

BBM 498 Software Requirements- DEL3: SRS

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1. Introduction

- 1.1 Purpose

The purpose of this document is to present a detailed description of the ARTHUNT. This document provides features, interfaces, reactions, constraints, business use-case models, business process models and software requirements for ARTHUNT. This document is intended for both the stakeholders and the developers of the system and this document uses IEEE writing standards.

- 1.2 Scope

ARTHUNT is a kind of social media application that aims to bring together talents who have proven their expertise in different fields around the world and employers. By identifying talented individuals in different occupational groups, ARTHUNT not only ensures that talented individuals are employed in better positions and attains higher living standards, but also aims to increase their competitiveness and success potential in the market, and therefore their profitability by choosing the most qualified personnel. By maximizing the work efficiency and production the system will meet the customers of companies needs while remaining easy to understand and use.

With this application, we hope to provide a comfortable user experience along with providing a free environment where users can showcase their talent. Because ARTHUNT will provide uninterrupted and fast accessibility from anywhere in the world with the opportunity to follow current trends in the world. Although there are applications (Linkedin, etc.) designed for similar purposes today, none of these applications have a feature for individuals to freely and comfortably display their talents. ARTHUNT will be the best choice in order to fix deficiencies in existing applications. ARTHUNT will meet functional, social and emotional needs of all users, especially talented users, companies and advertisers in different manners.

- 1.3 Definitions, acronyms, and abbreviations

Term	Definition
Advertiser	A person or company that advertises a product, service, or event
ArtHunt	A kind of social media application that aims to bring together talented persons and employers.
Artwork	Illustrations, photographs, or other non-textual material prepared for inclusion in a publication.

Author	Person submitting an article to be reviewed. In case of multiple authors, this term refers to the principal author, with whom all communication is made.
Database	Collection of all the information monitored by this system.
Janitor	Administrators of the system.
Hunter	Company representatives who seek talented persons.
IT staff	An employee who carries out any of the functions of information technology support.
Lawyer	Person who receives articles, sends articles for review, and makes final judgments for publications.
May	Indicates a permissible requirement. (IEEE Writing standard)
Novice	A person who shows his/her talents in ArtHunt.
Payment Service Provider	A third-party company that allows businesses to accept electronic payments, such as credit cards and debit cards.
Saloneer	A person who performs events such as movies etc.
Sponsor	A person or organization that pays for or contributes to the costs involved in staging a sporting or artistic event in return for advertising.
Shall	Indicates a mandatory requirement. (IEEE Writing standard)
Should	Indicates a recommended requirement. (IEEE Writing standard)
Software Requirements Specification	A document that completely describes all of the functions of a proposed system and the constraints under which it must operate. (For example, this document.)
Stakeholder	Any person with an interest in the project who is not a developer.
User	Janitor, novice, saloneer, hunter, advertiser, sponsor, IT staff, lawyer or payment service provider.

- 1.4 References

- IECC. *IEEE Std 830-1998 IEEE Recommended Practice for Software Requirements*

Specifications. IEEE Computer Society, 1998

- <https://www.linkedin.com>

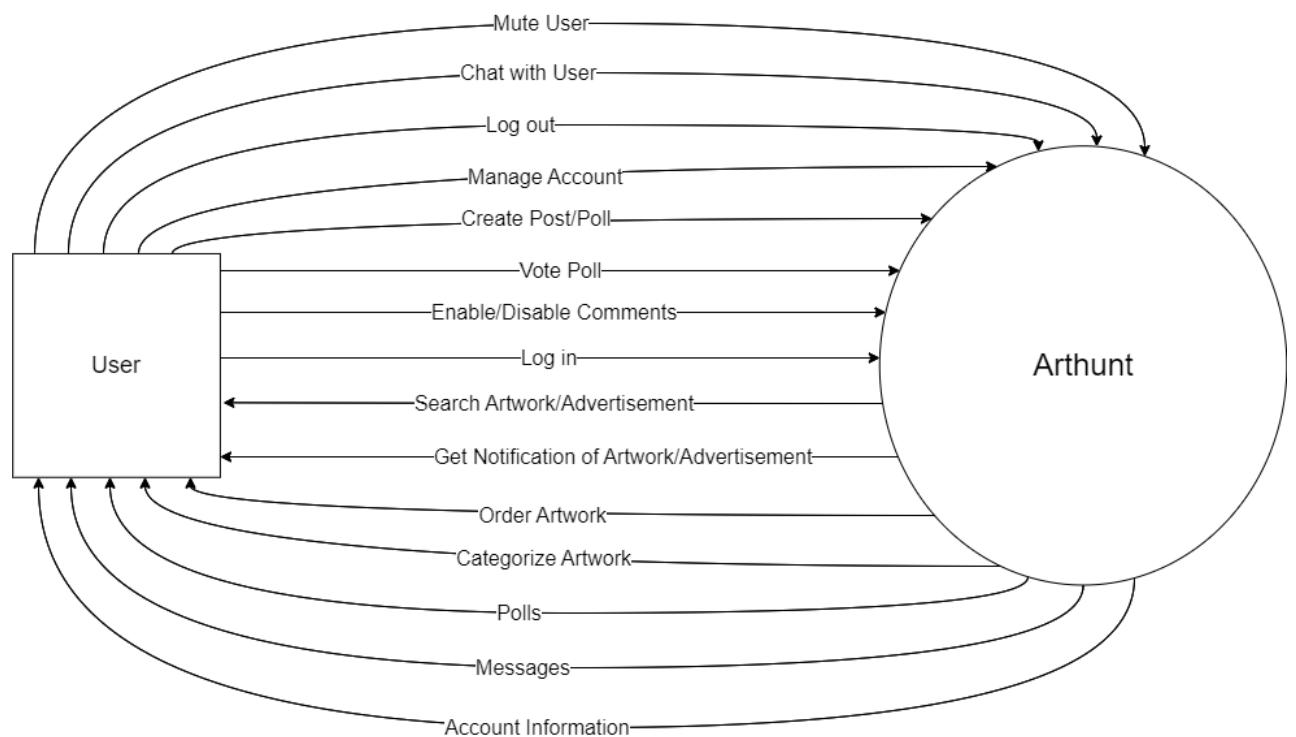
- 1.5 Overview

In the next chapter (Overall Description section) of this document is about an overview of the main functionalities of the product. This section describes non-technical requirements specification and establishes a context for technical requirements of ARTHUNT in the next chapter. In the third chapter (Requirements Specification section) of this document is about technical specifications and development details of applications. As a summary, it is about technical details of functionalities of the ARTHUNT. Both sections of the document describe ARTHUNT in its entirety but are intended for different audiences and thus use different language.

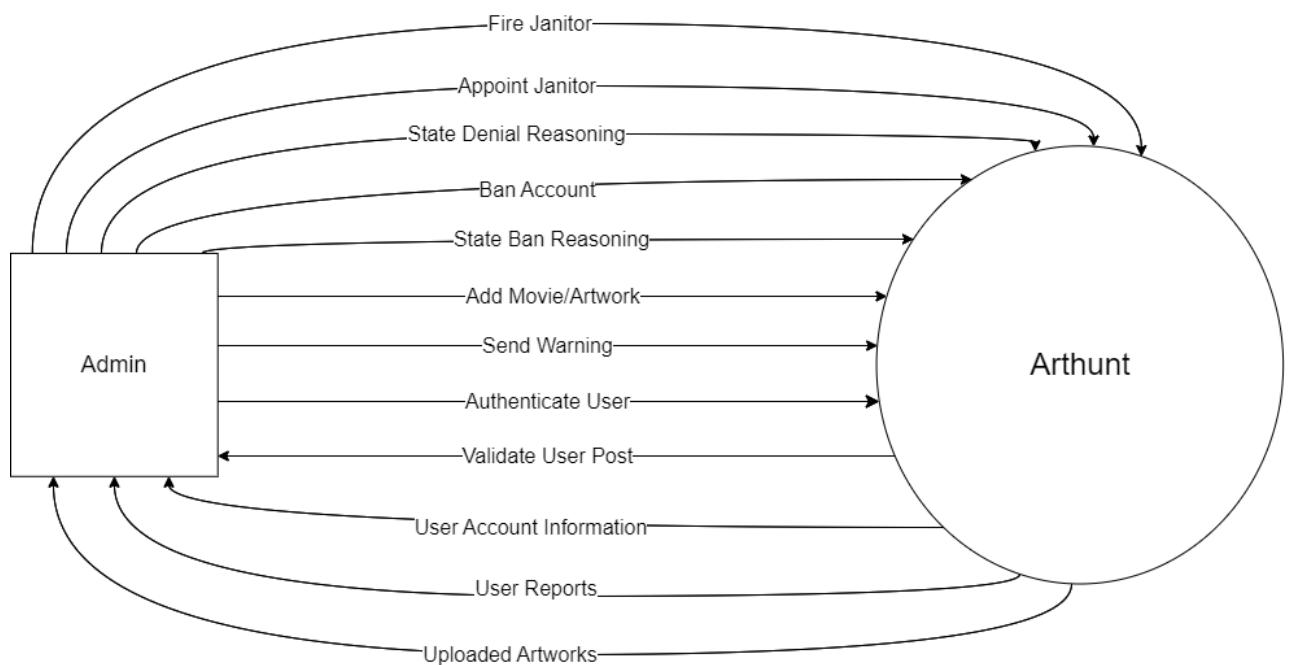
2. Overall description

- 2.1 Product perspective (eg: Context Diagram)

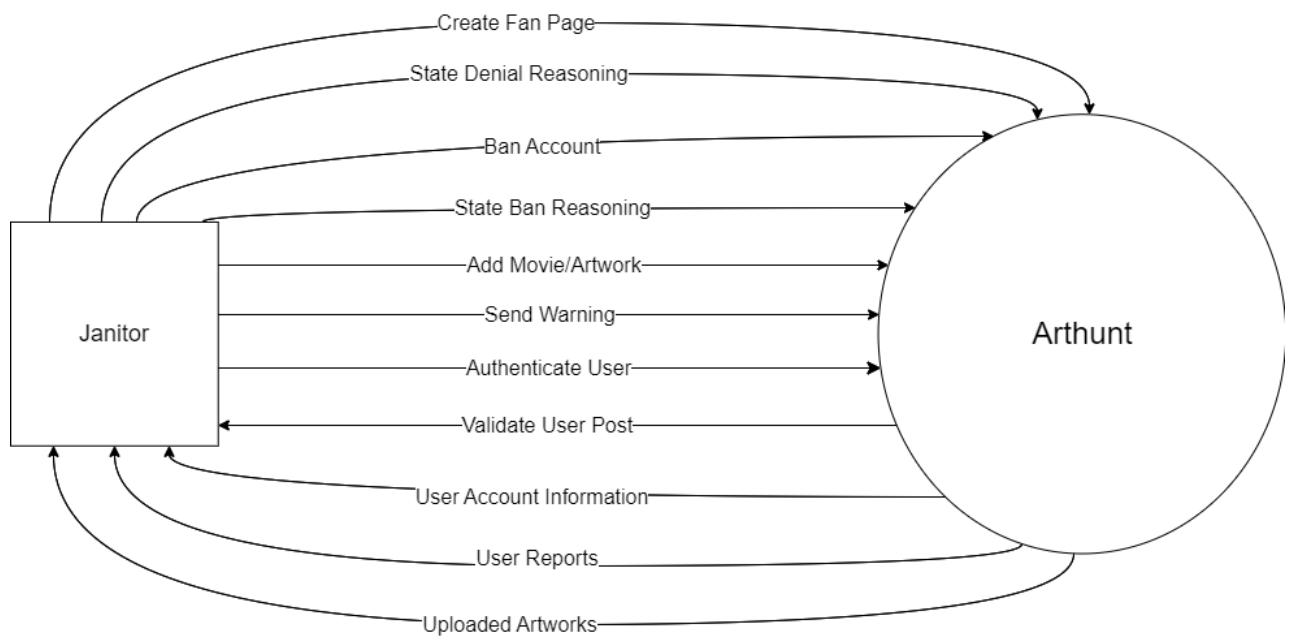
User Context Diagram



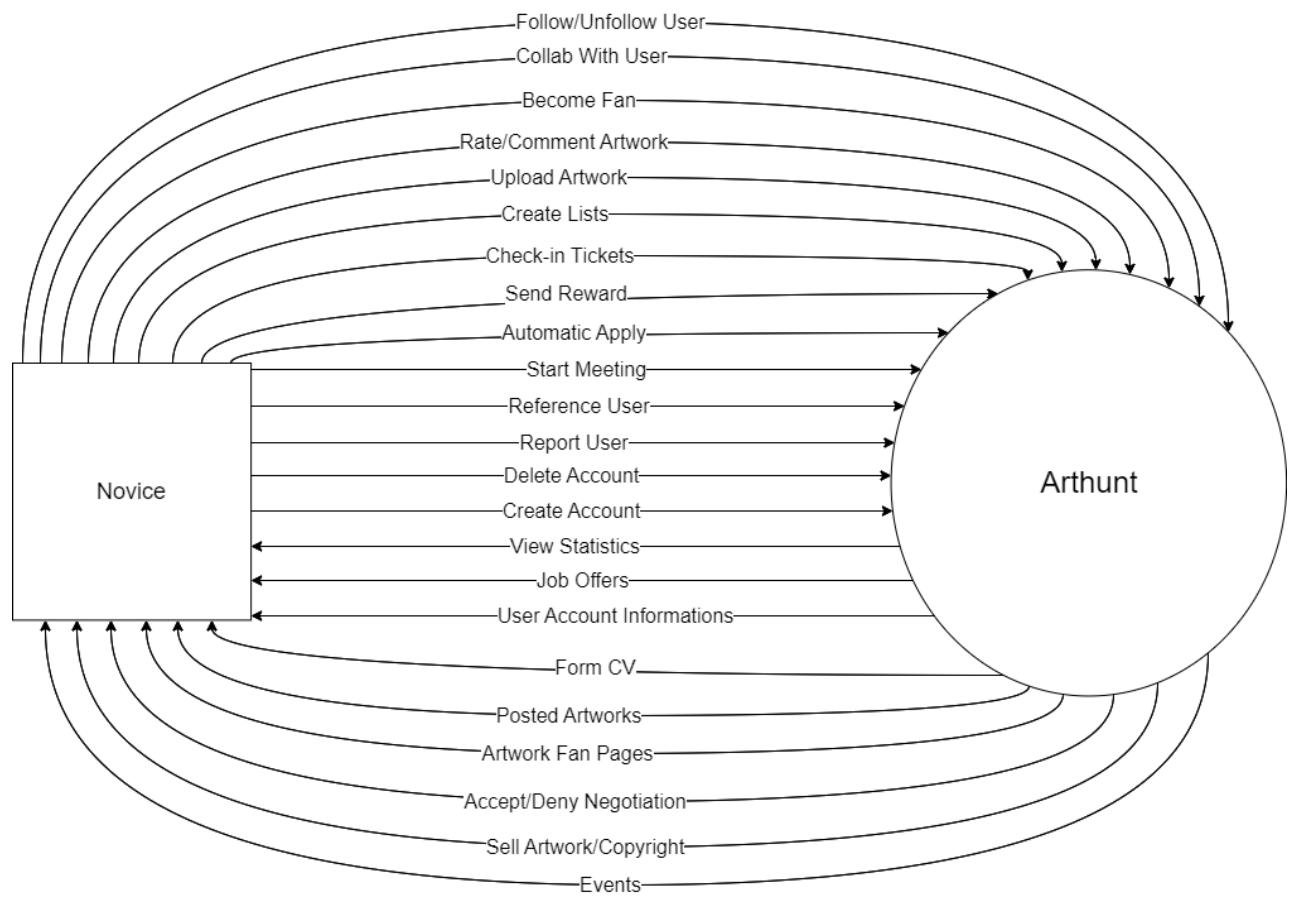
Admin Context Diagram



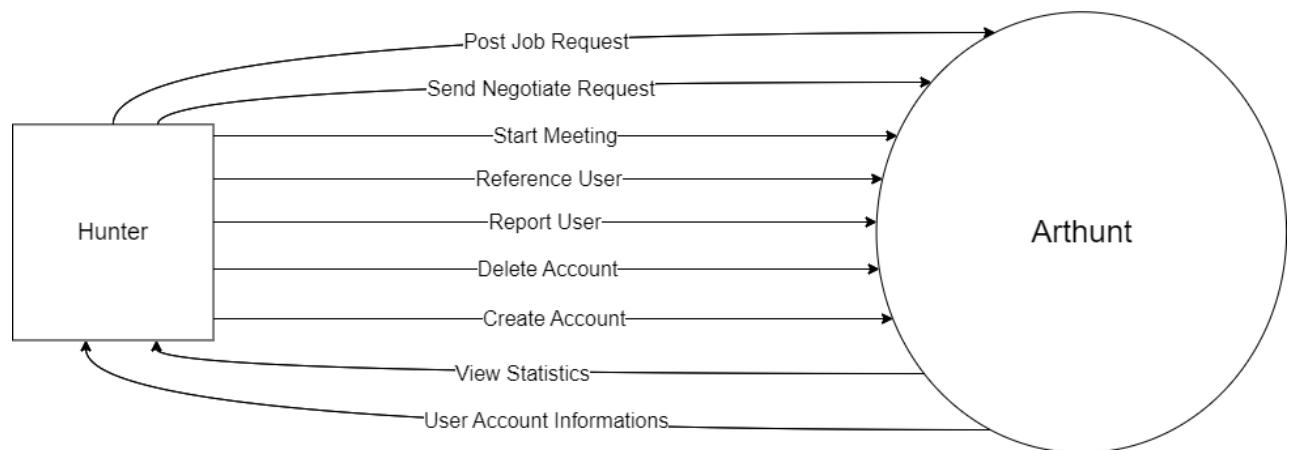
Janitor Context Diagram



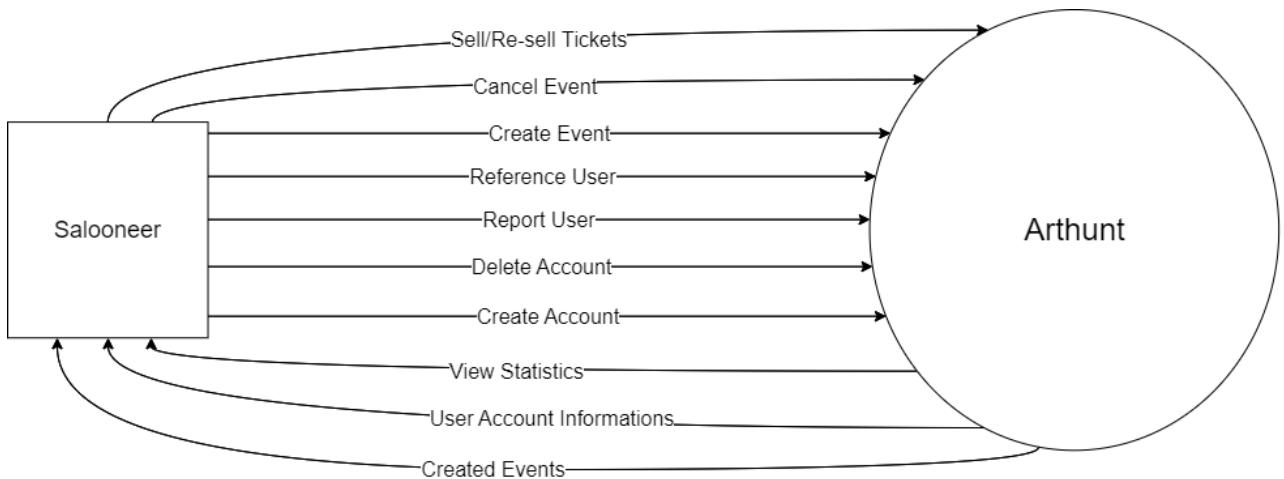
Novice Context Diagram



Hunter Context Diagram



Salooneer Context Diagram



- 2.1.1. System Interfaces

- Web Server: Server is the place where the ArtHunt web site is hosted.
- Device With Web Browser: It is a device that accesses the arthunt website, is connected to the internet and has an internet browser installed.

- 2.1.2. User Interfaces

- The user interface for the software shall be compatible with any browser such as Internet Explorer, Mozilla or Netscape Navigator by which user can access to the system.
- Since ArtHunt is a website, it shall be implemented with HTML, CSS, JS and PHP. User interface of the application shall be easy to use and understandable.
- In order to control the system and enter data, the user shall use a mouse or touchpad and keyboard.
- User interfaces shall have different languages and preferable language can be selected by users.
- Moreover, users are expected to know how to use Android or IOS mobile devices or Windows or Linux desktop devices and to be able to write and read messages and use buttons.

- 2.1.3. Hardware Interfaces

- This application works on mobile devices (Android, IOS etc.) and desktop devices (Linux, Windows etc.).
- Since the application must run over the internet, all the hardware required to connect to the internet will be hardware interface for the system. As for e.g. Modem, WAN – LAN, Ethernet Cross-Cable.

- On the other hand, the application (website) shall be hosted in a web server which contains a relational database. No other hardware is required.

- 2.1.4. Software Interfaces

- Since ArtHunt shall be a website, the required operating system is completely about compatibility between web browsers and operating systems.
- Therefore, it shall work on different devices which are based on Windows, Linux, IOS, Android etc.
- The most important criterion here is that the operating system installed on the device supports the web browser used on the device.
- Since ArtHunt is a web-based project, JavaScript libraries and frameworks shall be used. On the other hand; in recommendation, advertisement etc. staff, data science and machine learning libraries of Python shall be beneficial.
- In addition, website shall use third party plugins in order to provide better user experience, security and performance.
- In the background, ArtHunt's software system shall communicate with the database system.

- 2.1.5. Communication Interfaces

- Communications shall be done with web browsers. Web browsers have different versions. We need to decide whether our website must work ok with all versions or just on a new one.
- Communications shall be done using HyperText Transfer Protocol Secure (HTTPS) in order to provide data and network security over the internet and for the intranet communication will be through TCP/IP protocol suite.
- Online forms shall be used in order to get feedback and data from the users. Direct message (DM) systems and commenting features are the most important ones of them.
- Users shall communicate with messages in different formats such as text, audio, image or video.
- Communication security shall be provided with end-to-end encryption. With this method, anyone including system administrators will not be allowed to read others messages or secret data.
- The Port number used shall be 80.

- 2.1.6 Memory Constraints

- A user may send or upload a file with a maximum size of 8 MB.
- Maximum data transfer rate may be 2 MB per second.
- There should be at least 50 MB of free space on the device. (If an mobile application will be developed)

- 2.1.7 Operations

- The system shall have two different modes: operational and secure.
- In operational mode everything works as it should. There shall be no restrictions (accessibility, speed etc.) in this mode.
- In secure mode there shall be restrictions. In this mode, only admins shall have full access to the system. This mode shall be used during maintenance and in situations where security risk occurs such as huge DDoS attacks.

- 2.1.8 Site Adaptation Requirements

- According to Google (Core Web Vitals), the most important criterion for a web page is Largest Contentful Paint (LCP) time. It is a metric for measuring perceived load speed because it marks the point in the page load timeline when the page's main content has likely loaded a fast LCP helps reassure the user that the page is useful. For Google, a good LCP score is less than 2.5 seconds.
- Most important factor that affects LCP is server response time in other words time to first byte (TTFB). TTFB is a metric that measures the time between the request for a resource and when the first byte of a response begins to arrive. For Google, a good TTFB is 0.8 seconds or less.
- According to Google (Core Web Vitals), another important criterion is First Input Delay (FID) time. FID is the stable Core Web Vital metric for measuring load responsiveness because it quantifies the experience users feel when trying to interact with unresponsive pages—a low FID helps ensure that the page is usable. For Google, a good FID score is less than 100 milliseconds.
- According to Google (Core Web Vitals), the last important criterion is Cumulative Layout Shift (CLS). It measures how much the layout shifts unexpectedly when users are viewing your webpage. A layout shift, or content shift, is any time something on the page visibly changes position within the frame. For Google, a good CLS score is less than 0.1.

- 2.2 Product functions

- Providing a free environment where users can showcase their talent
- Uploading, sharing, showing, rating and commenting artworks
- Creating events and enjoying them together
- Collaborating with other users and enhancing artworks
- Making profit from artworks, providing income for some users
- Providing uninterrupted and fast accessibility from anywhere in the world

- Improved decision making and following current trends for talent hunters

- **2.3 User characteristics**

The user shall be able to use a desktop or mobile device.

The user shall have a valid e-mail, and register the system with using it.

The user shall obey the policies of the system.

- **2.4 Constraints**

- **2.4.1 Regulatory Policies**

ArtHunt is strictly bound by laws and regulations. Therefore ArtHunt shall display the disclaimers, copyright, word mark, trademark and product warranties of the system owner company. ArtHunt has the right to use its legal possibilities in case of violation of legal situations.

In addition, users who log in for the first time will be shown a small consent form at the bottom of the page, including a link to a GDPR (KVKK) clarification text regarding the collection and processing of data of their own actions in order to provide them with a better user experience.

- **2.4.2 Hardware Limitations**

In order for the application to serve smoothly while providing the best user experience, the hosting service must be in TIER-4 standards and include some indispensable additional services (daily backup etc.). Hosting standards can be summarized as follows:

- **Tier 1 Level:** Data centers serving small businesses. Computer systems, electrical and mechanical installations are non-redundant. In general, it does not prevent a power cut of more than 10 minutes. It offers an estimated 99.676% availability.
- **Tier 2 Level:** It includes partial redundancy in energy and cooling systems. It can withstand a 24-hour power outage using a generator. It offers an estimated 99.741% availability.
- **Tier 3 Level:** Includes backup power grid. It includes backup energy and cooling systems. Includes backup service providers. It can withstand a 72-hour outage. It offers an estimated 99.982% availability.
- **Tier 4 Level:** All Tier 3 criteria are met. In addition, it can withstand 96 hours of interruption. There is a staff team working 24/7. The site selection is very strict, and high security measures have been taken.

- **2.4.3 Interfaces to Other Applications**

As arthunt is a versatile application, it will integrate with 3rd party applications to provide the best user experience, the main ones are these:

- Integration with a third-party security app for two-sided verification
- Integration with 3D secure in order to make digital payments securely,

- Integration with Google Analytics for the purpose of processing and analyzing the data collected from users,
- Integration with Google Search Console and Yandex Metrica to increase the SEO performance of the site and to check some important data,
- Integration with Ahrefs to perform keyword analysis and competitor analysis in the SEO studies of the site,
- Integration with Google Pagespeed Insights to measure the overall site performance,
- Integration with third party platforms to analyze the data collected from users from different perspectives will be made.

- 2.4.4 Parallel Operation

In ArtHunt, the main features of the system and the 3rd party applications and integrations which are specified in the 2.4.3 section will work simultaneously, integrated, compatible and parallel.

- 2.4.5 Audit Functions

ArtHunt will have advanced control mechanisms. In addition to manual checks by admins and moderators, automatic message / word filtering, examining the type and quality of shared content (for example, machine learning will be used extensively for image classification etc.); Those who have a risky score above a certain rate in the audits will be automatically punished by the system. For example, accounts that make large amounts of risky and trouble actions (spam, +18, gambling, unauthorized advertising, inappropriate content, etc.) will be shadowbanned, as in famous social media applications.

- 2.4.6 Control Functions

- 2.4.6.1. Input Validity Control

Rules such as whitelisting, blacklisting, formatting, length etc. shall be created, data type validators shall be used, type conversion with strict exception shall be handled, minimum and maximum value range shall be checked for numerical parameters and dates, minimum and maximum length for strings shall be checked, array of allowed values for small sets of string parameters (e.g. days of week) shall be used, allow lists and block lists shall be used, free-form unicode text shall be validated, regular expressions for any other structured data cover in order to provide better user experience and security with preventing input validity attacks such as buffer overflow, SQL injection and cross-site scripting.

- 2.4.6.2. Integrity Control

Input data shall be validated always (preferably risk-based validation may be done), appropriate system and service providers shall be selected, access controls shall be implemented, audit trail shall be kept, data shall be archived and backed up regularly, best security practises shall be adopted and workers may be educated in order to provide better user experience and security via providing better integrity control.

- 2.4.7 Higher-order Language Requirements

In ArtHunt software, professionally designed software components such as functions, modules or objects shall be used. This is a very important step to make the system sustainable by facilitating the maintenance and updating of the program. On the other hand, in programming step models of computation such as lambda calculus which make heavy use of higher-order functions can be used.

- 2.4.8 Signal Handshake Protocols

Handshaking is the process that establishes communication between two networking devices. Handshaking is necessary at the start of each session because typically the modems differ in their vendor, model, or hardware/software configuration. The handshake ensures that communication is possible despite these differences.

- 2.4.9 Reliability Requirements

System should have a high availability ratio. Applicants should access their resume 98% of the time without failure. Also using constant values, using limits, using distributions, using time-dependent profiles may be beneficial in order to improve reliability via avoiding, detecting or tolerating faults in the software and so ensure that these faults do not lead to system failure.

- 2.4.10 Criticality of the Application

ArtHunt is a critical application in different terms. In the field of business, ArtHunt will help determine talented individuals in different occupational groups around the world. With this way companies shall significantly increase their competitiveness and success potential in the market, and thus their profitability, thanks to highly qualified employees. In the field of users (talented people), ArtHunt shall make self-educated qualified people to achieve a higher level of welfare and to lead a fairer life. On the other hand, in the field of making money system owners shall have great opportunities to make profit. Therefore, ArtHunt is an application that aims to be beneficial to every individual who has proven himself/herself.

- 2.4.11 Safety and Security Considerations

Since ArtHunt is a web application, an online ticket (help) system becomes a critical component of the system in order to provide specific guidelines to a user for using the system efficiently. On the other hand, help, link and search fields shall be provided. In the field of security, indispensable security measures such as the use of SSL, end to end asymmetric encryption and storing hash versions of important data such as passwords rather than their original form, will be taken.

- 2.5 Assumptions and dependencies

- Users shall have an internet connection when using an application since it is a web site. It is not a must to have an internet connection after loading the webpage but an internet connection is required in order to load pages and trigger events such as making comments, rating etc.
- Internet browsers installed on users' devices shall be up-to-date and compatible.

- 2.6. Apportioning of requirement

The requirements mentioned in section 2.5 are completely user-related and these ones

require users to have:

- A stable and strong internet connection
- An up-to-date and compatible operating system
- An up-to-date and compatible internet browser

3. Specific requirements

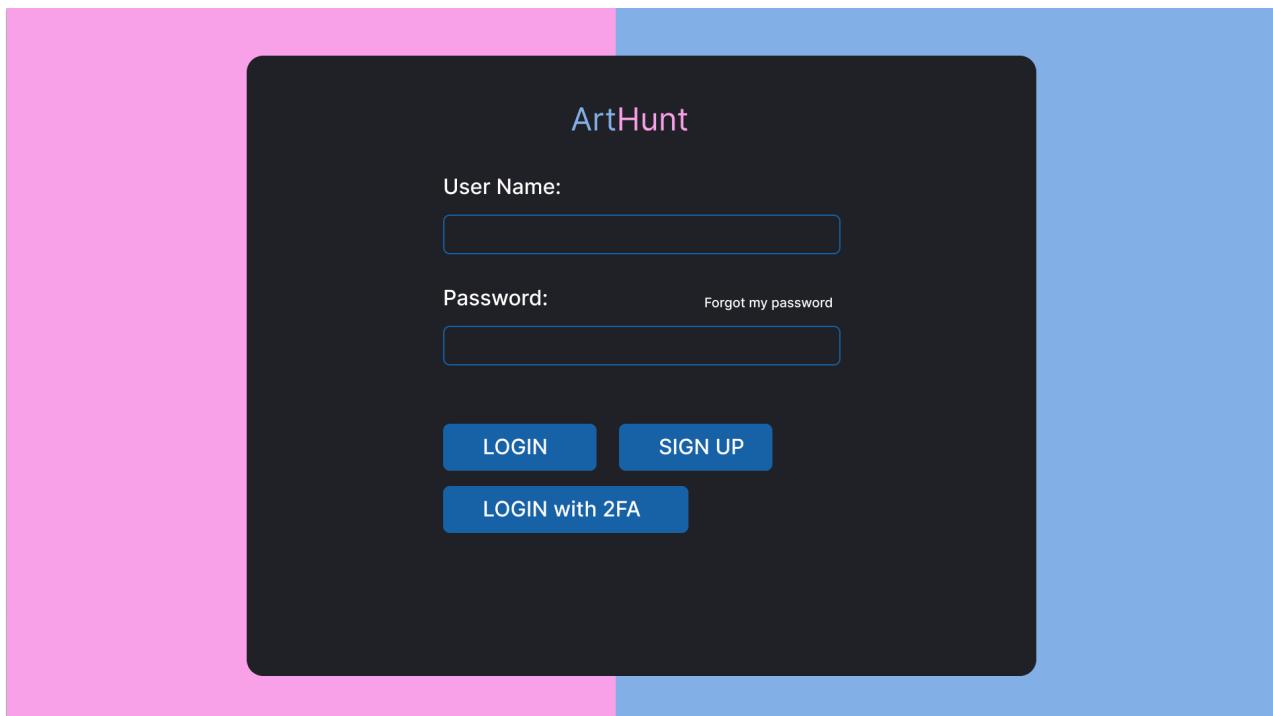
3.1. External interface requirements

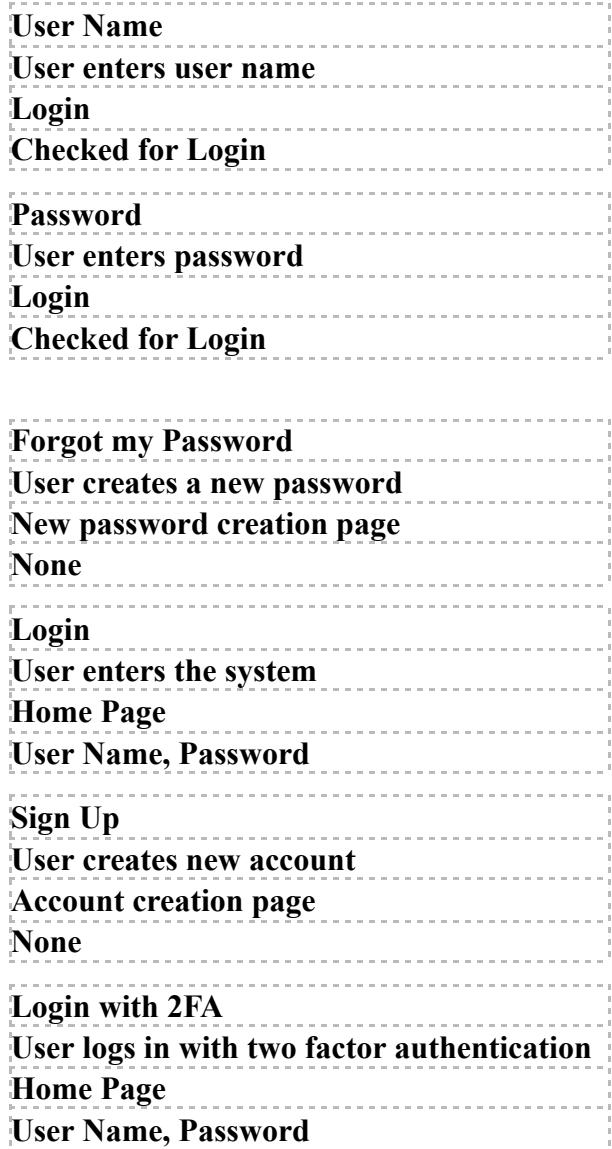
3.1.1 User interfaces (Mockup of each screen).

An example screen design is given below. There are many free mockup and wireframe tools available online. Please use one of them and create UIs of your software.

Login:

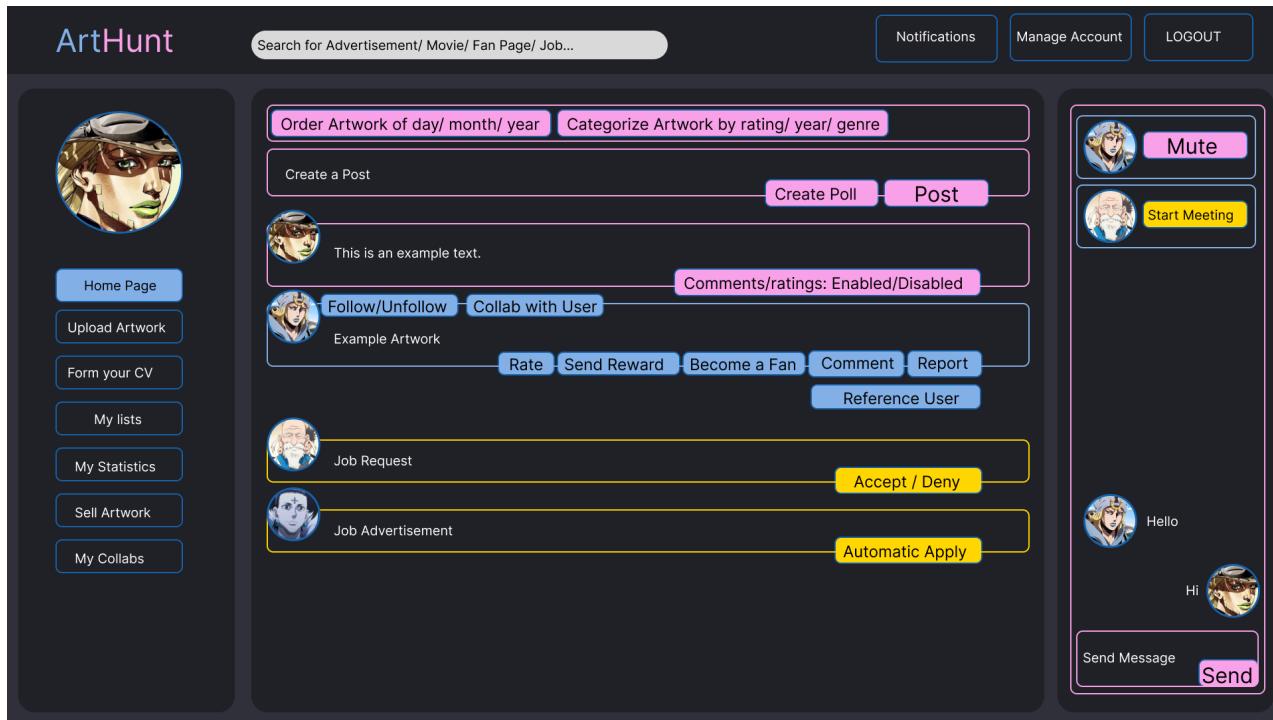
Related Use Cases: Login, Create Account, 2FA for login





Novice:

Related Use Cases: Log out, Report User, Reference User, Rate Saloon/ Artwork, Comment Saloon/ Artwork, Become a Fan of an Art Work, Follow User, Unfollow User, Chat with User, Mute User, Create Post, Search for Advertisement/ Movie/ Fan Page/ Job..., Get Notification of Movie/ User/ Event/ Job ..., Enable comments/ rating, Disable comments/ ratings, Accept/ Deny negotiate request, Start Meeting, Check-in ticket, Create Poll, Vote Poll, Send Reward, Automatic Apply for a job, Order top art work of day/ month/ year, Categorize Art Work by rating/ year/ genre



Search bar

User search for items in the website

Relative searched item

Relative searched item

Notifications

User gets notifications

Activities in the system

Relative activity

Manage Account

User edits account information

Manage Account Page

Every item in the management page

Logout

User logs out from the website

Login Page

None

Order Artwork

User orders artworks

Displayed Artworks

Artworks in the website

Categorize Artwork

User categorizes artworks by a criteria

Displayed Artworks

Artworks in the website

Create Poll

User creates a poll

User's own profile

None

Post

Users posts an entry

Feed of the followers

User's post

Comments/ratings: Enabled/Disabled

User enables/disables comments/ratings

User's post

Rate, Comment

Follow/Unfollow

User follows/unfollows another user

User's follower info

None

Collab with User

User collabs with another user for an artwork

My collabs repo

My collabs

Rate

User rates a post/artwork

Relative user post

User's Statistics

Send Reward

User sends a reward to another user

Other User's Post

User's reward count

Become a Fan

User becomes a fan of an artwork

Artwork

Fan Page follower count

Comment

User makes a comment about an artwork

Artwork's comment section

Enable/disable comments

Report

User reports another user

Admins and Janitors

Ban Account, Send Warning

Reference User

User writes a reference letter to another

user's profile

Other User's Profile

None

Accept/Deny

User accepts/denies job request

My jobs

Negotiation request

Automatic Apply

User applies for a job automatically

Related job

Form your CV

Mute

User mutes another user

Another user's chat

Muted user's activities

Start Meeting

User starts a meeting with the Hunter

Meeting room

Chat with User

Send Message

User sends a message to another user

Other User's inbox

Chat with User

Home Page

User goes to Home Page

Home Page

None

Upload Artwork

User goes to Upload Artwork Page

Upload Artwork Page

None

Form your CV

User goes to Form your CV page

Form your CV page

None

My lists

User goes to My Lists Page

My Lists Page

None

My Statistics

User goes to My statistics Page

My statistics Page

None

Sell Artwork

User goes to Sell Artwork Page

Sell Artwork Page

None

My collabs

User goes to My Collabs Page

My Collabs Page

None

Related Use Cases: Upload Artwork

The screenshot shows the ArtHunt application interface. At the top, there is a navigation bar with the logo "ArtHunt", a search bar, and three buttons: "Notifications", "Manage Account", and "LOGOUT". On the left, a sidebar features a user profile picture of a woman with blonde hair and green lips, and a list of buttons: "Home Page", "Upload Artwork" (which is highlighted in blue), "Form your CV", "My lists", "My Statistics", "Sell Artwork", and "My Collabs". The main content area has a large central box with the placeholder text "Drag and Drop or Upload Files". Below this are two input fields: "Title ..." and "Description ...". In the bottom right corner of this area is a blue button labeled "Submit Artwork". To the right of the main content area is a sidebar with a pink border. It contains a "Mute" button with a person icon, a "Start Meeting" button with a person icon, a message from a user with a profile picture and the text "Hello", and a "Send Message" button with a "Send" button.

Upload Files

User uploads artwork

User's Artwork

Validate User Post

Title

User enters title for artwork

Artwork's title

Artwork

Descriptions

User enters description for the artwork

User

Artwork

Submit Artwork

User submit uploaded artwork

Uploaded Artwork

Validate User Post

Related Use Cases: Form a CV

The screenshot shows the ArtHunt application interface. On the left, there's a sidebar with a user profile picture and several buttons: Home Page, Upload Artwork, Form your CV (which is highlighted in blue), My lists, My Statistics, Sell Artwork, and My Collabs. The main content area features a large circular profile picture of a character. Below it, the text "CV Example" is displayed, followed by the message "Your CV is automatically generated based on your activities." At the bottom of this section are two buttons: "Edit CV" and "Form CV". To the right, there's a sidebar with a "Mute" button and a "Start Meeting" button. At the bottom right, there's a messaging interface showing a message from a user with the profile picture "Hello" and a reply from another user with the profile picture "Hi". Below the message is a "Send Message" button and a "Send" button.

CV

User's CV based on the past activities on the website

User's activities

Form CV

Edit CV

User can edit created CV

CV

Form CV

Form CV

User form the CV

User's CV

Edit CV

Related Use Cases: Create List

The screenshot shows the ArtHunt application interface. At the top, there is a navigation bar with the logo "ArtHunt", a search bar, and links for "Notifications", "Manage Account", and "LOGOUT". Below the navigation bar, there is a sidebar on the left containing a user profile picture and several buttons: "Home Page", "Upload Artwork", "Form your CV", "My lists" (which is highlighted in blue), "My Statistics", "Sell Artwork", and "My Collabs". To the right of the sidebar, there are three cards: "My favorites", "To be Watched", and "Sci-fi". At the bottom right of the main area, there are buttons for "Edit List" and "Create New List". On the far right, there is a vertical sidebar with a messaging interface showing a conversation between two users, with options to "Send Message" and "Send".

Lists

User's created lists

Create New List

Edit List

Edit List

User edits the created list

Created Lists

Lists

Create New List

User creates new list

Lists

My Lists

Related Use Cases: View Statics, Download Statistics

The screenshot shows the ArtHunt application interface. At the top, there is a navigation bar with the logo "ArtHunt", a search bar, and links for "Notifications", "Manage Account", and "LOGOUT". On the left, a sidebar displays a user profile picture and a list of menu items: "Home Page", "Upload Artwork", "Form your CV", "My lists", "My Statistics", "Sell Artwork", and "My Collabs". The main content area features a bar chart titled "Select Artwork ..." showing opinion frequencies. The y-axis is labeled "Opinion Frequency" and ranges from 0 to 30. The x-axis categories are "Strongly Disagree", "Disagree", "Neutral", "Agree", and "Strongly Agree". The chart shows approximately 10 for "Strongly Disagree", 8 for "Disagree", 25 for "Neutral", 30 for "Agree", and 5 for "Strongly Agree". Below the chart is a "Download Statistics" button. To the right, there is a messaging sidebar with options like "Mute", "Start Meeting", and a message history showing "Hello" and "Hi".

Select Artwork

User selects artwork

User's artworks

My Statistics

Statistics

User views statistics for the selected artwork

User's Artwork

Download Statistics

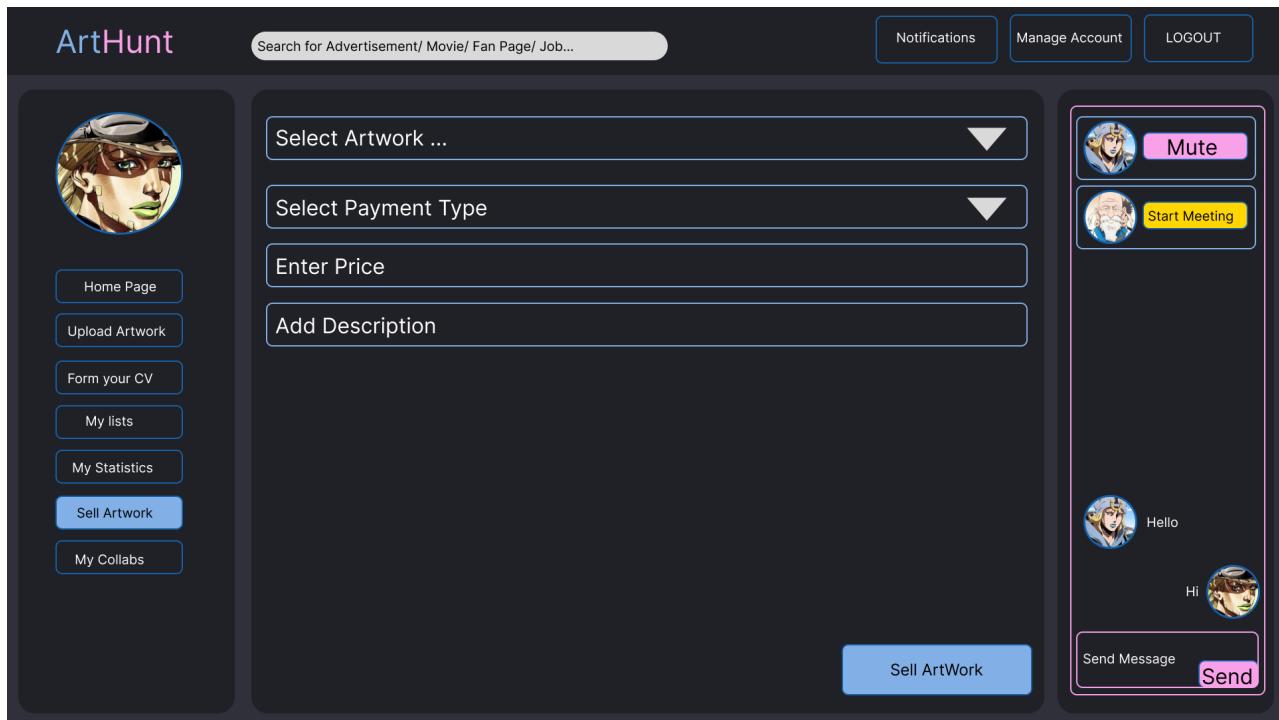
Download Statistics

User downloads statistics for an artwork

Statistics

Statistics

Related Use Cases: Sell copyright of Artwork, Sell Art Work



Select Artwork

User selects artwork

User's Artwork

Artwork

Select Payment Type

User selects payment type

Sell Artwork

Sell Artwork

Enter Price

User enters price for artwork

Sell Artwork

Sell Artwork

Add Description

User adds descriptions for an artwork

Sell Artwork

Sell Artwork

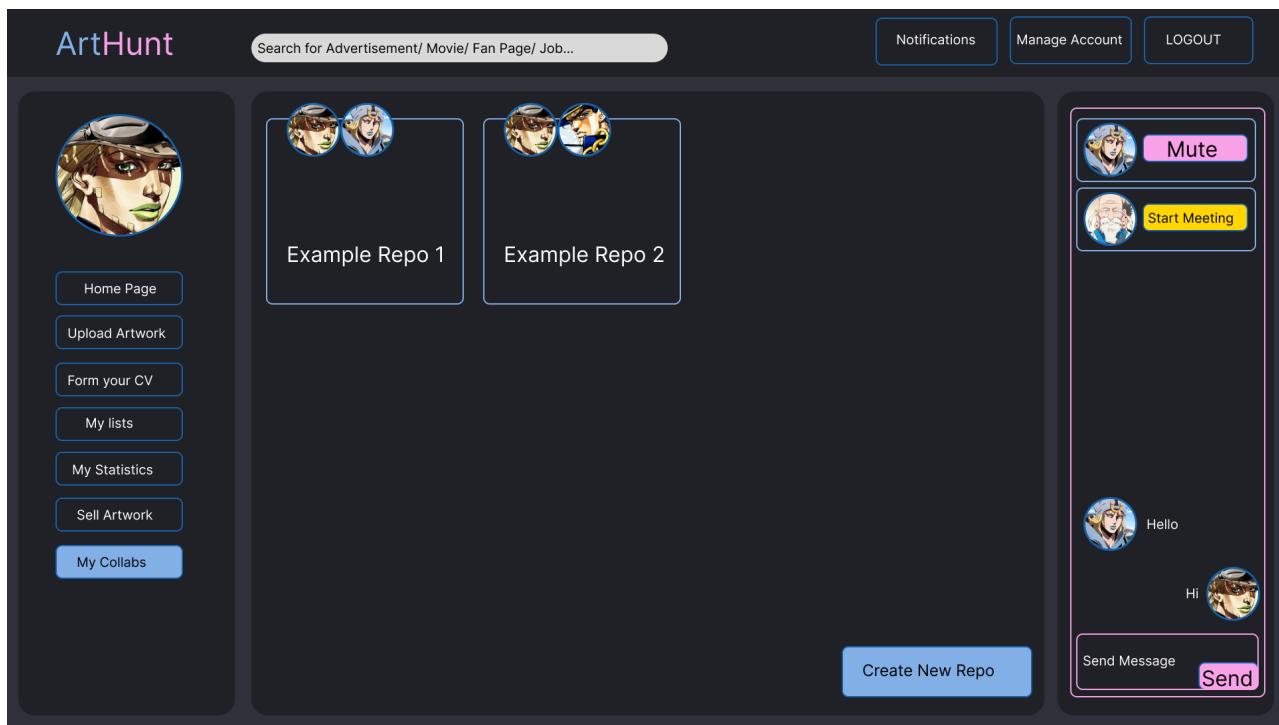
Sell Artwork

User sells artwork

Select payment type, enter price, add description

Select payment type, enter price, add description

Related Use Cases: Collab with User, Create Advertisement of Collab



Collab Repo

User views created repos

Create new Repo

Create new Repo

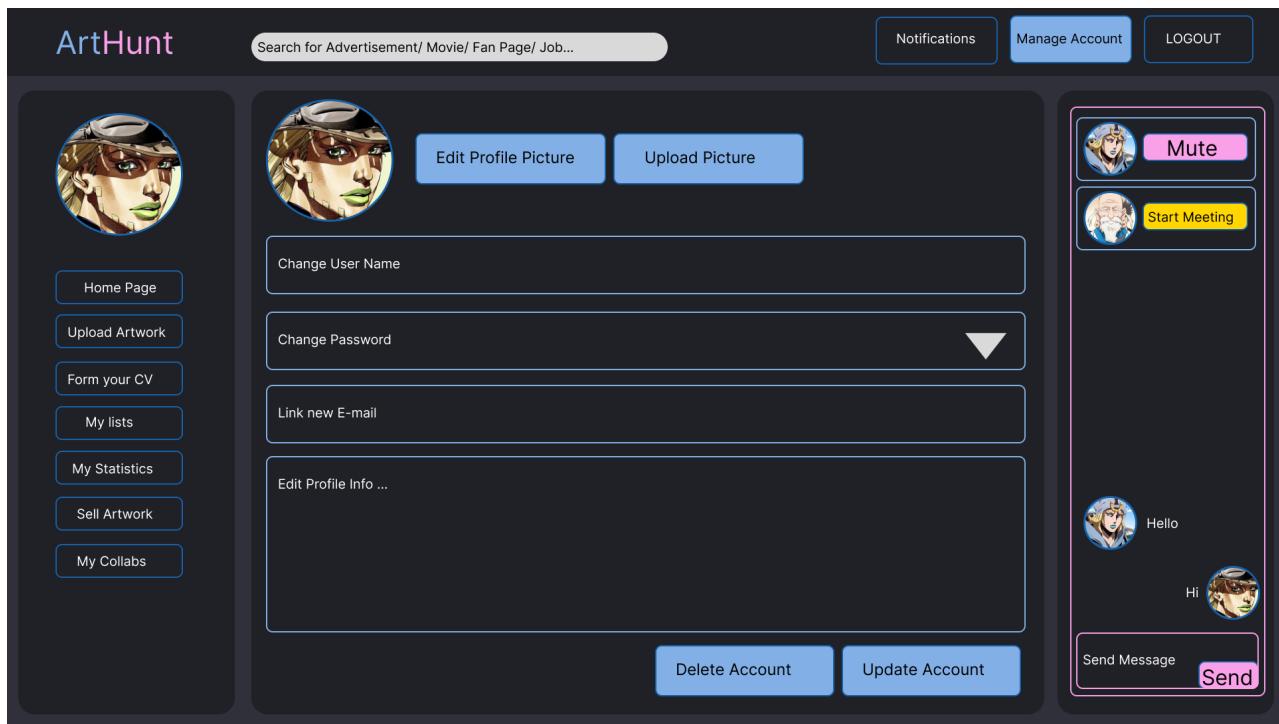
Create New Repo

User creates a repo for collab

Collab Repo

Collab Repo

Related Use Cases: Delete Account, Manage Account



Profile picture

User's profile picture

Upload picture

Edit profile picture

Edit Profile picture

User edits profile picture

Profile picture

Upload picture

Upload picture

User uploads profile picture

Profile picture

Profile picture

Change User name

User changes user name

User name

Update Account

Change Password

User changes account's password

Account's password

Update Account

Link new Email

User links email to account

Accounts linked emails

Update Account

Edit profile info

User edits profile info

User's profile

Update Account

Delete Account

User deletes account

User's Account

None

Update Account

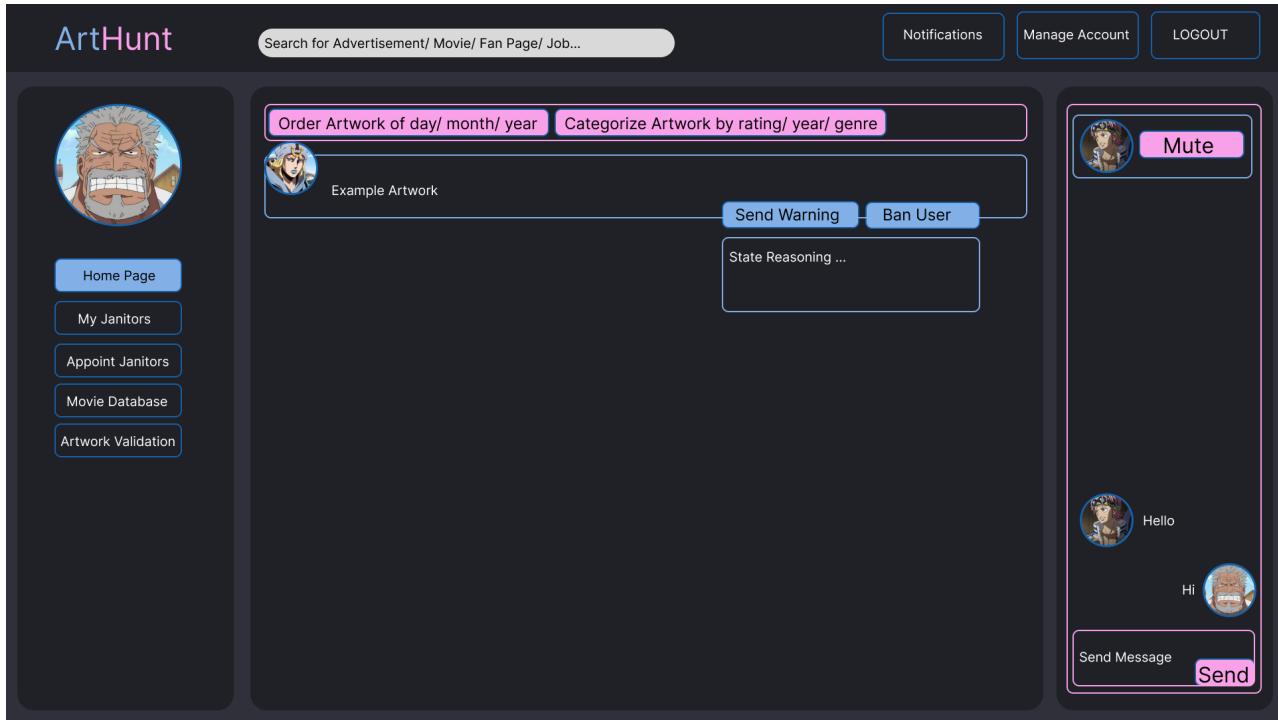
User updates the account info

Every other item in the page

User's Account

Admin:

Related Use Cases: Ban account, State Ban reasoning, Send Warning



Send Warning

Admin sends warning to user

User's notifications

User's Account

Ban User

Admin bans user

User's Account

None

My Janitors

Admin goes to My Janitors Page

My Janitors Page

None

Appoint Janitors

Admin goes to Appoint Janitors Page

Appoint Janitors Page

None

Movie Database

Admin goes to Movie Database Page

Movie Database Page

None

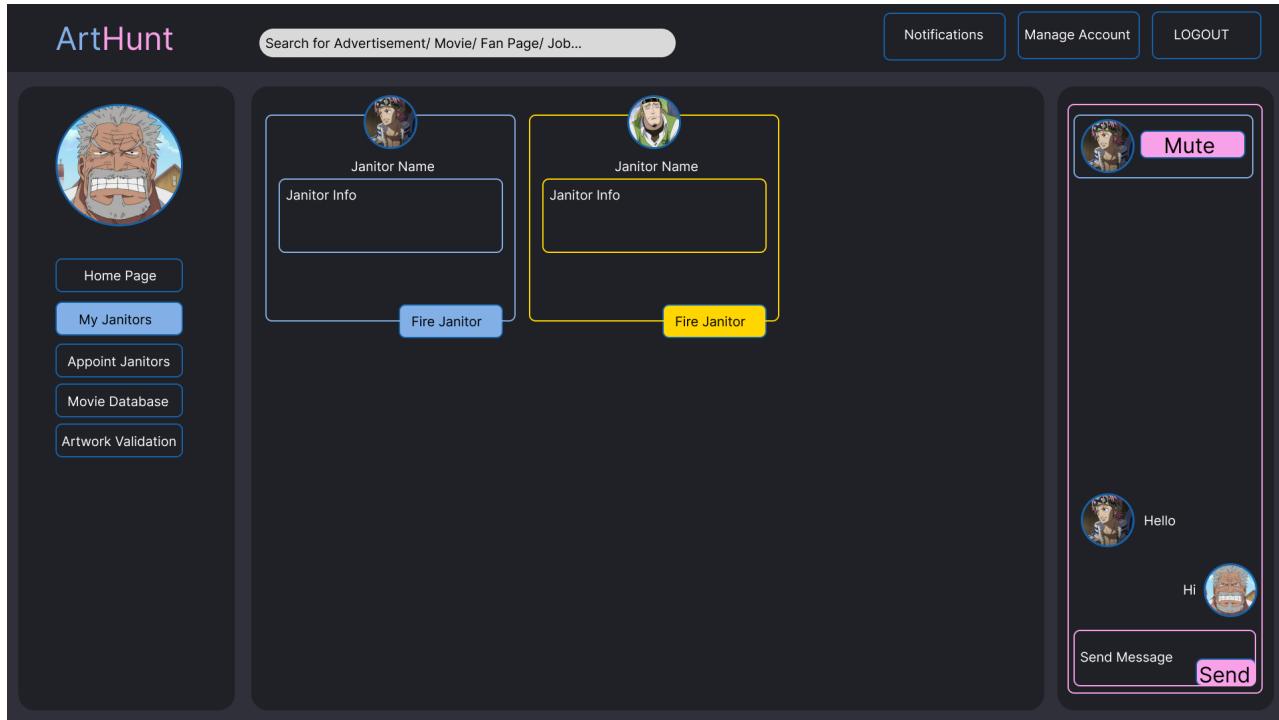
Artwork validation

Admin goes to Artwork validation page

Artwork validation page

None

Related Use Cases: Fire Janitor



Janitor Name

Janitor's Name

Janitor's Account

None

Janitor Info

Info of the Janitor

Janitor's Account

None

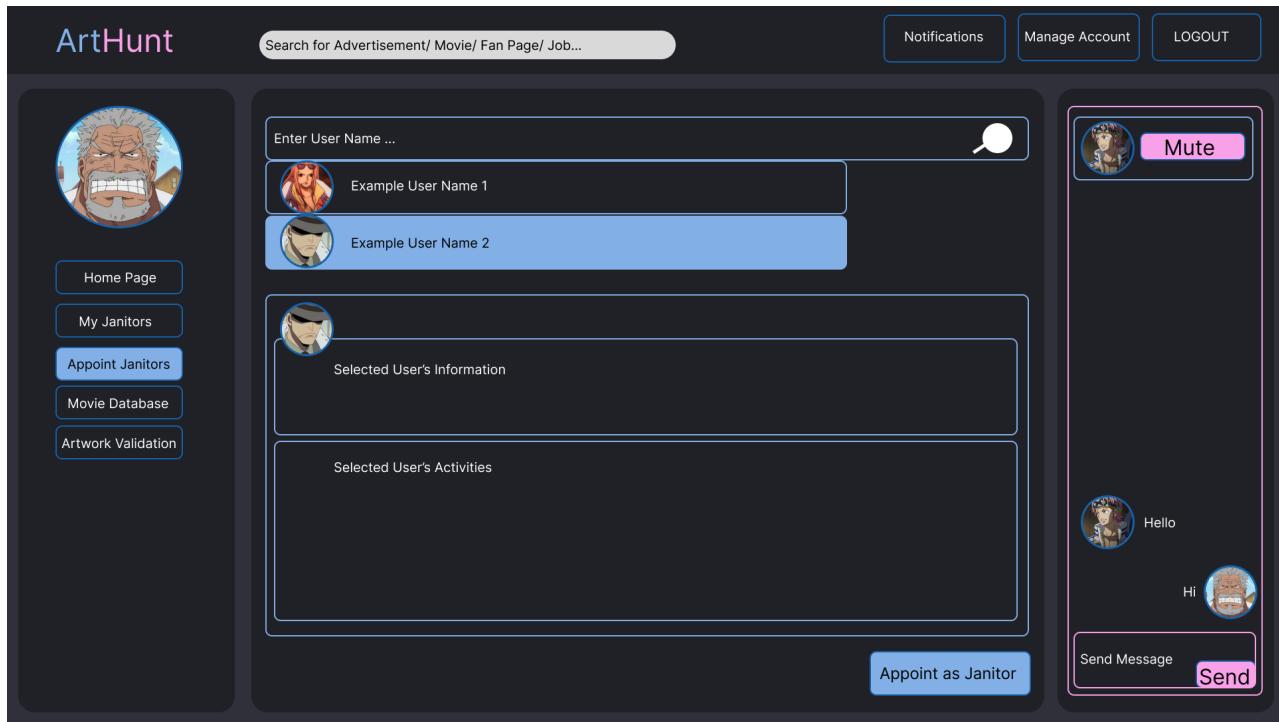
Fire Janitor

Admin fires Janitor

Janitor's privileges

None

Related Use Cases: Appoint Janitor



Enter User Name

Admin enters a user's name

User's profile

Appoint as Janitor

Selected User's Info

View selected user's info

Appoint Janitors

Appoint as Janitor

Selected User's Activities

View User's Activities

User's Account

Appoint as janitor

Appoint as Janitor

Admin appoints user as Janitor

User's Account

None

Related Use Cases: Add movies to the database



Home Page
My Janitors
Appoint Janitors
Movie Database
Artwork Validation



Edit Movie Poster

Upload Movie Poster

Enter Movie Title ...

Fill out movie details ...

Director ...

Release Year ...

Actors ...

Add Synopsis ...

Add Movie



Mute



Hello



Hi

Send Message

Send

Movie Poster**Movie's Poster****User****Edit Movie Poster****Edit Movie Poster****Edit Movie's Poster****Movie Poster****Add Movie****Upload Movie Poster****Upload a picture of the Movie's Poster****Movie Poster****Add Movie****Enter Movie Title****Enter a title for the movie****Movie Title****Add Movie****Fill out Movie Details****Add details for the movie****Movie Details****Add Movie****Director****Add director for a movie****Movie Details****Add Movie**

Release Year

Add release year for a movie

Movie Details

Add Movie

Actors

Add actors involved in the movie

Movie Details

Add Movie

Add Synopsis

Add the synopsis of the movie

Movie details

Add Movie

Add Movie

Add movie to the database

Movie Database

None

Related Use Cases: Validate User Post, State Deny reasoning, Authenticate User



[Home Page](#)
[My Janitors](#)
[Appoint Janitors](#)
[Movie Database](#)
[Artwork Validation](#)

View Submitted Artworks ...

Artwork

[Accept](#)[Deny](#)[State Deny Reasoning ...](#)

Authenticate User Tags:

Enter Tag ...

Director | X

Editor | X

Script Writer | X

[Send](#)

Mute



Hello



Hi

[Send Message](#)[Send](#)

View Submitted Artworks

Select a submitted Artwork

Submitted Artworks

[Send](#)

Artwork

View Artwork

Submitted Artwork

[Send](#)

Accept

Accept Artwork

Submitted Artwork

[Send](#)

Deny

Deny Artwork

Submitted Artwork

[Send](#)

State Deny Reasoning

Enter the reason for the denial

Submitted Artwork

[Send](#)

Enter Tag

Select Tag for the User

User's Profile

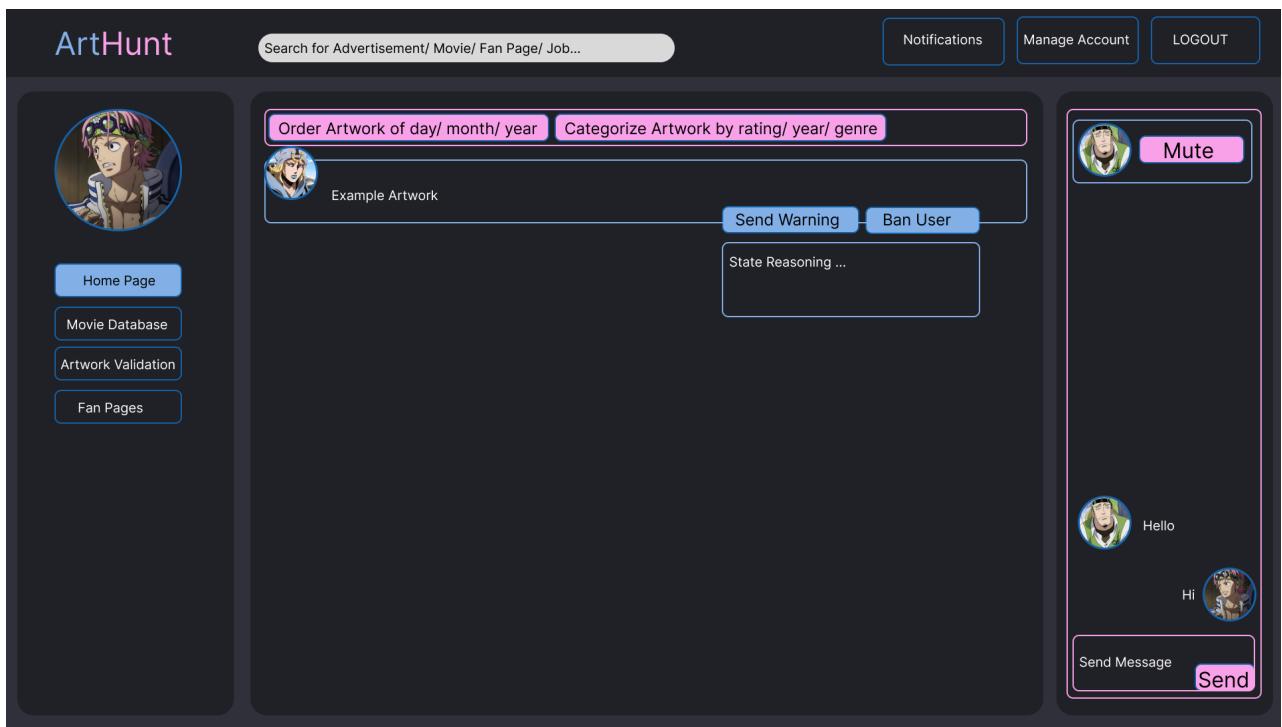
[Send](#)

Tags
Roles in the system
User's Profile
Send

Send
Send the Artwork
Artwork
None

Janitor:

Related Use Cases:



Movie Database
User goes to Movie Database Page
Movie Database Page
None

Artwork Validation
User goes to Artwork Validation Page
Artwork Validation Page
None

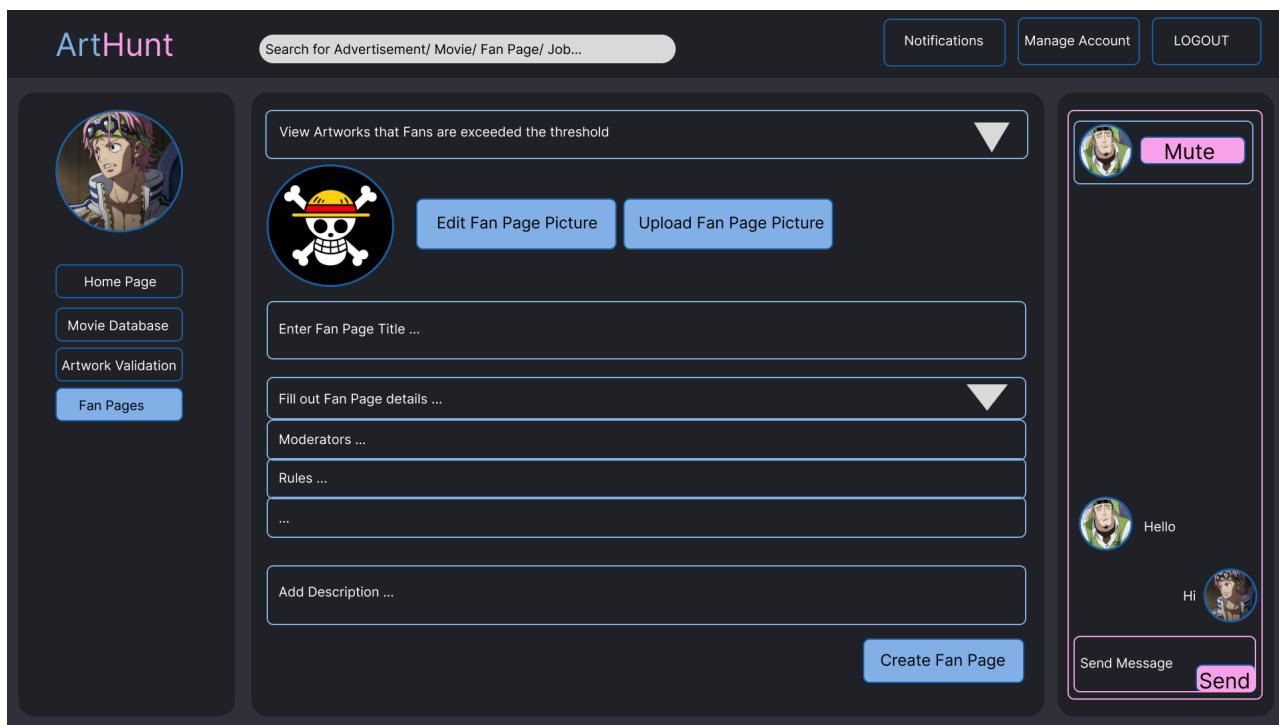
Fan Pages

User goes to Fan Pages Page

Fan Pages Page

None

Related Use Cases: Create Fan Page



View Artworks

View Artworks to create fan page

Artworks

Create Fan Page

Fan Page Picture

Picture of the Fan Page

Uploaded Picture

Create Fan Page

Edit Fan Page Picture

Edit picture of the fan page

Uploaded Fan Page

Create Fan Page

Upload Fan Page Picture

Upload a picture

Picture

Create Fan Page

Enter Fan Page Title

Title of the Fan Page

Fan Page

Create Fan Page

Fill out Fan Page Details

Details of the page

Fan Page

Create Fan Page

Moderators

Add moderators for the fan page

Fan Page

Create Fan Page

Rules

Add rules for the fan page

Fan Page

Create Fan Page

Add description

Description of the fan page

Fan Page

Create Fan Page

Create Fan Page

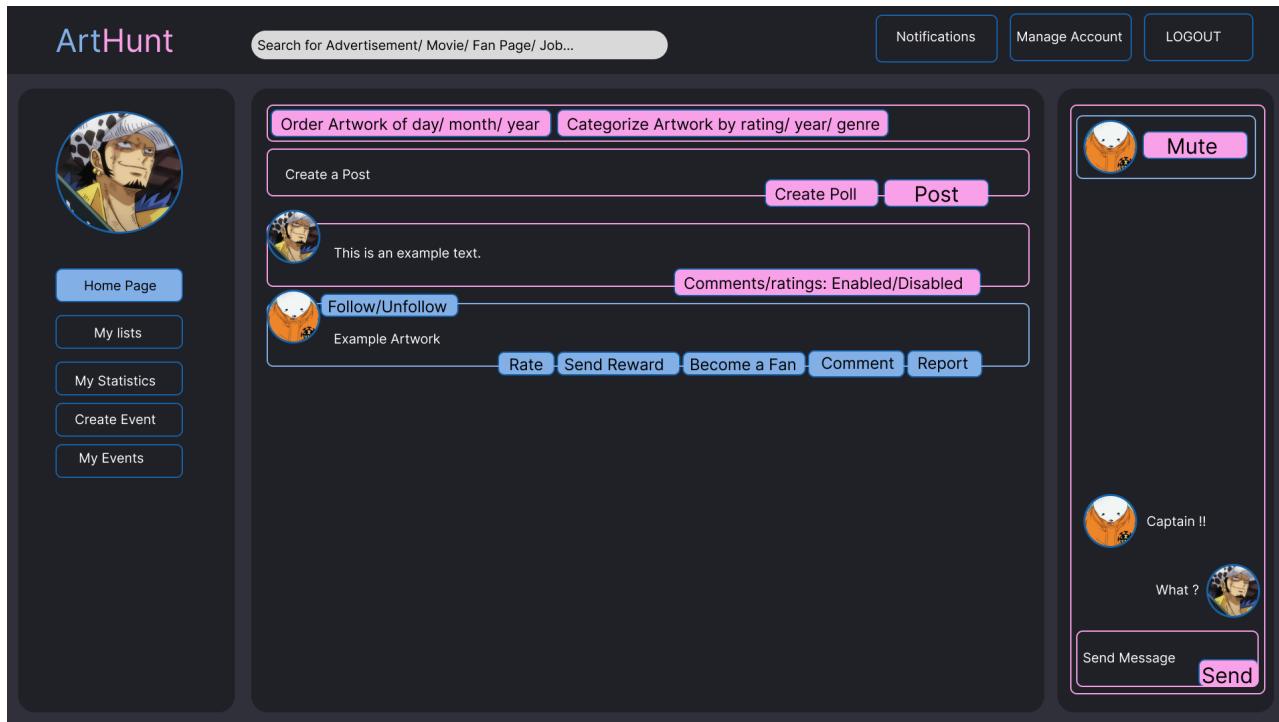
Create the fan page

Fan Page

None

Salooneer:

Related Use Cases:



My lists

User goes to My Lists Page

My Lists Page

None

My statistics

User goes to My statistics Page

My statistics Page

None

Create Event

User goes to create event page

Create event page

None

My Events

User goes to My Events Page

My Events Page

None

Related Use Cases: Create an Event, Sell ticket for event



Edit Event Poster

Upload Event Poster

Home Page

My lists

My Statistics

Create Event

My Events

Enter Event Title ...

Select Event Type ...

Select Pricing ...

Select Start Time ...

Add Descriptions ...

Create Event



Mute



Captain !!



What ?

Send Message

Send

Event Poster

Poster for the event

Upload poster

Create Event

Edit Event Poster

Edit the poster

Poster

Create Event

Upload Event Poster

Upload a poster for the event

Poster

Create Event

Enter event title

Title of the event

Event

Create Event

Select Event Type

Select the type for the event

Event

Create Event

Select pricing

Select the pricing for the event

Event

Create Event

Select start time

Select starting time for the event

Event

Create Event

Add descriptions

Descriptions for the event

Event

Create Event

Create Event

Create the Event for the Users

Event

None

Related Use Cases: Cancel Event, Re-sell ticket

The mockup displays the ArtHunt mobile application interface. On the left, a sidebar shows a user profile picture of a character with a mustache, followed by five buttons: "Home Page", "My lists", "My Statistics", "Create Event", and "My Events" (which is highlighted in blue). The main screen shows an event creation form with fields for "Event Name" (containing a trophy icon) and "Event Info". Below the form are two buttons: "Cancel Event" and "View Statistics". At the top of the main screen are three buttons: "Notifications", "Manage Account", and "LOGOUT". On the right, there is a messaging interface with a message from a user named "Captain !!": "What ?" and a reply button "Send".

Event Name

Name of the event

Event

Event

Event Info

Information about the event

Event

Event

Cancel Event

Cancel the event

Event

Event

View Statistics

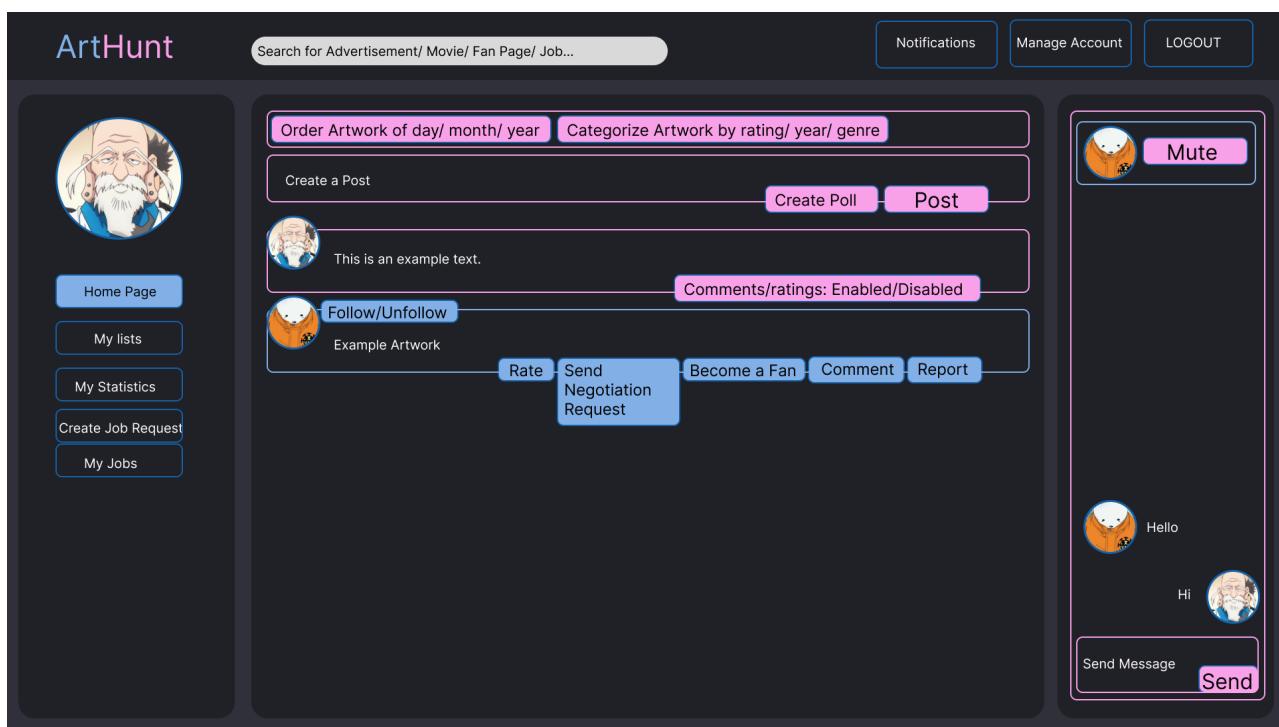
Statistics of the event

Event

Event

Hunter:

Related Use Cases:



Send Negotiation Request

Negotiate with the User

User post

User

My lists

User goes to My Lists Page

My Lists Page

None

My Statistics

User goes to My Statistics Page

My Statistics Page

None

Create Job Request

User goes to Create Job Request Page

Create Job Request Page

None

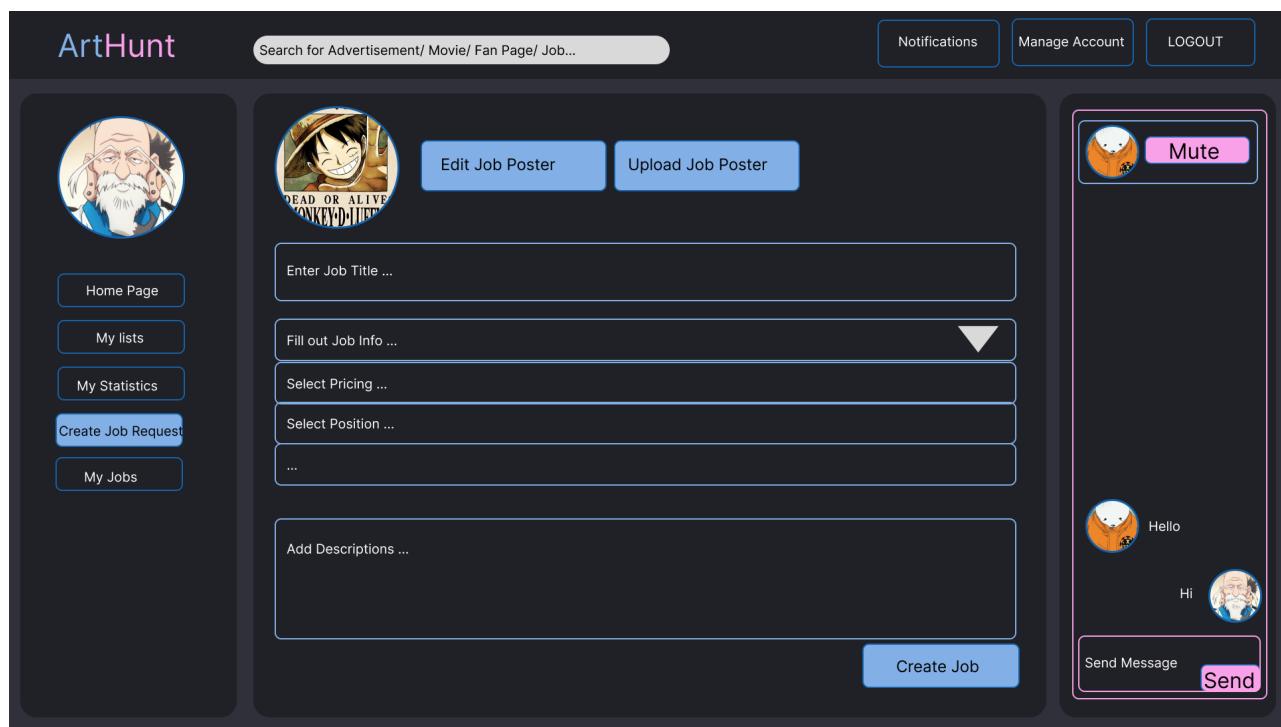
My Jobs

User goes to My Jobs Page

My Jobs Page

None

Related Use Cases: Share Job request



Job Poster

Poster for the job

Job

Create Job

Edit Job Poster

Edit the Poster

Job

Create Job

Upload Job Poster

Upload a poster for the job

Job

Create Job

Enter Job Title

Title of the job

Job

Create Job

Fill Out Job Info

Info about the job

Job

Create Job

Select Pricing

Pricing of the job

Job

Create Job

Select Position

Wanted positions for the job

Job

Create Job

Add Descriptions

Description of the job

Job

Create Job

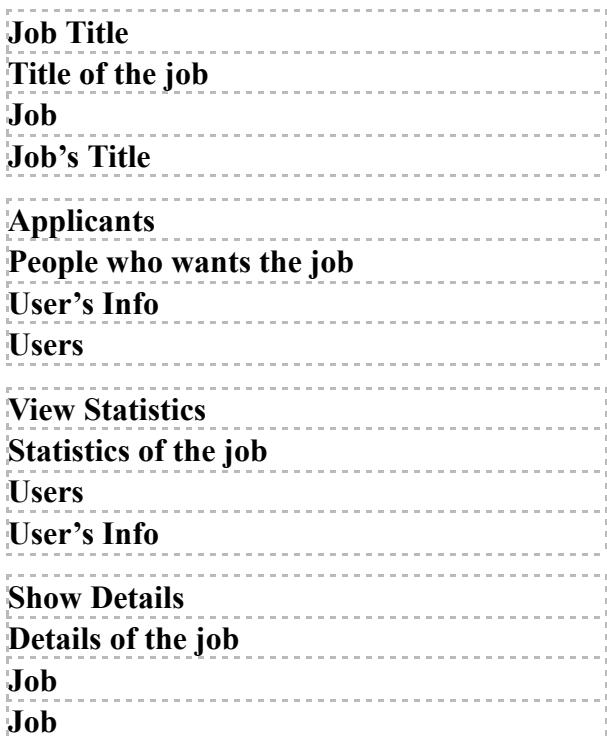
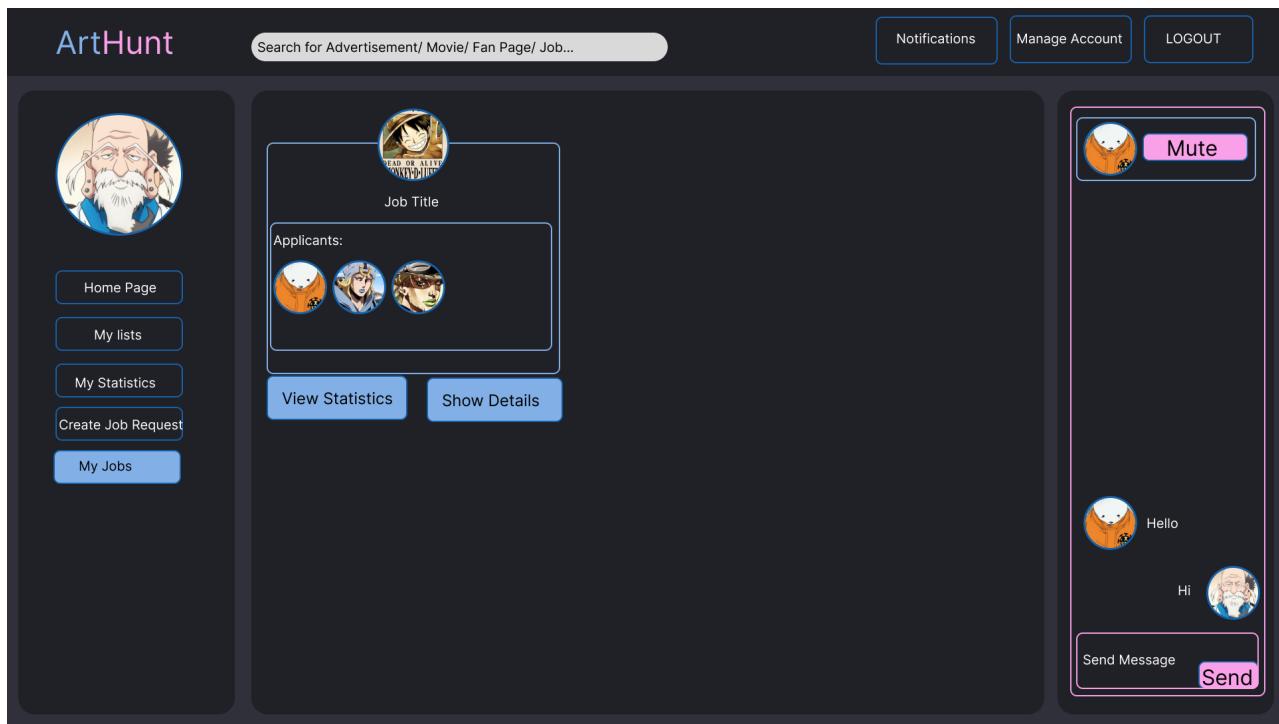
Create Job

Create the job

Job

None

Related Use Cases: Send negotiate request



Items are Project, Category, Task Start Time Interval, Task Name Link, and Size unit for the UI above. The following table should be fulfilled for each item.



Relationships to other inputs / outputs

These should be repeated for each UI.

3.2. FUNCTIONS

Functional requirements are organized by use cases. We use a template for stating use cases as follow.

1. Log in

Use Case ID	ARTHUNT-UC-01	
Description	Log in to the system	
Actors	User	
Preconditions	User is not logged in	
Post Conditions	User is logged in	
Main Success Scenario	<ol style="list-style-type: none">1. User enters account information2. Information is checked3. User enters the system	
Alternative Flow	<ol style="list-style-type: none">2a. Information is wrong3a. User cannot enter the system	
Exceptional Flow	<ol style="list-style-type: none">2a. User is redirected to login page again	
Rules	Name of the Business Rule	Result(s)
	1. Account information must be correct	Login Successful

2. Log out

Use Case ID	ARTHUNT-UC-02	
Description	Log out of the system	
Actors	User	
Preconditions	User is logged in	
Post Conditions	User is not logged in	
Main Success Scenario	<ol style="list-style-type: none">1. User press “LOGOUT” button2. User logs out from the system3. User is redirected to the login page	
Alternative Flow	None	
Exceptional Flow	None	
Rules	Name of the Business Rule	Result(s)
	1. User must already be logged in	Logout Successful

3. Create Account

Use Case ID	ARTHUNT-UC-03	
Description	Create an account for the system	
Actors	Novice, Hunter, Salooneer	
Preconditions	User does not have an account	
Post Conditions	User has an account	
Main Success Scenario	<ol style="list-style-type: none">1. User enters the required information to create an account.2. An email of confirmation is sent to user's email address3. Account is created	
Alternative Flow	<ol style="list-style-type: none">1a. Invalid information2a. Email is not sent4a. Account is not created	
Exceptional Flow	<ol style="list-style-type: none">1a. User must enter the correct information	
Rules	Name of the Business Rule	Result(s)
	1. Users must have a valid email address.	Account Created

4. Delete Account

Use Case ID	ARTHUNT-UC-04	
Description	Delete an account from the system	
Actors	Novice, Hunter, Salooneer	
Preconditions	User have an account	
Post Conditions	User's account is deleted	
Main Success Scenario	<ol style="list-style-type: none">1. User clicks "Delete Account"2. A message of confirmation appears3. User receives an email of confirmation4. Account is deleted	
Alternative Flow	2a. User chooses to cancel the process	
Exceptional Flow	3a. User does not receive the email	
Rules	Name of the Business Rule	Result(s)
	1. Users must already have an account	Account is deleted

5. Manage Account

Use Case ID	ARTHUNT-UC-05	
Description	Edit account information	
Actors	User	
Preconditions	User have an account	
Post Conditions	User's account info is updated	
Main Success Scenario	<ol style="list-style-type: none">1. User clicks "Manage Account"2. User enters new account information3. User updates his/her account	
Alternative Flow	2a. User enters invalid info	
Exceptional Flow	2a. User must enter the required information	
Rules	Name of the Business Rule	Result(s)
	1. User must enter the account information correctly.	Account is updated

6. Appoint Janitor

Use Case ID	ARTHUNT-UC-06	
Description	Appoint a user as janitor	
Actors	Admin	
Preconditions	User is not a Janitor	
Post Conditions	User is a Janitor	
Main Success Scenario	<ol style="list-style-type: none">1. Admin views User's account information.2. Admin examines User's past activity.3. Admin assigns User as Janitor	
Alternative Flow	3a. Admin does not assign the User as Janitor	
Exceptional Flow	1a. User's account is deleted/ does not exist.	
Rules	Name of the Business Rule	Result(s)
	1. User must not be a Janitor already.	User is assigned as Janitor

7. Ban Account

Use Case ID	ARTHUNT-UC-07	
Description	Ban an account from the system	
Actors	Admin, Janitor	
Preconditions	User is reported	
Post Conditions	User is banned	
Main Success Scenario	<ol style="list-style-type: none">1. Admin or Janitor receives a report2. They examine the report.3. They ban the related User from the system	
Alternative Flow	<ol style="list-style-type: none">3a. They decide that the report is invalid3b. They send a warning to the User	
Exceptional Flow	<ol style="list-style-type: none">3a. User is not banned from the system.	
Rules	Name of the Business Rule	Result(s)
	1. User must have a valid reason to be banned	User is banned

8. State Ban Reasoning

Use Case ID	ARTHUNT-UC-08	
Description	State the reasoning behind banning of user	
Actors	Admin, Janitor	
Preconditions	User is decided to be banned	
Post Conditions	User received the ban reasoning	
Main Success Scenario	<ol style="list-style-type: none">1. User is banned2. User has received the ban reasoning	
Alternative Flow	1a. User is not banned	
Exceptional Flow	2a. User has not received the reasoning	
Rules	Name of the Business Rule	Result(s)
	1. User must be banned from the system	User has received the message

9. Fire Janitor

Use Case ID	ARTHUNT-UC-09	
Description	Fire an appointed janitor	
Actors	Admin	
Preconditions	User is appointed as Janitor	
Post Conditions	User is not a Janitor anymore	
Main Success Scenario	<ol style="list-style-type: none">1. Janitor's past activities are examined.2. Janitor is fired	
Alternative Flow	2a. Janitor is not fired	
Exceptional Flow	None	
Rules	Name of the Business Rule	Result(s)
	1. User must already be a Janitor	Janitor is fired

10. Report User

Use Case ID	ARTHUNT-UC-10	
Description	Report a user to management	
Actors	Novice, Hunter, Salooneer	
Preconditions	User has taken an action that is not suitable for the website	
Post Conditions	User is reported to the website management	
Main Success Scenario	<ol style="list-style-type: none">1. User's related post or comment is selected2. User is reported	
Alternative Flow	2a. User is not reported	
Exceptional Flow	None	
Rules	Name of the Business Rule	Result(s)
	1. User must have done something that is not appropriate for the website	User is reported

11. Reference User

Use Case ID	ARTHUNT-UC-11	
Description	Reference another user	
Actors	Novice, Hunter, Salooneer	
Preconditions	User is selected	
Post Conditions	A paragraph of reference exists in the selected User's profile	
Main Success Scenario	<ol style="list-style-type: none"> 1. User is selected 2. A text editor dialog appears. 3. A reference paragraph is written for the User 	
Alternative Flow	3a. Reference paragraph is not written	
Exceptional Flow	2a. Dialog not appears	
Rules	Name of the Business Rule	Result(s)
	1. User must have uploaded an artwork to the system	User is referenced

12. Upload Artwork

Use Case ID	ARTHUNT-UC-12	
Description	Upload an artwork to the system	
Actors	Novice	
Preconditions	Novice's artwork must be accepted by the management	
Post Conditions	Novice's artwork is uploaded to the website	
Main Success Scenario	<ol style="list-style-type: none">1. Novice uploads the artwork2. Novice enters the title3. Novice enters the description4. Artwork is sent to the management	
Alternative Flow	None	
Exceptional Flow	None	
Rules	Name of the Business Rule	Result(s)
	1. Novice must have upload an artwork to send the management	Artwork is uploaded

13. Validate User Post

Use Case ID	ARTHUNT-UC-13	
Description	Approve uploaded artwork	
Actors	Admin, Janitor	
Preconditions	Novice must have uploaded an artwork	
Post Conditions	Novice's artwork is examined	
Main Success Scenario	<ol style="list-style-type: none"> 1. Admin or Janitors receive the uploaded artwork 2. They examine it. 3. They accept the artwork 4. Artwork is uploaded to the website 	
Alternative Flow	3a. Artwork is rejected	
Exceptional Flow	4a. Artwork is not uploaded to the website	
Rules	Name of the Business Rule	Result(s)
	1. Novice must have uploaded an artwork to be examined by the management	Artwork is Validated

14. State Denial Reasoning

Use Case ID	ARTHUNT-UC-14	
Description	State the reasoning behind denial of artwork	
Actors	Admin, Janitor	
Preconditions	Novice's artwork must be examined	
Post Conditions	Denial message is sent to the Novice	
Main Success Scenario	<ol style="list-style-type: none">1. Novice's artwork is denied.2. Denial reasoning is written3. Message is sent to the Novice	
Alternative Flow	None	
Exceptional Flow	3a. Message is not sent	
Rules	Name of the Business Rule	Result(s)
	1. Novice's work must be rejected	Message is sent to the Novice

15. Rate Saloon/Artwork

Use Case ID	ARTHUNT-UC-15	
Description	Rate artwork or saloons in the system	
Actors	Novice	
Preconditions	Novice is logged in Saloon or artwork exists in the system	
Post Conditions	Posted saloon or artwork rated	
Main Success Scenario	1. View a posted artwork 2. Select Rate button 3. Select rate option	
Alternative Flow	1a. View a saloon in the system 2a. Select Rate button 3a. Select rate option	
Exceptional Flow	3b. Select Cancel button	
Rules	Name of the Business Rule 1. Artwork must be validated. 2. Saloon owner must be authenticated.	Result(s) Rating artwork/saloon is done.

16. Comment Saloon/Artwork

Use Case ID	ARTHUNT-UC-16	
Description	Comment on saloons or artworks in the system	
Actors	Novice	
Preconditions	Novice is logged in Saloon or artwork exists in the system	
Post Conditions	Commented on posted saloon or artwork	
Main Success Scenario	1. View a posted artwork 2. Select Comment button 3. Write comment 4. Select Send button	
Alternative Flow	1a. View a saloon in the system 2a. Select Comment button 3a. Write comment 4a. Select Send button	
Exceptional Flow	4b. Select Cancel button	
Rules	Name of the Business Rule 1. Artwork must be validated. 2. Saloon owner must be authenticated.	Result(s) Commenting on artwork/saloon is done.

17. Become a Fan of an Artwork

Use Case ID	ARTHUNT-UC-17	
Description	Become a fan of an artwork in the system	
Actors	Novice	
Preconditions	Novice is logged in Artwork exists in the system	
Post Conditions	Became fan of a posted artwork	
Main Success Scenario	1. View a posted artwork 2. Select Become a Fan button 3. Select Confirm button	
Alternative Flow	None	
Exceptional Flow	3a. Select Cancel button	
Rules	Name of the Business Rule	Result(s)
	1. Artwork must be validated. 2. Novice must not be a fan of said artwork.	Became a fan of posted artwork.

18. Create Fan Page

Use Case ID	ARTHUNT-UC-18	
Description	Create a fan page if number of fans is high enough	
Actors	Janitor	
Preconditions	Janitor is logged in Artwork has reached required number of fans	
Post Conditions	Created fan page for an artwork	
Main Success Scenario	1. Receive notification about an artwork reaching required number of fans 2. Check if artwork satisfies other fan page criterias 3. Enter required information for fan page if artwork satisfies criterias 4. Create fan page	
Alternative Flow	None	
Exceptional Flow	3a. Create denial report if artwork does not satisfies criterias	
Rules	Name of the Business Rule	Result(s)
	1. Artwork fan number must pass a certain threshold. 2. Artwork must satisfy other criterias.	Fan page successfully created.

19- Create an Event

Use Case ID	ARTHUNT-UC-19	
Description	Create an event in the system	
Actors	Salooneer	
Preconditions	Salooneer is logged in	
Post Conditions	Created and shared an event	
Main Success Scenario	1. Select Create Event button 2. Enter required information 3. Check number of created events 4. Create event if number of created events is less than 10	
Alternative Flow	4a. Request payment if number of created events is more than 10 5a. Send payment 6a: Create event	
Exceptional Flow	5b. Do not send payment 6b. Event not created	
Rules	Name of the Business Rule	Result(s)
	1. Salooneers must send payment if their created event number is more than 10.	Payment successfully received.

20- Follow User

Use Case ID	ARTHUNT-UC-20	
Description	Follow another user	
Actors	Novice	
Preconditions	Novice is logged in	
Post Conditions	Followed another user	
Main Success Scenario	1. Select Follow button 2. Follow user	
Alternative Flow	None.	
Exceptional Flow	None.	
Rules	Name of the Business Rule	Result(s)
	1. Followed user must not be already followed.	User followed successfully

21- Unfollow User

Use Case ID	ARTHUNT-UC-21	
Description	Unfollow a followed user	
Actors	Novice	
Preconditions	Novice is logged in User is followed	
Post Conditions	Unfollowed another user	
Main Success Scenario	1. Select Unfollow button 2. Unfollow user	
Alternative Flow	None	
Exceptional Flow	None	
Rules	Name of the Business Rule	Result(s)
	1. Unfollowed must be previously followed.	User unfollowed successfully.

22- Sell Copyright of Artwork

Use Case ID	ARTHUNT-UC-22	
Description	Sell copyright of approved artwork	
Actors	Novice	
Preconditions	Novice is logged in Novice has uploaded artwork	
Post Conditions	Sold copyrights of artwork	
Main Success Scenario	1. Select Sell Artwork button 2. Select Sell Copyright of Artwork 3. Enter required information 4. Sell Artwork	
Alternative Flow	None	
Exceptional Flow	4a. Select Cancel button	
Rules	Name of the Business Rule	Result(s)
	1. Artwork must be validated.	Artwork copyrights have been sold.

23- Sell Artwork

Use Case ID	ARTHUNT-UC-23	
Description	Sell an approved artwork	
Actors	Novice	
Preconditions	Novice is logged in Novice has uploaded artwork	
Post Conditions	Sold a copy of artwork	
Main Success Scenario	1. Select Sell Artwork button 2. Select Sell Artwork 3. Enter required information 4. Sell Artwork	
Alternative Flow	None	
Exceptional Flow	4a. Select Cancel button	
Rules	Name of the Business Rule	Result(s)
	1. Artwork must be validated.	A copy of artwork has been sold.

24- Collab with User

Use Case ID	ARTHUNT-UC-24	
Description	Collaborate with other users	
Actors	Novice	
Preconditions	Novice is logged in Novice has uploaded artwork	
Post Conditions	Collaborated with another user Created collab repository	
Main Success Scenario	1. Send request for collab to another user 2. Create collab repository if request is accepted	
Alternative Flow	1a. Receive collab request from another user 2a. Accept collab request 3a. Create collab repository	
Exceptional Flow	2b. Do not create collab repository if request is rejected	
Rules	Name of the Business Rule	Result(s)
	1. Both users must have validated artworks.	A collab repository has been created.

25- Create Advertisement of Collab

Use Case ID	ARTHUNT-UC-25	
Description	Create an advertisement for collaboration requests	
Actors	Novice	
Preconditions	Novice is logged in A collab repo exists	
Post Conditions	Created advertisement for collab repo	
Main Success Scenario	1. Select Create Advertisement on collab repo 2. Enter required information 3. Publish advertisement	
Alternative Flow	None	
Exceptional Flow	3a. Select Cancel button	
Rules	Name of the Business Rule	Result(s)
	1. Collab repo must have at least one artwork associated with it.	Advertisement for collab repo has been published

26- Sell Ticket for Event

Use Case ID	ARTHUNT-UC-26	
Description	Sell tickets for upcoming events	
Actors	Salooneer	
Preconditions	Salooneer is logged in An event is created	
Post Conditions	Sold tickets for created event	
Main Success Scenario	1. Set price for event tickets 2. State details of tickets 3. Sell tickets	
Alternative Flow	None	
Exceptional Flow	None	
Rules	Name of the Business Rule	Result(s)
	1. Ticket price must be less than the maximum price decided by the system.	Tickets are shared and sold.

27- Cancel Event

Use Case ID	ARTHUNT-UC-27	
Description	Cancel an upcoming event	
Actors	Salooneer	
Preconditions	Salooneer is logged in An event is created	
Post Conditions	Canceled upcoming event	
Main Success Scenario	1. Select My Events button 2. Select Cancel Event button on an event 3. Confirm cancellation	
Alternative Flow	None	
Exceptional Flow	3a. Do not confirm cancellation	
Rules	Name of the Business Rule	Result(s)
	1. Remaining time for the start of the event must be more than 3 hours. 2. Current event must not be already cancelled.	Event has been canceled successfully.

28- Add Movies to Database

Use Case ID	ARTHUNT-UC-28	
Description	Add released movies to database	
Actors	Admin, Janitor	
Preconditions	Admin or Janitor is logged in	
Post Conditions	Added movie to database	
Main Success Scenario	<ol style="list-style-type: none">1. Select Movie Database button2. Enter required information3. Add movie	
Alternative Flow	None	
Exceptional Flow	2a. Move to another page by clicking another button	
Rules	Name of the Business Rule	Result(s)
	1. Entered movie must not exist in the database.	Movie has been successfully added to database.

29. 2FA for Login

Use Case ID	ARTHUNT-UC-29	
Description	Use Two-Factor Authentication for login	
Actors	User	
Preconditions	User activated two-factor authentication for login	
Post Conditions	User logins successfully	
Main Success Scenario	<ol style="list-style-type: none">1. Enter username and password to the form2. Enter code which sent to phone to the form3. Enter login button	
Alternative Flow	None	
Exceptional Flow	<ol style="list-style-type: none">1a. Entering wrong username or password2a. Entering wrong code	
Rules	Name of the Business Rule	Result(s)
	1. The entered username, password and code must be correct.	User logins successfully in a more secure way.

30- Chat with User

Use Case ID	ARTHUNT-UC-30	
Description	Chat with another user	
Actors	User	
Preconditions	User logged in	
Post Conditions	None	
Main Success Scenario	<ol style="list-style-type: none">1. User opens chat screen2. User selects target user3. User sends message	
Alternative Flow	None	
Exceptional Flow	<ol style="list-style-type: none">2a. User sends message to wrong target user3a. User sends wrong message to target user	
Rules	Name of the Business Rule	Result(s)
	1. Target user must exist.	Message sent to target user successfully.

31- Mute User

Use Case ID	ARTHUNT-UC-31	
Description	Mute another user for yourself	
Actors	User	
Preconditions	Main user logged in	
Post Conditions	Target user has muted	
Main Success Scenario	<ol style="list-style-type: none">1. User opens mute screen2. User selects target user3. User enters mute button	
Alternative Flow	None	
Exceptional Flow	None	
Rules	Name of the Business Rule	Result(s)
	1. Target user must not be already muted.	Target user has been muted by the main user successfully.

32- Create Post

Use Case ID	ARTHUNT-UC-32	
Description	Create a post on the system	
Actors	Novice	
Preconditions	Novice logged in	
Post Conditions	Post created successfully	
Main Success Scenario	<ol style="list-style-type: none">1. User opens post form2. User fills required components3. User enters share button	
Alternative Flow	None	
Exceptional Flow	2a. User has not entered filled components correctly	
Rules	Name of the Business Rule	Result(s)
	1. Post must not contain spam or inappropriate content.	Post has been created and shared successfully.

33- Search for Advertisement/Artwork/...

Use Case ID	ARTHUNT-UC-33	
Description	Search for advertisement, artwork, etc. on the system	
Actors	Hunter	
Preconditions	Hunter logged in	
Post Conditions	Search process done	
Main Success Scenario	1. User enters 'target text' to the search textbox 2. User enters search button 3. Search results are shown	
Alternative Flow	None	
Exceptional Flow	3a. Query does not return results (Result does not exist)	
Rules	Name of the Business Rule	Result(s)
	1. Existing results must exist	Search process done successfully.

34- Get Notification of User/Fan Page/...

Use Case ID	ARTHUNT-UC-34	
Description	Gets notifications about followed users, fan pages, etc.	
Actors	User	
Preconditions	User logged in	
Post Conditions	Notifications enabled	
Main Success Scenario	1. User searches for another user, fan page etc. 2. User selects and views user, fan page etc. 3. User clicks 'open notifications' button	
Alternative Flow	None	
Exceptional Flow	None	
Rules	Name of the Business Rule	Result(s)
	1. Another user, fan page etc. must exist.	User enabled notifications from another user, fan page etc. successfully.

35- Enable Comments/Ratings

Use Case ID	ARTHUNT-UC-35	
Description	Enable comments/ratings for artworks, posts, etc.	
Actors	Novice	
Preconditions	Novice logged in	
Post Conditions	Comments/ratings enabled	
Main Success Scenario	<ol style="list-style-type: none">1. Novice enters profile settings section2. Novice enables comments or ratings3. Novice saves new settings	
Alternative Flow	None	
Exceptional Flow	None	
Rules	Name of the Business Rule	Result(s)
	1. Comments / ratings must not be already enabled.	Novice enables comments or ratings successfully.

36- Disable Comments/Ratings

Use Case ID	ARTHUNT-UC-36	
Description	Disable comments/ratings for artworks, posts, etc.	
Actors	Novice	
Preconditions	Novice logged in	
Post Conditions	Comments/ratings disabled	
Main Success Scenario	<ol style="list-style-type: none">1. Novice enters profile settings section2. Novice disables comments or ratings3. Novice saves new settings	
Alternative Flow	None	
Exceptional Flow	None	
Rules	Name of the Business Rule	Result(s)
	1. Comments / ratings must not be already disabled.	Novice disables comments or ratings successfully.

37- Create List

Use Case ID	ARTHUNT-UC-37	
Description	Create a list of movies, artworks, etc.	
Actors	Novice	
Preconditions	Novice logged in	
Post Conditions	List created	
Main Success Scenario	1. Novice enters to his/her profile 2. Novice clicks to 'create list' button 3. Novice enters list name and type of list 4. Novice selects items which will be added to list	
Alternative Flow	4a. If a list exists, the novice can add an item to it (if the novice wants to use it) or the novice can create a new list.	
Exceptional Flow	3a. List has not created (if novice enters buggy input)	
Rules	Name of the Business Rule	Result(s)
	1. Profile must be validated.	List of movies and artworks has been created.

38- View Statistics

Use Case ID	ARTHUNT-UC-38	
Description	View statistics for movies, artworks, etc.	
Actors	Novice, Hunter, Salooneer	
Preconditions	User logged in (For hunter and salooneer) Having a verified profile	
Post Conditions	Statistics are shown	
Main Success Scenario	1. User enters to artwork's page 2. User clicks to 'show statistics' button	
Alternative Flow	None	
Exceptional Flow	None	
Rules	Name of the Business Rule	Result(s)
	1. Statistics must exist.	Statistics are shown to the user.

39- Download Statistics

Use Case ID	ARTHUNT-UC-39	
Description	Download statistics for movies, artworks, etc.	
Actors	Novice, Hunter, Salooneer	
Preconditions	User logged in (For hunter and salooneer) Having a verified profile	
Post Conditions	Statistics are downloaded	
Main Success Scenario	1. User enters to artwork's page 2. User clicks to 'show statistics' button 3. User selects the format (.pdf, .png etc.) 4. User clicks to 'download statistics' button	
Alternative Flow	None	
Exceptional Flow	3a. Statistics not downloaded if format has not selected or supported	
Rules	Name of the Business Rule	Result(s)
	1. Statistics must exist.	Statistics are downloaded by the user.

40- Authenticate User

Use Case ID	ARTHUNT-UC-40	
Description	Authenticate a user as hunter or salooneer	
Actors	Admin, Janitor	
Preconditions	Having a verified profile	
Post Conditions	User assigned as hunter or salooneer	
Main Success Scenario	1. Enter to the admin panel 2. Enter to the authentication page 3. Select users 4. Update proofs (look at business rules) 5. Assign users roles	
Alternative Flow	None	
Exceptional Flow	4a. Same user can't have hunter and salooneer roles in the same time	
Rules	Name of the Business Rule	Result(s)
	1. (For hunter) having a proof to being a company representative 2. (For salooneer) having a document about being a salooneer 3. User must not be already authenticated.	Selected user(s) are authenticated as hunter or salooneer

41- Form a CV

Use Case ID	ARTHUNT-UC-41	
Description	Form a CV based on account information	
Actors	Novice	
Preconditions	Having a verified profile Having a CV file in .pdf format	
Post Conditions	CV has stored in database	
Main Success Scenario	1. Novice enters to his profile page 2. Novice clicks to 'edit profile' button 3. Novice selects CV file from his/her computer 4. Novice clicks to 'upload CV' button	
Alternative Flow	4a. The novice can form a new CV when applying for a job. Or the novice can use the existing CV which was uploaded when editing the profile.	
Exceptional Flow	None	
Rules	Name of the Business Rule	Result(s)
	1. Profile must be validated. 2. Novice must upload a CV to the system.	CV has been submitted and stored in the system.

42. Send Negotiation Request

Use Case ID	ARTHUNT-UC-42	
Description	Send negotiation request to another user	
Actors	Hunter	
Preconditions	Being logged in	
Post Conditions	Request sent to user	
Main Success Scenario	1. Hunter enters to user's profile 2. Hunter clicks the button of '...' 3. Hunter clicks the item in list which is named as 'send negotiation request'	
Alternative Flow	None	
Exceptional Flow	None	
Rules	Name of the Business Rule	Result(s)
	1. Request must not be already sent.	Negotiation request sent to another user. The user will receive a notification.

43. Accept/Deny Negotiation Request

Use Case ID	ARTHUNT-UC-43	
Description	Accept or deny received negotiation requests	
Actors	Novice	
Preconditions	Being logged in Having at least one negotiation request	
Post Conditions	Accepting / denying request	
Main Success Scenario	1. Novice enters to his/her profile's requests section 2. Novice accepts or denies negotiation requests	
Alternative Flow	None	
Exceptional Flow	None	
Rules	Name of the Business Rule	Result(s)
	1. Profile must be validated. 2. Negotiation request must exist.	The user will receive a notification about this action.

44- Start Meeting

Use Case ID	ARTHUNT-UC-44	
Description	Start a meeting about negotiation requests	
Actors	Novice, Hunter	
Preconditions	Being logged in Having at least one connection (negotiation)	
Post Conditions	Starting meeting and sending notification about that	
Main Success Scenario	1. User enters to his/her profile's negotiations section 2. User selects at least one negotiation 3. User clicks 'start meeting' button	
Alternative Flow	None	
Exceptional Flow	None	
Rules	Name of the Business Rule	Result(s)
	1. At least one negotiation must exist.	The user will receive a notification about the meeting request.

45- Send Warning

Use Case ID	ARTHUNT-UC-45	
Description	Send warning to user the first time they are reported	
Actors	Admin, Janitor	
Preconditions	Being logged in Having reasons and proofs	
Post Conditions	Sending warning message	
Main Success Scenario	1. Select the user who will receive warning 2. State warning reason in detailed form 3. Add proofs (if possible)	
Alternative Flow	None	
Exceptional Flow	None	
Rules	Name of the Business Rule	Result(s)
	1. Having at least one reason to send warning 2. Having proofs of them	The user will receive a notification about the warning.

46- Check-in Ticket

Use Case ID	ARTHUNT-UC-46	
Description	Check-in tickets one hour before start of the event	
Actors	Novice	
Preconditions	Having a ticket	
Post Conditions	Checking in with using existing ticket	
Main Success Scenario	1. Novice opens the ticket page. 2. Novice fills the form which is about ticket details. 3. Novice enters 'check-in' button.	
Alternative Flow	None	
Exceptional Flow	3a. Novice cancels ticket (what happens after cancel is 47th use case , which is re-sell ticket) 3b. Ticket canceled automatically if time-left to the event is less than 1 hour	
Rules	Name of the Business Rule	Result(s)
	1. Having a real ticket 2. Checking in at least 1 hour before the event	Novice checked-in to the event using the ticket.

47- Re-sell Ticket

Use Case ID	ARTHUNT-UC-47	
Description	Re-sell tickets if check-in operation is not done	
Actors	Salooner	
Preconditions	Having a ticket that not checked in	
Post Conditions	Selling the ticket that not checked in	
Main Success Scenario	1. Novice searches ticket within the last 1 hour before the event starts 2. Salooner checks whether a non-checked ticket exists 3. If it exists then novice makes payment 4. Novice takes the ticket	
Alternative Flow	None	
Exceptional Flow	2a. If ticket doesn't exist, then salooner can't sold it	
Rules	Name of the Business Rule	Result(s)
	1. Ticket can be taken within the last 1 hour before the event starts	Ticket has sold

48- Share Job Request

Use Case ID	ARTHUNT-UC-48	
Description	Share job request regarding your work	
Actors	Hunter	
Preconditions	Being logged in Having a real and paid job	
Post Conditions	Request shared on the system	
Main Success Scenario	1. Hunter opens job request page 2. Hunter fills details about job, requested qualifications etc. 3. Hunter shares request	
Alternative Flow	None	
Exceptional Flow	2a. If the details are missing, the request will not be shared.	
Rules	Name of the Business Rule	Result(s)
	1. Having a official job to hire people	Job request shared on the system and users will start to see it.

49- Create Poll

Use Case ID	ARTHUNT-UC-49	
Description	Create a poll on the system	
Actors	User	
Preconditions	Being logged in Having a verified profile	
Post Conditions	Sharing poll	
Main Success Scenario	1. User opens poll request page 2. User adds question 3. User adds possible answers 4. User sets a time limit (range) 5. User starts poll	
Alternative Flow	None	
Exceptional Flow	2,3a. Questions and at least 2 possible answers have to be added 4a. After time range ends, users can't send their answers	
Rules	Name of the Business Rule	Result(s)
	1. Same poll can't be created more than 1 time.	Poll has been shared and users will start to see and answer it.

50- Vote Poll

Use Case ID	ARTHUNT-UC-50	
Description	Vote in a poll on the system	
Actors	User	
Preconditions	Being logged in Existence of a trend poll	
Post Conditions	Sending vote to the poll	
Main Success Scenario	1. User sees poll in the timeline 2. User selects the one of the options 3. User approves selection	
Alternative Flow	None	
Exceptional Flow	2a. User don't have to vote the poll	
Rules	Name of the Business Rule	Result(s)
	1. Poll must exist 2. Same poll can't be voted more than 1 time	Poll has been voted.

51- Send Reward

Use Case ID	ARTHUNT-UC-51	
Description	Send reward to another user	
Actors	Novice	
Preconditions	Being logged in Having reasons to send reward	
Post Conditions	Sending reward with a message (reason)	
Main Success Scenario	1. Select the user who will receive warning 2. State warning reason in detailed form 3. Add reward details	
Alternative Flow	None	
Exceptional Flow	None	
Rules	Name of the Business Rule	Result(s)
	1. Existence of real reward 2. Same reward can't be given to same person more than 1 time	The user will receive a notification about the reward.

52- Automatic Apply for a Job

Use Case ID	ARTHUNT-UC-52	
Description	Automatically apply for a job with previously formed CV	
Actors	Novice	
Preconditions	Being logged in Having a verified profile Having a already uploaded CV in the system	
Post Conditions	Applications to different jobs which satisfies predetermined conditions	
Main Success Scenario	1. Novice enables setting of 'automatic apply for job' 2. Novice uploads CV 3. Novice selects criterias for jobs 4. Novices saves settings	
Alternative Flow	All of these processes can be done manually	
Exceptional Flow	None	
Rules	Name of the Business Rule	Result(s)
	1. Novice must upload a CV to the system	Job applications are now made automatically, thus saving time.

53- Order Top Artwork of day/month/year/...

Use Case ID	ARTHUNT-UC-53	
Description	Order artworks based on day, month, year or etc.	
Actors	User	
Preconditions	Existence of results for given input query	
Post Conditions	Limited number of results are shown	
Main Success Scenario	1. User searches artwork with using a query 2. All possible results are returned 3. Only n top related results are shown	
Alternative Flow	None	
Exceptional Flow	2a. Input query don't have to return results, therefore if any results doesn't return then no results will show	
Rules	Name of the Business Rule	Result(s)
	1. Ordering can be done if there are more than a certain number of results	Saves space and time by showing fewer but most relevant results

54- Categorize Artwork by Rating/Genre/Year/...

Use Case ID	ARTHUNT-UC-54	
Description	Categorize artworks based on rating, genre, year or etc.	
Actors	User	
Preconditions	Existence of results for given input query	
Post Conditions	Limited number of results are shown	
Main Success Scenario	1. User searches artwork with using a query 2. User selects at least one category 3. All possible results are returned 4. Only results from selected categories are shown	
Alternative Flow	None	
Exceptional Flow	3a. Input query don't have to return results, therefore if any results doesn't return then no results will show	
Rules	Name of the Business Rule	Result(s)
	1. Ordering can be done if there are more than a certain number of results with different categories	Saves space and time by showing fewer but most relevant results

3.2.1. Login

3.2.2. Users shall login to the system.

3.2.3. Log out

3.2.4. Users shall log out from the system

3.2.5. Create Account

3.2.6. Users shall create accounts.

3.2.7. Delete Account

3.2.8. Users should delete their accounts.

3.2.9. Manage Account

3.2.10. Users shall manage their accounts such as changing name, e-mail, password, profile picture.

3.2.11. Appoint Janitor

3.2.12. Admin shall appoint Janitors.

3.2.13. Ban account

3.2.14. Admin and Janitors shall ban accounts if needed.

3.2.15. State Ban reasoning

3.2.16. Admin and Janitor shall state the reasoning of the ban.

3.2.17. Fire Janitor

3.2.18. Admin shall remove Janitors.

3.2.19. Report User

3.2.20. Users may report other users.

3.2.21. Reference User

3.2.22. Users may reference other users.

3.2.23. Upload Artwork

3.2.24. Users shall upload their artworks to the website.

3.2.25. Validate User Post

3.2.26. Janitors may examine the user's artwork and then approve it.

3.2.27. State Deny reasoning

3.2.28. Janitor shall state the reason if they deny the user's artwork.

3.2.29. Rate Saloon/ Artwork

3.2.30. Users shall rate the cinema saloons, artworks.

3.2.31. Comment Saloon/ Artwork

3.2.32. Users may comment on saloons, artworks.

3.2.33. Become a Fan of an Art Work

3.2.34. Users shall become a fan of the artwork that they want.

3.2.35. Create Fan Page

3.2.36. Janitors shall create a fan page if the fan number is above the threshold.

3.2.37. Create an Event

3.2.38. Salooneers shall create events.

3.2.39. Follow User

3.2.40. Users shall follow other users.

3.2.41. Unfollow User

3.2.42. Users may unfollow other users.

3.2.43. Sell copyright of Artwork

3.2.44. Users may sell the copyright of their artworks.

3.2.45. Sell Art Work

3.2.46. Users shall sell their artworks.

3.2.47. Collab with User

3.2.48. Users shall collaborate with other users.

3.2.49. Create Advertisement of Collab

3.2.50. Users may create a post of their collaboration requests.

3.2.51. Sell ticket for event

3.2.52. Salooneers shall sell tickets for their events.

3.2.53. Cancel Event

3.2.54. Salooneers may cancel their events.

3.2.55. Add movies to the database

3.2.56. Admin and Janitors shall add movies to the database.

3.2.57. 2FA for login

3.2.58. Users may use two factor authentication for the login process.

3.2.59. Chat with User

3.2.60. Users shall chat with other users.

3.2.61. Mute User

3.2.62. Users may mute other users.

3.2.63. Create Post

3.2.64. Users shall create a post.

3.2.65. Search for Advertisement/ Movie/ Fan Page/ Job...

3.2.66. Users shall search for advertisements for their desired category.

3.2.67. Get Notification of Movie/ User/ Event/ Job ...

3.2.68. Users shall get notifications for their desired category.

3.2.69. Enable comments/ rating

3.2.70. Users shall enable comments/ ratings for their artworks.

3.2.71. Disable comments/ ratings

3.2.72. Users shall disable comments/ ratings for their artworks.

3.2.73. Create List

3.2.74. Users may create lists for their movies, artworks.

3.2.75. View Statics

3.2.76. Salooneers shall view the statistics for a movie, artwork.

3.2.77. Download Statistics

3.2.78. Salooneers shall download the statistics for a movie, artwork.

3.2.79. Authenticate User

3.2.80. Admin and Janitors shall authenticate the users.

3.2.81. Form a CV

3.2.82. Users shall create a CV from their previous activities.

3.2.83. Send negotiate request

3.2.84. Users or Hunters shall send negotiation requests.

3.2.85. Accept/ Deny negotiate request

3.2.86. Users or Hunters shall accept/deny negotiation requests.

3.2.87. Start Meeting

3.2.88. Users shall start meetings about the negotiation requests

3.2.89. Send Warning

3.2.90. Janitors and Admin may send warnings to the users. They should state the reasoning behind the warning.

3.2.91. Check-in ticket

3.2.92. Users shall check in before 1 hour to the start of the movie.

3.2.93. Re-sell ticket

3.2.94. Salooneers shall re-sell the tickets if the check-in operation is not done before 1 hour to the start of the movie.

3.2.95. Share Job request

3.2.96. Users may share job requests regarding their work.

3.2.97. Create Poll

3.2.98. Users may create polls.

3.2.99. Vote Poll

3.2.100. Users should vote in the polls.

3.2.101. Send Reward

3.2.102. Users shall send rewards to other users

3.2.103. **Automatic Apply for a job**

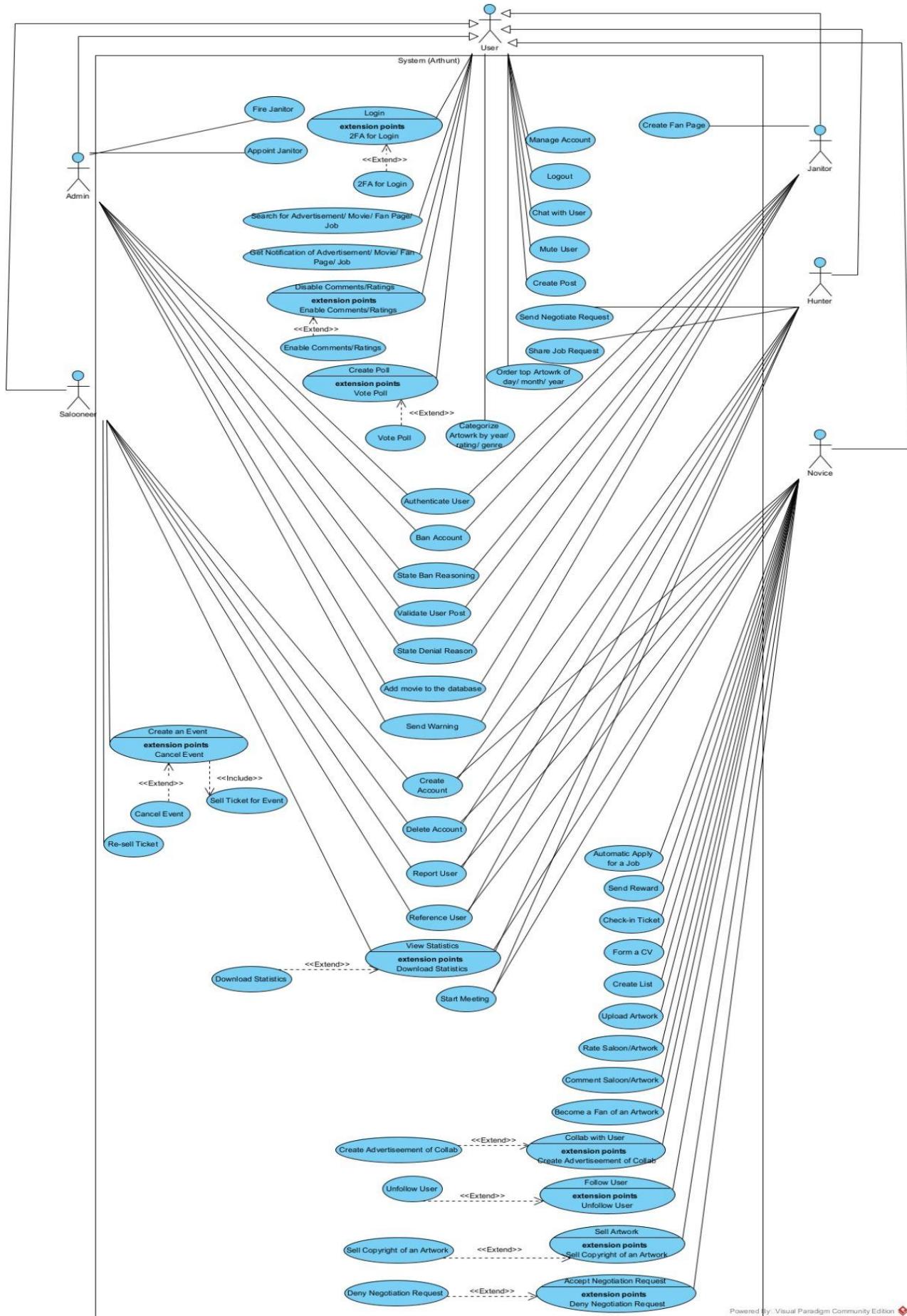
3.2.104. Users may automatically apply for a job with their pre-formed CV and other information.

3.2.105. **Order top art work of day/ month/ year**

3.2.106. Users may order the highest rated artworks of the day/ month/ year.

3.2.107. **Categorize Art Work by rating/ year/ genre**

3.2.108. Users may categorize artworks by their rating/year/genre.



3.3 PERFORMANCE REQUIREMENTS

- The response time for each operation in Arthunt should be optimized to ensure a smooth and efficient user experience. The system should aim for a maximum response time of 3 seconds for operations, including data retrieval, searches, and interactions with the user interface. Distributed file systems like Hadoop should be used to decrease response times and enhance data access across geographically distributed nodes.
- Payment operations should be completed within a maximum of 3 minutes to facilitate seamless transactions and enhance user satisfaction.

3.4 LOGICAL DATABASE REQUIREMENTS

- Arthunt is an inherently data-driven system designed to fulfill specific objectives and cater to various use cases. Accurate determination of the system's data requirements is essential to ensure the correct and effective implementation of the use cases while meeting performance and security standards. Once these requirements have been carefully considered, a comprehensive analysis is conducted to identify all entities within the system and establish the interrelationships between them. These findings are then integrated with the use cases and transferred into an entity relationship diagram, providing a logical representation of the system's underlying database. The aforementioned steps were diligently followed to create a model that can be seamlessly implemented within a database management system and the resulting model has been included in the appendices.

3.5 DESIGN CONSTRAINTS

- Cross-Platform Compatibility: Arthunt must be compatible with various operating systems, including Windows, macOS, and Linux, to ensure users can access the platform regardless of their preferred devices. It should also support popular web browsers such as Chrome, Firefox, Safari, and Edge, allowing users to interact with the system seamlessly.
- Scalability: The system should be designed to handle a growing number of users, artworks, and transactions. As the user base expands, Arthunt should be able to efficiently manage the increased load and ensure responsiveness and optimal performance. This requires careful consideration of database design, caching mechanisms, and server infrastructure.
- Responsive Design: Arthunt should employ responsive design principles to ensure optimal user experience across different devices, screen sizes, and resolutions. Novices and other users should be able to access and interact with the system seamlessly, regardless of whether they are using desktop computers, laptops, tablets, or smartphones.
- Integration Capabilities: Arthunt should have the ability to integrate with external services, such as payment gateways, social media platforms(Google,Facebook,Instagram,Twitter,SoundCloud,Linkedin...), and analytics tools. This will allow novices to securely sell their artwork, promote their creations on various channels, and gain insights into user engagement and trends.

3.6 SOFTWARE SYSTEM ATTRIBUTES

3.6.1 Reliability

- To ensure reliability, the Arthunt software system shall implement RAID techniques for data duplication and redundancy, minimizing the risk of data loss and maximizing the mean time to failure (MTTF). Redundant storage arrays shall be used to provide fault tolerance and enhance system reliability.

3.6.2 Availability

- The system shall handle high traffic effectively, ensuring that users can access Arthunt without interruptions or delays. It shall employ horizontal scaling techniques to accommodate increased data needs and user growth, ensuring a smooth user experience.
- Arthunt shall be available to users at all times, except during planned maintenance periods communicated in advance (Once in a month). The system shall provide notifications and alerts to users during maintenance to minimize disruption.

3.6.3 Security

- The system shall prioritize security by utilizing encryption techniques, such as SSL/TLS, to ensure confidentiality during data transmission. Hashing algorithms shall be used to maintain data integrity, preventing unauthorized modifications or tampering. For example, hashed passwords of the system users shall be stored in the database instead of the password itself.
- Arthunt shall offer 2FA authentication as an option for users, enhancing security by requiring an additional authentication factor. User activities shall be logged comprehensively, and threat intelligence software shall be applied to detect anomalies or suspicious behavior.

- A highly secure payment provider system shall be integrated to handle user transactions securely.
- Arthunt shall employ robust measures to handle Distributed Denial of Service (DDoS) attacks and ensure the system remains online during such attacks. Advanced threat detection and mitigation strategies shall be implemented to protect against security threats.

3.6.4 Maintainability

- The system design of Arthunt shall follow a modular and well-organized structure (Microservices Architecture), promoting ease of maintenance and updates. Clear documentation and coding standards shall be in place to facilitate future maintenance efforts.
- The system shall adopt version control systems such as Github and change management practices to track and manage software changes effectively. Automated testing and continuous integration shall be utilized to ensure stability and maintainability.
- Regular code reviews and refactoring shall be performed to improve code quality and reduce technical debt.

3.6.5 Portability

- Arthunt shall be designed for portability, allowing users to access the system from any device and any browser, independent of the operating system used. The system shall adhere to web standards and technologies that ensure cross-platform compatibility and a consistent user experience. Java Programming Language and Spring Framework shall be used to ensure compatibility in all platforms.
- The system shall support responsive design principles, ensuring optimal display and functionality across different screen sizes and resolutions.

3.6.6 Usability

- The user interface of Arthunt shall be intuitive and user-friendly, allowing users to adapt to the system within a short period. It shall provide clear navigation, consistent design patterns, and user-friendly controls to enhance usability.
- The system shall offer comprehensive documentation, tutorials, and tooltips to assist users in understanding the system's features and functionalities. Help resources, such as FAQs or a knowledge base, shall be readily available to address user queries.

3.6.7 Scalability

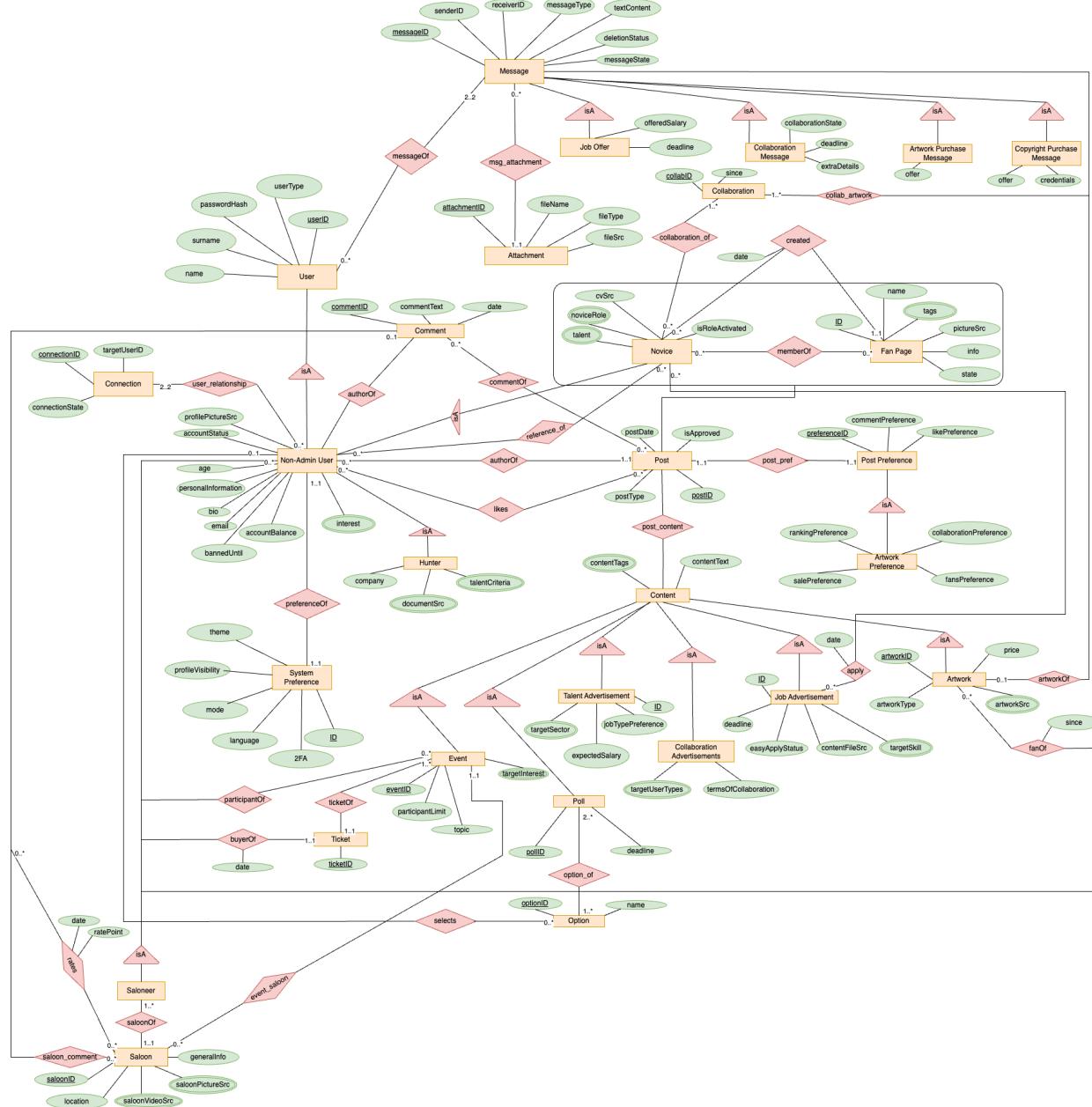
- Elasticity: Arthunt shall be designed to have elastic scalability, meaning it can dynamically scale up or down based on demand. This can be achieved by utilizing cloud computing platforms that offer auto-scaling capabilities. The system should automatically provision additional resources when there is an increase in workload and release resources when the demand decreases, ensuring efficient resource utilization.
- Distributed Data Storage: To handle the growing data needs, Arthunt shall employ distributed data storage techniques. This involves partitioning and distributing the data across multiple storage nodes or clusters. Distributed data storage systems like NoSQL databases or distributed file systems can be used to ensure data is evenly distributed and accessed efficiently. Hadoop can be used to address this problem.
- Statelessness: To achieve scalability, the system shall be designed to be stateless,

meaning that no session-specific data is stored on individual servers. Instead, user sessions and data shall be managed centrally or stored in a distributed cache or database. This allows requests to be processed by any available server, enabling easy horizontal scaling without the need for server affinity.

- Microservices Architecture: The system shall be divided into smaller, loosely coupled services, each responsible for specific functionalities. Each microservice shall be independently deployed and scaled based on demand, allowing for efficient resource allocation and enabling the system to scale specific components that experience high demand.
- Asynchronous Processing: To optimize scalability, Arthunt can utilize asynchronous processing. Long-running or computationally intensive tasks can be offloaded to background processes or worker queues, allowing the main system to handle incoming requests quickly and efficiently. Asynchronous processing minimizes the blocking of resources, enabling the system to scale and handle more concurrent requests.
- Distributed Caching: Caching frequently accessed data can significantly improve scalability. Distributed caching solutions like Redis or Memcached can be employed to store and retrieve frequently accessed data quickly, reducing the load on backend services and improving overall system performance.
- Monitoring and Auto-Scaling: Arthunt shall incorporate monitoring and auto-scaling mechanisms to dynamically adjust the system's capacity based on resource utilization and demand. By monitoring key performance metrics, such as CPU usage, memory utilization, or network throughput, the system can automatically scale up or down to ensure optimal performance and efficient resource allocation.

4. APPENDICES

4.1 Appendix A: Entity Relationship Diagram



4.2 Appendix B: Process Models of the Designed To-be System based on BPMN.