AcuArt Online Gallery Platform

Business Requirements and Technical Design Document

1. Executive Summary

AcuArt Online Gallery Platform is a sophisticated web-based e-commerce solution designed to showcase and sell artwork from emerging and established artists. The platform provides a comprehensive digital gallery experience with integrated shopping capabilities, artist portfolio management, and customer engagement tools. The system prioritizes user experience and rapid content delivery while maintaining a clean, artistic interface.

2. Business Requirements

2.1 Functional Requirements

User Authentication and Account Management

- Customer registration and login system

- Artist account management with portfolio access

- Guest browsing capabilities

- Password recovery and account settings

- User profile management with purchase history

Art Gallery and Catalog Management

- Comprehensive artwork display system

- High-resolution image gallery with zoom functionality

- Artwork categorization by style, medium, artist, and price range

- Advanced search and filtering capabilities

- Featured artwork and recommendation engine

E-commerce Shopping Platform

- Shopping cart functionality with persistent sessions

- Secure checkout process with multiple payment options

- Order management and tracking system

- Inventory management for limited edition pieces

- Digital receipt and confirmation system

Artist Portfolio Management

- Artist profile creation and management

- Portfolio upload and organization tools

- Artwork metadata management (title, description, price, dimensions)

- Artist biography and exhibition history

- Commission request system

Content Management System

- Dynamic content publishing for exhibitions and events

- Blog platform for art news and artist features

- Comment system for artwork and blog posts

- Social media integration for sharing

- Newsletter subscription and management

Customer Service and Communication

- Contact form for customer inquiries

- Live chat support system

- FAQ and help documentation

- Customer feedback and review system

- Artist-customer direct messaging

2.2 Non-Functional Requirements

Performance and Scalability

- Fast image loading with progressive enhancement

- Support for high-resolution artwork images

- Scalable architecture for growing artist and customer base

- Optimized database queries for catalog browsing

- CDN integration for global content delivery

User Experience

- Responsive design for desktop, tablet, and mobile devices

- Intuitive navigation and search interface

- Accessibility compliance for all users

- Multi-language support capability

- Clean, artistic visual design

Security and Trust

- Secure payment processing integration

- Customer data protection and privacy

- Fraud detection and prevention

- Secure file upload for artist portfolios

- Regular security monitoring and updates

3. Technical Architecture

3.1 Technology Stack

Frontend Technologies

- HTML5 and CSS3 for modern web standards

- JavaScript for dynamic user interactions

- Responsive design framework for mobile compatibility

- AJAX for smooth browsing experience

- Image optimization and lazy loading

Backend Technologies

- PHP 7.4+ for server-side processing

- Object-oriented programming architecture

- RESTful API design for mobile app integration

- Session management for shopping cart persistence

- Template engine for consistent design

Database Infrastructure

- MySQL database for data persistence
- Optimized indexing for search performance
- Relational design for complex art metadata
- Backup and recovery procedures
- Data integrity constraints

Infrastructure and Hosting

- Apache web server with mod_rewrite
- SSL/TLS encryption for secure transactions
- Cloud hosting for scalability
- Regular backup systems
- Performance monitoring tools

3.2 Database Design

User and Authentication Tables

```
CREATE TABLE users (

    user_id INT PRIMARY KEY AUTO_INCREMENT,

    username VARCHAR(50) UNIQUE NOT NULL,

    email VARCHAR(100) UNIQUE NOT NULL,

    password VARCHAR(255) NOT NULL,

    first_name VARCHAR(50),

    last_name VARCHAR(50),

    user_type ENUM('customer', 'artist', 'admin') DEFAULT 'customer',

    registration_date TIMESTAMP DEFAULT CURRENT_TIMESTAMP,

    last_login TIMESTAMP,

    is_active BOOLEAN DEFAULT TRUE

);
```

Artwork and Gallery Tables

```sql
CREATE TABLE artworks (

    artwork_id INT PRIMARY KEY AUTO_INCREMENT,

    title VARCHAR(200) NOT NULL,

    description TEXT,

    artist_id INT NOT NULL,

    category_id INT,

    price DECIMAL(10,2),

    image_url VARCHAR(500),

    dimensions VARCHAR(100),

    medium VARCHAR(100),

    year_created YEAR,

    is_available BOOLEAN DEFAULT TRUE,

    created_date TIMESTAMP DEFAULT CURRENT_TIMESTAMP,

    FOREIGN KEY (artist_id) REFERENCES users(user_id)

);


CREATE TABLE categories (

    category_id INT PRIMARY KEY AUTO_INCREMENT,

    category_name VARCHAR(100) NOT NULL,

    description TEXT,

    parent_category_id INT,

    display_order INT DEFAULT 0

);
```

E-commerce and Order Management

```sql
CREATE TABLE shopping_cart (
```

```sql
    cart_id INT PRIMARY KEY AUTO_INCREMENT,

    user_id INT,

    artwork_id INT NOT NULL,

    quantity INT DEFAULT 1,

    added_date TIMESTAMP DEFAULT CURRENT_TIMESTAMP,

    FOREIGN KEY (user_id) REFERENCES users(user_id),

    FOREIGN KEY (artwork_id) REFERENCES artworks(artwork_id)

);


CREATE TABLE orders (

    order_id INT PRIMARY KEY AUTO_INCREMENT,

    user_id INT NOT NULL,

    total_amount DECIMAL(10,2) NOT NULL,

    order_status ENUM('pending', 'confirmed', 'shipped', 'delivered', 'cancelled'),

    shipping_address TEXT,

    billing_address TEXT,

    payment_method VARCHAR(50),

    order_date TIMESTAMP DEFAULT CURRENT_TIMESTAMP,

    FOREIGN KEY (user_id) REFERENCES users(user_id)

);
```

Content and Communication Tables

```sql
CREATE TABLE blog_posts (

    post_id INT PRIMARY KEY AUTO_INCREMENT,

    title VARCHAR(200) NOT NULL,

    content TEXT NOT NULL,

    author_id INT NOT NULL,
```

```
    publication_date TIMESTAMP DEFAULT CURRENT_TIMESTAMP,

    is_published BOOLEAN DEFAULT FALSE,

    view_count INT DEFAULT 0,

    FOREIGN KEY (author_id) REFERENCES users(user_id)

);


CREATE TABLE comments (

    comment_id INT PRIMARY KEY AUTO_INCREMENT,

    post_id INT,

    artwork_id INT,

    user_id INT,

    comment_text TEXT NOT NULL,

    comment_date TIMESTAMP DEFAULT CURRENT_TIMESTAMP,

    is_approved BOOLEAN DEFAULT FALSE,

    parent_comment_id INT

);
```

3.3 Application Architecture

MVC Structure

- Models: User.php, Artwork.php, Order.php, Category.php
- Views: Twig template engine for clean separation
- Controllers: HomeController.php, ShopController.php, UserController.php
- Services: PaymentService.php, EmailService.php, ImageService.php

API Layer

- RESTful endpoints for mobile app integration
- JSON response format for all API calls
- Authentication middleware for protected routes

- Rate limiting for API abuse prevention

4. Feature Specifications

4.1 User Authentication System

Registration and Login

// User registration processing

$username = $_POST['username'];

$email = $_POST['email'];

$password = $_POST['password'];

$query = "INSERT INTO users (username, email, password) VALUES ('$username', '$email', '$password')";

$result = $database->query($query);

Session Management

- PHP session-based authentication

- Shopping cart persistence across sessions

- Remember me functionality with secure cookies

- Automatic logout after inactivity

4.2 Artwork Gallery System

Artwork Display and Search

// Artwork search functionality

$search_term = $_GET['search'];

$category = $_GET['category'];

$query = "SELECT * FROM artworks WHERE title LIKE '%$search_term%' OR description LIKE '%$search_term%'";

if ($category) {

  $query .= " AND category_id = '$category'";

```
}
```

$results = $database->query($query);

Image Management

- High-resolution image upload system

- Automatic thumbnail generation

- Image optimization for web delivery

- Watermark protection for artist portfolios

4.3 E-commerce Shopping Cart

Cart Management

```
// Add item to shopping cart
$user_id = $_SESSION['user_id'];
$artwork_id = $_POST['artwork_id'];
$quantity = $_POST['quantity'];


$query = "INSERT INTO shopping_cart (user_id, artwork_id, quantity) VALUES ('$user_id', '$artwork_id', '$quantity')";
$database->query($query);
```

Payment Processing

- Integration with multiple payment gateways

- Secure tokenization of payment information

- Order confirmation and tracking

- Digital receipt generation

4.4 Content Management

Blog and News System

```
// Blog post creation
$title = $_POST['title'];
```

```php
$content = $_POST['content'];

$author_id = $_SESSION['user_id'];


$query = "INSERT INTO blog_posts (title, content, author_id) VALUES ('$title', '$content', '$author_id')";

$database->query($query);
```

Comment System

```php
// Comment submission

$post_id = $_POST['post_id'];

$user_id = $_SESSION['user_id'];

$comment_text = $_POST['comment'];


$query = "INSERT INTO comments (post_id, user_id, comment_text) VALUES ('$post_id', '$user_id', '$comment_text')";

$database->query($query);
```

4.5 Artist Portfolio Management

Portfolio Upload System

```php
// Artwork upload processing

$title = $_POST['title'];

$description = $_POST['description'];

$price = $_POST['price'];

$image_file = $_FILES['artwork_image'];


$upload_dir = './uploads/artworks/';

$image_path = $upload_dir . basename($image_file['name']);


if (move_uploaded_file($image_file['tmp_name'], $image_path)) {
```

```
    $query = "INSERT INTO artworks (title, description, price, image_url) VALUES ('$title',
'$description', '$price', '$image_path')";

    $database->query($query);

}
```

4.6 Customer Service Features

Contact and Inquiry System

```
// Contact form processing

$name = $_POST['name'];

$email = $_POST['email'];

$message = $_POST['message'];

$inquiry_type = $_POST['inquiry_type'];


$query = "INSERT INTO customer_inquiries (name, email, message, inquiry_type) VALUES
('$name', '$email', '$message', '$inquiry_type')";

$database->query($query);
```

5. User Interface Design

5.1 Homepage Layout

Hero Section

- Featured artwork carousel with high-quality images

- Artist spotlight with rotating profiles

- Call-to-action buttons for browsing and registration

- Search bar with intelligent autocomplete

Navigation Structure

- Main menu with gallery categories

- User account dropdown with login/register

- Shopping cart icon with item count

- Mobile-responsive hamburger menu

5.2 Gallery and Shop Interface

Artwork Grid Display

- Masonry layout for optimal image presentation

- Filter sidebar with category, price, and artist options

- Sort functionality by price, date, popularity

- Infinite scroll or pagination for large catalogs

Individual Artwork Pages

- High-resolution image viewer with zoom

- Detailed artwork information and artist bio

- Add to cart and wishlist functionality

- Related artwork recommendations

- Customer reviews and ratings

5.3 Shopping Cart and Checkout

Cart Interface

- Item preview with thumbnails and details

- Quantity adjustment and removal options

- Price calculation with taxes and shipping

- Save for later functionality

- Guest checkout option

Checkout Process

- Multi-step form with progress indicator

- Address validation and shipping options

- Payment method selection

- Order summary and confirmation

- Email confirmation and tracking information

6. Security and Data Protection

6.1 Data Security Measures

User Data Protection

- Encrypted password storage

- Personal information access controls

- GDPR compliance for European users

- Data retention and deletion policies

Payment Security

- PCI DSS compliance for payment processing

- SSL encryption for all transactions

- Secure payment gateway integration

- Fraud detection algorithms

6.2 Application Security

Input Validation

- Form input sanitization and validation

- File upload restrictions and scanning

- SQL injection prevention measures

- Cross-site scripting protection

Access Control

- Role-based permission system

- Administrative interface security

- Artist account verification process

- Customer data access restrictions

7. Integration and Third-Party Services

7.1 Payment Gateways

Supported Payment Methods

- Credit and debit card processing

- PayPal integration

- Digital wallet support (Apple Pay, Google Pay)

- Bank transfer and wire payment options

- International currency support

7.2 Shipping and Logistics

Shipping Integration

- Real-time shipping rate calculation

- Multiple carrier support (UPS, FedEx, DHL)

- International shipping capabilities

- Package tracking integration

- Insurance and signature confirmation

7.3 Marketing and Analytics

Analytics Integration

- Google Analytics for user behavior tracking

- Conversion funnel analysis

- Artist performance metrics

- Customer lifetime value calculation

- A/B testing framework

8. Performance and Optimization

8.1 Image Optimization

Image Processing Pipeline

- Automatic image compression and resizing

- WebP format support for modern browsers

- Lazy loading for improved page speed

- CDN distribution for global performance

- Progressive image enhancement

8.2 Database Optimization

Query Performance

- Indexed searches for artwork and categories

- Query caching for frequently accessed data

- Database connection pooling

- Optimized join operations

- Regular maintenance and optimization

9. Mobile and Accessibility

9.1 Mobile Experience

Responsive Design

- Touch-optimized interface elements

- Mobile-specific navigation patterns

- Optimized image sizes for mobile bandwidth

- Progressive web app capabilities

- Offline browsing for cached content

9.2 Accessibility Compliance

Universal Design Principles

- Screen reader compatibility

- Keyboard navigation support

- High contrast mode availability

- Alternative text for all images

- WCAG 2.1 AA compliance

10. Testing and Quality Assurance

10.1 Functional Testing

Core Feature Testing

- User registration and authentication flow

- Shopping cart and checkout process

- Payment processing verification

- Image upload and display functionality

- Search and filtering accuracy

10.2 Performance Testing

Load Testing Scenarios

- High-traffic gallery browsing

- Concurrent checkout processes

- Image-heavy page loading

- Database query performance under load

- Payment gateway stress testing

10.3 Security Testing

Vulnerability Assessment

- Input validation testing

- Authentication security verification

- File upload security validation

- Payment security compliance

- Data protection audit

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Platform Type: E-commerce Art Gallery
Target Audience: Art Collectors, Artists, Gallery Visitors
Business Model: Commission-based Art Sales Platform