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A RESEARCH PAPER ON THE DESIGN AND DEVELOPMENT OF A WEB-BASED ART EXHIBITION

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Abstract

Art exhibitions involve the coordinated management of artists, artworks, exhibition schedules, venues, visitors, and administrative information. When these activities are handled through paper records or separate files, duplication, data inconsistency, scheduling conflicts, and difficulty in retrieving information can occur. This research paper presents the design and development of an Art Exhibition Management System (AEMS), a centralized web-based system intended to organize exhibition-related data and simplify administrative activities. The proposed system provides modules for administrator management, artist registration, artwork management, exhibition scheduling, venue information, and report generation. The system uses a structured database to maintain relationships among artists, artworks, and exhibitions. A modular design and role-based access approach are proposed to improve maintainability and data security. The study reviews existing exhibition-management research and translates its findings into a practical academic project model. The proposed

system can reduce repetitive manual work, improve data accessibility, support accurate exhibition scheduling, and provide a foundation for future features such as online registration, digital catalogues, visitor analytics, and virtual exhibition support.

Keywords: Art Exhibition, Exhibition Management System, Artwork Management, Artist Management, Exhibition Scheduling

Introduction

Art exhibitions are organized activities in which artworks are selected, documented, displayed, and made available to visitors. The management of an exhibition requires coordination between administrators, artists, curators, venues, and other participants. As the number of artworks and exhibitions increases, maintaining accurate records becomes increasingly important. A digital management system can provide a centralized way to store and retrieve information and can support administrative decision-making.

Earlier research on exhibition management systems has investigated the use of information technology to structure exhibition workflows and improve operational efficiency. Nam Hyun Woo's (2006) study described an internet-based exhibition management system designed around museum exhibition processes, while Hu and Shi (2021) proposed a browser/server exhibition management information system with user management, visualization, document management, and information scheduling functions. These studies provide a basis for designing systems that integrate exhibition information into a common platform.

The proposed Art Exhibition Management System focuses on a manageable academic implementation. It organizes the core entities of an exhibition environment—ADMIN, ARTIST, ART, and EXHIBITION—and provides functions for creating, updating, viewing, and managing their records. The system is designed to be simple enough for educational implementation while remaining extensible for future real-world use.

Problem Statement

Many small exhibition organizations and academic exhibition projects use spreadsheets, paper forms, or multiple disconnected files to maintain artist and artwork information. Such approaches can make it difficult to maintain consistent records, identify artwork associated with a particular artist, monitor exhibition dates, and generate reports. Manual data entry can also lead to duplication and errors.

The problem addressed in this research is the absence of a centralized system that combines artist, artwork, and exhibition information in a structured database while providing simple administrative functions. The proposed AEMS addresses this problem through a web-based application with clearly defined modules and database relationships.

Objectives

- To design a centralized database for artists, artworks, and exhibitions.
- To provide secure administrator login and user-management functions.
- To maintain complete and searchable artist and artwork records.
- To support creation and management of exhibition schedules and venues.
- To reduce repetitive manual record keeping and improve information retrieval.
- To generate useful reports for administrative monitoring.
- To provide a scalable foundation for future online and virtual exhibition features.

Literature Review

Research in exhibition information systems demonstrates the value of integrating exhibition activities into structured digital platforms. Nam Hyun Woo (2006) developed an internet-based Exhibition Management System for art museums by analyzing recurring exhibition tasks and modeling exhibition workflows. The study reported a prototype approach centered on structural and content design and suggested improvements in work efficiency and the use of exhibition related knowledge.

Hu and Shi (2021) proposed a flexible exhibition management information system using a Browser/Server architecture. Their design separated browser, server, and middle-layer functions and included user management, exhibition visualization, data-resource management, document management, project management, and information scheduling. The study illustrates how layered architecture can support exhibition information management.

More recent work has also examined digital and virtual approaches. A 2023 study described a Virtual Art Exhibition System that combines museum data with virtual-space technologies (Fukuda & Ishibashi, 2023). In 2025, research on an Art Gallery Management System described centralized management of artists, artworks, exhibitions, and sales (Satpute et al., 2025). A 2026 Scientific Reports article further explored an art management platform integrating virtual scenes, art display, trading, social interaction, and recommendation methods (He et al., 2026). These developments indicate that exhibition systems are expanding beyond basic record management toward digital presentation and interactive services.

The present project adopts the core management principles from this body of work but limits the implementation to essential academic functions. This keeps the system understandable, testable, and suitable for a student software-development project.

Proposed System

The Art Exhibition Management System is proposed as a web-based application connected to a Relational database. The administrator interacts with the application through a user interface, while the application performs validation, database operations, and report generation. The database stores structured records and maintains relationships between entities.

Major Modules

Administrator Module: Provides login, authentication, and administrative control over system records.

Artist Management: Stores artist ID, name, email, phone number, and other relevant details.

Artwork Management: Stores artwork ID, artist association, title, category, price, and related information.

Exhibition Management: Stores exhibition ID, exhibition name, date, venue, and associated exhibition information.

Report Module: Provides summarized information such as artist lists, artwork lists, and exhibition schedules.

System Design

The system follows a modular architecture consisting of a presentation layer, application layer, and database layer. The presentation layer provides forms and screens. The application layer validates requests and applies business rules. The database layer stores persistent information.

Entity Relationship Model

The principal entities are ADMIN, ARTIST, ART, and EXHIBITION. ADMIN manages the system. ARTIST represents artists participating in exhibitions. ART stores information about individual artworks and includes Artist_ID as a foreign key to associate an artwork with its artist.

EXHIBITION stores exhibition name, date, and venue. Additional linking tables can be introduced if an artwork may participate in multiple exhibitions.

Suggested Database Tables

Table 1:Suggested Database Tables

Entity	Important Attributes	Purpose
ADMIN	Admin_ID (PK), Name, Email, Password	Administrator authentication an control
ARTIST	Artist_ID (PK), Name, Email, Phone	Stores artist information
ART	Art_ID (PK), Artist_ID (FK), Title, Category, Price	Stores artwork information
EXHIBITION	Exhibit_ID (PK), Name, Date, Venue	Stores exhibition information

Methodology

A sequential software-development approach can be used for the academic implementation. The major stages are requirement analysis, system design, implementation, testing, deployment, and maintenance. During requirement analysis, functional and non-functional requirements are identified. During design, database entities, relationships, user interfaces, and module boundaries are defined. Implementation converts the design into application code. Testing verifies individual modules and their integration. Deployment makes the application available to intended users, while maintenance addresses corrections and future improvements.

Functional Requirements

- The system shall authenticate authorized administrators.
- The system shall allow administrators to add, edit, view, and delete artist records.

- The system shall allow administrators to add, edit, view, and delete art work records.
- The system shall allow administrators to create and update exhibition records.
- The system shall associate artworks with their corresponding artists.
- The system shall provide search and viewing functions for stored information.
- The system shall generate basic management reports.

Non-Functional Requirements

- Security: Authentication and authorization should protect administrative functions.
- Usability: Interfaces should be simple and understandable for intended users.
- Performance: Common database operations should return results efficiently.
- Reliability: Data should be stored consistently and validated before submission.
- Maintainability: Modular code and normalized database design should simplify future changes.
- Scalability: The design should permit additional features and records as system usage grows.

Implementation

The proposed implementation can use a standard web-application stack consisting of a front-end interface, server-side application logic, and a relational database such as MySQL. HTML, CSS, and JavaScript can be used for the user interface, while a server-side framework or language can process requests and communicate with the database. The exact technology stack can be selected according to institutional requirements.

Database operations should use primary keys, foreign keys, input validation, and appropriate constraints. Passwords should be stored using secure password-hashing mechanisms rather than plain text. Administrative functions should be separated from public viewing functions if the system is later extended for public use.

Testing

Testing is required to verify that the system behaves according to its requirements. Unit testing can verify individual functions such as login validation, artist insertion, artwork insertion, and exhibition creation. Integration testing can verify interactions between application modules and the database. System testing can evaluate complete workflows, such as logging in, registering an artist, adding artwork, creating an exhibition, and retrieving a report.

Example test cases include valid and invalid administrator login, duplicate artist IDs, missing required artwork fields, invalid foreign-key references, exhibition date validation, and report generation. Testing should also consider usability, access control, and database recovery procedures.

Expected Results

The expected outcome is a centralized Art Exhibition Management System that reduces dependence on manual records and improves the organization of exhibition data. Administrators should be able to retrieve artist, artwork, and exhibition information more systematically. The database structure should reduce unnecessary duplication and make relationships between records explicit.

The project is also expected to provide a foundation for further development. Future versions may include artist self-registration, visitor registration, online ticketing, artwork sales, QR codebased artwork information, digital catalogues, visitor analytics, notifications, and virtual exhibition environments.

Advantages

- Centralized storage of exhibition information.
- Faster retrieval of artist and artwork records.
- Easier exhibition scheduling and monitoring.

- Reduced duplication associated with separate manual files.
- Better consistency through database constraints and validation.
- Easier generation of administrative reports.
- Expandable architecture for future digital exhibition services.

Limitations

The proposed academic system focuses on core management functions and does not attempt to implement every feature found in commercial gallery platforms. Advanced capabilities such as real-time visitor analytics, online payment processing, augmented or virtual reality, recommendation engines, and large-scale digital asset management are outside the initial scope. The quality of the final system also depends on the accuracy of data entered by authorized users.

Conclusion

This research presented the design of an Art Exhibition Management System intended to organize the core information and activities associated with art exhibitions. By integrating administrator, artist, artwork, and exhibition data into a centralized relational database, the system provides a structured alternative to fragmented manual record keeping. The proposed modular architecture supports authentication, data management, exhibition scheduling, and reporting while leaving room for future expansion.

Existing research demonstrates that information systems can support exhibition workflows, digital resource management, visualization, and virtual exhibition experiences. Building on these ideas, the proposed AEMS provides a practical and educational foundation for implementing digital exhibition management. Future work can extend the system with public-facing services, digital catalogues, analytics, online transactions, and virtual exhibition capabilities.

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