FINAL REPORT

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

1. INTRODUCTION

1.1 Project Overview

This project aims to analyze and visualize UNESCO World Heritage Sites globally, focusing on their distribution, endangered status, and regional inscription trends. Using Tableau dashboards built from a cleaned dataset, this project delivers actionable insights for researchers, policymakers, and enthusiasts to explore and understand the global heritage landscape.

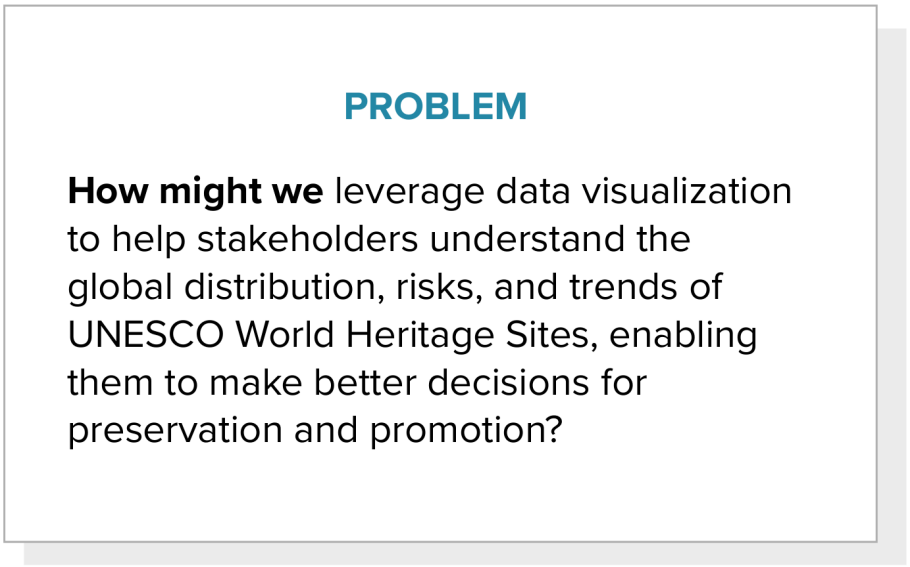
1.2 Purpose

The purpose of this project is to provide interactive visualizations of World Heritage Sites using Tableau. By transforming raw UNESCO data into meaningful insights, the project helps identify global patterns, endangered sites, and historical inscription trends.

2. IDEATION PHASE

Stakeholders face difficulty interpreting large heritage datasets and identifying key trends like endangered sites and region-wise patterns due to scattered and static data sources.

Step-1: Team Gathering, Collaboration and Select the Problem Statement



Step-2: Brainstorm, Idea Listing and Grouping

Step-3: Group Ideas

Clusters and Labels:

Heritage Site Distribution and Ranking

- Country-level dashboards.
- Heatmaps and block charts for country-wise visualization.
- Ranking visualization for top countries with heritage sites.

Risk & Vulnerability Analysis

- Highlight endangered sites with reasons.
- Color-coded maps for danger status.
- Correlation between inscription year and risk status.

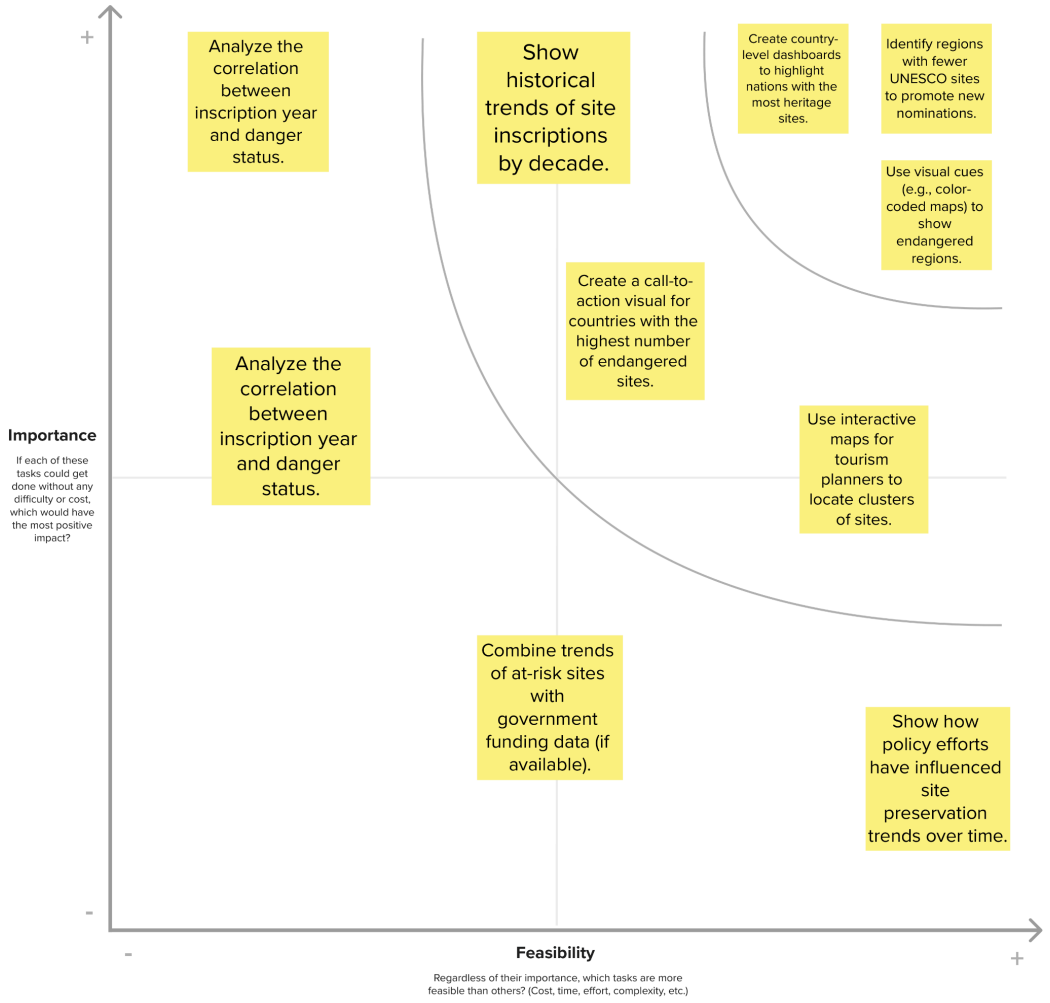
Trends and Growth Insights

- Historical trends by decade.
- Regional inscription trends over time.
- Tourism growth due to heritage sites.

Policy and Promotion

- Focus on regions with fewer sites for new nominations.
- Policy impact on preservation trends.
- Sites per category (cultural, natural, mixed).

Step-4: Prioritize



2.2 Empathy Map Canvas

Think & Feel: Users want accessible, visual insights into heritage distribution and conservation trends.

See & Hear: Users face static reports or fragmented data without intuitive visual summaries.

Pain: Analyzing raw datasets is time-consuming and lacks interactivity.

Gain: A clean, interactive dashboard simplifies exploration and supports informed decisions.

2.3 Brainstorming

Ideas included:

Country-wise and region-wise site distribution (treemap or bar chart).

Pie chart for endangered vs. safe heritage sites.

Line charts for regional inscription trends across years.

Filters for region, type (Cultural/Natural/Mixed), and danger status.

3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

Stage	Action	Tool	Emotion	Opportunity
Discover	User learns about dashboard	Tableau Public, Web Links	Curious	Engage with interactive visuals
Explore	Filters and charts are explored	Region/Type/Danger filters	Engaged	Smooth navigation and interactivity
Learn	Trends and patterns identified	Interactive charts	Surprised	Highlight endangered sites and top countries
Share	Insights shared via dashboard	Export/Share Links	Proud	Wider awareness and heritage promotion

3.2 Solution Requirement

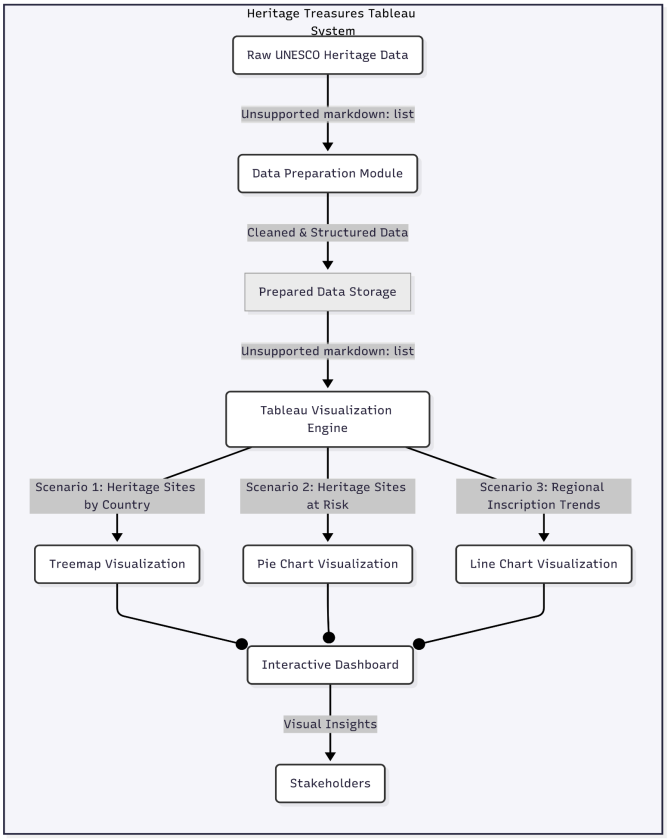
Functional Requirements:

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 Access	View UNESCO Heritage Sites by Country
		Filter by Type (Cultural, Natural, Mixed)
		Search for Heritage Sites
FR-4	Data Visualization	View Endangered vs. Safe Sites (Pie Chart)
		View Regional Inscription Trends (Line Chart)
		View Country-Wise Site Rankings (Bar Chart/Blocks)
FR-5	Mobile Accessibility	Responsive Dashboard for Mobile Devices
		Interactive Filters on Mobile
FR-6	Administration & Data Management	Update Heritage Site Data
		Manage User Access (View/Edit Permissions)
		Validate and Monitor Data Sources

Non-functional Requirements:

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The dashboards must be intuitive, interactive, and user-friendly, allowing users to easily filter and explore heritage site data without extensive training.
NFR-2	**Security**	User data (e.g., registration details) and dashboard access must be protected through secure login mechanisms, encrypted connections, and proper access controls.
NFR-3	**Reliability**	The system should provide consistent access to heritage site data with accurate and verified information, ensuring no downtime or data loss during operations.
NFR-4	**Performance**	Dashboards must load within 2–3 seconds, even when handling large datasets of UNESCO heritage sites (e.g., 1000+ records).
NFR-5	**Availability**	The application should be available 24/7 with at least 99% uptime to ensure stakeholders can access insights anytime.
NFR-6	**Scalability**	The system must be capable of scaling to handle increasing volumes of heritage site data and users without performance degradation.

3.3 Data Flow Diagram



3.4 Technologies

S.No	Component	Description	Technology
1	**User Interface**	Web-based dashboards for data visualization and interaction	Tableau Public / Tableau Desktop
2	**Application Logic-1**	Logic for preparing and cleaning the UNESCO dataset	Python (Pandas, NumPy)
3	**Application Logic-2**	Logic to automate data import and transformation	Python Scripts or Tableau Prep
4	**Application Logic-3**	Logic to export and embed dashboards	Tableau JavaScript API / Tableau Public Links
5	**Database**	Stores UNESCO heritage site data (static or dynamic)	CSV, Excel files (processed offline), or MySQL if backend is used
6	**Cloud Database**	Cloud-hosted version of the dataset for collaborative access	Google Drive (Sheets) / Amazon RDS / IBM Cloudant
7	**File Storage**	For storing raw datasets, configuration files	Local filesystem or Google Drive / Dropbox
8	**External API-1**	Optional use of APIs to enrich data (e.g., weather, maps)	Mapbox API / Google Maps API (for mapping sites)
9	**External API-2**	Optional — future integration for tourism data or government datasets	UNESCO Official API or Tourism APIs
10	**Machine Learning Model**	Not directly applicable — optional for future risk prediction	N/A (not used in current Tableau scope)
11	**Infrastructure (Server / Cloud)**	Project hosted via Tableau Public or embedded in website	Tableau Public (Cloud), Local (Tableau Desktop)

4. PROJECT DESIGN

4.1 Problem Solution Fit

1. Problem Statement

- Stakeholders such as heritage researchers, policymakers, and conservationists lack a centralized, visual platform to analyze global UNESCO heritage data.
- Current datasets are scattered, often in static formats, and fail to provide actionable insights such as endangered sites, trends over time, or country/region-wise comparisons.
- Lack of visual clarity hinders quick decision-making for preservation and promotion of heritage sites.

2. Target Customers / Users

- Researchers & Historians: Need visual insights to understand heritage patterns.
- Policymakers: Require country and region-level data to identify areas needing preservation efforts.
- Tourism Boards: Want to highlight and promote heritage sites effectively.
- General Public/Enthusiasts: Desire easy-to-understand dashboards to explore cultural heritage globally.

3. Proposed Solution

- Interactive Tableau Dashboards showcasing:
- Heritage Sites by Country (treemap/bar chart)
- Endangered vs Safe Sites (pie chart)
- Regional Inscription Trends (line chart over years)
- Search and Filter Features (by site type: Cultural, Natural, Mixed).
- Mobile-responsive dashboards for universal access.
- Cloud-hosted visualizations via Tableau Public for high availability and easy sharing.

4. Why This Solution Fits

- Tableau dashboards provide dynamic, interactive, and user-friendly visuals.
- Enables real-time insights for users without requiring deep technical expertise.
- Reduces time spent analyzing raw datasets by providing pre-processed, clear, and structured visualizations.
- Aligns with the customer behavior of using visual and interactive tools to gain actionable insights.

5. Benefits / Outcomes

- Faster Decision-Making: Stakeholders can identify endangered sites instantly.

- Increased Awareness: Helps promote heritage preservation efforts globally.
- Accessible Insights: Dashboards are easily shareable and accessible on any device.
- Enhanced Data Understanding: Visual trends highlight patterns (e.g., which regions saw the highest growth in inscriptions).

4.2 Proposed Solution

S.No.	Parameter	Description
1	**Problem Statement (Problem to be solved)**	Stakeholders lack an interactive platform to analyze UNESCO World Heritage Sites, identify endangered sites, and observe historical trends. Data is scattered and static, making analysis time-consuming.
2	**Idea / Solution description**	Build an interactive Tableau-based dashboard to visualize global UNESCO heritage data. Features include country-wise distribution, endangered site proportions, regional trends, and filters for deep insights.
3	**Novelty / Uniqueness**	Provides a **single, interactive visualization hub** combining multiple heritage insights (distribution, trends, danger status) with a **user-friendly interface** and **real-time cloud accessibility**.
4	**Social Impact / Customer Satisfaction**	Increases public awareness about heritage preservation, helps policymakers prioritize conservation efforts, and improves accessibility for researchers, historians, and tourism boards.
5	**Business Model (Revenue Model)**	The dashboards can be monetized through **subscriptions for advanced analytics**, **data insights services**, or by partnering with tourism boards and educational platforms for premium visualizations.
6	**Scalability of the Solution**	The solution can scale by integrating **cloud-hosted databases** for dynamic updates, expanding datasets (e.g., historical photos, tourism stats), and deploying dashboards on websites and mobile apps.

4.3 Solution Architecture

Input: Raw UNESCO dataset.

Clean: Remove nulls and standardize columns.

Load: Create Tableau extract.

Visualize: Build interactive dashboards (bar, treemap, pie, line).

Interact: Enable filters and story points.

5. PROJECT PLANNING & SCHEDULING

- **Sprint-1:** Data collection, cleaning, and initial dashboard layout.
- **Sprint-2:** Filters implementation and advanced charts.
- **Sprint-3:** Story creation, optimization, and performance testing.
- **Sprint-4:** Final publication on Tableau Public.

6. FUNCTIONAL & PERFORMANCE TESTING

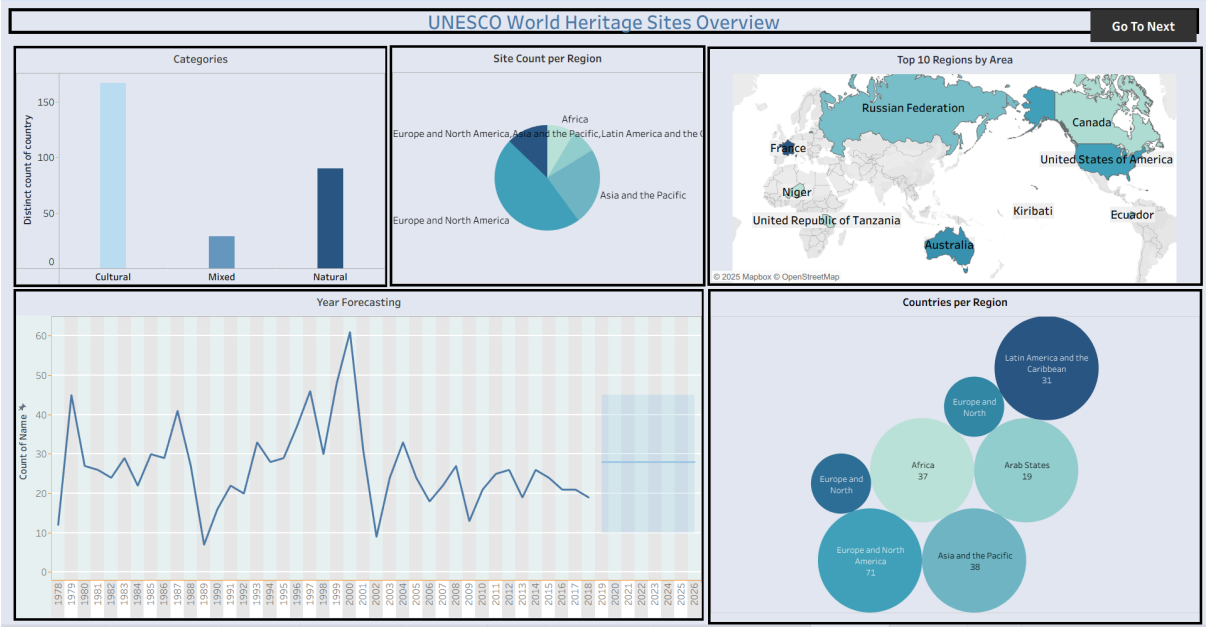
- Tested on multiple devices and browsers.
- Dashboards loaded quickly with smooth filter responses.
- Verified accuracy of calculations (site counts, percentages).

S.No	Parameter	Description / Values
1	**Data Rendered**	UNESCO World Heritage dataset including attributes: Country, Region, Type (Cultural/Natural/Mixed), Danger status, and Year of inscription.
2	**Data Pre-processing**	Data cleaned and standardized using Tableau Prep / Excel: removed null values, corrected inconsistent names, formatted date fields, and organized columns.
3	**Utilization of Filters**	Filters implemented for Region, Type (Cultural/Natural/Mixed), Danger Status, and Year of inscription, with interactive filter actions across all charts.
4	**Calculation Fields Used**	Total heritage sites per country, Percentage of endangered sites (In Danger vs Not in Danger), Year-over-Year growth in heritage inscriptions.
5	**Dashboard Design**	Interactive Tableau dashboard featuring country-wise distribution (bar chart/treemap), endangered vs safe sites (pie chart), and regional inscription trends (line chart).
6	**Story Design**	Tableau Story with 3 slides: 1. Global overview of UNESCO sites, 2. Endangered sites analysis, 3. Regional trends and historical growth.

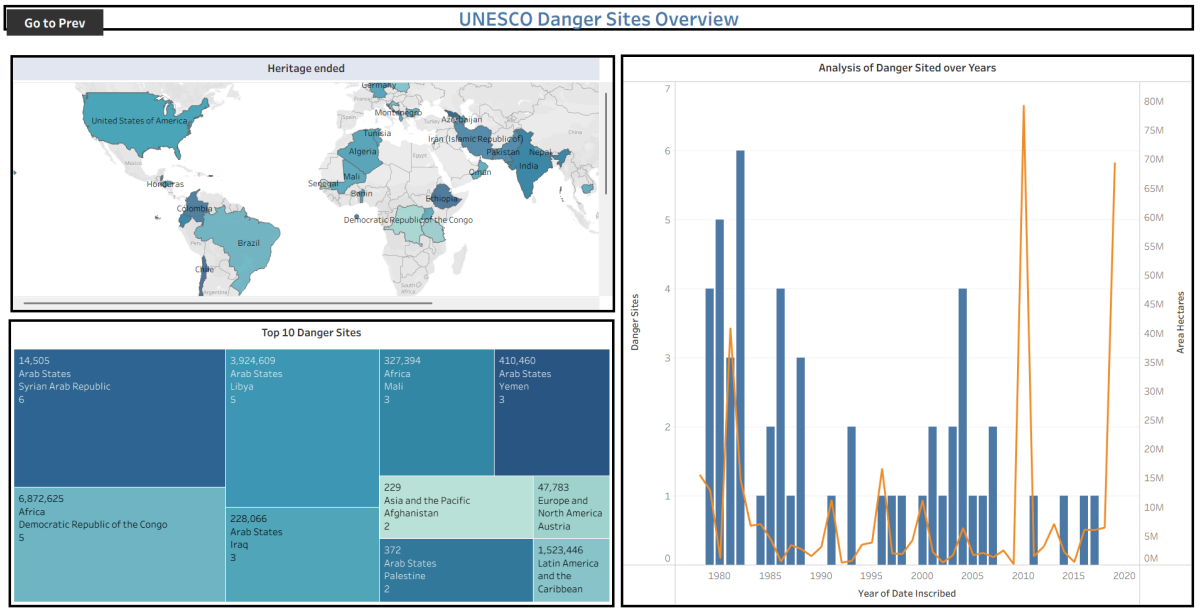
7. RESULTS

7.1 Output Screenshots

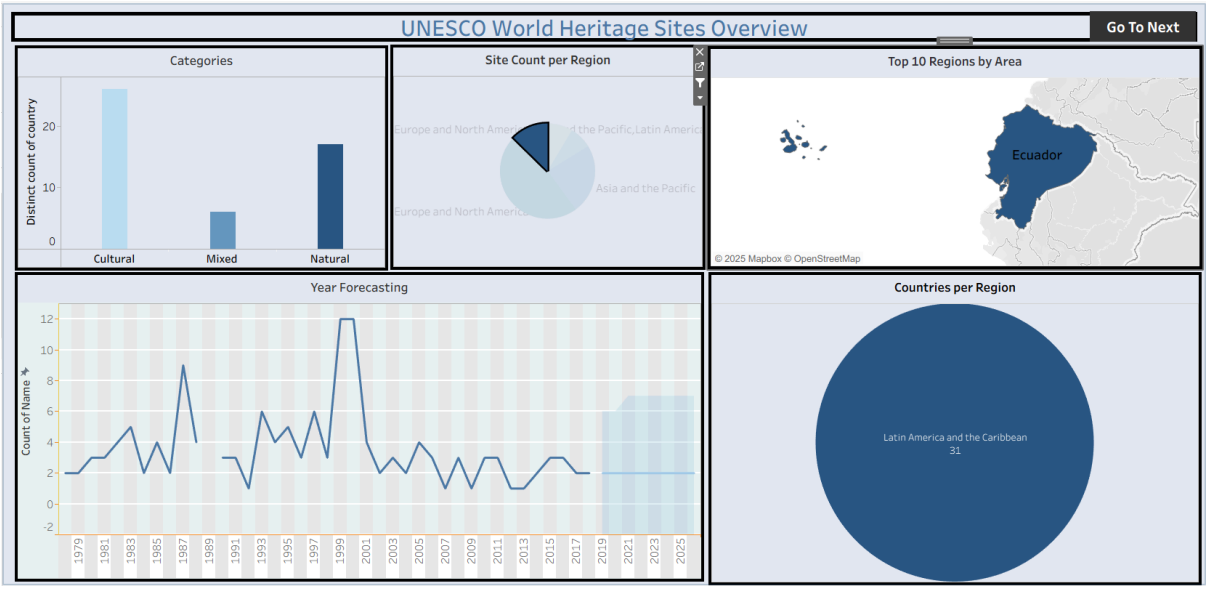
UNESCO World Heritage Sites Overview



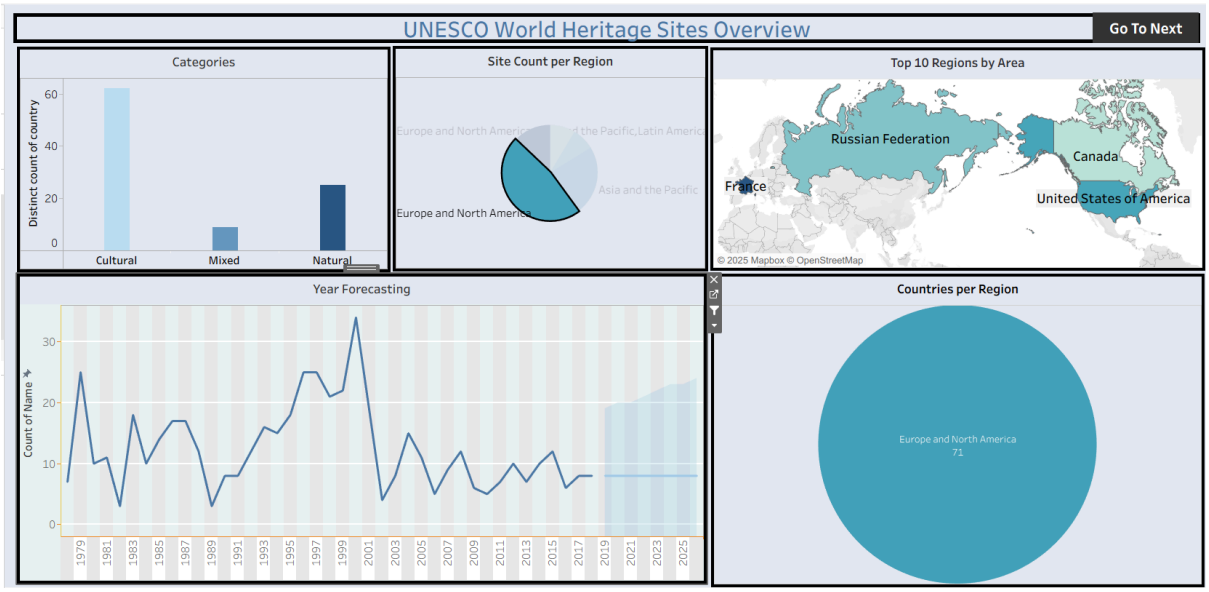
UNESCO Danger Sites Overview

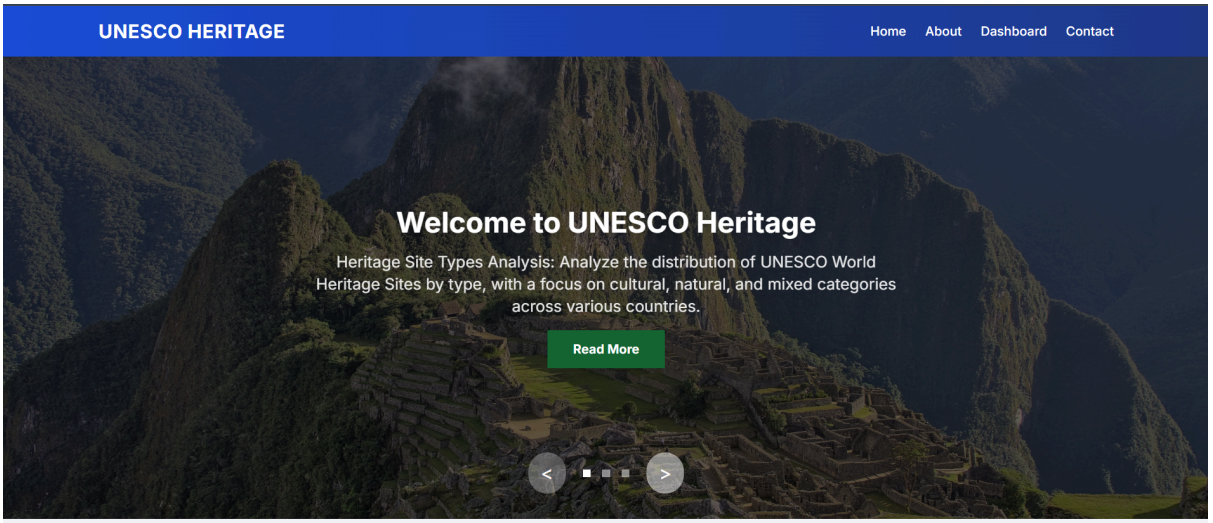


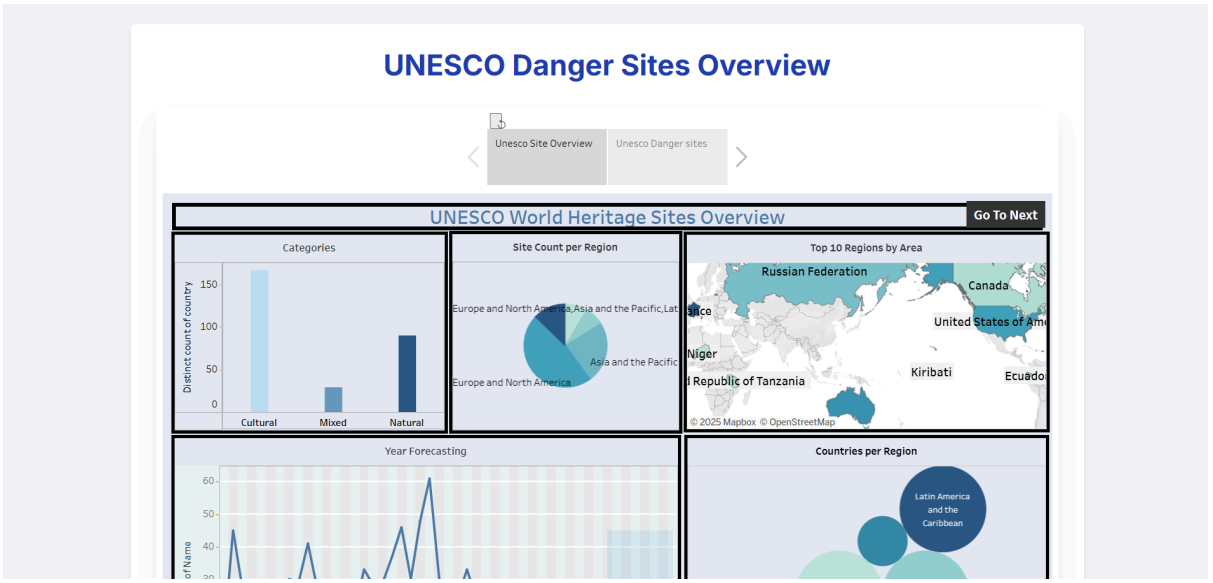
Activity : Selected “Latin America” as a filter



Activity : Selected “Europe and North America” as a Filter







8. ADVANTAGES & DISADVANTAGES

Advantages:

- Interactive and user-friendly interface.
- Accessible via Tableau Public.
- Useful for researchers, policymakers, and heritage enthusiasts.

Disadvantages:

- Limited to available dataset (2019).

- Tableau Public has privacy limitations.
- No real-time updates.

9. CONCLUSION

The project successfully visualizes UNESCO World Heritage Sites, providing clear and actionable insights through interactive dashboards. It empowers heritage researchers and decision-makers to focus on endangered sites and trends, offering a foundation for future enhancements.

10. FUTURE SCOPE

- Expand the dataset to include more years and real-time updates.
- Add predictive analytics for heritage site risks.
- Integrate tourism and economic impact data.
- Provide multi-language support for global accessibility.

11. APPENDIX & DATASET LINK

Dataset: **UNESCO Heritage Sites 2019 Dataset**

Web-Application Source Code : **github**

GitHub : **View Documentation**

Project Demo Link: **View Demo**