



**COMSATS University Islamabad**  
**Abbottabad, Pakistan**

## **Artistry Hub**

*By*

**Neelam Khan      CIIT/FA21-BSE-175/ATD**

**Zaroon Tahir      CIIT/FA21-BSE-168/ATD**

**Qasim Jameel      CIIT/FA21-BSE-130/ATD**

*Supervisor*

**Ma'am Fizza Seemab Nazli**

***Bachelor of Science in Computer Science (2021-2025)***

The candidate confirms that the work submitted is their own and appropriate credit has been given where reference has been made to the work of others.



**COMSATS University, Islamabad Pakistan**

## **Artistry Hub**

**A project presented to  
COMSATS Institute of Information Technology, Islamabad**

**In partial fulfillment  
of the requirement for the degree of**

***Bachelor of Science in Computer Science (2021-2025)***

**By**

<b>Neelam Khan</b>	<b>CIIT/FA21-BSE-175/ATD</b>
<b>Zaroon Tahir</b>	<b>CIIT/FA21-BSE-168/ATD</b>
<b>Qasim Jameel</b>	<b>CIIT/FA21-BSE-130/ATD</b>

## **DECLARATION**

We hereby declare that this software, neither whole nor as a part has been copied out from any source. It is further declared that we have developed this software and accompanied report entirely on the basis of our personal efforts. If any part of this project is proved to be copied out from any source or found to be reproduction of some other. We will stand by the consequences. No Portion of the work presented has been submitted of any application for any other degree or qualification of this or any other university or institute of learning.

Neelam Khan

Qasim Jameel

Zaroon Tahir

-----

-----

-----

## **CERTIFICATE OF APPROVAL**

It is to certify that the final year project of BS (CS) “Artistry Hub” was developed by **NEELAM KHAN (CIIT/FA21-BSE-175)**, **QASIM JAMEEL (CIIT/FA21-BSE-130)** and **ZAROON TAHIR (CIIT/FA21-BSE-168)** under the supervision of “MA’AM FIZZA SEEMAB NAZLI” and co supervisor “CO-SUPERVISOR NAME” and that in (her) opinion; it is fully adequate, in scope and quality for the degree of Bachelors of Science in Computer Sciences.

-----  
**Ma’am Fizza Seemab Nazli**

-----  
**External Examiner**

-----  
**Head of Department**  
**(Department of Computer Science)**

## **EXECUTIVE SUMMARY**

**Artistry Hub** is a digital platform designed to bring artists and buyers together in a secure, scalable, and interactive online space. The platform allows **artists** to upload and manage their digital artwork, while **clients** can search, view, and purchase art effortlessly. It also supports **community features** like comments, reviews, and follows to encourage engagement.

The system is built using a **modular architecture** and developed using the **Agile methodology**, which allows for flexibility, frequent updates, and a user-centered design process. It consists of key modules such as **User Management, Artwork Management, Transaction Processing, Search & Discovery, Community Engagement, and Analytics & Reporting**.

To ensure quality and reliability, the platform is designed with strong **non-functional requirements** in mind, including support for **1,000+ concurrent users, <2 second response times, AES-256 encryption, 99.9% uptime, and WCAG 2.1 Level AA accessibility**.

Supporting diagrams such as **Data Flow Diagrams (DFDs)** and an **Entity Relationship Diagram (ERD)** have been developed to illustrate the system's structure and data flow clearly. These design models guide the implementation and help maintain the integrity and performance of the platform.

Artistry Hub ultimately aims to offer a seamless and engaging experience that supports the growth of digital art communities and online art commerce.

## **ACKNOWLEDGEMENT**

All praise is to Almighty Allah who bestowed upon us a minute portion of His boundless knowledge by virtue of which we were able to accomplish this challenging task.

We are greatly indebted to our project supervisor “Ma’am Fizza Seemab Nazli”. Without her personal supervision, advice and valuable guidance, completion of this project would have been doubtful. We are deeply indebted to her for her encouragement and continual help during this work.

And we are also thankful to our parents and family who have been a constant source of encouragement for us and brought us the values of honesty & hard work.

Neelam Khan

Qasim Jameel

Zaroon Tahir

-----

-----

-----

## **ABBREVIATIONS**

<b>AI</b>	Artificial Intelligence
<b>PK</b>	Primary Key
<b>FK</b>	Foreign Key
<b>HCI</b>	Human Computer Interaction
<b>NFT</b>	Non Fungible Tokens
<b>SDLC</b>	Software Development Life Cycle
<b>UI</b>	User Interface
<b>UAT</b>	User Acceptance Testing
<b>CDN</b>	Content Delivery Network
<b>JPEG</b>	Joint Photographic Experts Group
<b>PNG</b>	Portable Network Graphics
<b>GIF</b>	Graphics Interchange Format
<b>PCI DSS</b>	Payment Card Industry Data Security Standard
<b>JWT</b>	JSON Web Token

# **TABLE OF CONTENTS**

<b><u>1</u></b>	<b><u>Introduction</u></b> .....	11
1.1	Brief.....	11
1.2	Relevance to Course Modules.....	111
1.3	Project Background.....	122
1.4	Literature Review.....	122
1.5	Analysis from Literature Review (in the context of your project).....	133
1.6	Methodology and Software Lifecycle for This Project.....	144
1.6.1	Rationale behind Selected Methodology.....	145
<b><u>2</u></b>	<b><u>Problem Definition</u></b> .....	17
2.1	Problem Statement.....	17
2.2	Deliverables and Development Requirements.....	18
2.3	Current System (if applicable to your project).....	19
<b><u>3</u></b>	<b><u>Requirement Analysis</u></b> .....	21
3.1	Use Cases Diagram(s).....	21
3.2	Detailed Use Case.....	21
3.3	Functional Requirements.....	27
3.4	Non-Functional Requirements.....	31
<b><u>4</u></b>	<b><u>Design and Architecture</u></b> .....	34
4.1	System Architecture.....	34
4.2	Data Representation [Diagram + Description].....	36
4.3	Process Flow/Representation.....	41
4.4	Design Models [along with descriptions].....	42
<b><u>5</u></b>	<b><u>Implementation</u></b> .....	40
5.1	Algorithm.....	45
5.2	External APIs.....	47
5.3	User Interface.....	47
<b><u>6</u></b>	<b><u>Testing and Evaluation</u></b> .....	48
6.1	Manual Testing.....	49
6.1.1	System testing.....	50
6.1.2	Unit Testing.....	50
6.1.3	Functional Testing.....	52
6.1.4	Integration Testing.....	53
6.2	Automated Testing:.....	54
	Tools used:.....	55
<b><u>7</u></b>	<b><u>Conclusion and Future Work</u></b> .....	56
7.1	Conclusion.....	57
7.2	Future Work.....	58
<b><u>8</u></b>	<b><u>References</u></b> .....	59



## **LIST OF FIGURES**

Fig 2.1 Use Case Digram .....	21
Fig 3.1 System Architecture Diagram .....	34
Fig 3.2.1 DFD level 0 .....	36
Fig 3.2.2 DFD level 1 .....	37
Fig 3.2.3 DFD level 2 .....	39
Fig 4.1 Process/flow.....	41
Fig 4.2 ERD .....	42

## **LIST OF TABLES**

Table 2.1.1 Use case 1 .....	21
Table 2.1.2 Use case 2 .....	22
Table 2.1.3 Use case 3 .....	22
Table 2.1.4 Use case 4 .....	23
Table 2.1.5 Use case 5 .....	23
Table 2.1.6 Use case 6 .....	24
Table 2.1.7 Use case 7 .....	24
Table 2.1.8 Use case 8 .....	24
Table 2.1.9 Use case 9 .....	25
Table 2.1.10 Use case 10 .....	25
Table 2.1.11 Use case 11 .....	26

# 1. Introduction

**Artistry Hub** is a smart, artist-friendly platform that helps creators get noticed and sell their work with ease. Using AI, it offers personalized art recommendations and ensures every piece is authentic. More than just a marketplace, it's a vibrant community where artists and art lovers connect, share, and grow together.

## 1.1. Brief

Artistry Hub is a digital marketplace built specifically for artists and art lovers, aiming to make it easier for creators to showcase and sell their work while helping buyers discover unique pieces they'll love. By using AI to offer personalized art recommendations and strong verification tools to ensure authenticity, the platform creates a secure, user-friendly space for both artists and collectors. With easy artwork uploads, detailed artist profiles, and a focus on community, Artistry Hub is designed to support and connect the digital art world in a more meaningful way. It's not just about transactions—it's about building relationships, encouraging creativity, and giving artists the tools they need to grow. Whether you're a seasoned collector or new to digital art, Artistry Hub offers a space to explore, connect, and be inspired.

## 1.2. Relevance to Course Modules

The development of Artistry Hub is closely aligned with several key courses studied during the Bachelor of Computer Science (BCS) program. Below is a brief explanation of how specific courses contribute to the project's foundation and execution:

1. **Web Development:** This course provided essential skills in building and designing user-friendly web applications. The knowledge gained in HTML, CSS, JavaScript, and frameworks will be directly applied in creating the Artistry Hub platform, ensuring an intuitive interface for both artists and consumers.
2. **Database Management:** Understanding database design and management is crucial for Artistry Hub, as it will require a robust backend to store user profiles, artwork details, transaction records, and authentication data. Skills learned in this course will help in selecting the appropriate database systems and structuring data efficiently.
3. **Software Engineering:** The principles of software development life cycles, project management, and agile methodologies covered in this course will guide the planning, development, and deployment phases of Artistry Hub. This knowledge will ensure that the project is executed systematically and meets user requirements effectively.
4. **Artificial Intelligence:** The AI course provided insights into machine learning algorithms and recommendation systems. This knowledge will be instrumental in

developing the AI-driven recommendation engine for Artistry Hub, allowing for personalized art suggestions based on user preferences and behaviors.

5. **Human-Computer Interaction (HCI):** This course emphasized the importance of user experience and interface design. The principles of HCI will be applied to ensure that Artistry Hub is not only functional but also engaging and accessible for users, enhancing overall satisfaction and usability.

By integrating concepts and skills from these courses, the Artistry Hub project aims to create a comprehensive and innovative online marketplace that effectively addresses the needs of artists and art consumers in the digital age.

### 1.3. Project Background

Artistry Hub is a fresh, modern online marketplace built specifically for digital artists and art lovers. As digital art continues to grow, many creators still struggle to find the right platform to showcase and sell their work, with traditional marketplaces often feeling outdated and lacking the tools artists truly need. Artistry Hub changes that by offering a user-friendly, secure space designed around both the creator and the buyer. It uses smart AI to recommend artwork based on each user's personal taste, making discovery easier and more meaningful. To protect artists and build trust with buyers, the platform includes strong authenticity verification along with similarity and originality checks to prevent plagiarism or duplication. Artists can create rich profiles featuring their portfolios, bios, and social media links, helping them connect with their audience and grow their visibility. From smooth uploads to safe transactions, everything is designed to be simple and secure. But at its core, Artistry Hub is more than just a marketplace—it's a creative community where artists are supported, buyers are inspired, and digital art is truly celebrated.

### 1.4. Literature Review

The digital art marketplace has undergone substantial transformation in recent years, influenced by technological advancements, shifts in consumer behavior, and an increasing acceptance of various digital art forms. This literature review examines the current trends, research, and existing products relevant to Artistry Hub, providing insight into the environment in which the platform will function. Numerous online platforms have surfaced to meet the diverse needs of artists and art consumers, each offering distinct features and targeting specific audiences, thereby shaping the competitive landscape that Artistry Hub will navigate. Notable examples include:

- **Etsy:** Primarily focused on handmade and vintage items, Etsy has expanded to include digital downloads, allowing artists to sell digital prints and designs. However, its broad focus means that digital artists may struggle to gain visibility among a diverse range of products.

- **Saatchi Art:** This platform offers a curated selection of original artworks, including digital pieces. While it provides a marketplace for artists, it primarily emphasizes traditional art forms, which may limit its appeal to digital creators.
- **ArtStation:** A platform specifically designed for digital artists, ArtStation allows users to showcase their portfolios, connect with other artists, and sell prints. It has gained popularity among concept artists, illustrators, and game designers, but it lacks robust features for direct sales and community engagement.

### **1.5. Analysis from Literature Review (in the context of your project)**

The literature review has provided valuable insights into the current trends, challenges, and opportunities within the digital art marketplace. This analysis will discuss how Artistry Hub aligns with and addresses the findings from the literature, highlighting its unique contributions and potential impact on the digital art ecosystem.

#### **1. Addressing the Growth of Digital Art**

The literature indicates a significant increase in the popularity of digital art, particularly among younger audiences. Artistry Hub is strategically positioned to capitalize on this trend by providing a dedicated platform that caters specifically to digital artists. Unlike broader marketplaces such as Etsy and Saatchi Art, which may dilute the visibility of digital works among various product categories, Artistry Hub focuses exclusively on digital art. This specialization allows for a more targeted approach, ensuring that artists can effectively showcase their work to an audience that appreciates and seeks out digital art.

#### **2. Differentiation from Existing Marketplaces**

While platforms like ArtStation and SuperRare have made strides in supporting digital artists, they often lack comprehensive features for direct sales and community engagement. Artistry Hub differentiates itself by combining the best elements of these platforms while addressing their shortcomings. For instance, while ArtStation allows for portfolio showcasing, it does not facilitate seamless transactions. Artistry Hub will provide user-friendly artwork upload options, integrated payment processing, and a secure environment for transactions, making it easier for artists to sell their work directly to consumers.

#### **3. Leveraging AI for Personalization**

The literature highlights the growing importance of AI in enhancing user experience through personalized recommendations. Artistry Hub will implement advanced AI algorithms to analyze user behavior and preferences, providing tailored art suggestions that enhance the discovery process for consumers. This feature not only aligns with current e-commerce trends but also addresses the challenge of information overload in the digital art space, where consumers may struggle to find artworks that resonate with

their tastes. By offering personalized recommendations, Artistry Hub aims to improve user satisfaction and increase conversion rates.

#### **4. Ensuring Authenticity and Copyright Protection**

The issue of authenticity and copyright protection is a critical concern in the digital art market, as highlighted in the literature. Artistry Hub will address this challenge by incorporating robust mechanisms for verifying the authenticity of digital artworks. By implementing verification processes, such as confirmation emails and blockchain technology for NFTs, Artistry Hub will enhance trust among users, encouraging more artists and consumers to engage with the platform. This focus on authenticity not only protects artists' rights but also reassures buyers that they are purchasing original works.

#### **5. Fostering Community Engagement**

The literature emphasizes the importance of community engagement in the art world, which is often lacking in existing digital art platforms. Artistry Hub will prioritize community features, such as artist profiles that allow for social networking, forums for discussion, and collaborative projects. By fostering a sense of community, Artistry Hub aims to create an environment where artists can connect with their audience, share experiences, and collaborate with fellow creators. This approach aligns with the findings from the National Endowment for the Arts, which suggest that social interactions enhance the appreciation and promotion of art.

### **1.6. Methodology and Software Lifecycle for This Project**

#### **Methodology: Agile Development**

For the Artistry Hub project, the Agile development methodology has been selected due to its adaptability and focus on user-centric design. Agile is characterized by iterative development, where requirements and solutions evolve through collaboration between cross-functional teams. This approach is particularly beneficial for Artistry Hub for several reasons:

#### **SDLC Model: Agile Model**

The Agile model, as part of the broader Agile methodology, serves as the chosen Software Development Life Cycle (SDLC) model for Artistry Hub. The Agile SDLC model consists of several key phases:

#### **1.6.1 Selected Methodology: Agile Development**

- **Adaptability to Change:** The digital art market is characterized by rapid changes in trends, user preferences, and technology. The Agile methodology allows for flexibility in adapting to these changes, enabling the development team to pivot based on user feedback and market demands.

- **Quality Assurance:** Agile incorporates testing and continuous integration practices, which help identify and resolve issues early in the development cycle. This focus on quality enhances the reliability and performance of the Artistry Hub platform.
- **User -Centric Focus:** Agile emphasizes collaboration with stakeholders and end-users throughout the development process. This ensures that the platform is designed with the actual needs and experiences of artists and art consumers in mind, leading to a more relevant and effective product.
- **Incremental Delivery:** Agile promotes the delivery of functional increments in short cycles (sprints). This approach allows users to interact with essential features early in the development process, providing valuable feedback that can be incorporated into subsequent iterations.
- **Continuous Improvement:** The iterative nature of Agile encourages ongoing testing and refinement. This leads to higher software quality, as issues can be identified and resolved early, and enhancements can be made based on real user experiences.
- **Flexibility and Responsiveness:** The digital art market is dynamic, with user preferences and trends changing rapidly. Agile allows the development team to respond quickly to feedback and changing requirements, ensuring that the platform remains relevant and aligned with user needs.
- **Collaboration and Innovation:** Agile fosters a collaborative environment among team members, which is crucial for a multidisciplinary project like Artistry Hub. This collaboration encourages creativity and innovation, essential for developing a unique and engaging platform.

## **2. Selected SDLC Model: Agile Model**

- **Alignment with Agile Principles:** The Agile SDLC model aligns perfectly with the principles of Agile methodology, emphasizing iterative development, user feedback, and flexibility. This model allows for continuous engagement with users and stakeholders, ensuring that the project remains aligned with their needs.
- **Phased Approach:** The Agile model consists of distinct phases (planning, design, development, testing, deployment, and maintenance) that facilitate organized progress while allowing for adjustments based on feedback. This structured yet flexible approach is ideal for managing the complexities of the Artistry Hub project.
- **Early and Frequent Releases:** The Agile model supports the release of functional increments, enabling the team to deploy features progressively. This is particularly beneficial for Artistry Hub, as it allows artists and consumers to start using the platform and provide feedback while further enhancements are developed.
- **Focus on Quality Assurance:** The integration of continuous testing within the Agile model ensures that quality is maintained throughout the development process. This is critical for Artistry Hub, where user trust and satisfaction are paramount.

- **Facilitation of Collaboration:** The Agile model encourages collaboration among cross-functional teams, which is essential for a project that involves various disciplines, including development, design, and marketing. This collaboration enhances communication and fosters a shared vision for the platform.



## Problem Definition

Digital artists encounter numerous challenges when it comes to effectively showcasing and marketing their work on existing online marketplaces. Key issues include limited visibility for their unique artworks, a lack of features specifically designed to meet artists' needs, concerns about authenticity due to the prevalence of digital art forgeries, and a fragmented and insecure economic environment that does not adequately support either artists or consumers. Artistry Hub seeks to tackle these challenges by offering a specialized platform that improves the buying experience, empowers artists, and incorporates robust methods for verifying the authenticity of artworks.

To achieve this, Artistry Hub will provide artist profiles that allow creators to manage their portfolios effectively, along with a user-friendly interface that includes advanced search capabilities to help consumers find artworks that match their interests. The platform will leverage artificial intelligence to offer personalized recommendations, enhancing the likelihood of successful sales. Additionally, secure payment processing will ensure that transactions are safe and reliable, while community engagement features will foster interaction among users, creating a sense of belonging and support.

The anticipated outcome of Artistry Hub is the establishment of a cohesive marketplace that not only increases visibility for artists but also enhances the overall user experience for consumers. By building trust through authenticity verification, equipping artists with essential tools for promotion and sales, and nurturing a supportive community, Artistry Hub aims to contribute to the sustainable growth of the digital art market. Ultimately, the platform aspires to create a vibrant ecosystem where both artists and art lovers can thrive.

### 2.1.Problem Statement

Many digital artists struggle to find platforms that effectively showcase and market their work, as existing marketplaces often fall short in several key areas. Unique artworks frequently lack visibility in these environments, making it difficult for artists to attract potential buyers. Additionally, many platforms do not offer features specifically designed to meet the needs of digital artists, nor do they have adequate screening mechanisms to ensure the quality and authenticity of the artworks being sold. The rise of digital art forgeries further complicates the situation, undermining trust between buyers and sellers and threatening the integrity of the market.

Current solutions tend to create a fragmented and insecure economic landscape, either by failing to verify the authenticity of artworks or by not providing artists with the necessary tools to promote and sell their work effectively. In response to these challenges, the development of Artistry Hub aims to offer a focused solution that enhances the buying experience, empowers artists, and includes robust methods for verifying the authenticity of digital artworks.

Through this project, I hope to gain insights into several important areas, including the integration of artificial intelligence to personalize user experiences, the design of a marketplace that meets the specific needs of digital artists and consumers, and effective strategies for fostering community engagement. By addressing these aspects, Artistry Hub aspires to create a more trustworthy and supportive environment for digital art, ultimately benefiting both artists and art buyers.

## 2.2.Deliverables and Development Requirements

### Deliverables

#### 1. Project Documentation:

- Comprehensive project plan outlining objectives, scope, timeline, and milestones.
- Requirements specification document detailing functional and non-functional requirements.
- User stories and use cases to guide development and ensure user-centric design.

#### 2. User Interface (UI) Design:

- Wireframes and mockups for key pages, including the homepage, artist profiles, artwork listings, search and filter functionalities, and user dashboards.
- A style guide that defines the visual elements, color schemes, typography, and branding for the platform.

#### 3. Functional Prototype:

- An interactive prototype demonstrating core functionalities, including user registration, portfolio management, artwork submission, search capabilities, and payment processing.

#### 4. Final Report:

- A detailed project report covering all phases of development, including research, analysis, design, implementation, testing, and conclusion.

#### 5. Presentation & Demonstration:

- A visual presentation of the project objectives, development process, challenges faced, and final implementation demo.

### Development Requirements

#### 1. Technical Requirements:

- **Frontend Technologies:** JavaScript, and frameworks such as React for building a responsive user interface.
- **Backend Technologies:** A server-side language (e.g., Node.js, Python) and a web framework (e.g., Express, Django) for handling server logic and database interactions.
- **Database:** A relational database (e.g., MySQL) for storing user data, artwork information, and transaction records.

#### 2. Security Requirements:

- Implementation of secure user authentication and authorization mechanisms (e.g., OAuth, JWT).
- Data encryption for sensitive information, including payment details and personal user data.

#### 3. Integration Requirements:

- Payment processing integration with secure payment gateways (e.g., Stripe) facilitate transactions.
- Integration of AI algorithms for personalized recommendations and metadata analysis for authenticity verification.

#### 4. User Experience Requirements:

- User testing sessions to gather feedback and iterate on design and functionality based on real user experiences.

#### 5. Community Engagement Features:

- Tools for users to provide feedback, reviews and ratings on artworks and artists.

## Current System

In the context of the Artistry Hub project, it is essential to understand the limitations of existing digital art marketplaces that the new platform aims to improve upon. Below is a brief description of some current systems in the digital art space:

### 1. Etsy

Etsy is a well-known online marketplace that allows artists and crafters to sell handmade, vintage, and unique goods, including digital art. While Etsy provides a platform for artists to showcase their work, it lacks specialized features tailored specifically for digital art. The search functionality can be limited, making it difficult for consumers to find specific types of digital art. Additionally, the platform does not have robust mechanisms for verifying the authenticity of digital artworks, which can lead to concerns about forgeries.

### 2. Saatchi Art

Saatchi Art is an online gallery that connects artists with buyers, offering a wide range of original artworks, including digital pieces. While it provides a curated experience and promotes artists, the platform primarily focuses on traditional art forms. The user interface can be overwhelming, and the search and filtering options are not optimized for digital art, making it challenging for users to discover unique pieces. Furthermore, Saatchi Art does not offer comprehensive tools for artists to manage their portfolios or engage with their audience.

### 3. ArtStation

ArtStation is a platform designed specifically for artists in the digital space, allowing them to showcase their portfolios and connect with potential clients. While it offers a community-driven environment and features like project sharing and feedback, it lacks a built-in marketplace for direct sales. Artists often have to rely on external payment systems, which can complicate transactions. Additionally, the platform does not provide mechanisms for verifying the authenticity of digital artworks, which can lead to trust issues among buyers.

### 4. DeviantArt

DeviantArt is one of the largest online communities for artists and art enthusiasts, allowing users to share and sell their artwork. While it has a vast user base and offers community engagement features, the platform's marketplace functionality is limited. Artists may struggle to gain visibility among the vast array of submissions, and the lack of advanced search and filtering options can hinder the buying experience. Moreover, DeviantArt does not have robust tools for authenticity verification, which can lead to concerns about the legitimacy of digital art.

## Limitations of Current Systems

The existing digital art marketplaces exhibit several common limitations:

- **Lack of Specialized Features:** Most platforms do not offer features specifically designed for digital artists, such as portfolio management tools, advanced search capabilities, or tailored recommendations.

- **Visibility Challenges:** Unique artworks often struggle to stand out in crowded marketplaces, making it difficult for artists to reach potential buyers.
- **Authenticity Concerns:** There is a significant lack of mechanisms for verifying the authenticity of digital artworks, leading to mistrust between buyers and sellers.
- **Fragmented User Experience:** Many platforms provide a disjointed experience, lacking cohesive systems that support both artists and consumers effectively.

### 3. Requirement Analysis

#### 3.1. Use Cases Diagram

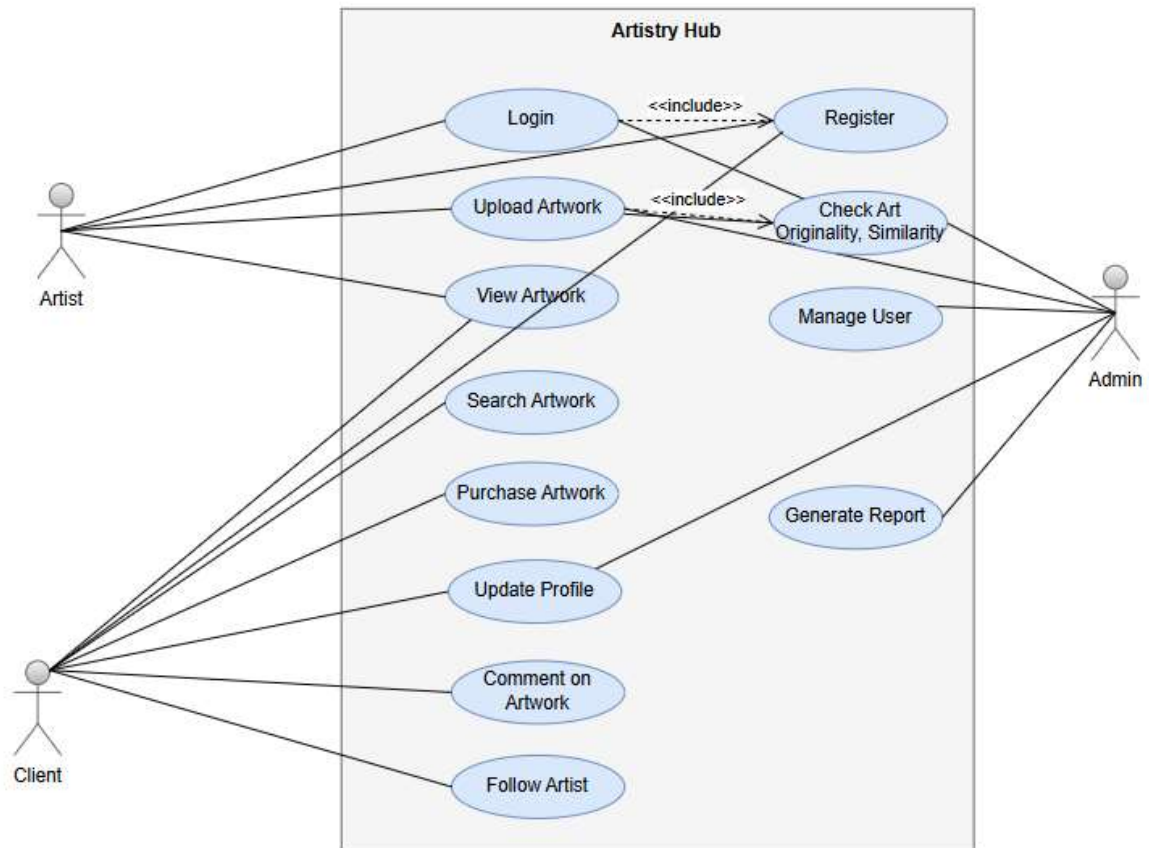


Figure 2.1: Use case diagram

#### 3.2. Detailed Use Case

<b>Use Case ID:</b>	UC-1
<b>UseCase Name:</b>	Register
<b>Actors:</b>	Primary Actor: User Secondary Actor: System Database
<b>Description:</b>	A user registers an account by providing necessary details such as name, email, and password. An artist registers an account by providing name, email, password and verified social account.
<b>Trigger:</b>	User selects "Register" on the login screen.
<b>Preconditions:</b>	PRE-1: User is not already registered. PRE-2: User has a valid email address.

<b>Post conditions:</b>	POST-1: User account is created and stored in the database. POST-2: User receives a confirmation email.
<b>Normal Flow:</b>	1. User clicks "Register" and enters their details. 2. System validates the details. 3. System stores the user details in the database. 4. System sends a confirmation email. 5. User confirms their email address.
<b>Alternative Flows:</b>	1.1 Email Already Exists - System informs the user that the email is already registered. - User enters a different email and retries. 1.2 Social account doesn't belong to user - Try another social account.
<b>Exceptions:</b>	1.0.E1 Validation Error - System detects invalid input (e.g., weak password) and prompts the user to correct it.
<b>Business Rules</b>	BR-1: Password must meet complexity requirements (e.g., 8+ characters). BR-2: Emails must be unique.
<b>Assumptions:</b>	Users are familiar with standard registration forms.

Table 2.1.1: Use case 1

<b>Use Case ID:</b>	UC-2
<b>Use Case Name:</b>	Login
<b>Actors:</b>	Primary Actor: User Secondary Actor: System Database
<b>Description:</b>	A user logs into the platform using email and password.
<b>Trigger:</b>	User clicks "Login" on the home screen.
<b>Preconditions:</b>	PRE-1: User is registered on the platform.
<b>Post conditions:</b>	User gains access to their account.
<b>Normal Flow:</b>	1. User enters email and password. 2. System validates the credentials 3. User is granted access and redirected to the dashboard.
<b>Alternative Flows:</b>	1.1 Incorrect Credentials - System informs the user of incorrect login details. - User retries login.
<b>Exceptions:</b>	1.0.E1 Network Issue - System detects a network issue and prompts the user to retry.
<b>Business Rules</b>	BR-1: User accounts must be verified before login.
<b>Assumptions:</b>	Users remember their login credentials.

Table 2.1.2: Use case 2

<b>Use Case ID:</b>	UC-3
<b>Use Case Name:</b>	Upload Artwork
<b>Actors:</b>	Primary Actor: Artist Secondary Actors: System Database

<b>Description:</b>	An Artist uploads their artwork to the Artistry Hub platform. The artwork details, including title, description, and price, are stored in the system database for display to Clients. Reverse Image Search will be applied to check the originality of art.
<b>Trigger:</b>	The Artist selects the option to upload artwork.
<b>Preconditions:</b>	<ul style="list-style-type: none"> <li>- PRE-1: Artist is logged into the system.</li> <li>- PRE-2: Artist has a valid profile on Artistry Hub.</li> </ul>
<b>Postconditions:</b>	<ul style="list-style-type: none"> <li>- POST-1: Artwork details are successfully stored in the database.</li> <li>- POST-2: Originality of art is successfully checked</li> <li>- POST-3: Artwork becomes visible for Clients to view and purchase.</li> <li>- POST-4: Artist receives confirmation of a successful upload.</li> </ul>
<b>Normal Flow:</b>	<p>1.0 Upload Artwork</p> <ol style="list-style-type: none"> <li>1. Artist selects "Upload Artwork" from the dashboard.</li> <li>2. System prompts Artist to enter artwork details (title, description, price, and optional tags).</li> <li>3. Artist uploads the artwork file.</li> <li>4. System validates the artwork file format and checks if uploaded artwork exist in public database or on the internet.</li> <li>5. System stores the artwork and its metadata in the database.</li> <li>6. System displays a confirmation message to the Artist.</li> <li>7. Artwork becomes visible on the platform for Clients.</li> </ol>
<b>Alternative Flows:</b>	<p>1.1 Invalid Artwork Format</p> <ol style="list-style-type: none"> <li>1. Artist uploads an unsupported file format.</li> <li>2. System informs the Artist about supported formats (e.g., JPG, PNG).</li> <li>3. Artist uploads a valid format and returns to step 4 of the normal flow.</li> </ol> <p>1.2 Artwork already exist</p> <ol style="list-style-type: none"> <li>1. Uploaded artwork already exist in public database or on the internet.</li> <li>2. Flag the artwork for admin review and notify the artist.</li> </ol> <p>1.3 Missing Required Details</p> <ol style="list-style-type: none"> <li>1. Artist submits artwork details without filling in required fields (e.g., title or price).</li> <li>2. System prompts the Artist to complete the missing fields.</li> <li>3. Artist completes the details and</li> <li>4. Return to step 1 of normal flow.</li> </ol>
<b>Exceptions:</b>	<p>1.0.E1 <b>System Error During Upload</b></p> <ol style="list-style-type: none"> <li>1. System encounters an error while uploading the artwork file.</li> <li>2. System informs the Artist and provides the option to retry or contact support.</li> <li>3. If the Artist retries successfully, continue from step 4 of the normal flow.</li> </ol> <p>1.0.E2 <b>Network Disruption</b></p> <ol style="list-style-type: none"> <li>1. System detects a network issue during the upload process.</li> <li>2. System informs the Artist and saves the progress temporarily.</li> <li>3. Artist retries once the network is stable, and the system resumes from the saved state.</li> </ol>
<b>Business Rules</b>	<ul style="list-style-type: none"> <li>- BR-1: All artwork must have a minimum price set by the platform (e.g., \$10).</li> <li>- BR-2: Only logged-in Artists can upload artwork.</li> <li>- BR-3: Maximum file size for artwork upload is 10 MB.</li> </ul>
<b>Assumptions:</b>	<ul style="list-style-type: none"> <li>- Assume that 80% of Artists upload artwork as image files.</li> <li>- Assume that Artists are familiar with the platform's supported file formats.</li> </ul>

Table 2.1.3: Use case 3

<b>Use Case ID:</b>	UC- 4
<b>Use Case Name:</b>	View Artwork
<b>Actors:</b>	Primary Actor: Client Secondary Actor: System Database
<b>Description:</b>	A client views details of an artwork displayed on the platform.
<b>Trigger:</b>	Client selects an artwork from the gallery.
<b>Preconditions:</b>	PRE-1: Artwork is available on the platform. PRE-2: Client is logged into the system.
<b>Postconditions:</b>	POST-1: Client can see detailed information about the artwork.
<b>Normal Flow:</b>	1. Client clicks on an artwork. 2. System fetches and displays artwork details.
<b>Alternative Flows:</b>	None
<b>Exceptions:</b>	1.0.E1 Artwork Not Found - System informs the client that the artwork is unavailable.
<b>Business Rules</b>	BR-1: Only published artworks are visible.
<b>Assumptions:</b>	Assume artworks have clear and detailed descriptions.

Table 2.1.4: Use case 4

<b>Use Case ID:</b>	UC-5
<b>Use Case Name:</b>	Search Artwork
<b>Actors:</b>	Primary Actor: Client Secondary Actor: System
<b>Description:</b>	A client searches for artworks using Singular Value Decomposition collaborative. SVD collaborative will search the artwork based on likes, purchase, follow etc.
<b>Trigger:</b>	Client enters a search term.
<b>Preconditions:</b>	PRE-1: Artwork exists in the database.
<b>Postconditions:</b>	POST-1: Client sees search results matching the criteria.
<b>Normal Flow:</b>	1. Client enters a search term. 2. System processes the query and displays results.
<b>Alternative Flows:</b>	None
<b>Exceptions:</b>	1.0.E1 No Results Found - System informs the client that no matches were found.
<b>Business Rules</b>	BR-1: Search results must be relevant to the criteria.
<b>Assumptions:</b>	Assume clients use common keywords for searches.

Table 2.1.5: Use case 5

<b>Use Case ID:</b>	UC-6
<b>Use Case Name:</b>	Purchase Artwork



<b>Actors:</b>	Primary Actor: Client Secondary Actor: Payment Gateway
<b>Description:</b>	A client purchases an artwork through secure payment processing.
<b>Trigger:</b>	Client clicks "Buy" on an artwork.
<b>Preconditions:</b>	PRE-1: Client is logged into the system. PRE-2: Client has a valid payment method.
<b>Postconditions:</b>	POST-1: Transaction is recorded in the system. POST-2: Client receives a receipt.
<b>Normal Flow:</b>	1. Client clicks "Buy" on an artwork. 2. System displays payment details. 3. Client confirms the Payment. 4. System processes the payment securely. 5. System confirms the transaction and sends a receipts.
<b>Alternative Flows:</b>	1.1 Insufficient Funds - System informs the client of payment failure. - Client updates payment details and retries
<b>Exceptions:</b>	1.0.E1 Network Failure - System saves transaction progress and prompts the client to retry later.
<b>Business Rules</b>	BR-1: Only logged-in clients can make purchases.
<b>Assumptions:</b>	Assume clients have valid payment credentials.

Table 2.1.6: Use case 6

<b>Use Case ID:</b>	UC-7
<b>Use Case Name:</b>	Updated Profile
<b>Actors:</b>	Primary Actor: User Secondary Actor: System
<b>Description:</b>	A user updates their profile information, such as name, profile picture, bio and can add certifications.
<b>Trigger:</b>	User selects the "Edit Profile" option.
<b>Preconditions:</b>	PRE-1: User is logged into the system. PRE-2: User has an existing profile
<b>Postconditions:</b>	POST-1: Updated profile information is stored in the system. POST-2: User sees the updated profile.
<b>Normal Flow:</b>	1. User selects "Edit Profile" from their dashboard. 2. System displays the current profile information. 3. User updates the desired fields and confirms changes. 4. System validates the input and saves the changes. 5. System displays the updated profile.
<b>Alternative Flows:</b>	None
<b>Exceptions:</b>	1.0.E1 System Error During Update - System informs the user and provides the option to retry later
<b>Business Rules</b>	BR-1: Only logged-in users can update their profiles
<b>Assumptions:</b>	Assume users update their profiles periodically.

Table 2.1.7: Use case 7

<b>Use Case ID:</b>	UC-8
<b>Use Case Name:</b>	Manage Users
<b>Actors:</b>	Primary Actor: Admin Secondary Actor: System

<b>Description:</b>	Admin manages user accounts by activating, deactivating, or modifying user information.
<b>Trigger:</b>	Admin selects "Manage Users" from the admin panel.
<b>Preconditions:</b>	PRE-1: Admin is logged into the system.
<b>Postconditions:</b>	POST-1: User account changes are saved in the system.
<b>Normal Flow:</b>	1.Admin selects Manage Users. 2. System displays the list of users. 3. Admin selects a user to modify. 4. Admin updates the account status or details. 5. System saves the changes and updates the database.
<b>Alternative Flows:</b>	None
<b>Exceptions:</b>	1.0.E1 Unauthorized Access - System denies access if the user is not an admin.
<b>Business Rules</b>	BR-1: Only admins can access user management features.
<b>Assumptions:</b>	Assume admins manage accounts responsibly.

Table 2.1.8: Use case 8

<b>Use Case ID:</b>	UC -9
<b>Use Case Name:</b>	Generate Report
<b>Actors:</b>	Primary Actor: Admin Secondary Actor: System
<b>Description:</b>	Admin generates reports on platform activities such as sales, user registrations, or artwork uploads.
<b>Trigger:</b>	Admin selects "Generate Report" from the admin panel.
<b>Preconditions:</b>	PRE-1: Admin is logged into the system PRE-2: Relevant data exists in the system.
<b>Postconditions:</b>	POST-1: Report is generated and displayed or downloaded.
<b>Normal Flow:</b>	1. Admin selects Generate Report. 2. System prompts for report type (e.g., sales, registrations, artwork upload). 3. Admin selects the desired type and date range 4. System generates the report and displays it. 5. Admin can download the report if required.
<b>Alternative Flows:</b>	None
<b>Exceptions:</b>	1.0.E1 Data Unavailable - System informs the admin if no data exists for the selected criteria.
<b>Business Rules</b>	BR-1: Only admins can access the reporting feature.
<b>Assumptions:</b>	Assume admins frequently generate reports for insights.

Table 2.1.9: Use case 9

<b>Use Case ID:</b>	UC-10
<b>Use Case Name:</b>	Comment on Artwork
<b>Actors:</b>	Primary Actor: User Secondary Actor: System
<b>Description:</b>	A user comments on an artwork to share feedback or ask questions.
<b>Trigger:</b>	User selects the option to add a comment

<b>Preconditions:</b>	PRE-1: User is logged into the system. PRE-2: Artwork is available for commenting.
<b>Postconditions:</b>	POST-1: Comment is saved and visible to other users.
<b>Normal Flow:</b>	1. User selects "Add Comment" under an artwork 2. System prompts the user to enter a comment 3. User submits the comment. 4. System validates and saves the comment 5. Comment becomes visible on the artwork page.
<b>Alternative Flows:</b>	None
<b>Exceptions:</b>	1.0.E1 Comment Moderation - System flags inappropriate comments and notifies the user.
<b>Business Rules</b>	BR-1: Only logged-in users can comment.
<b>Assumptions:</b>	Assume users provide constructive and respectful feedback.

Table 2.1.10: Use case 10

<b>Use Case ID:</b>	UC-11
<b>Use Case Name:</b>	Follow Artist
<b>Actors:</b>	Primary Actor: User Secondary Actor: System
<b>Description:</b>	A user follows an artist to receive updates about their new artworks.
<b>Trigger:</b>	User selects the "Follow" option on an artist's profile.
<b>Preconditions:</b>	PRE-1: User is logged into the system. PRE-2: Artist profile exists on the platform.
<b>Postconditions:</b>	POST-1: User is added to the artist's followers list. POST-2: User receives updates from the artist.
<b>Normal Flow:</b>	1. User views an artist's profile. 2. User clicks "Follow." 3. System updates the followers list. 4. User receives confirmation of the follow action.
<b>Alternative Flows:</b>	None
<b>Exceptions:</b>	None
<b>Business Rules</b>	BR-1: Only logged-in users can follow artists.
<b>Assumptions:</b>	Assume users follow artists to stay engaged with their work.

Table 2.1.11: Use case 11

### 3.3.Functional Requirements

The goal of the Artistry Hub app is to provide a dynamic environment for artists and art lovers. It has all the necessary features in a number of important categories. Password recovery and email confirmation are made possible by user registration and authentication, which also enables safe account creation by social media or email. Users can access, modify, and manage their profiles with User Profile Management, which also allows them to delete their accounts and change their passwords. Digital artworks can be uploaded and categorized by users using the Art Upload and Management tool. Users may simply locate artwork with the help of Art Discovery and Search's powerful search features. Comments, likes, and sharing options encourage user interaction through social interaction and community engagement. The Art Sales and Transactions function facilitates the safe purchase and sale of artwork. Lastly, the

Administrator Dashboard and Management gives administrators the ability to oversee user activities and maintain community guidelines, ensuring a smooth and positive user experience. Together, these functionalities create a comprehensive and engaging environment for artists and art lovers.

## User Registration and Authentication

- The system shall allow users to register for an account using an email address and password.
- The system shall send a confirmation email to the user upon successful registration.
- The system shall allow users to log in using their email address and password.
- The system shall implement password recovery functionality, allowing users to reset their passwords via email.
- The system shall support social media login options for user authentication.

<b>Identifier</b>	FR-1
<b>Title</b>	User Registration and Authentication
<b>Requirement</b>	The client shall be able to register using email.  Artist shall be able to register using email, name, password, verified social account.
<b>Source</b>	Stakeholder
<b>Rationale</b>	To enable platform access.
<b>Business Rule</b>	Password complexity enforced.
<b>Dependencies</b>	None
<b>Priority</b>	High

## User Profile Management

- The system shall allow users to view and edit their profile information, including name, email address, and profile picture, artworks.
- The system shall allow users to change their password from the profile management page.
- The system shall allow users to delete their account, which will remove all associated data from the system.

<b>Identifier</b>	FR-2
<b>Title</b>	User Profile Management
<b>Requirement</b>	The user shall manage their profile details.
<b>Source</b>	User
<b>Rationale</b>	To allow personalization.
<b>Business Rule</b>	Only logged-in users can modify.
<b>Dependencies</b>	FR-1
<b>Priority</b>	Medium

## Art Upload and Management

- The system shall allow users to upload digital art files in various formats (e.g., JPEG, PNG, GIF).
- The system shall check the originality of art using Reverse Image Search.
- The system shall provide users with the ability to categorize their uploaded art (e.g. digital).
- The system shall allow users to edit the title, description, and tags of their uploaded art.
- The system shall allow users to delete their uploaded art from their profile.

<b>Identifier</b>	FR-3
<b>Title</b>	Art Upload and Management
<b>Requirement</b>	The artist shall upload artwork with relevant details.
<b>Source</b>	Artist
<b>Rationale</b>	To showcase digital art
<b>Business Rule</b>	Max file size: 10 MB.
<b>Dependencies</b>	FR-2
<b>Priority</b>	High

## Art Discovery and Search

- The system shall provide a search functionality that allows users to search for art by title, artist name, or tags.
- The system shall provide artwork based on previous art that user had liked, follow or purchase.
- The system shall display a gallery of featured art on the homepage, which updates regularly.
- The system shall allow users to filter art based on categories, popularity, and recent uploads.

<b>Identifier</b>	FR-4
<b>Title</b>	Art Discovery and Search
<b>Requirement</b>	Users shall search artworks by keywords or categories.
<b>Source</b>	Client
<b>Rationale</b>	To enable efficient discovery.
<b>Business Rule</b>	Search results within 2 seconds.
<b>Dependencies</b>	FR-3
<b>Priority</b>	High

## Social Interaction and Community Engagement

- The system shall allow users to like and comment on uploaded art.
- The system shall enable users to follow other artists and receive notifications of their new uploads.
- The system shall provide a messaging feature (link to WhatsApp) that allows users to communicate with each other privately.

<b>Identifier</b>	FR-5
<b>Title</b>	Social Interaction and Community Engagement
<b>Requirement</b>	Users shall comment on artworks for feedback.
<b>Source</b>	User
<b>Rationale</b>	To foster community interaction.
<b>Business Rule</b>	Moderation required for comments.
<b>Dependencies</b>	FR-4
<b>Priority</b>	Medium

## Art Sales and Transactions

- The system shall allow users to list their art for sale, including setting a price and payment method.
- The system shall implement a secure payment processing system for transactions.
- The system shall send notifications to users regarding the status of their sales (e.g., sold, pending, cancelled).

<b>Identifier</b>	FR-6
<b>Title</b>	Art Sales and Transaction
<b>Requirement</b>	Users shall purchase digital artworks securely.
<b>Source</b>	Client
<b>Rationale</b>	To facilitate transactions.
<b>Business Rule</b>	PCI DSS compliance required.
<b>Dependencies</b>	FR-4
<b>Priority</b>	High

## Admin Dashboard and Management

- The system shall provide an admin dashboard for monitoring user activity and content.
- The system shall allow admins to manage user accounts, including suspending or deleting accounts.
- The system shall enable admins to review and moderate uploaded art to ensure compliance with community guidelines.

<b>Identifier</b>	FR-7
<b>Title</b>	Admin Dashboard and Management
<b>Requirement</b>	Admins shall manage user accounts.

<b>Source</b>	Admin
<b>Rationale</b>	To ensure platform security.
<b>Business Rule</b>	Admin access restrictions apply.
<b>Dependencies</b>	FR-1
<b>Priority</b>	High

### **3.4.Non-Functional Requirements**

The Artistry Hub application's nonfunctional requirements center on guaranteeing a topnotch user experience and system performance.

At least 1000 users must be able to access the platform at once without experiencing any performance issues, and user activities must respond in less than two seconds to keep users interested.

With an annual uptime objective of 99.9%, reliability is essential to guaranteeing users' and in order to safeguard user information, sensitive data must be encrypted using AES-256. Prioritizing usability also means making sure the interface is easy to use and intuitive, with a minimum score of 80% on the System Usability Scale. Scalability is crucial because it enables the system to accommodate a possible 200% increase in user load without requiring a major redesign. Taken together, these specifications guarantee that Artistry Hub provides a dependable, safe, and user-focused experience.

#### **Usability**

The system must pass user testing with a usability score of at least 80% on the System Usability Scale (SUS). A high usability score means that consumers can easily explore and use the platform. This criterion guarantees that the application satisfies the requirements and expectations of its users while highlighting the significance of user-centered design.

#### **Scalability**

A 200% increase in user load must be supported via horizontal scalability in the system architecture. The ability of the program to scale with its user base is guaranteed. In order to accommodate future expansion, the platform must be able to manage higher traffic volumes without experiencing major rework or outages.

#### **Compatibility**

The program must work with the most recent iterations of the three main web browsers (Chrome, Firefox, and Safari). Making sure the platform is compatible with widely used web browsers enables a larger audience to use it without any problems. By accommodating users who could have varied browser preferences, this requirement improves accessibility in general.

#### **Data Integrity**

Throughout transactions, the system must guarantee data integrity with a failure rate of less than 0.01%. To keep users' trust, data integrity is essential. For financial transactions and user-

generated content in particular, a low transaction failure rate guarantees accurate and trustworthy user data.

## **Accessibility**

The application must adhere to the accessibility guidelines of WCAG 2.1 Level AA. Making the platform accessible guarantees that people with impairments can use it efficiently. All users can interact with the information in an inclusive setting when specified criteria are followed.

## **Maintainability**

With no more than one hour of downtime every month, the system will support new additions and code changes. For an application to remain up to date and functional, maintainability is crucial. Reducing downtime during updates guarantees that consumers may keep using the platform while enhancements are being implemented, which raises user satisfaction levels all around.

## **Security**

All sensitive user data, including passwords and payment details, must be encrypted by the system using AES-256. Security is crucial, particularly when handling private data. Data encryption ensures adherence to data protection laws and fosters user confidence in the platform by shielding it from illegal access and breaches.

## **Performance**

At least 1000 people must be able to access the system at once without experiencing any performance issues. For an art-sharing network that might see surges in traffic during events, promotions, or peak hours, these criteria guarantee that the site can support a sizable number of users concurrently. Sustaining performance while under load guarantees a seamless user experience and helps avoid crashes.

## **Response Time**

Under typical load circumstances, the system must react to user operations (such as uploads and searches) in less than two seconds. For users to be satisfied, response times must be fast. Users may lose patience and quit the platform if activities take too long to process. For the majority of web applications, a target of two seconds is widely seen as acceptable, resulting in a more interesting and pleasurable user experience.

## **Availability**

With the exception of planned maintenance, the system must have a 99.9% uptime rate during a 12-month period. High availability is essential for user engagement and confidence. A goal of 99.9% uptime guarantees that the platform is dependable and reduces downtime, which could result in lost users and income, as consumers expect to access it at any time.



## 4. Design and Architecture

Agile development offers significant advantages for Artistry Hub, enabling the platform to effectively meet the dynamic demands of the digital art market. Its iterative and flexible approach allows for rapid adjustments based on evolving user preferences and feedback, ensuring that the platform remains aligned with the needs of its users. By prioritizing stakeholder and end-user involvement, Agile fosters a user-centric design process that results in a more intuitive and engaging experience for artists and art enthusiasts alike. The methodology's emphasis on delivering functional increments allows for quicker time-to-market, enabling users to access essential features sooner while ongoing improvements are made. Furthermore, Agile practices such as continuous integration and testing facilitate the early detection and resolution of issues, enhancing the overall quality and reliability of the software. The collaborative nature of Agile also promotes innovation and creativity, which are vital for a multidisciplinary project like Artistry Hub, where marketing, development, and design must work in harmony to create a successful and appealing platform. Overall, Agile development not only streamlines the development process but also ensures that Artistry Hub remains responsive to the ever-changing landscape of digital art.

### 4.1. System Architecture

The system architecture of Artistry Hub is designed using a modular approach, which enhances organization, maintainability, and scalability. This architecture consists of several key components, each responsible for specific functionalities, allowing for seamless interaction and data flow between modules. Below is a brief overview of the architecture:



Figure 3.1: System Architecture

## 4.2.Data Representation

In data representation, the flow of the data is represented. Basically, data flow diagrams are used to graphically illustrate the movement of data through a system.

### 4.2.1. Data Flow Diagram

Level 0:

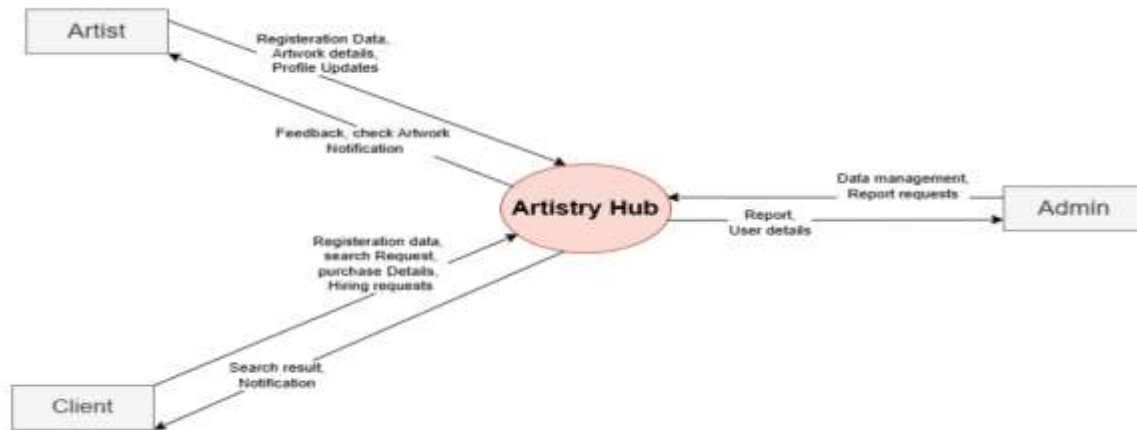


Figure 3.2.1: DFD level 0

#### 1. External Entities (Actors):

- **Artist:** Contributes artwork details, updates their profile, and manages artwork.
- **Client:** Registers, searches for artwork and purchases items.
- **Admin:** Handles system data management and generates reports.

#### 2. Process (Artistry Hub):

- The central processing hub that interacts with all the actors, manages their data, processes requests, and maintains system integrity.

#### 3. Flows:

- **Artist → Artistry Hub:**
  - Sends registration data.
  - Provides artwork details (uploads, edits, deletes).
  - Updates their profile.
- **Client → Artistry Hub:**
  - Sends registration data.
  - Initiates search requests for artwork.
  - Completes purchases and sends hiring requests.
- **Admin → Artistry Hub:**
  - Sends data management commands to update the database.
  - Requests for reports to monitor the system or analyze trends.

## -Level 1:

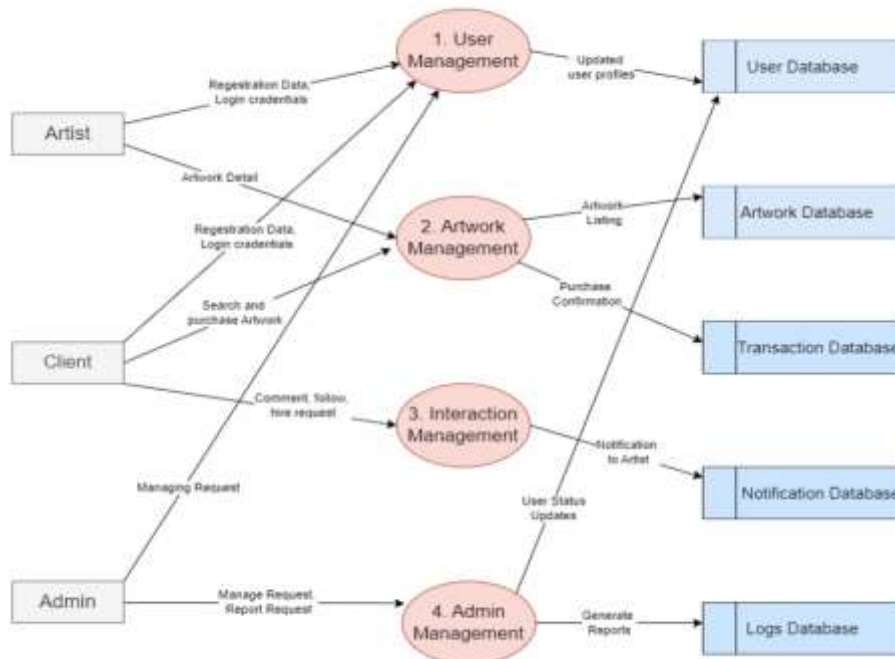


Figure 3.2.2: DFD level 1

### 1. External Entities (Actors):

- **Artist:** Contributes artwork details, updates their profile, and manages artwork.
- **Client:** Registers, search for artwork and purchases items.
- **Admin:** Handles system data management and generates reports.

### 2. Process:

- **User Login:** Handles login requests for all users.
- **Artwork Management:** Manages the uploading, searching, and purchasing of artworks.
- **Interaction Management:** Handles comments and follow actions on the platform.
- **Admin Management:** Manages admin-specific tasks, such as user management and report generation.

### 3. Databases:

- **User Database:** Stores user credentials and profiles.
- **Artwork Database:** Stores details about artworks.
- **Transaction Database:** Stores details about transactions and payments.
- **Notification Database:** Manages notifications such as comments and follows.
- **Logs Database:** Logs all user actions for monitoring and auditing purposes.

### 4. Flows:

- **Artist → User Management:**
  - Sends registration data.

- Enter Login credentials.
- **Artist → Artwork Management:**
  - Sends artwork details
- **Client → User Management:**
  - Sends registration data.
  - Enter Login credentials.
- **Client → Artwork Management:**
  - Search and purchase artwork.
- **Client → Interaction Management:**
  - Comment on artwork.
  - Follow an artist
- **Admin → User Management:**
  - Manage requests
- **Admin → Admin Management:**
  - Manage requests
  - Report request
- **User Management → User Database:**
  - Updated user profiles
- **Artwork Management → Artwork Database:**
  - Lists the artwork
- **Artwork Management → Transaction Database:**
  - Confirmation about purchase
- **Interaction Management → Notification Database:**
  - Sends notification to artist
- **Admin Management → User Database:**
  - Sends updated user status
- **Admin Management → Logs Database:**
  - Generate reports about user (actor, admin, client)

## Level 2:

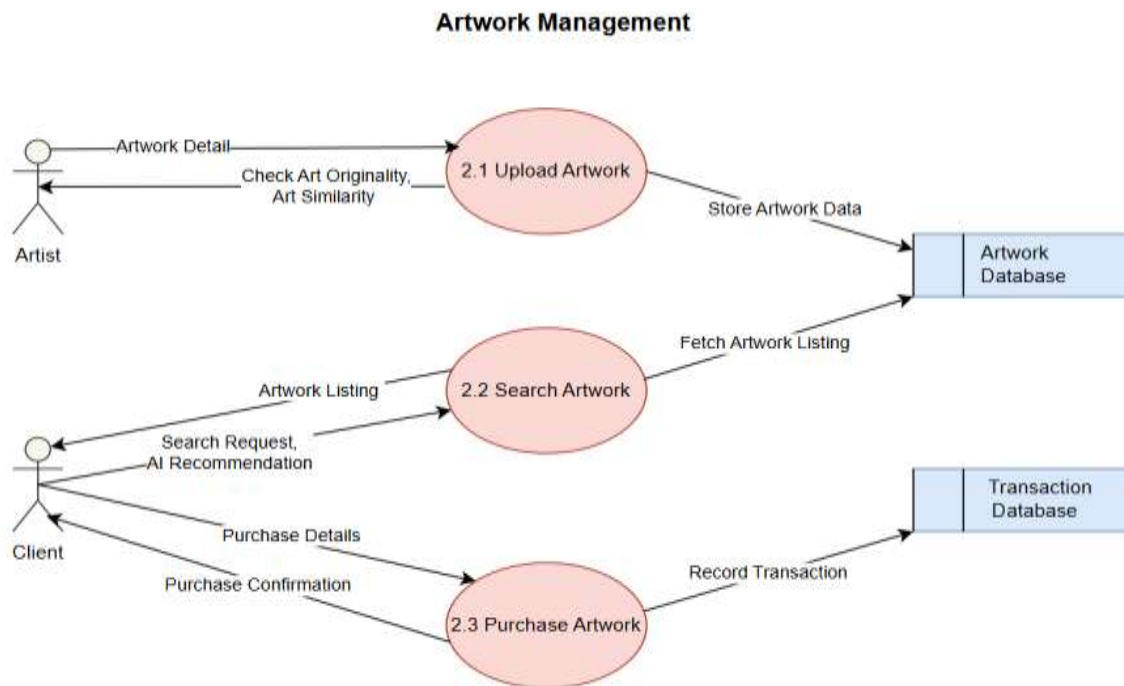


Figure 3.2.3: DFD level 2

### 1. Actors:

- **Artist:** The person who creates and uploads artwork into the system.
- **Client:** The customer who searches for and purchases artwork.

### 2. Processes:

- **Artwork Management:** This is the main process area for managing artwork.
  - **Upload Artwork:** This process handles the uploading of artwork details by the artist.
  - **Search Artwork:** This process allows the client to search for available artwork.
  - **Purchase Artwork:** This process involves the client making a purchase after finding an artwork they are interested in.

### 3. Databases

- **Artwork Database:** This database stores the details about the artwork, including the artist's input in Upload Artwork and the listings that clients can search for.
- **Transactions Database:** This database stores information about purchases made by clients, recorded during the Purchase Artwork process.

#### **4. Data Flows (Arrows)**

- **Artist → Upload Artwork:**
  - The artist provides artwork details to be uploaded into the system.
- **Client → Search Artwork:**
  - The client initiates a search request to find available artwork.
- **Client → Purchase Artwork:**
  - The client proceeds with providing purchase details for the selected artwork.
- **Search Artwork → Artwork Database:**
  - The system fetches artwork listings from the database based on the client's search.
- **Search Artwork → Client:**
  - The search results (listings) are sent back to the client.
- **Purchase Artwork → Client:**
  - The system sends a purchase confirmation back to the client.
- **Upload Artwork → Artwork Database:**
  - Once the artwork is uploaded, its details are stored in the Artwork Database.
- **Purchase Artwork → Transactions Database:**
  - The system records the transaction details in the Transactions Database.

### 4.3.Process Flow/Representation

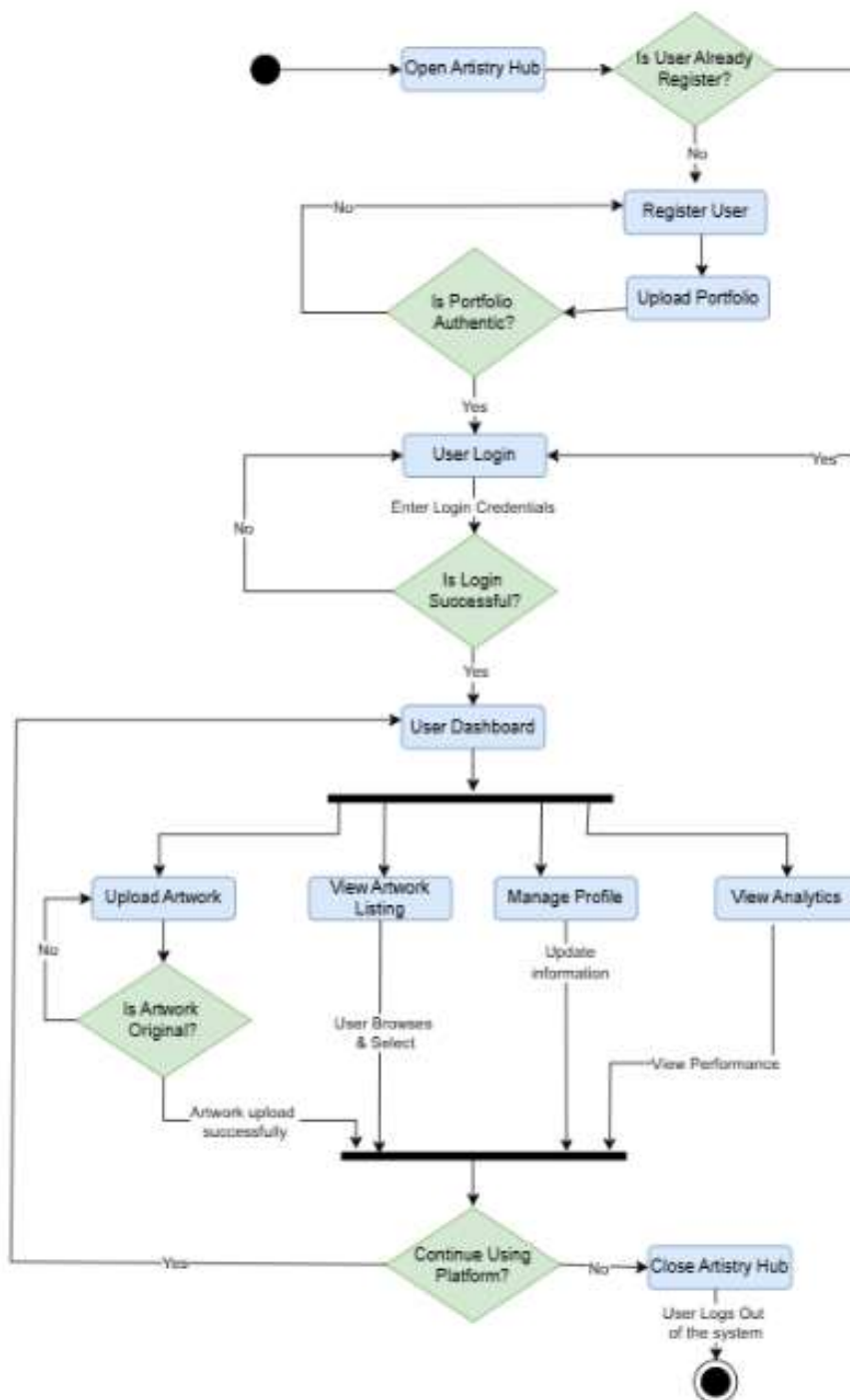


Figure 4.1: process/flow

## 4.4.Design Models

### Entity Relation Diagram

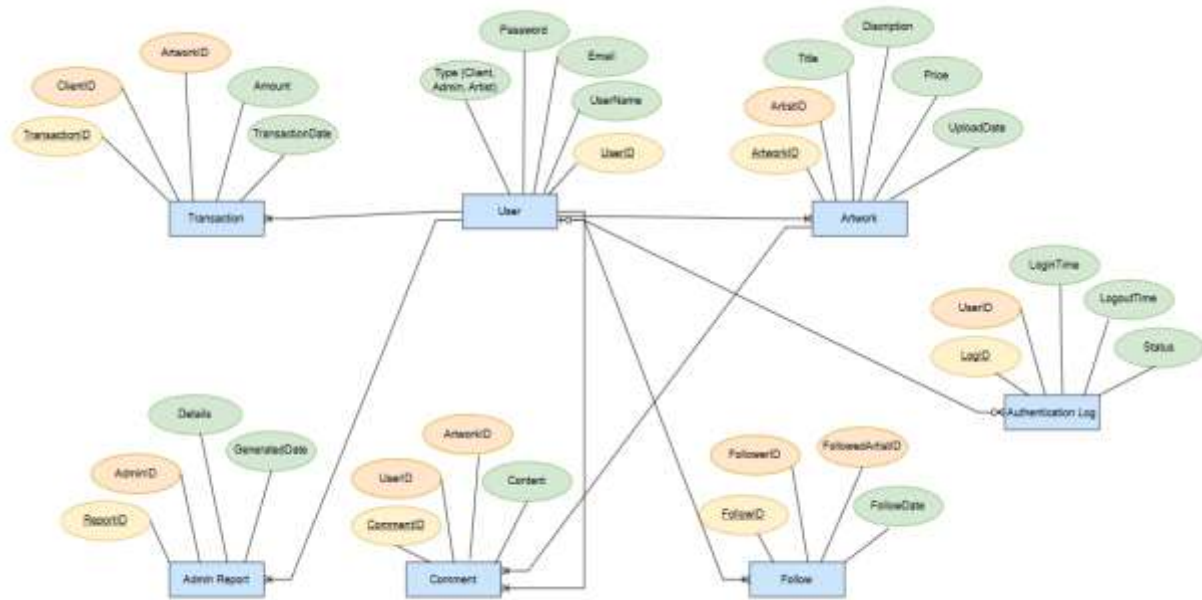


Figure 4.2: ERD

#### Entities and Attributes:

1. **User**
  - **Attributes:** UserID (PK), Email, Username, Password, Type (Artist/Client/Admin).
2. **Artwork**
  - **Attributes:** ArtworkID (PK), Title, Description, Price, UploadDate, Category, ArtistID (FK).
3. **Transaction**
  - **Attributes:** TransactionID (PK), ClientID (FK), ArtworkID (FK), TransactionDate, Amount
4. **Comment**
  - **Attributes:** CommentID, UserID (FK), ArtworkID (FK), Content.
5. **Follow**
  - **Attributes:** FollowID (PK), FollowerID (FK), FollowedArtistID (FK), FollowDate
6. **AdminReport**
  - **Attributes:** ReportID (PK), AdminID (FK), GeneratedDate, Details
7. **AuthenticationLog**
  - **Attributes:** LogID (PK), UserID (FK), LoginTime, LogoutTime, Status



**Relationships:**

**1. User and Artwork**

- One Artist can upload multiple Artworks.
- Relationship: User.UserID = Artwork.ArtistID

**2. User and Transaction**

- One Client can make multiple Transactions.
- Relationship: User.UserID = Transaction.ClientID

**3. User and Comment**

- One User can make multiple Comments on different Artworks.
- Relationship: User.UserID = Comment.UserID

**4. Artwork and Comment**

- One Artwork can have multiple Comments.
- Relationship: Artwork.ArtworkID = Comment.ArtworkID

**5. User and Follow**

- One Client can follow multiple Artists.
- Relationship: User.UserID = Follow.FollowerID
- One Artist can have multiple followers.
- Relationship: User.UserID = Follow.FollowedArtistID

**6. User and AdminReport**

- One Admin can generate multiple Reports.
- Relationship: User.UserID = AdminReport.AdminID

**7. User and AuthenticationLog Relationship:**

- Each user can have multiple authentication logs.
- Relationship: User.UserID = AuthenticationLog.UserID (One-to-Many relationship).