1. INTRODUCTION

1.1. Project Overview

The Gemini Historical Artifact System is a digital platform designed to preserve, manage, and provide access to historical artifacts from the Gemini space missions. These artifacts include spacecraft components, mission records, astronaut equipment, photographs, and other important historical materials. Many of these valuable artifacts are stored in physical form, making them vulnerable to damage, deterioration, and loss over time.

The system allows archivists and administrators to upload, update, and maintain artifact records, while researchers, students, and educators can easily search and access artifact information through a user-friendly interface.

The Gemini Historical Artifact System also helps protect space exploration heritage and ensures that valuable historical information is preserved for future generations. By using digital technologies, the system improves artifact accessibility, enhances preservation efforts, and supports learning and research activities related to Gemini space missions.

1.2. Objectives

The main objectives of the Gemini historical artifact description project are:

- To Store artifact information such as mission details, images, and descriptions in a secure system.
- To Allow researchers, students, and educators to search and view artifact data efficiently.
- To Provide accurate artifact information to help research and learning about Gemini space missions.
- To Enable archivists and administrators to upload, update, and maintain artifact records.

2. IDEATION PHASE

2.1. Problem Statement

I am a student, researcher, or museum curator trying to identify, analyze, and understand historical artifacts accurately, but there is no easy and fast way to get detailed and reliable artifact descriptions because artifacts require expert knowledge, historical context, and manual research, which makes me feel confused, slow in learning, and limited in accessing accurate historical information.

Example:

I am	Describe customer with 3-4 key characteristics - *who are they?*	Describe the customer and their attributes here
I'm trying to	*List their outcome or "job" the care about - what are they trying to achieve?*	List the thing they are trying to achieve here
but	Describe what problems or barriers stand in the way – *what bothers them most?*	Describe the problems or barriers that get in the way here
because	Enter the "root cause" of why the problem or barrier exists – *what needs to be solved?*	Describe the reason the problems or barriers exist
which makes me feel	Describe the emotions from the customer's point of view – *how does it impact them emotionally?*	Describe the emotions the result from experiencing the problems or barriers

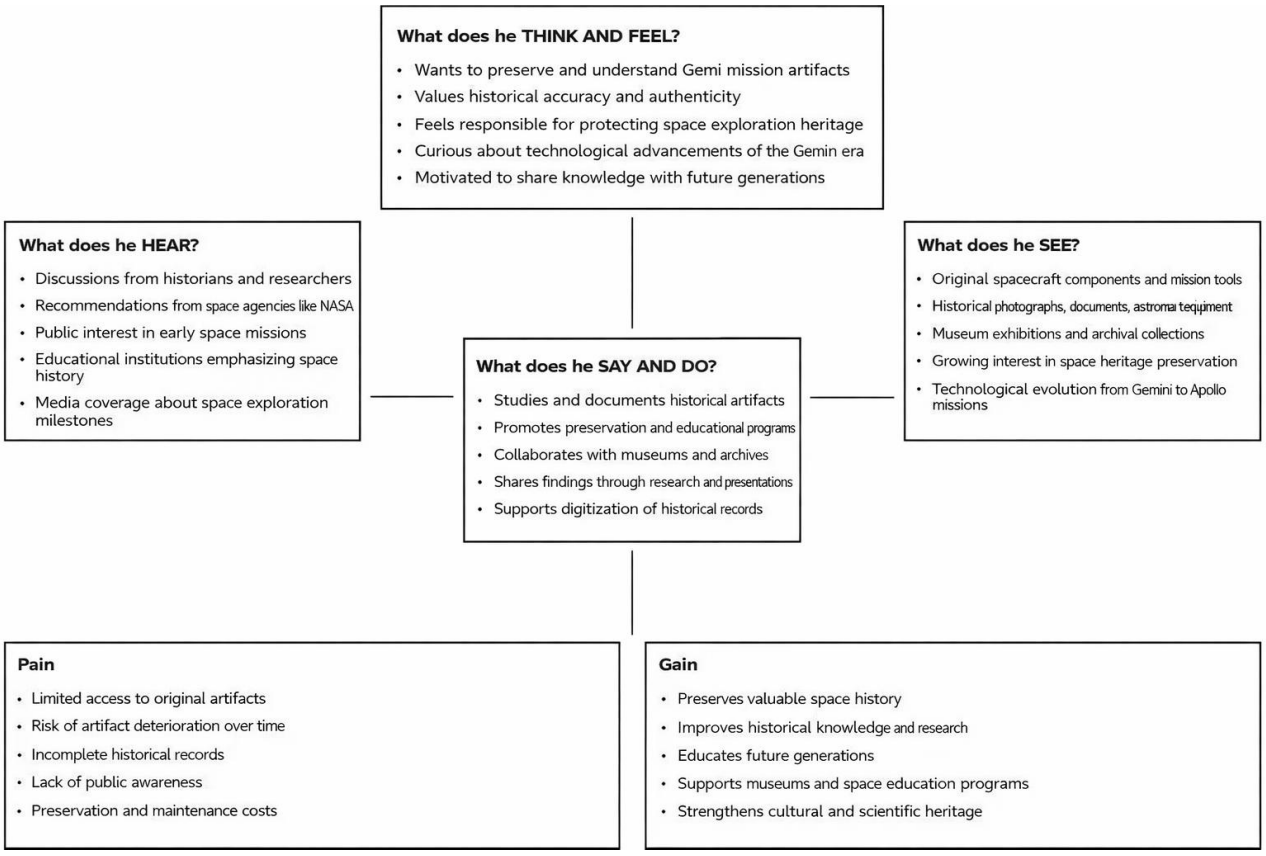
I am	**I'm trying to**	**But**	**Because**	**Which makes me feel**
A researcher	identify and understand historical artifacts accurately	traditional identification methods are slow and require expert knowledge	artifacts need detailed analysis, historical context.	confused, inefficient, and limited in accessing accurate historical
I am a Museum Curator	I'm trying to preserve and manage Gemini historical	But there is no secure and efficient digital system to store	Because traditional storage methods	Concerned about losing valuable historical artifacts and information

2.2. Empathy Map Canvas

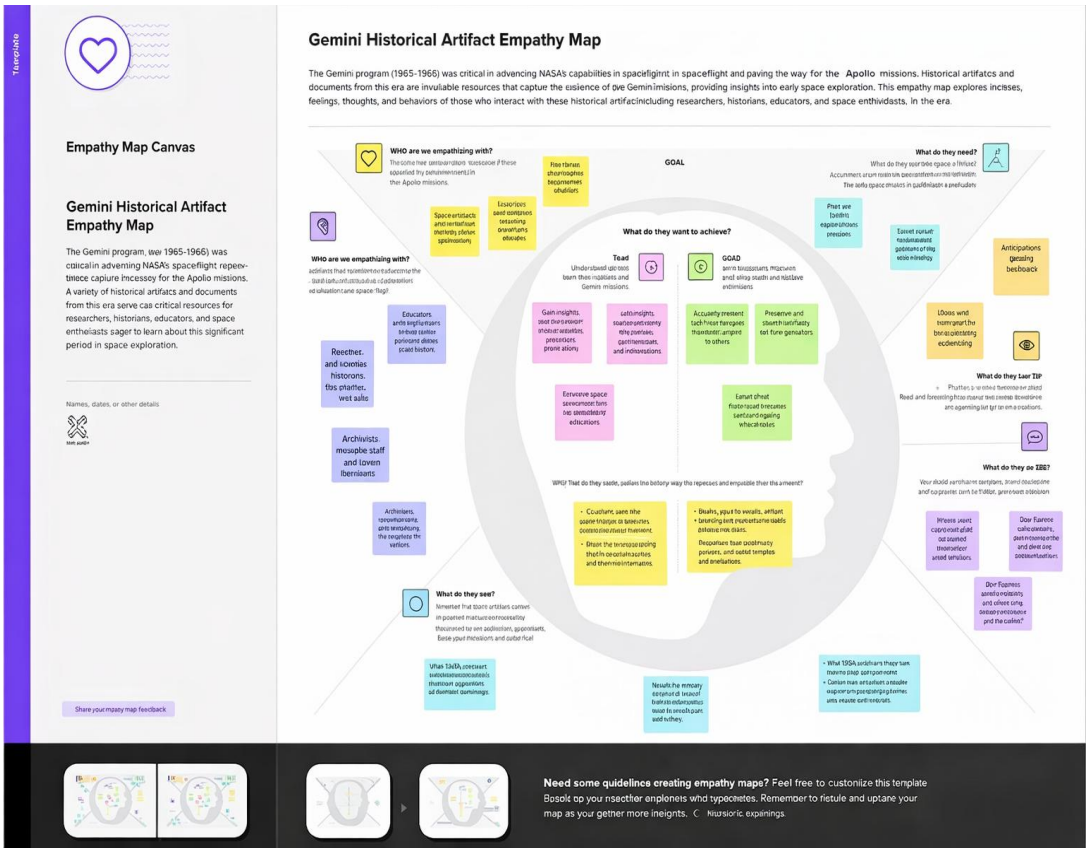
Empathy Map Canvas:

The Gemini Historical Artifact Empathy Map focuses on understanding the needs, experiences, and motivations of historians, researchers, archivists, and space enthusiasts who interact with artifacts from the Gemini space program. These individuals are deeply committed to preserving and documenting important spacecraft components, mission records, photographs, and astronaut equipment that represent a crucial phase in space exploration history.

Example:



Example: Gemini historical artifact description



2.3 Brainstorming

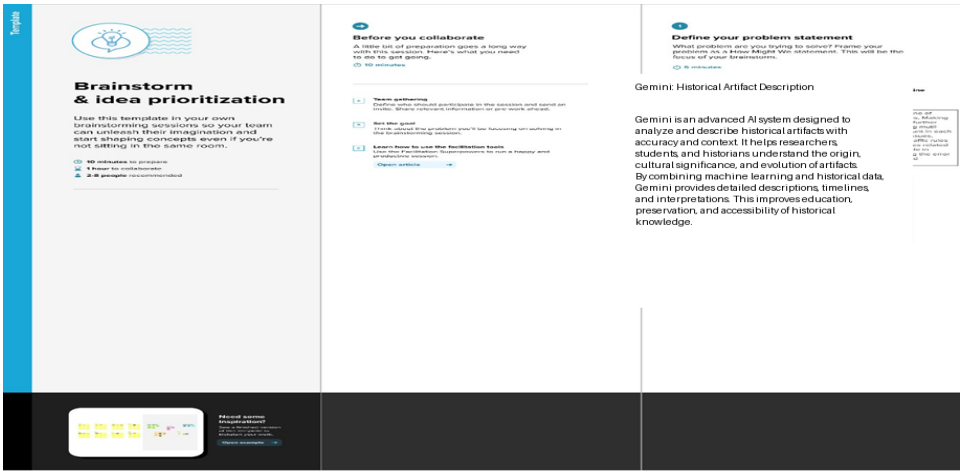
Brainstorm & Idea Prioritization:

Brainstorming for “Gemini historical artifact description”:

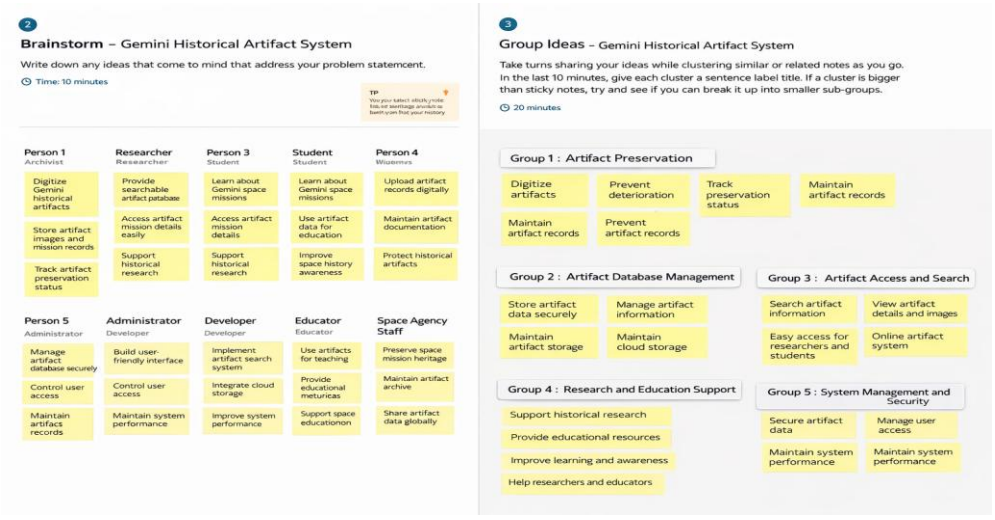
Brainstorming for the project “Gemini Historical Artifact Description” focuses on exploring how artificial intelligence can help identify, analyze, and describe historical artifacts accurately. The main goal of this brainstorming session is to generate ideas on how Gemini can assist students, researchers, and museums in understanding the origin, cultural significance.

Gemini can solve this problem by using image analysis and natural language processing to examine artifact images and automatically generate detailed descriptions, including information about the artifact’s time period, material, origin, and cultural importance.

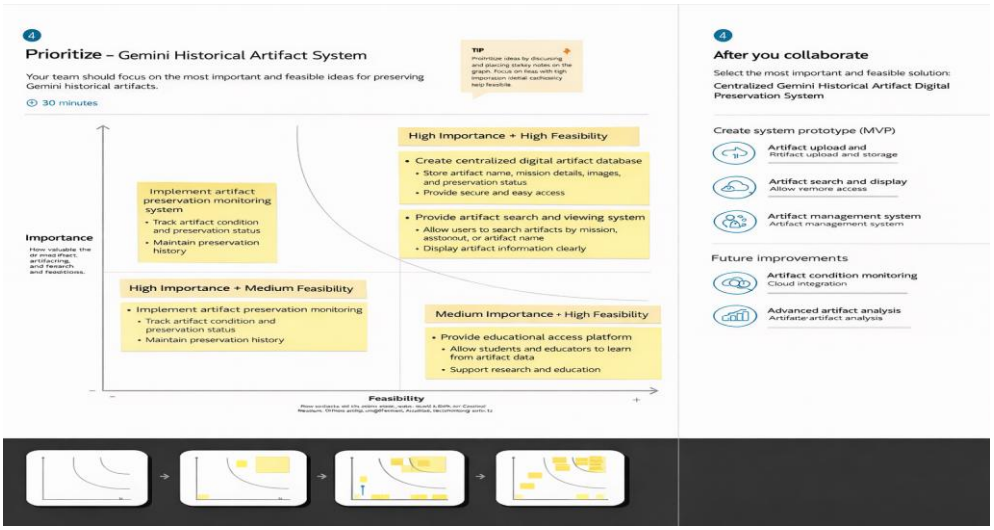
Step-1: Team Gathering, Collaboration and Select the Problem Statement:



Step-2: Brainstorm, Idea Listing and grouping:



Step-3: Idea Prioritization:



3. Requirement Analysis

3.1. 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	Artifact Data Management	Upload and store Gemini historical artifact information including name, mission, description
FR-2	Artifact Search and Retrieval	Allow users to search and retrieve artifact information quickly and accurately
FR-3	Artifact Preservation Tracking	Track artifact condition, preservation status, and storage details
FR-4	User Management ccess, and maintain system security	Allow administrator to manage users to control

Non-functional Requirements:

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

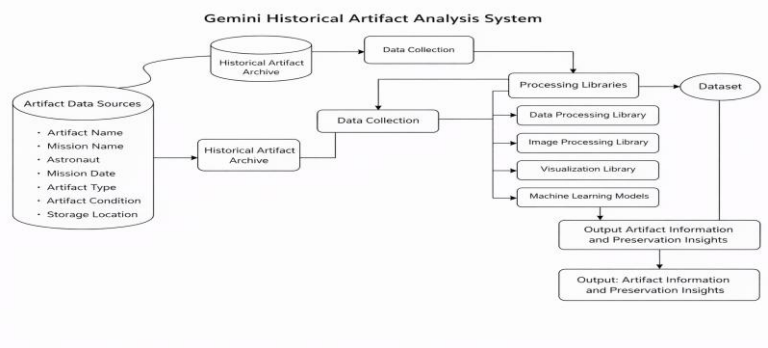
FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The system shall provide a simple and user-friendly interface that allows users to easily search and view artifact information
NFR-2	**Reliability**	The system shall consistently store and retrieve artifact data accurately without data loss
NFR-3	**Performance**	The system shall display artifact information
NFR-4	**Availability**	The system shall be available and operational during research and educational usage

3.2. Data Flow Diagram

Data Flow Diagrams:

The Gemini Historical Artifact Analysis System is designed to collect, store, process, and analyze historical artifacts from the Gemini space missions. The system begins with artifact data sources, which include important information such as artifact name, mission name, astronaut, mission date, artifact type, artifact condition, and storage location.

Flow Diagram:



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
Archivist	Artifact Data Management	USN-1	As an Archivist, I want to upload and store Gemini historical artifact information	System allows artifact upload with name, mission, description, and images. Data is stored securely.	High	Sprint-1
Researcher	Artifact Search and Access	USN-2	As a Researcher, I want to search and view Gemini historical artifacts	System provides accurate artifact search results. Artifact details and images are displayed clearly.	High	Sprint-1
Student / Public User	Artifact Viewing	USN-3	As a Student, I want to view artifact information so that I can learn about Gemini space	Artifact information is displayed clearly. Images and mission details are accessible.	Medium	Sprint-2
System Administrator	Artifact Database Management	USN-4	As an Administrator, I want to manage artifact records so that the system remains accurate and secure.	Admin can add, edit, and delete artifact records. System maintains data integrity.	High	Sprint-1
Museum Curator	Artifact Documentation	USN-5	As a Curator, I want to document artifact present	System allows preservation status updates.	High	Sprint-2

3.3. Technology Stack

Technical Architecture:

The Deliverable shall include the architectural diagram as below and the

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	User Interface	Critical element designed for both Traffic Managers and everyday users, ensuring an intuitive and informative experience.	HTML, CSS, JavaScript
2.	Application Logic-1	Involves a robust backend system responsible for processing, analyzing, and managing traffic data.	Python
3.	Database	Involves the storage and management of diverse traffic data for analysis.	File Manager, csv
4.	File Storage/ Data	Involves managing diverse types of data, including raw traffic data, models, and configuration files.	Local System, Google Drive
5.	Frame Work	It is a crucial part of our program as it is responsible for connecting the frontend with the backend.	Python Flask

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Open-source frameworks can accelerate development and ensure the reliability of Gemini.	Python's Flask
2.	Scalability	Using cameras to collect data and to make models for specific locations.	Computer vision, dynamic databases.
3.	Performance	Regular performance testing, monitoring, and optimization are integral components of the development and maintenance process	R squared, Root mean squared error, Root Mean Square deviation
4.	Availability	Website can be made available all time in a webserver. This makes the website running without any issues	High speed Linux based webservers.

4. PROJECT DESIGN

4.1. Problem Solution Fit

Problem – Solution Fit Template:

The Gemini Historical Artifact System addresses the critical problem of preserving and managing historical artifacts from the Gemini space missions. Many valuable artifacts, documents, and mission records are stored in physical form, making them vulnerable to deterioration, damage, and loss over time.

Purpose:

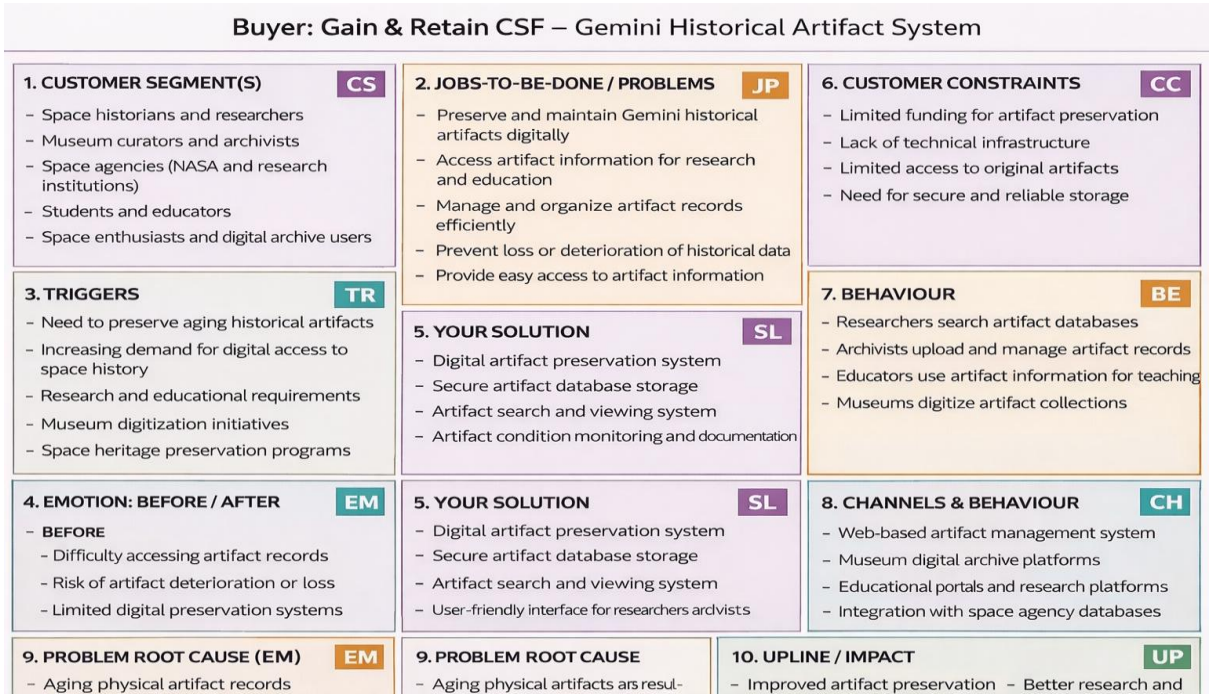
 To digitally preserve Gemini historical artifacts and prevent loss or deterioration.

 To store artifact information such as mission details, images, and descriptions in secure database.

 To provide easy access to artifact information for researchers, students, and educators.

 To support historical research and educational activities related to Gemini space missions.

Template:



4.2. Proposed Solution

Proposed Solution Template:

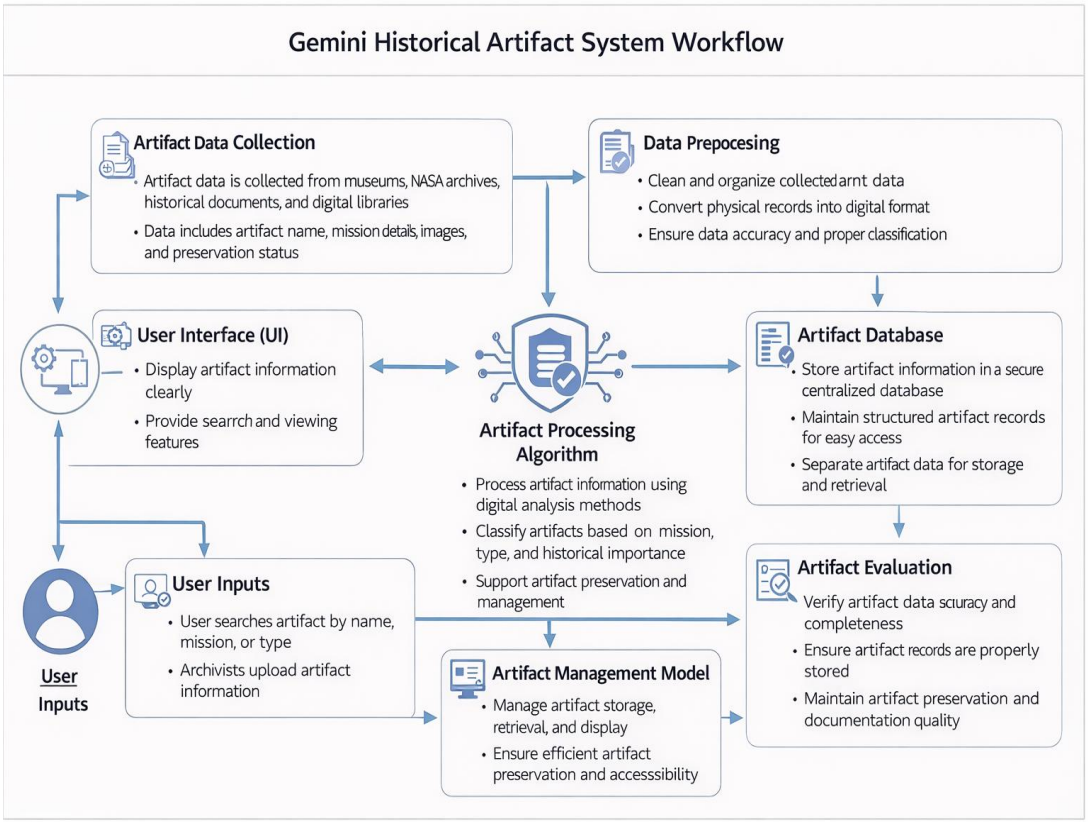
Project team shall fill the following information in the proposed solution template.

S.No.	Parameter	Description
1.	Artifact Data Collection	Collect artifact information from museums, NASA archives, historical documents, and digital libraries Gather artifact name, mission details, images, and descriptions
2.	Data Processing	Convert collected artifact data into digital format and organize it properly Ensure artifact data is structured, accurate, and ready for storage
3.	Artifact Database	User interface to display artifact information Show artifact name, mission details, images, and preservation records
4.	Artifact Search System	Convert collected artifact data into digital format and organize it properly Ensure artifact data is structured, accurate, and ready for storage
5.	Artifact Display Module	User interface to display artifact information Show artifact name, mission details, images, and preservation records
6.	User Management System	Manage users such as researchers, students, and administrators Control access and ensure system security
7.	Preservation Monitoring	Track artifact condition and preservation status Help maintain and protect artifact information

4.3 Solution Architecture

Solution Architecture:

The solution architecture of the Gemini Historical Artifact System is designed to digitally preserve, manage, and provide access to historical artifacts from the Gemini space missions. The system begins with artifact data collection from various sources such as museums, NASA archives, historical documents, and digital libraries. This data is then processed and converted into digital format to ensure accuracy and proper organization.



5. PROJECT PLANNING & SCHEDULING

5.1. Project Planning

Product Backlog, Sprint Schedule, and Estimation (4 Marks)

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	User Interface Setup	USN-1	As a user, I can access a Streamlit-based interface to enter a recipe topic and word count.	2	High	All Team Members
Sprint-1	Input Validation	USN-2	As a user, I want the application to validate my inputs before generating the recipe.	1	High	All Team Members
Sprint-2	AI Model Integration	USN-3	As a user, I want the system to generate a recipe blog using the Gemini Flash Lite model.	3	High	All Team Members
Sprint-2	Joke Generation	USN-4	As a user, I want to see a programming joke while the recipe is being generated.	1	Medium	All Team Members
Sprint-3	Output Display	USN-5	As a user, I want to view the generated recipe blog clearly on the screen.	2	High	All Team Members
Sprint-3	Deployment	USN-6	As a user, I want the application to be deployed and accessible through the internet.	2	Medium	All Team Members

Project Tracker, Velocity & Burndown Chart: (4 Marks)

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Complete	Sprint Release Date (Actual)
Sprint 1	20	4 Days	28 January 2026	31 January 2026	20	31 January 2026
Sprint 1	20	4 Days	28 January 2026	31 January 2026	20	31 January 2026
Sprint 2	20	8 Days	02 February 2026	09 February 2026	20	09 February 2026
Sprint 2	20	8 Days	02 February 2026	09 February 2026	20	09 February 2026
Sprint 3	20	7 Days	12 February 2026	18 February 2026	20	18 February 2026
Sprint 3	20	7 Days	12 February 2026	18 February 2026	20	18 February 2026

6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

Test Scenarios & Results:

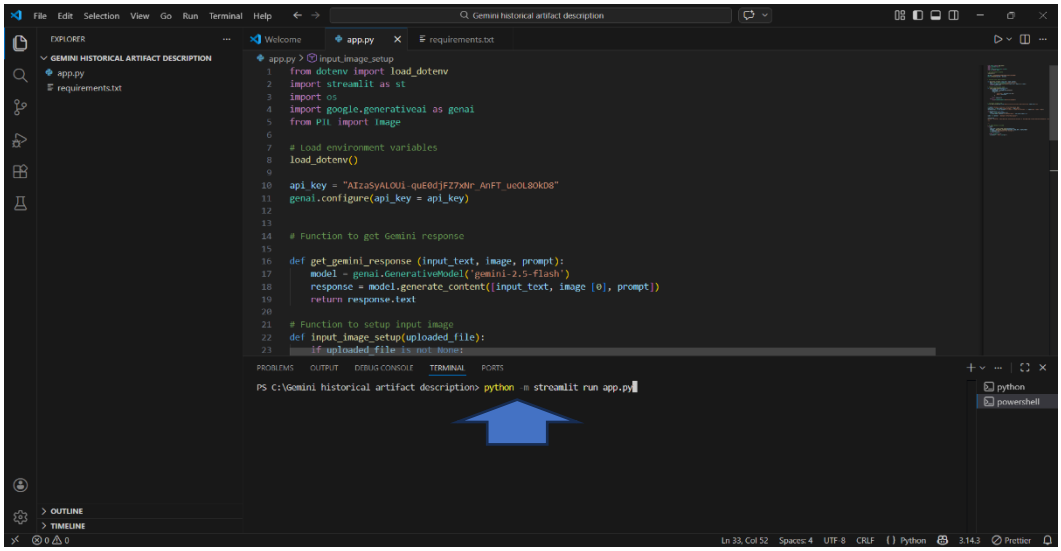
Test Case ID	Scenario (What to test)	Test Steps (How to test)	Expected Result	Actual Result	Pass/ Fail
FT-01	Recipe Topic Input Validation	Enter valid recipe topic and leave field empty	Valid input accepted, error shown for empty input	As Expected	Pass
FT-02	Ingredient Input Validation	Enter valid ingredients and try empty/invalid inputs	Accepts valid input, shows warning for invalid input	As Expected	Pass
FT-03	AI Recipe Generation	Enter recipe topic and click “Generate Recipe”	Structured recipe with title, ingredients, and steps generated	As Expected	Pass
FT-04	Gemini API Connection Check	Trigger recipe generation with valid API key	API responds successfully and generates recipe	As Expected	Pass
FT-05	Programming Joke Feature	Generate recipe and check joke display	Programming joke appears along with recipe	As Expected	Pass
PT-01	Response Time Test	Measure time after clicking generate	Recipe generated within 3–5 seconds	Within Limit	Pass
PT-02	Multiple Request Handling	Generate multiple recipes sequentially	Application handles requests without crash	Stable	Pass
PT-03	Deployment Test	Access deployed app via browser	Application loads and works correctly online	Working	Pass

7. RESULTS

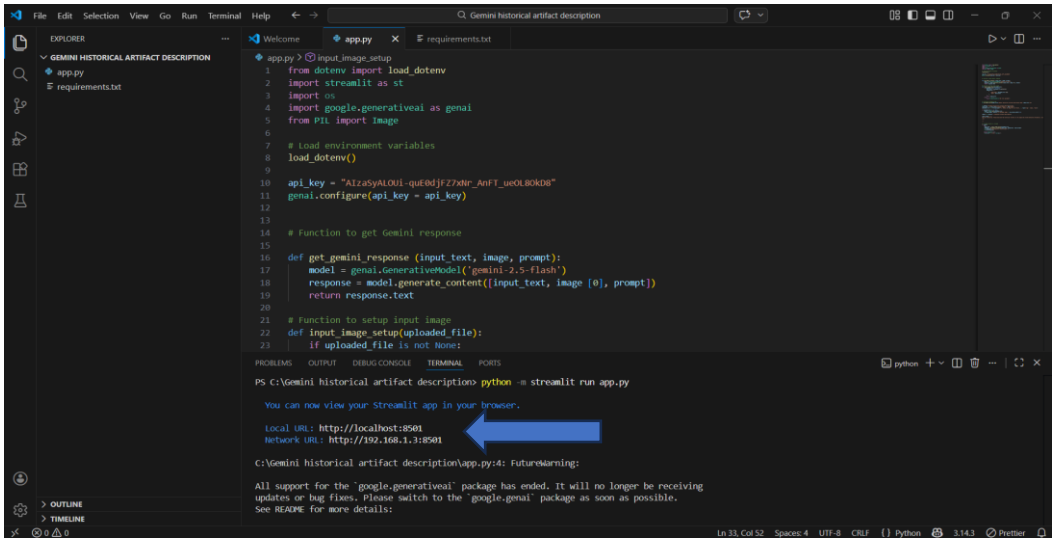
7.1. Output Screenshots

The complete execution of Gemini historical artifact descriptionis represented step by step in the following screenshots.

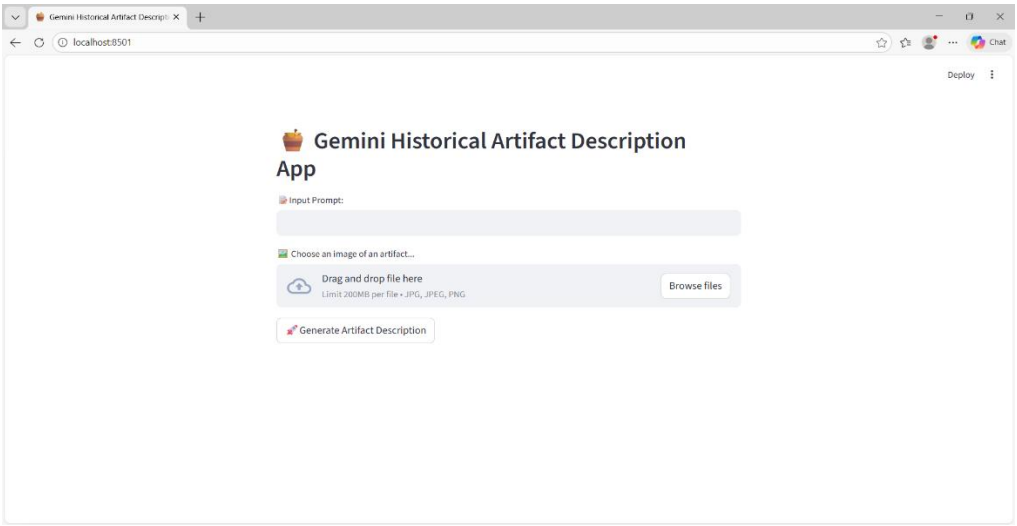
Step 1: To run the Streamlit Application we have to use the command python streamlit run app.py in the terminal in path where the app.py file is located.



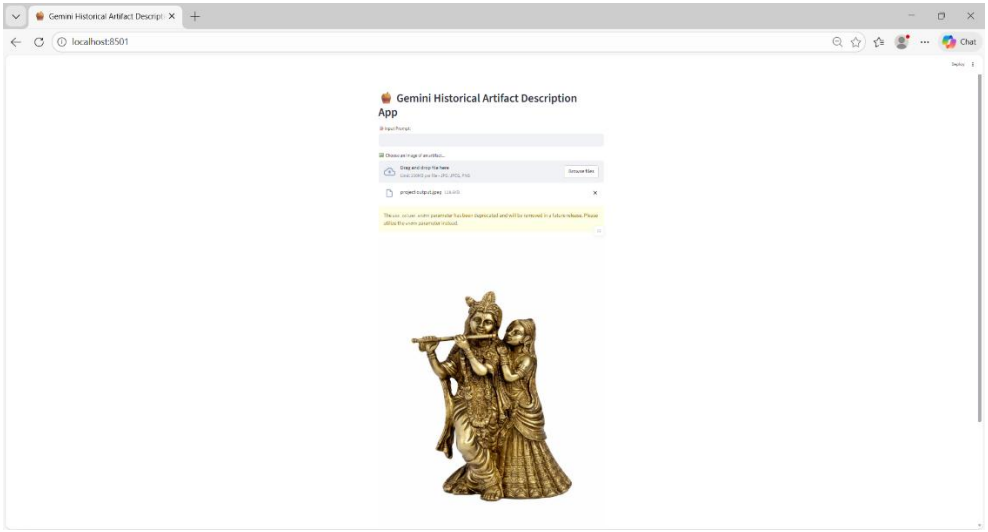
Step 2: After running the command in terminal, the code will get executed and the webpage will open directly. Another way to open webpage is that a localhost link will get generated in the terminal, we can access the webpage using that link.

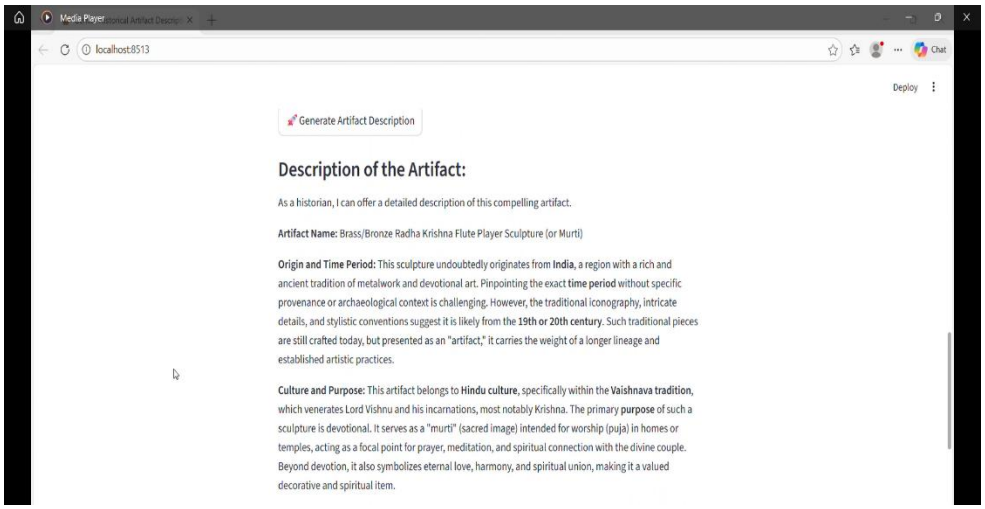


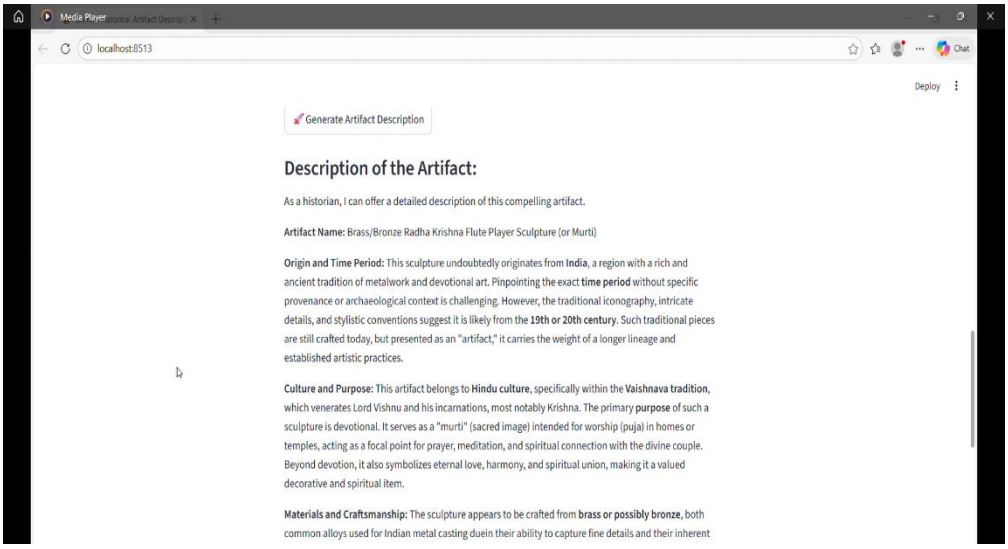
Step 3: The Streamlit webpage opens as shown in the figure given below. This is an automated webpage. No secondary HTML codes required to build this webpage. Python code itself consists the webpage building code.

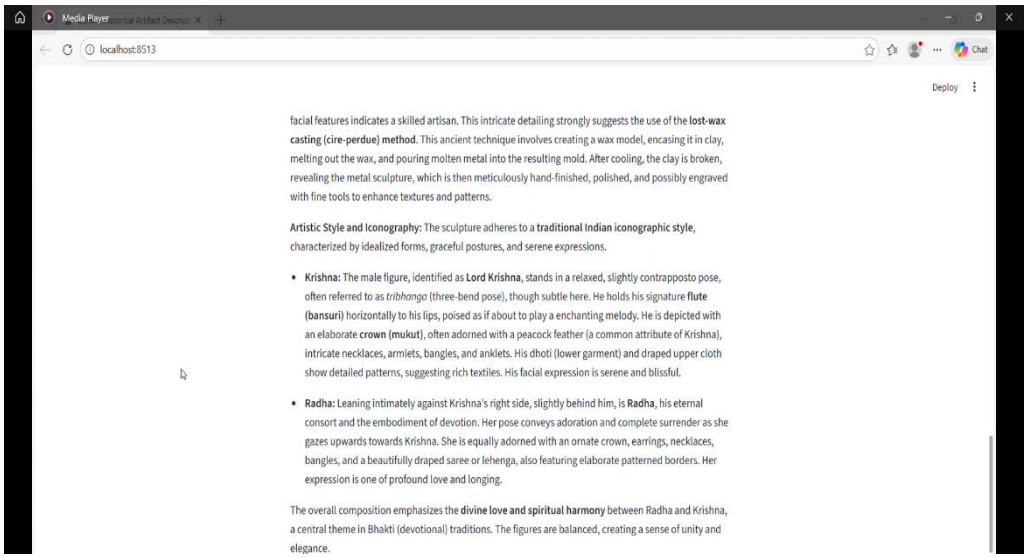


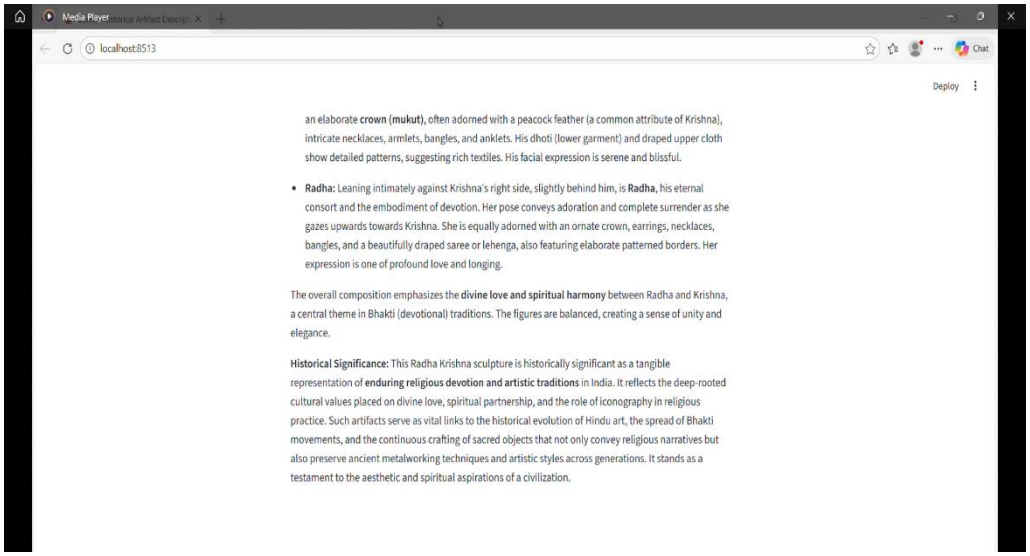
Step 4: After opening this portal it displays the Gemini Historical Description App, First we should type about any image description what ever we want contant in input prompt . It asks choose any image like wheather location etc. It generate based on the user inputs as shown in the following images






Media Player
localhost:8513
Chat
Deploy
Generate Artifact Description
Description of the Artifact:
As a historian, I can offer a detailed description of this compelling artifact.
Artifact Name: Brass/Bronze Radha Krishna Flute Player Sculpture (or Murti)
Origin and Time Period: This sculpture undoubtedly originates from India, a region with a rich and ancient tradition of metalwork and devotional art. Pinpointing the exact time period without specific provenance or archaeological context is challenging. However, the traditional iconography, intricate details, and stylistic conventions suggest it is likely from the 19th or 20th century. Such traditional pieces are still crafted today, but presented as an "artifact," it carries the weight of a longer lineage and established artistic practices.
Culture and Purpose: This artifact belongs to Hindu culture, specifically within the Vaishnava tradition, which venerates Lord Vishnu and his incarnations, most notably Krishna. The primary purpose of such a sculpture is devotional. It serves as a "murti" (sacred image) intended for worship (puja) in homes or temples, acting as a focal point for prayer, meditation, and spiritual connection with the divine couple. Beyond devotion, it also symbolizes eternal love, harmony, and spiritual union, making it a valued decorative and spiritual item.
Materials and Craftsmanship: The sculpture appears to be crafted from brass or possibly bronze, both common alloys used for Indian metal casting duein their ability to capture fine details and their inherent


Media Player
localhost:8513
Chat
Deploy
facial features indicates a skilled artisan. This intricate detailing strongly suggests the use of the lost-wax casting (cire-perdue) method. This ancient technique involves creating a wax model, encasing it in clay, melting out the wax, and pouring molten metal into the resulting mold. After cooling, the clay is broken, revealing the metal sculpture, which is then meticulously hand-finished, polished, and possibly engraved with fine tools to enhance textures and patterns.
Artistic Style and Iconography: The sculpture adheres to a traditional Indian iconographic style, characterized by idealized forms, graceful postures, and serene expressions.
Krishna: The male figure, identified as Lord Krishna, stands in a relaxed, slightly contrapposto pose, often referred to as tribhanga (three-bend pose), though subtle here. He holds his signature flute (bansuri) horizontally to his lips, poised as if about to play a enchanting melody. He is depicted with an elaborate crown (mukut), often adorned with a peacock feather (a common attribute of Krishna), intricate necklaces, armlets, bangles, and anklets. His dhoti (lower garment) and draped upper cloth show detailed patterns, suggesting rich textiles. His facial expression is serene and blissful.
Radha: Leaning intimately against Krishna's right side, slightly behind him, is Radha, his eternal consort and the embodiment of devotion. Her pose conveys adoration and complete surrender as she gazes upwards towards Krishna. She is equally adorned with an ornate crown, earrings, necklaces, bangles, and a beautifully draped saree or lehenga, also featuring elaborate patterned borders. Her expression is one of profound love and longing.
The overall composition emphasizes the divine love and spiritual harmony between Radha and Krishna, a central theme in Bhakti (devotional) traditions. The figures are balanced, creating a sense of unity and elegance.


Media Player
localhost:8513
Chat
Deploy
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The overall composition emphasizes the divine love and spiritual harmony between Radha and Krishna, a central theme in Bhakti (devotional) traditions. The figures are balanced, creating a sense of unity and elegance.
Historical Significance: This Radha Krishna sculpture is historically significant as a tangible representation of enduring religious devotion and artistic traditions in India. It reflects the deep-rooted cultural values placed on divine love, spiritual partnership, and the role of iconography in religious practice. Such artifacts serve as vital links to the historical evolution of Hindu art, the spread of Bhakti movements, and the continuous crafting of sacred objects that not only convey religious narratives but also preserve ancient metalworking techniques and artistic styles across generations. It stands as a testament to the aesthetic and spiritual aspirations of a civilization.

8. ADVANTAGES AND DISADVANTAGES

Advantages

- Generates artifact descriptions quickly and efficiently.
- Understands both images and text for accurate analysis.
- Saves time compared to manual research.
- Supports multiple languages for global users.
- Helps students and researchers in learning.
- Provides historical and cultural context.
- Can be integrated into apps and museum systems.

Disadvantages

- May sometimes give incorrect or incomplete information.
- Accuracy depends on image quality.
- Cannot recognize very rare or new artifacts well.
- Requires internet connection to work.
- Cannot fully replace human experts.
- May have data privacy concerns.
- Depends on training data quality.

9. CONCLUSION

Gemini is a powerful and useful tool for generating descriptions of historical artifacts quickly and efficiently. It helps students, researchers, and museums by providing detailed information and historical context through image and text analysis. This saves time and makes learning easier and more accessible. However, its accuracy depends on image quality and available data, and it may sometimes provide incorrect or incomplete information. Therefore, Gemini is best used as a supportive tool and cannot fully replace human experts such as historians and archaeologists.

Github link:

https://github.com/JahnaviMeda66/Gemini-historical-artifact-description

Demo link:

https://drive.google.com/uc?id=1_61ooxVNp9jzMLOqN_UjYA1QzimbHQ2&export=download