavi Engineering College

Sreeja Gavara

Team Member

B. Tech – Computer Science Engineering

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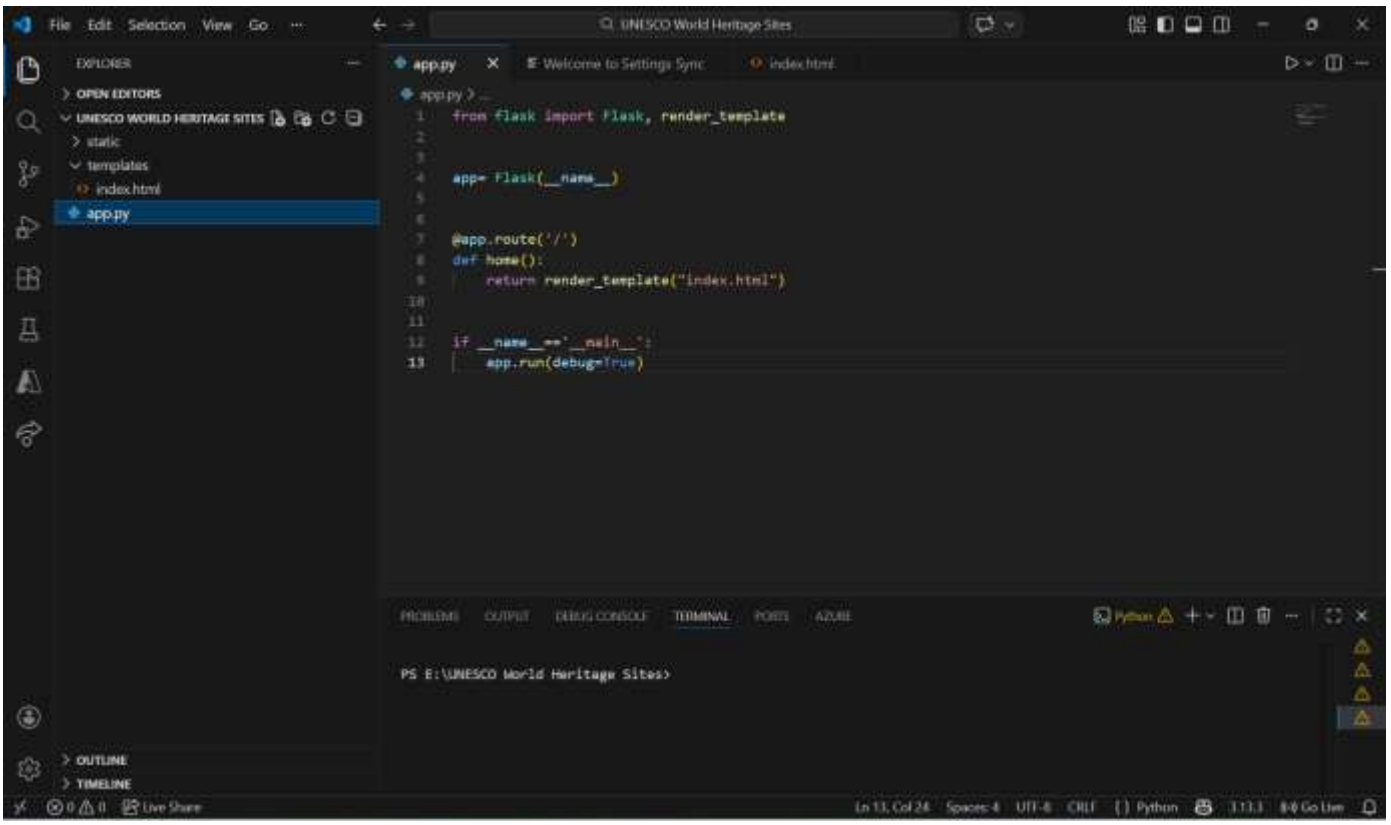
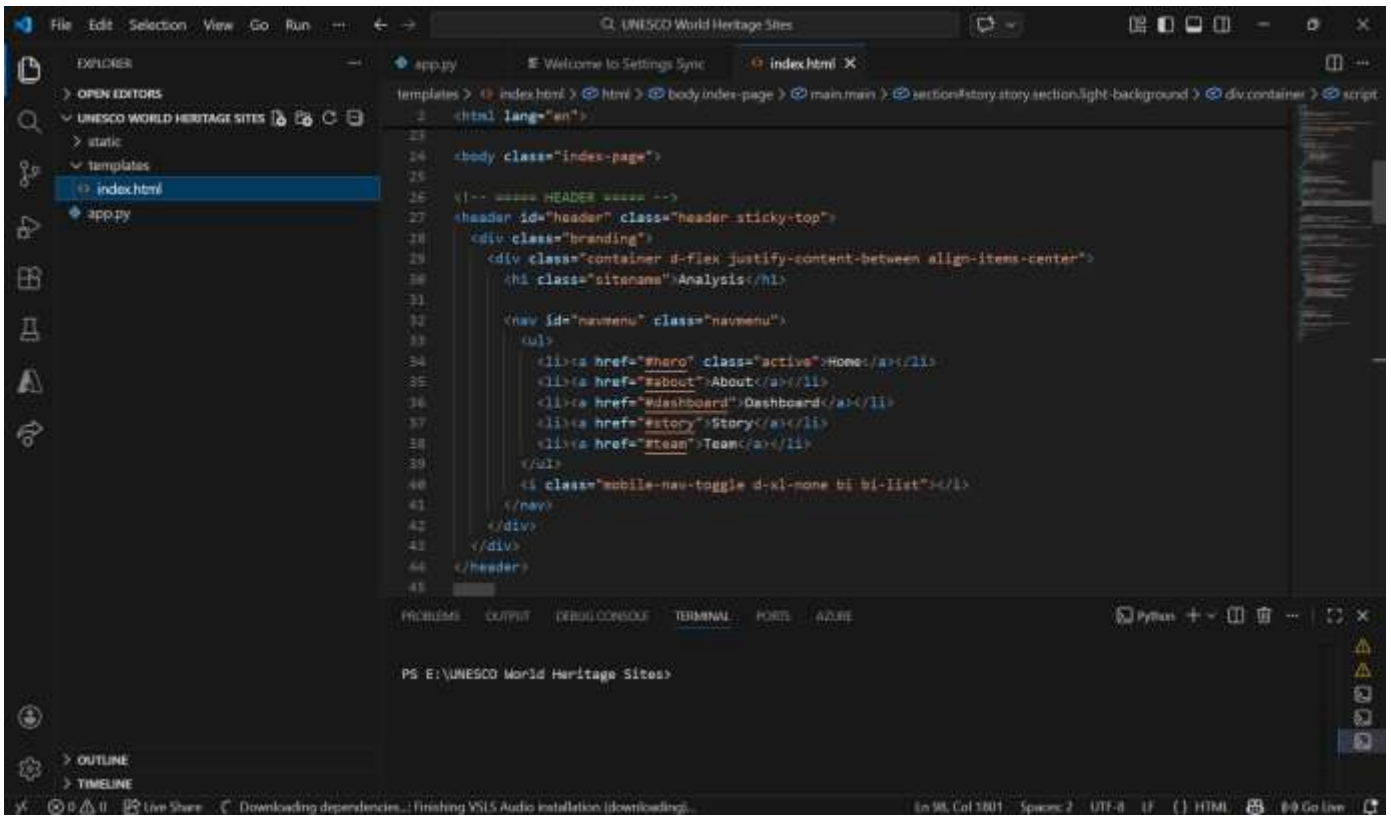

File Edit Selection View Go
UNESCO World Heritage Sites
EXPLORER
OPEN EDITORS
UNESCO WORLD HERITAGE SITES
static
templates
index.html
app.py
app.py
Welcome to Settings Sync
index.html
from flask import Flask, render_template
app= Flask(__name__)
@app.route('/')
def home():
return render_template("index.html")
if __name__=='__main__':
app.run(debug=True)
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS AZURE
PS E:\UNESCO World Heritage Sites>
OUTLINE
TIMELINE
Live Share
Ln 13, Col 24 Spaces: 4 UTF-8 CRLF { } Python
Go Live


File Edit Selection View Go Run
UNESCO World Heritage Sites
EXPLORER
OPEN EDITORS
UNESCO WORLD HERITAGE SITES
static
templates
index.html
app.py
app.py
Welcome to Settings Sync
index.html
templates > index.html > html > body.index-page > main.main > section#story.story.section.light-background > div.container > script
<html lang="en">
<body class="index-page">
<!-- ===== HEADER ===== -->
<header id="header" class="header sticky-top">

<h1 class="sitename">Analysis</h1>
<nav id="navmenu" class="navmenu">

Home
About
Dashboard
Story
Team

</nav>

</header>
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS AZURE
PS E:\UNESCO World Heritage Sites>
OUTLINE
TIMELINE
Live Share
Downloading dependencies... Finishing VSLS Audio installation (downloading)...
Ln 98, Col 1801 Spaces: 2 UTF-8 LF { } HTML
Go Live

8. ADVANTAGES & DISADVANTAGES

Advantages:

- Provides clear visual understanding of UNESCO World Heritage data.
- Interactive dashboard with filters (Region, Country, Category, Year).
- Easy comparison of regions and countries.
- Helps identify trends and patterns over time.
- Integrated with web application using Flask for accessibility.
- Useful for academic research and data analysis.

Disadvantages:

- Depends on the accuracy of the dataset.
- Static dataset (2021) – not real-time updated.
- Limited advanced predictive analytics.
- Performance may reduce with very large datasets.

9. CONCLUSION

The UNESCO World Heritage Sites Dashboard successfully visualizes global heritage data in an interactive and meaningful way. The project demonstrates how data preprocessing, visualization, and web integration can transform raw data into actionable insights. It helps users understand site distribution, regional trends, and danger status effectively. Overall, the project achieves its objective of providing a clear analytical view of UNESCO heritage data.

10. FUTURE SCOPE

- Integrate real-time updated UNESCO dataset.
- Add predictive analysis using Machine Learning.
- Include tourism statistics and visitor data.
- Add advanced analytics such as growth forecasting.
- Improve UI/UX design and performance optimization.
- Deploy the project on cloud for global accessibility.
- Add user authentication and report download features.

11. APPENDIX

Source Code

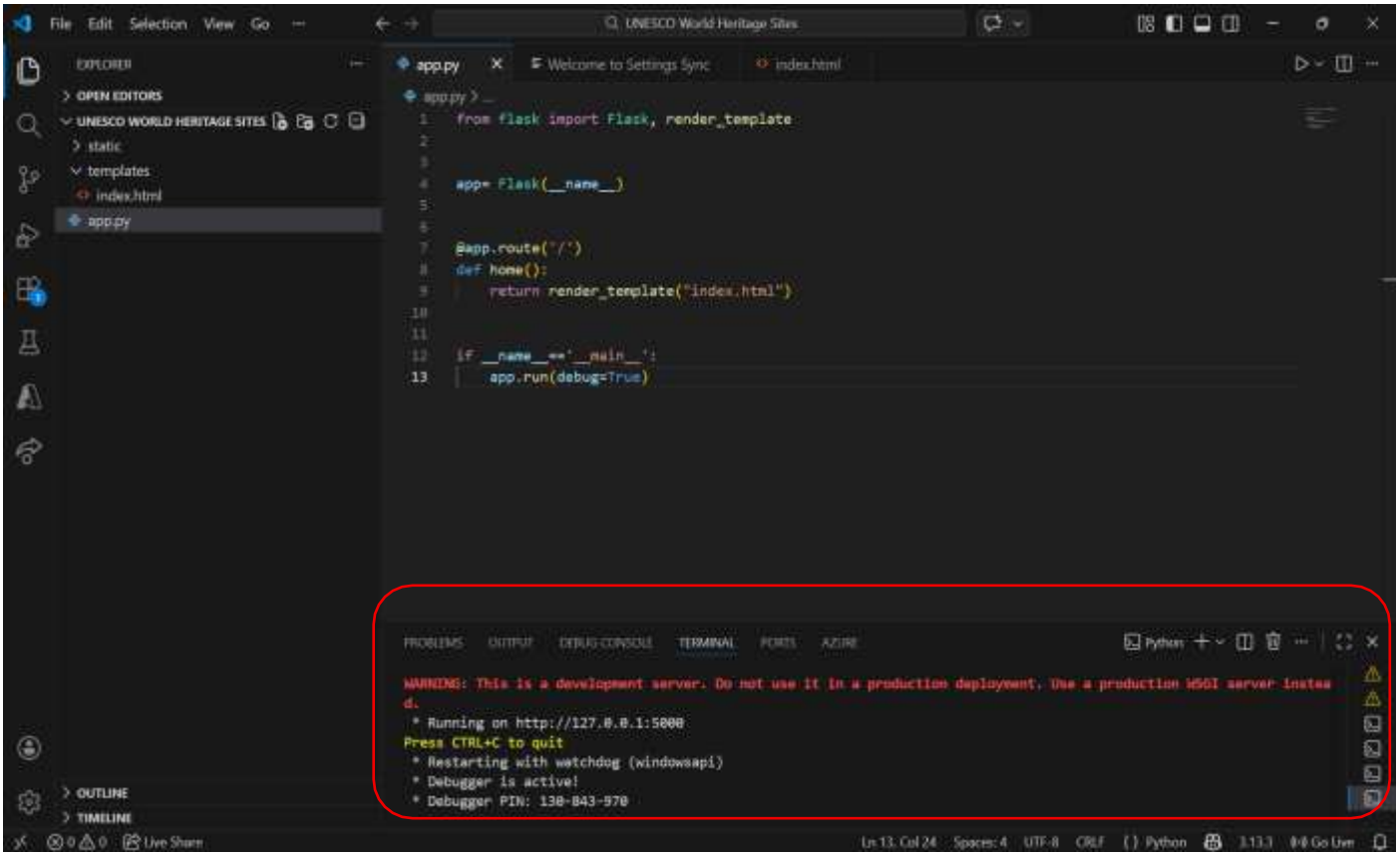
app.py code:

```
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)
```



index.html code:

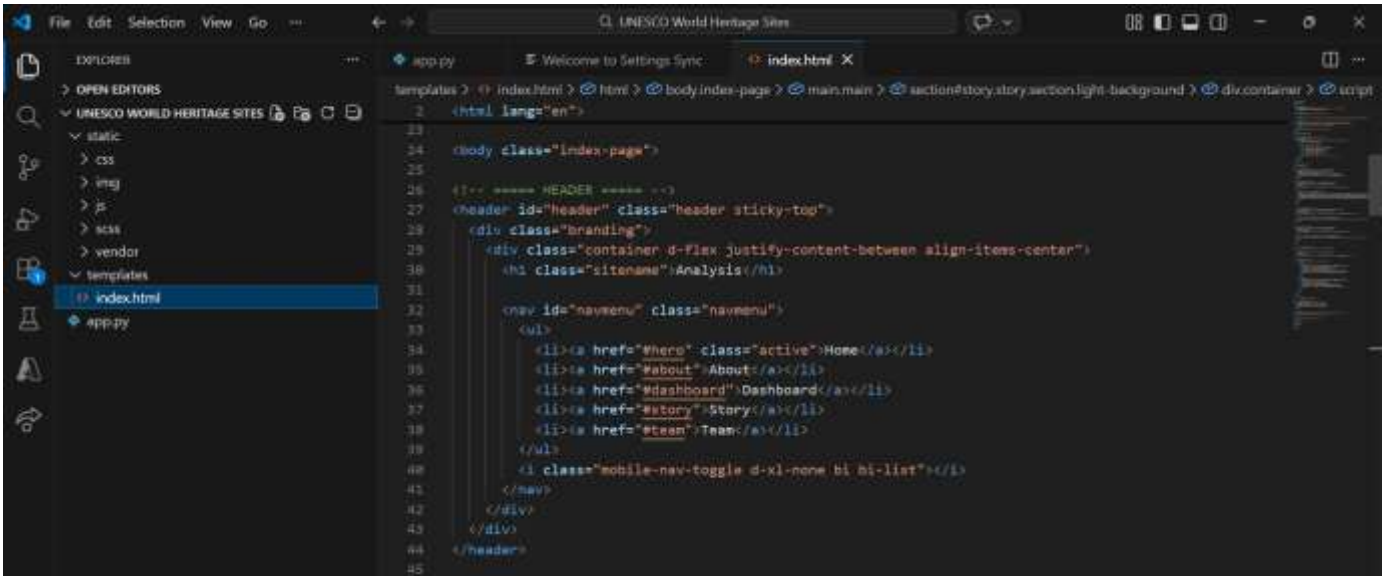


Tableau Public Links:

Dashboard Link:

https://public.tableau.com/views/UNESCO_World_Heritage_Sites/UNESCOWorldHeritageDashboard1?:language=en-US&publish=yes&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link

Story Link:

https://public.tableau.com/shared/MDXG24GH3?:display_count=n&:origin=viz_share_link

Dataset Link:
https://drive.google.com/file/d/1RNibftZqlvQTd8h3eNRtcMJzYV4Q91uv/view?usp=sharing