

# **ArtLink AI-Powered Social Media and E-Commerce Platform**

**Mr. Ajay Ravindra Gosavi, Ms. Harshada Sanjay Wadile,  
Mr. Darshan Rajendra Patil, Prof. Dr. P. R. Patil**

Students, Computer Science and Engineering  
Professor, Computer Science and Engineering  
Sandip University, Nashik

**Abstract:** *ArtLink is an AI-powered social media and e-commerce platform designed specifically for digital creators and art collectors. The system integrates social networking, portfolio management, and secure monetization within a single ecosystem. The platform is developed using the MERN stack consisting of MongoDB, Express.js, React.js/Next.js, and Node.js. It incorporates JWT authentication, Stripe payment integration, Cloudinary media management, and scalable REST APIs. Future enhancements include AI-powered recommendation systems using multimodal learning architectures*

**Keywords:** *ArtLink*

## **I. INTRODUCTION**

In the modern era of digital transformation, the creator economy has emerged as one of the fastest-growing sectors of the internet. Artists, designers, photographers, illustrators, and digital creators increasingly rely on online platforms to showcase their work, connect with audiences, and generate income. However, existing social media and e-commerce platforms often fail to address the unique needs of creators. Most traditional platforms prioritize viral and engagement-driven content, making it difficult for talented artists to gain visibility unless they consistently produce high-frequency content. As a result, many creators struggle with limited discoverability, fragmented workflows, and reduced monetization opportunities.

To overcome these challenges, the **ArtLink AI-Powered Social Media and E-Commerce Platform** is proposed as an integrated ecosystem specifically designed for digital creators and art enthusiasts. ArtLink combines the features of a social networking platform, professional portfolio management system, and online marketplace into a single unified application. The platform enables creators to upload and showcase their artwork, interact with followers, receive feedback, and securely sell their work through an integrated payment gateway.

The system is developed using the MERN stack, which includes MongoDB, Express.js, React.js/Next.js, and Node.js. This modern technology stack provides scalability, flexibility, and high performance. The frontend is designed with a responsive and user-friendly interface that focuses on artwork presentation, while the backend handles secure authentication, API management, database interactions, and payment processing. Technologies such as JWT authentication, Cloudinary media storage, and Stripe payment integration ensure security and seamless user experience. One of the most important features of ArtLink is its future scope for AI-powered recommendation systems. By utilizing advanced machine learning models and multimodal recommendation techniques, the platform aims to recommend artworks based on artistic style, user preferences, color composition, and semantic similarity rather than simple popularity metrics. This approach promotes fair discoverability and encourages artistic creativity.

The ArtLink platform not only simplifies the workflow of digital creators but also provides collectors and art enthusiasts with a curated environment to discover and purchase high-quality artwork. Through its scalable architecture, secure infrastructure, and AI-driven vision, ArtLink represents a next-generation solution for the growing digital creator economy.



## II. PROBLEM DEFINITION

The rapid growth of the digital creator economy has created new opportunities for artists and content creators to share and monetize their work online. However, despite the availability of multiple social media and e-commerce platforms, creators continue to face several major challenges that limit their growth, visibility, and financial stability. Existing platforms are primarily designed for mass engagement and entertainment rather than supporting the professional needs of artists and digital creators.

One of the primary problems is **algorithmic dilution**. Traditional social media platforms such as Instagram, TikTok, and Facebook prioritize highly engaging and frequently posted content. As a result, creators who spend significant time producing high-quality artwork often receive less visibility compared to users posting short-form viral content daily. This reduces the reach of professional artists and discourages creativity and originality.

Another significant issue is **workflow fragmentation**. Creators are forced to use multiple platforms for different purposes. For example, they may use Instagram for audience engagement, Behance for portfolio display, Shopify for selling products, and Patreon for subscriptions. Managing multiple accounts and platforms increases complexity and reduces user convenience. Potential buyers are also required to navigate through several external links before completing a purchase, leading to poor user experience and lower conversion rates.

The existing systems also suffer from **high commission fees and payment friction**. Many online marketplaces charge substantial commission percentages on artwork sales, reducing the profits earned by creators. Additionally, complicated checkout processes and lack of integrated payment systems discourage customers from completing transactions.

Another challenge is the **lack of personalized artwork discovery**. Most platforms recommend content based on popularity metrics such as likes, shares, and watch time rather than artistic style or user preferences. This makes it difficult for new creators to gain exposure, especially when they do not already have a large follower base.

Furthermore, current platforms often lack a **creator-centric interface**. Advertisements, unrelated content, and cluttered layouts distract users from the artwork itself. Artists require a clean, professional environment where their creative work remains the primary focus.

Therefore, there is a strong need for a dedicated platform that integrates social networking, portfolio management, artwork discovery, and secure e-commerce functionality into a single ecosystem. The proposed ArtLink platform aims to solve these issues by providing creators with a scalable, AI-powered, and user-focused environment that supports creativity, discoverability, and monetization.

### Objectives of the System

The primary objective of the ArtLink AI-Powered Social Media and E-Commerce Platform is to provide a unified digital ecosystem for artists, creators, and art collectors. The system is designed to integrate social networking, portfolio management, and online monetization into a single platform. The major objectives of the system are as follows:

- To provide creators with a professional platform for showcasing digital artwork.
- To enable secure buying and selling of artwork through integrated payment systems.
- To reduce workflow fragmentation by combining social media and e-commerce features.
- To implement secure user authentication and authorization using JWT.
- To develop a scalable and high-performance system using the MERN stack.
- To improve artwork discoverability through AI-powered recommendation systems.
- To create a responsive and user-friendly interface for both creators and buyers.
- To provide secure media storage and management using Cloudinary integration.

## III. LITERATURE SURVEY

The growth of social commerce and digital marketplaces has significantly transformed the creator economy. Existing research highlights the importance of combining social interaction with e-commerce functionalities to improve user



engagement and transaction efficiency. Platforms that integrate community interaction with online purchasing systems achieve better customer retention and conversion rates.

Research on recommender systems identifies three major approaches: Collaborative Filtering, Content-Based Filtering, and Hybrid Recommendation Systems. Traditional collaborative filtering methods face the “cold start problem,” where newly uploaded content receives limited visibility due to lack of engagement data. Modern AI-based recommendation systems such as OpenAI’s CLIP model overcome this limitation by analyzing visual and textual similarities between artworks.

Several studies also compare relational and NoSQL databases for social networking applications. NoSQL databases such as MongoDB are preferred due to their scalability, flexibility, and ability to manage large volumes of unstructured data. Similarly, microservices and event-driven architectures are widely adopted in scalable social media systems because they support high concurrency and independent service deployment.

The literature survey concludes that combining AI-powered recommendation systems, scalable NoSQL databases, and integrated social commerce features can significantly improve digital creator platforms.

### **System Architecture**

The ArtLink platform follows a MERN stack architecture consisting of MongoDB, Express.js, React.js/Next.js, and Node.js. The architecture is divided into multiple layers to ensure scalability, maintainability, and modularity.

Main Layers of the Architecture:

#### **Client Layer**

The frontend application is built using React.js and Next.js. It handles user interaction, page rendering, and responsive design.

#### **API Layer**

Express.js is used to expose RESTful APIs for authentication, artwork management, social interactions, and payment processing.

#### **Business Logic Layer**

Controllers manage application logic such as likes, comments, follows, and artwork uploads.

#### **Database Layer**

MongoDB stores user data, artwork details, comments, likes, and transaction information.

#### **External Services Layer**

Cloudinary handles media storage while Stripe manages secure online payments.

The architecture ensures secure communication between components and supports future scalability for AI-driven features.

#### **Frontend Design**

The frontend of ArtLink is designed using React.js and Next.js to provide a responsive and interactive user interface. The interface focuses on simplicity, modern design, and artwork visibility.

#### **Key Frontend Features:**

- Responsive user interface for desktop and mobile devices
- Dynamic artwork feed and profile pages
- Real-time social interactions such as likes and comments
- Artwork upload forms with image previews
- Secure authentication pages
- Server-Side Rendering (SSR) for improved SEO and performance

React components are modular and reusable, making the frontend easier to maintain and scale. State management is implemented using React Hooks and Zustand.



### **Backend Design**

The backend is developed using Node.js and Express.js. It functions as a RESTful API server responsible for handling business logic, database communication, authentication, and payment integration.

Backend Features:

- JWT-based authentication and authorization
- Middleware for request validation and security
- REST API routing for users, artworks, comments, likes, and orders
- Cloudinary integration for image uploads
- Stripe integration for payment processing
- MongoDB database connectivity using Mongoose ODM

The backend follows a modular architecture where controllers, routes, models, and middleware are separated for better maintainability

### **Database Schema**

MongoDB is used as the primary NoSQL database for the ArtLink platform. The database schema is designed using Mongoose models.

Main Collections:

#### **Users Collection**

Stores user profile details, email, password hash, and profile picture.

#### **Artworks Collection**

Stores artwork images, titles, descriptions, tags, prices, and categories.

#### **Comments Collection**

Stores user comments associated with artworks.

#### **Likes Collection**

Tracks likes on artwork posts.

#### **Follows Collection**

Maintains follower-following relationships between users.

#### **Orders Collection**

Stores payment and transaction information.

The schema uses ObjectId references to maintain relationships between collections efficiently.

### **REST API Specification**

The ArtLink platform exposes multiple RESTful API endpoints for frontend communication.

Authentication APIs:

POST /api/auth/register

POST /api/auth/login

GET /api/auth/me

Artwork APIs:

GET /api/artworks

POST /api/artworks/upload

GET /api/artworks/search

Payment APIs:

POST /api/payment/create-checkout-session

POST /api/payment/webhook

Social Interaction APIs:



POST /api/like

POST /api/comment

POST /api/follow

All private endpoints are protected using JWT middleware.

#### 10. Security Features

Security is a critical aspect of the ArtLink platform.

Implemented Security Mechanisms:

Password hashing using bcrypt

JWT authentication for secure sessions

HTTPS communication using TLS encryption

Protection against Cross-Site Scripting (XSS)

CSRF protection using authorization headers

Environment variable management for API keys

Input validation and request sanitization

Secure Stripe webhook verification

These mechanisms ensure secure communication and protect user data

#### Testing and Quality Assurance

The ArtLink platform follows multiple testing methodologies to ensure reliability and performance.

Types of Testing:

##### **Unit Testing**

Tests individual functions and components.

##### **Integration Testing**

Tests API interactions with the database.

##### **End-to-End Testing**

Tests complete workflows such as registration and payment.

##### **Security Testing**

Detects vulnerabilities such as injection attacks and unauthorized access.

Quality assurance ensures stable deployment and minimizes runtime errors.

#### **AI Recommendation System**

Future versions of ArtLink will integrate AI-powered recommendation systems to improve artwork discovery.

Features of the Recommendation System:

- Content-based artwork recommendations
- Semantic similarity matching
- Personalized feeds based on user interests
- Visual feature extraction using CLIP models
- AI-powered search and tagging

The recommendation engine will help users discover artwork based on artistic style rather than popularity metrics.

#### **IV. FUTURE SCOPE**

The ArtLink platform can be further enhanced with advanced technologies and features.

Future Enhancements:

- Mobile applications using React Native
- Blockchain integration for artwork ownership verification
- AI-assisted artwork editing tools



- NFT marketplace support
- Real-time chat system
- Multi-language support
- Advanced analytics dashboard for creators

These improvements will increase platform scalability and user engagement.

## V. CONCLUSION

The ArtLink AI-Powered Social Media and E-Commerce Platform successfully demonstrates a modern solution for the digital creator economy. The system integrates social networking, artwork showcasing, secure payments, and AI-powered discovery into a single scalable ecosystem. By utilizing the MERN stack, JWT authentication, Cloudinary integration, and Stripe payment processing, the platform ensures performance, security, and scalability.

ArtLink addresses the limitations of traditional social media platforms by focusing on creator-centric features and fair discoverability. The future integration of AI recommendation systems and blockchain technologies has the potential to further revolutionize the digital art marketplace

## REFERENCES

- [1] OpenAI - CLIP Research Paper
- [2] MongoDB Documentation
- [3] Stripe API Documentation
- [4] Next.js Documentation
- [5] React.js Official Documentation

