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Weaver Mart – A No Middle Men E-Commerce Website

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Abstract

This project aims to build a comprehensive and customer-centric clothing and saree e-commerce platform that directly connects customers with traditional artisans like tailors and weavers. It offers two distinct services: a custom tailoring service where customers can select fabrics, request on-site measurements, and receive their stitched garments, and a saree weaving service where customers can either choose from a curated collection of designs or upload their own custom designs for hand-weaving by skilled artisans. This eliminates middlemen, ensures fair compensation for artisans, and promotes traditional craftsmanship. The platform includes dedicated portals for admins, customers, and artisans, with tools for managing orders, inventory, and customer communications. A well-organized product catalog showcases various fabrics, prices, discounts, reviews, and real-time stock updates, ensuring transparency. Secure payment methods like UPI, bank transfer, and cash on delivery offer flexibility, and customers receive timely order updates through email and push notifications. The platform is built to ensure smooth, hassle-free transactions and a high-quality shopping experience. The platform's design is modern, responsive, and easy to navigate. A dynamic homepage features user registration/login, testimonials, promotional banners, and a universal search bar for efficient browsing. Carousels highlight new arrivals, trending items, and special offers, while the shopping cart system simplifies the purchasing process. A review and rating system encourages customer feedback, promoting service improvement and trust. The admin panel provides a comprehensive view of platform performance, allowing for effective management of users, orders, payments, and content. Artisans can update their catalogs, manage inventory, and track orders in real-time, empowering them with the tools to manage their businesses efficiently. Additionally, the platform will feature a robust backend that can scale as the user base grows, supporting multiple languages and mobile applications in the future. By combining traditional craftsmanship with modern technology, the platform offers artisans better visibility, access to a global customer base, and opportunities to grow their business digitally. It also simplifies the customization process for customers, offering a direct, transparent, and secure way to purchase tailored clothing and handwoven sarees.

Keywords: Custom Clothing, E-commerce, Saree Weaving, Online Tailor Booking, Weaver Interface, Order Tracking, Inventory Management

1.Introduction

1.1 What are Hand woven Sarees and Custom - Tailored Clothing?

1.1.1 Handwoven Sarees: ALegacy of Craftsmanship

Hand woven sarees are an integral part of India's rich textile heritage, representing a deep cultural legacy through their intricate patterns, unique textures, and vibrant colors. Each saree is a masterpiece, woven meticulously by skilled artisans using traditional techniques passed down through generations. Andhra Pradesh, in particular, is renowned for its diverse range of handwoven sarees, each with distinct characteristics. Mangalagiri sarees are known for their durability and elegant simplicity, while Venkatagiri sarees stand out for their soft texture and intricate zari work. Uppada sarees, made from lightweight silk, offer a luxurious feel, whereas Gadwal sarees combine silk and cotton, making them both comfortable and stylish. Dharmavaram sarees, with their rich xtures and detailed gold borders, are often favored for grand occasions. Despite their cultural significance, many eavers struggle to find a direct market for their products, often relying on intermediaries who take a large share of their earnings. WeaverMart bridges this gap by offering a platform where artisans can showcase their creations rectly to customers, eliminating middlemen and ensuring fair pricing. Customers can explore sarees based on region, pattern, and weave, with detailed product descriptions, customer reviews, and real-time stock availability, ensuring a seamless and informed shopping experience.

1.1.2 Custom - Tailored Clothing: A Personalized Fashion Experience

Unlike mass-produced garments, custom-tailored clothing offers a unique combination of precision, personalization, and superior craftsmanship. With WeaverMart's tailored clothing services, customers can enjoy garments designed to fit their exact measurements and style preferences. The process begins with precise measurements taken according to the customer's body structure, ensuring a flawless fit. A wide range of high-quality fabrics, including cotton, linen, silk, and blended materials, are available for selection, allowing customers to choose the perfect material for their desired outfit. Additionally, the platform enables users to customize their clothing by selecting collar types, sleeve lengths, fit preferences, and embellishments, providing a truly personalized fashion experience. To enhance convenience, WeaverMart offers home measurement services where tailors visit the customer's location to take accurate measurements, eliminating the need for multiple visits to a shop. Customers can also monitor their garment's progress in real time, tracking the order from fabric selection to final delivery.

This approach not only ensures a perfect fit but also brings the luxury of personalized fashion into the digital space. By embracing tailor-made clothing through WeaverMart, customers can enjoy high- quality, customized apparel while supporting skilled tailors who take pride in their craftsmanship.

1.2 How Does Weaver Mart Work?

WeaverMart operates as a seamless online marketplace that connects customers directly with weavers and tailors, offering both handwoven sarees and custom-tailored clothing. For handwoven sarees, customers can browse through an extensive collection categorized by type, design, and color. Each weaver has their own profile showcasing unique designs, available colors, and pricing. Once a customer selects their preferred saree and color, they can place an order with full transparency regarding the cost and estimated delivery time, ensuring a smooth and convenient shopping experience. For custom-tailored clothing, WeaverMart offers a wide selection of fabrics, designs, and colors from skilled tailors. Customers can

choose their preferred fabric and design and schedule a visit from a tailor. The tailor then visits the customer's location, takes precise measurements, and provides a cost estimate along with a delivery timeline. Once the garment is stitched, it is delivered to the customer within the promised timeframe, ensuring a personalized and hassle free experience.

1.3 Why WeaverMart?

WeaverMart is more than just an e-commerce platform—it's a digital ecosystem crafted to **empower local artisans** and bring their authentic craftsmanship directly to the hands of customers. By removing intermediaries, WeaverMart allows **weavers and tailors to receive fair compensation**, ensuring that their talent and effort are truly valued. Each artisan has the opportunity to create a personal brand, list their handcrafted products, and directly interact with customers who appreciate their work. This model not only boosts their income but also encourages **entrepreneurial growth** within the artisan community.

The platform serves as a **cultural bridge**, showcasing handwoven sarees, traditional attire, and regional weaving styles such as Kancheepuram, Banarasi, and Pochampally. By digitizing these ancient techniques and presenting them to a global audience, WeaverMart contributes to the **preservation and revival of India's rich textile heritage**. Young weavers are also inspired to continue their family traditions, seeing tangible opportunities in the modern digital landscape.

From the customer's perspective, WeaverMart brings together **convenience, customization, and craftsmanship** under one roof. Users can explore a wide range of ready-made garments or personalize their orders by uploading fabric choices, selecting patterns, or even submitting custom designs for weavers to bring to life. The intuitive interface makes it easy to navigate through collections, read detailed product descriptions, and place orders effortlessly.

What sets WeaverMart apart is its **commitment to transparency and trust**. Every product page includes comprehensive details such as estimated delivery times, customer ratings, and clear pricing— ensuring there are no hidden costs or surprises. Real-time order tracking, secure payment gateways, and proactive customer support further strengthen confidence in the platform.

In addition, WeaverMart is committed to **sustainability and ethical fashion**. By supporting small-scale, eco-friendly production and discouraging mass-produced goods, the platform promotes a conscious shopping culture. Each purchase contributes to the livelihood of a skilled artisan and encourages a supply chain rooted in dignity, heritage, and craftsmanship.

Whether it's a bride looking for a unique saree, a fashion enthusiast supporting local talent, or a family wanting custom outfits stitched with care — WeaverMart brings tradition, trust, and technology together in one seamless shopping experience.

1.1 Challenges in Developing WeaverMart

Building a platform like WeaverMart comes with several challenges. User authentication and security are crucial, requiring secure login systems and encrypted payment gateways to protect sensitive user data. Database management is another key aspect, as the platform needs to handle a large volume of products, weavers, tailors, and customer orders efficiently. Additionally, customization features must be implemented to allow customers to modify their orders while ensuring accurate fulfillment. Scalability is

also a challenge, as the platform needs to support a growing number of users and transactions without compromising performance.

1.2 How WeaverMart Solves These Challenges

To address security concerns, WeaverMart implements robust authentication mechanisms such as OAuth and JWT (JSON Web Tokens) to ensure secure user access. An efficient database design using relational databases like MySQL or PostgreSQL is employed to manage products, orders, and user data systematically. For customization options, the platform offers an intuitive interface that allows customers to select designs, colors, and measurements easily. Lastly, to ensure scalability, WeaverMart utilizes cloud-based hosting solutions such as AWS or Google Cloud, allowing the platform to handle increasing demand while maintaining high performance and reliability.

By combining advanced technology with traditional craftsmanship, WeaverMart not only enhances the reach of weavers and tailors but also provides customers with a unique and personalized shopping experience.

2. LITERATURE SURVEY

The literature review provides a comprehensive understanding of the key concepts, technologies, and emerging trends that form the foundation of the WeaverMart E-Commerce App. In recent years, the growth of e-commerce platforms has significantly transformed the retail industry, making products more accessible to customers while creating new opportunities for businesses. However, traditional artisans, such as weavers and tailors, have often been left behind due to their limited digital exposure, lack of direct customer engagement, and reliance on intermediaries. WeaverMart aims to bridge this gap by providing a dedicated digital marketplace where weavers can showcase their handcrafted sarees, and tailors can offer custom- made clothing services, directly connecting them with customers who seek authenticity and personalization in their fashion choices.

Handwoven sarees hold immense cultural and historical significance in India, with each region offering distinct weaving styles and patterns. Previous studies on textile heritage and consumer behavior indicate that there is a growing preference for authentic, handmade products over machine-made alternatives. However, due to the lack of proper digital infrastructure, many skilled weavers struggle to market their products effectively, leading to financial instability and a decline in traditional weaving practices. Research on digital transformation in the handloom industry highlights the importance of technology-driven solutions such as e-commerce platforms, online catalogs, and virtual showrooms in promoting artisan products to a global audience. By incorporating these insights, WeaverMart ensures that every weaver has a personalized store on the platform, allowing them to list their products, set prices, and manage orders without relying on third-party retailers.[2]

1.1 Mangalagiri Sarees

Mangalagiri sarees originate from the historic town of Mangalagiri in Andhra Pradesh. The weaving tradition of these sarees dates back to the 15th century during the reign of the Vijayanagara Empire, making them one of the oldest and most revered handwoven textiles in the region. Crafted from pure cotton or silk, these sarees ensure both breathability and elegance. They are distinguished by their signature zari borders and intricately designed pallu (end piece), which add to their aesthetic appeal. The yarn used in

Mangalagiri sarees is pre-dyed, eliminating the need for additional dyeing after weaving.

These sarees are renowned for their lightweight and highly comfortable nature, making them perfect for daily wear. They are produced using an eco-friendly and sustainable process, preserving traditional handloom techniques that have been passed down for generations. By embodying the rich cultural heritage of Andhra Pradesh, Mangalagiri sarees continue to hold significance in both traditional and contemporary fashion.

1.2 Venkatagiri Sarees

Venkatagiri sarees originate from the town of Venkatagiri in the Nellore district of Andhra Pradesh. Their weaving tradition dates back to the 18th century, during the reign of the Venkatagiri Rajas, who patronized these exquisite handwoven sarees. Originally woven exclusively for royalty, these sarees were adorned with intricate designs and luxurious fabrics, making them a prized possession. Made from fine cotton or silk, they offer a soft and luxurious feel, making them both comfortable and elegant. The hallmark of Venkatagiri sarees is their intricate golden zari work, often woven with silver threads, and delicate motifs inspired by nature, such as peacocks, flowers, leaves, and temple designs. These sarees are known for their lightweight, breathable, and highly durable nature, making them ideal for all-day wear in any season.

One of the most remarkable features of Venkatagiri sarees is the jamdani weaving technique, a labor-intensive method that involves handweaving motifs directly onto the fabric, giving them a distinct and raised texture. The weavers use high-quality, fine-count cotton, making these sarees feel feather-light while maintaining their strength and longevity. Traditionally, these sarees were woven in pastel shades, but modern adaptations include vibrant hues to cater to contemporary preferences.

Venkatagiri sarees were once favored by royalty for their regal appearance and intricate craftsmanship, and today they remain a popular choice for weddings, festive occasions, and traditional ceremonies. Their blend of simplicity and sophistication makes them a preferred option for both casual and grand celebrations. They reflect the artistic excellence and centuries- old weaving heritage of Andhra Pradesh's skilled artisans, preserving a legacy of craftsmanship that continues to thrive in the modern fashion industry. The government has also recognized Venkatagiri sarees with a Geographical Indication (GI) tag, ensuring their authenticity and promoting the livelihood of weavers who have mastered this ancient craft.[3]

1.3 Dharmavaram Sarees:

Dharmavaram sarees originate from the town of Dharmavaram in the Anantapur district of Andhra Pradesh. The weaving tradition of these sarees dates back to the 19th century and has been a significant part of the region's cultural heritage. Crafted from pure silk, these sarees

offer a rich and luxurious texture that exudes elegance and sophistication. They are characterized by intricate zari work, bold color combinations, and heavy borders, making them a preferred choice for grand occasions. The designs often feature temple motifs, floral patterns, and artistic embellishments that add to their grandeur and aesthetic appeal.

Renowned for their opulent appearance, Dharmavaram sarees are highly sought after for bridal wear and traditional ceremonies. They are considered a symbol of prosperity and heritage in South Indian culture,

reflecting the artistry and craftsmanship of skilled weavers. In addition to their beauty, these sarees are known for their durability and long-lasting fabric quality, making them a timeless wardrobe essential that can be passed down through generations. The blend of tradition, artistry, and elegance ensures that Dharmavaram sarees continue to hold a special place in Indian ethnic fashion.

1.4 Uppada Sarees:

Uppada sarees originate from the coastal town of Uppada in the East Godavari district of Andhra Pradesh. The weaving tradition of these sarees began during the reign of the Golconda kings, showcasing a rich history of craftsmanship that has been passed down through generations. Made from fine silk, these sarees are known for their lightweight and soft texture, making them extremely comfortable to wear. One of their most remarkable features is the Jamdani weaving technique, which enables artisans to create intricate patterns without the use of machines. This handwoven process results in delicate and detailed motifs, giving Uppada sarees a distinctive and translucent appearance.

Renowned for their exquisite craftsmanship, Uppada sarees are admired for their intricate detailing and timeless elegance. Their versatility makes them suitable for both casual and formal occasions, allowing wearers to embrace tradition with a touch of sophistication. The production of these sarees requires immense patience and skill, reflecting the dedication of Uppada weavers who continue to preserve this age-old tradition. By blending artistry with heritage, Uppada sarees remain a cherished part of Andhra Pradesh's rich textile legacy.

1.5 Pedana Kalamkari Silk Sarees

Pedana Kalamkari sarees originate from the town of Pedana in the Krishna district of Andhra Pradesh. The art of Kalamkari dates back to ancient times and was notably patronized by the Mughal rulers, adding historical significance to this intricate craft. These sarees are crafted using either silk or cotton, offering a perfect combination of comfort and elegance. Unlike machine-made prints, Pedana Kalamkari sarees are renowned for their hand-painted designs, which are created using natural dyes and traditional techniques. The motifs often depict themes inspired by mythology, nature, and folklore, making each saree a unique piece of art.

These sarees are celebrated not only for their aesthetic beauty but also for their eco-friendly and sustainable production process. The use of organic dyes and hand-painting techniques ensures that every piece is crafted with meticulous care, preserving the authenticity of the art form. Pedana Kalamkari sarees are highly valued for their distinct and artistic appeal, offering a fusion of creative expression and traditional craftsmanship. By keeping alive the essence of India's cultural heritage, these sarees continue to captivate saree enthusiasts and art lovers alike.

3. PROPOSED METHOD

To address these issues, we propose a MERN-based Clothing E-commerce platform with two major sections:

Custom Tailoring Section: Customers can select fabrics, request measurements from a Handloom Saree Section: Customers can design sarees and directly place orders with tailor, and receive stitched clothes. weavers, eliminating middlemen.

A Seamless Order Tracking System for Customers:

WeaverMart integrates a real-time order tracking system that allows customers to monitor their order's progress from start to finish. Once an order is placed, customers receive regular updates at each stage of the process—order confirmation, tailor visit (if applicable), stitching or weaving progress, packaging, and delivery. This system not only increases transparency but also builds trust by keeping customers informed. Notifications are sent via email and SMS, and customers can also log in to their dashboard to view live order statuses at any time.

A Multi-Client Platform with Separate Portals for Admin, Customers, and Tailors/Weavers The platform has been thoughtfully designed with multiple interfaces to cater to different user roles. Customers have access to an interactive shopping portal where they can explore products, personalize orders, make payments, and track deliveries. Tailors and weavers use their dedicated portals to receive new orders, manage workflows, update progress, and communicate with customers. Meanwhile, the admin portal provides a powerful control center to monitor platform activity, verify artisan profiles, resolve disputes, and oversee inventory, user accounts, and analytics.

Secure Payment Gateway Supporting UPI, Bank Transfers, and COD WeaverMart ensures all transactions are handled with the highest standards of security by integrating trusted payment gateways such as Razorpay and Stripe. The system supports a variety of payment methods, including UPI, debit/credit cards, net banking, and Cash on Delivery (COD). Each transaction is encrypted and verified, protecting customer data and ensuring smooth payment processing. Upon successful payment, an electronic invoice is automatically generated and sent to the customer's registered email ID for reference and transparency.

Inventory Management for Tailors and Weavers to Manage Orders Efficiently Tailors and weavers can manage their orders, track materials, and update stock levels through a dedicated inventory management system. The dashboard allows artisans to view current workloads, accepted orders, and pending deliveries, enabling them to prioritize and plan effectively. They can mark stages of progress like "Measurement Taken," "Weaving Started," or "Stitching Completed," helping customers stay informed and reducing the chances of delays or miscommunication. The system also helps avoid overbooking by alerting artisans when they reach capacity.

Review and Rating System to Ensure Service Quality and Customer Feedback To maintain high standards and encourage continuous improvement, WeaverMart features a comprehensive review and rating system. After receiving their orders, customers are invited to rate the tailor or weaver and provide written feedback on their experience. This feature not only helps future buyers make informed decisions but also motivates service providers to maintain quality. The admin team regularly reviews this feedback to highlight top performers and take corrective action when needed, ensuring that only trusted artisans remain active on the platform.

METHODOLOGY

The MERN-based Clothing E-commerce Platform is an advanced and seamless solution for customers to connect directly with tailors and weavers for custom clothing and saree weaving services. Unlike traditional e-commerce platforms that only facilitate the purchase of ready-made garments, this platform

focuses on customization, direct ordering, and real-time tracking of tailoring and weaving processes.[4]

Key Objectives

Provide a user-friendly interface for customers to select clothing types, fabrics, and designs. Enable direct interaction with tailors and weavers, eliminating middlemen and reducing costs. Implement real-time order tracking, ensuring transparency in the entire process.

Offer secure payment integration via UPI, bank transfers, and cash on delivery (COD). Efficiently manage inventory and order history for all stakeholders.

The WeaverMart E-Commerce App was developed to provide traditional weavers and tailors with a digital platform to showcase and sell their handcrafted products directly to customers. The implementation involved multiple stages, including requirement gathering, system design, technology selection, development, database management, payment integration, logistics, security, and testing. This approach ensured a seamless, secure, and scalable marketplace where customers could browse, customize, and purchase traditional clothing, while artisans could manage their products, receive payments, and expand their reach globally.

4.1 SOFTWARE DEVELOPMENT LIFE CYCLE:

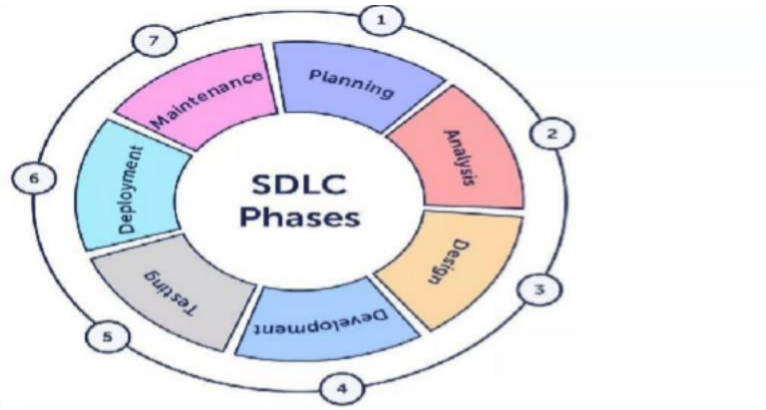

Fig. 4.1 SDLC

4.2 Requirement Analysis and System Planning

The first step involved understanding the needs of key stakeholders, including weavers, tailors, and customers. Extensive research was conducted through surveys, interviews, and industry analysis to identify pain points and expectations.

Key findings from the analysis led to defining the functional and non-functional requirements of the platform:

Functional Requirements:

User Authentication & Authorization: The platform ensures secure and seamless access for all users—customers, tailors, weavers, and admins—through robust registration and login systems. JWT (JSON Web Token) is used for authentication, providing stateless and encrypted user sessions. Once registered, users are assigned specific roles that define what parts of the application they can access and what actions they can perform. For instance, a customer can place orders and make payments, while a tailor or weaver can

manage incoming service requests. Admins hold the highest privileges, overseeing platform-wide operations including user approvals and data management. This role-based system keeps interactions streamlined and secure.

Product Listings & Customization: Weavers and tailors have the ability to upload their creations, such as sarees, fabrics, or stitched garments, into the product catalog. Each listing includes details like fabric type, customization options, price, delivery time, and visuals. Customers, on the other hand, are empowered to personalize their clothing orders. For tailoring services, customers can select fabrics and request specific cuts, patterns, or fits. They can also upload references or ideas for saree designs if they're opting for custom weaves. This feature fosters a highly personalized shopping experience and encourages customer-artisan collaboration.

Shopping Cart & Order Management: Customers can easily browse products and services, adding selected items to a dynamic shopping cart that supports edits like quantity adjustments or removing items. Before checkout, they can review order details, apply discounts, and choose delivery preferences. Once an order is placed, customers gain access to a dedicated order management panel where they can monitor status updates—such as "Order Confirmed," "Tailor Assigned," or "Out for Delivery." At the same time, artisans are notified of incoming orders and can manage their workload, update progress, or mark orders as complete through their respective dashboards.

Payment Processing: The platform integrates secure and reliable payment gateways like Razorpay to facilitate hassle-free transactions. Customers can choose from various methods including UPI, debit and credit cards, net banking, or even Cash on Delivery (COD). Each payment is securely encrypted, and transactions are instantly verified and logged into the user's order history. Digital invoices are automatically generated upon successful payment and sent via email for customer records. This streamlined system ensures both payment flexibility and transactional safety, enhancing the trust factor between the platform and its users.

Shipping & Logistics Management: Once orders are confirmed and processed, the shipping module ensures timely delivery with real-time tracking. Customers are continuously updated via SMS, email, or push notifications about the status of their order—from packaging to dispatch to delivery. Logistics partners are integrated within the backend to coordinate the pickup and delivery of goods, reducing delays and manual effort. Tailors and weavers can also track delivery status, helping them ensure their service commitments are met. This transparent and well- coordinated system adds a professional layer to the customer experience, improving overall satisfaction and reliability.

Non-Functional Requirements:

Scalability: Ability to handle increasing users and transactions efficiently.

Security: Encryption for user data and payment transactions. **Performance**: Fast loading times and smooth UI interactions. **User Experience**: Intuitive and accessible design across devices.

4.3 System Components

Admin Panel – (Manages users, products, orders, and payments)

The Admin Panel is responsible for managing and monitoring the entire platform. The administrator has full control over: The system includes comprehensive user management, allowing administrators to approve or reject tailor and weaver registrations while managing customer accounts. Product and inventory management features enable updating fabric availability, adding new clothing designs, and maintaining saree design templates. Efficient order management supports tracking orders, resolving disputes, and facilitating smooth communication among stakeholders. The platform also handles payment and transactions by managing gateway integrations, processing refunds, and ensuring successful order completions. To maintain security and compliance, it implements robust measures such as role-based authentication, data encryption, and fraud detection mechanisms.

Customer Portal – (Selection, customization, order placement, and tracking)

The Customer Portal is crafted to deliver a seamless and personalized shopping experience, starting with secure User Registration & Login through JWT or OAuth, including Google and Facebook sign- in options. In the Clothing Selection section, customers can choose between ready-made garments or opt for tailor-made clothing. Additionally, they have the option to customize saree designs and place orders directly with weavers. For Tailoring & Weaving Requests, if tailoring is selected, customers can schedule a home visit from a tailor for accurate measurements. In the case of saree weaving, customers can send their custom designs directly to the weaver. Order Tracking & Notifications keep customers informed with real-time updates about their order status, ensuring transparency throughout the purchase journey. With Secure Payment & Discounts, customers can complete transactions using UPI, bank transfers, or cash on delivery, and can also take advantage of available discounts. Finally, through the Review & Ratings feature, customers can share feedback and rate tailors, weavers, and products after receiving their orders, enhancing trust and service quality on the platform.

Tailor/Weaver Portal – (Accepting, processing, and managing orders)

The portal empowers tailors and weavers to manage their orders efficiently, beginning with order acceptance and scheduling, where tailors receive stitching requests and weavers handle saree weaving orders seamlessly. Customer communication is streamlined through direct messaging, allowing discussions around measurements, designs, and any specific customer requests for personalized service. Through inventory management, tailors and weavers can keep their fabric stock, saree materials, and customization options up to date, ensuring smooth workflow and availability. The order processing and status updates feature enables real-time tracking of every stage—from measurement and stitching or weaving to quality checks and final delivery—keeping both artisans and customers informed. Payment settlement is handled efficiently, with tailors and weavers receiving payments for completed orders through a secure system managed by the admin panel.

4.4 SYSTEM ARCHITECTURE

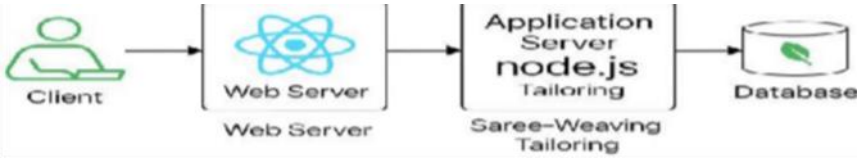

Fig. 4.2 System architecture

4.5 WORKING MODULE DESCRIPTION

The Clothing E-commerce Platform is divided into multiple modules to provide a seamless experience for customers, tailors, and weavers.

User Authentication:

The application ensures secure user access through JWT (JSON Web Token) authentication. Each user—whether a customer, tailor, weaver, or admin—must log in using verified credentials. The authentication process securely encodes user identity and role within a token, which is then used to authorize further actions without repeatedly asking for login credentials. Role-Based Access Control (RBAC) is implemented, allowing each user type to access and manage features specifically tailored to their role. For example, customers can place orders and track deliveries, while tailors and weavers gain access to manage and update ongoing service requests. Admins hold full privileges to oversee platform activities.

Customer Module:

Customers have access to a broad catalog of ready-made clothes and services like custom tailoring or personalized saree weaving. They can browse by category, filter by preferences, and add desired items to their cart. For tailoring services, customers can request a home visit for measurements by tailors. In the case of saree customization, they can upload their own designs, which are then assigned to weavers. Once an order is placed, customers can track its progress at each stage—whether it's "Measurements Taken," "Stitching Started," or "Weaving Completed." This transparency builds trust and keeps customers engaged throughout the process.

Tailor/Weaver Module:

Tailors and weavers are provided with dedicated dashboards to manage incoming orders efficiently. They can view order details, including specific customization requirements and delivery timelines. Once an order is accepted, they can update its status as work progresses— such as notifying when measurements are complete, stitching is in progress, or the saree is ready for dispatch. These updates are automatically reflected in the customer's order tracker. The dashboard also includes an overview of their order history, current workload, and earnings, empowering artisans with visibility and control over their services.

Admin Module:

The admin dashboard is a centralized panel for overseeing the entire platform. Admins are responsible for verifying artisan accounts, approving new tailor/weaver profiles to ensure service quality and authenticity. They can monitor active users, manage product listings, and control platform-wide inventory. Payment summaries, order volume reports, and delivery statuses are also accessible to admins for operational monitoring. Additionally, admins review customer feedback, handle service complaints, and moderate reviews to uphold platform integrity. This role ensures that both customers and service providers have a smooth, secure, and trustworthy experience.

Payment Module:

The platform supports a variety of payment options, including UPI, debit/credit cards, net banking, and Cash on Delivery (COD), catering to the diverse preferences of users. Payments are processed via secure integrations with APIs such as Razorpay or Stripe, ensuring end-to-end encryption and fraud protection. After successful payment, customers receive digital invoices and payment confirmations instantly.

Order Tracking &Reviews:

Once an order is placed, the system provides real-time tracking updates directly within the customer dashboard. Notifications about order status—such as "Tailor Assigned," "Work in Progress," or "Out for Delivery"—are delivered via email or push alerts. After receiving their order, customers are prompted to confirm the delivery and rate the service. They can leave feedback regarding quality, timeliness, and overall satisfaction. These ratings are visible to other users and help artisans maintain a positive reputation. Admins monitor this feedback to ensure consistent service quality and take necessary actions in case of repeated complaints or issues.

4.5.1 Requirement Analysis

Identifying stakeholders: Customers, Tailors, Weavers, and Admin. Understanding functional and non-functional requirements. Defining key features such as order tracking, online payments, and product customization.

4.5.2 Technology Stack Selection

Frontend Development (React.js + Redux)

The frontend of the application is developed using **React.js**, allowing for a modular and component- based architecture. This enhances maintainability and scalability as new features are added. The UI is designed to be fully responsive, ensuring a seamless experience across desktops, tablets, and mobile devices.

To manage complex application state, **Redux** is integrated, allowing centralized state management. Features such as user authentication status, cart contents, and product filters are handled efficiently using Redux Toolkit, improving performance and developer experience.

Backend Development (Node.js + Express.js)

The backend is built on **Node.js**, offering a non-blocking, event-driven architecture ideal for handling real-time operations like order tracking and user interactions. **Express.js** is used to define API routes and

handle server-side logic such as user authentication, product management, and order processing.

Database Management (MongoDB + Mongoose)

MongoDB is chosen for its flexibility in handling unstructured data. Its schema-less nature makes it ideal for evolving data models like customizable clothing orders, user roles, and artisan details. Collections are structured for users, products, orders, payments, and reviews.

To simplify data modeling and ensure schema consistency, **Mongoose** is used as an ODM (Object Data Modeling) library. Indexing and pagination techniques are implemented to optimize search and filter performance.

Authentication & Authorization (JWT + Bcrypt.js)

Secure access control is implemented using **JWT (JSON Web Tokens)**. Upon login, a token is generated and stored on the client-side (localStorage or cookies), enabling stateless and scalable session management.

Passwords are hashed using **bcrypt.js** before storage in the database, ensuring encryption and protection from data breaches. Role-based access control (RBAC) ensures that only authorized users (e.g., admin, tailor, weaver) can access certain features or perform critical operations.

Payment Integration (Razorpay, Stripe, UPI)

The platform supports multiple payment gateways to ensure flexibility and user convenience. **Razorpay** is the primary integration, supporting UPI, debit/credit cards, and net banking. **Stripe** is also supported for international transactions.

Payment statuses are tracked in real-time and linked to orders for easy reconciliation. Auto- generated invoices and transaction IDs help users and admins track financial activity with full transparency.

Deployment & DevOps (AWS, Vercel, Heroku)

For optimal performance and uptime, deployment is done across leading platforms. The **frontend is hosted on Vercel**, enabling rapid deployment, automatic CI/CD, and global CDN distribution for fast loading times.

The **backend is hosted on AWS EC2 or Heroku**, offering scalability and robust infrastructure management. Environment variables are securely managed, and auto-scaling ensures the app handles varying user loads efficiently.

Version Control & Collaboration (Git + GitHub)

The codebase is managed using **Git** and hosted on **GitHub** for collaborative development. Branching strategies like feature branches and pull requests are used for code reviews and team workflows.

CI/CD pipelines using GitHub Actions or Vercel workflows help automate testing, linting, and

deployment upon code changes, reducing manual errors and deployment delays.

4.5.3 Model-View-Controller

The platform follows an MVC (Model-View-Controller) pattern:

The **Model** layer in this project is responsible for managing the structure and interaction of the data stored in the MongoDB database. It defines the schemas for core entities such as users, products, orders, and payments using Mongoose, which ensures type safety, data validation, and relationships between collections. The user model stores information like names, emails, roles (customer, tailor, weaver, admin), hashed passwords, and account verification status. The product model captures details of clothing and sarees, including images, pricing, stock levels, and customization options. Order data includes order items, total pricing, delivery status, customer details, and links to either a tailor or a weaver, depending on the service. The payment model logs transaction IDs, payment modes (UPI, Razorpay, Stripe), timestamps, and associations with respective orders. Together, these models form the backbone of the application's data layer, allowing for smooth retrieval, updating, and storage of records in a structured and scalable manner.

The **View** layer is implemented using React.js and forms the client-side user interface of the application. It consists of reusable components that display and update dynamically based on user interaction and API responses. Customers have access to a dedicated dashboard that showcases their order history, real- time order tracking, saved customization preferences, and payment records. Tailors and weavers interact with specialized panels where they can manage product listings, receive and fulfill orders, update progress on custom clothing or saree designs, and view earnings. Admins use a powerful control panel to verify artisan profiles, manage the overall inventory, moderate customer reviews, handle refunds, and oversee system-wide analytics. The entire frontend is styled with Tailwind CSS or Chakra UI to maintain design consistency and responsiveness across devices. React Router handles client-side navigation, allowing users to seamlessly switch between pages like login, product catalog, product details, cart, checkout, and user profile without reloading the application.

The **Controller** layer, developed with Node.js and Express.js, serves as the bridge between the frontend and the database, handling all API requests and executing the business logic. It is responsible for processing data coming from the frontend, validating inputs, interacting with the database, and sending appropriate responses back to the client. The user controller manages authentication workflows including registration, login, JWT-based session handling, password encryption using bcrypt, and role- based authorization. The product controller enables tailors and weavers to create, update, and delete items, while also allowing the admin to oversee and

moderate inventory. The order controller ensures smooth order placement, updates statuses as the product moves through the tailoring or weaving pipeline, and tracks fulfillment progress. Payment processing is managed through a dedicated controller that integrates with third-party APIs like Razorpay or Stripe, securely verifying transactions and updating order statuses accordingly. Admin-level controllers

additionally handle advanced tasks such as managing user roles, verifying tailor/weaver accounts, responding to customer complaints, and issuing refunds. Middleware functions are used extensively to ensure that API routes are protected, data is sanitized, and any potential errors are gracefully handled.

Together, the MVC architecture creates a clear separation of concerns, which promotes modularity, scalability, and maintainability. This structure allows developers to work on different layers independently while ensuring the application behaves consistently across all user roles and scenarios.

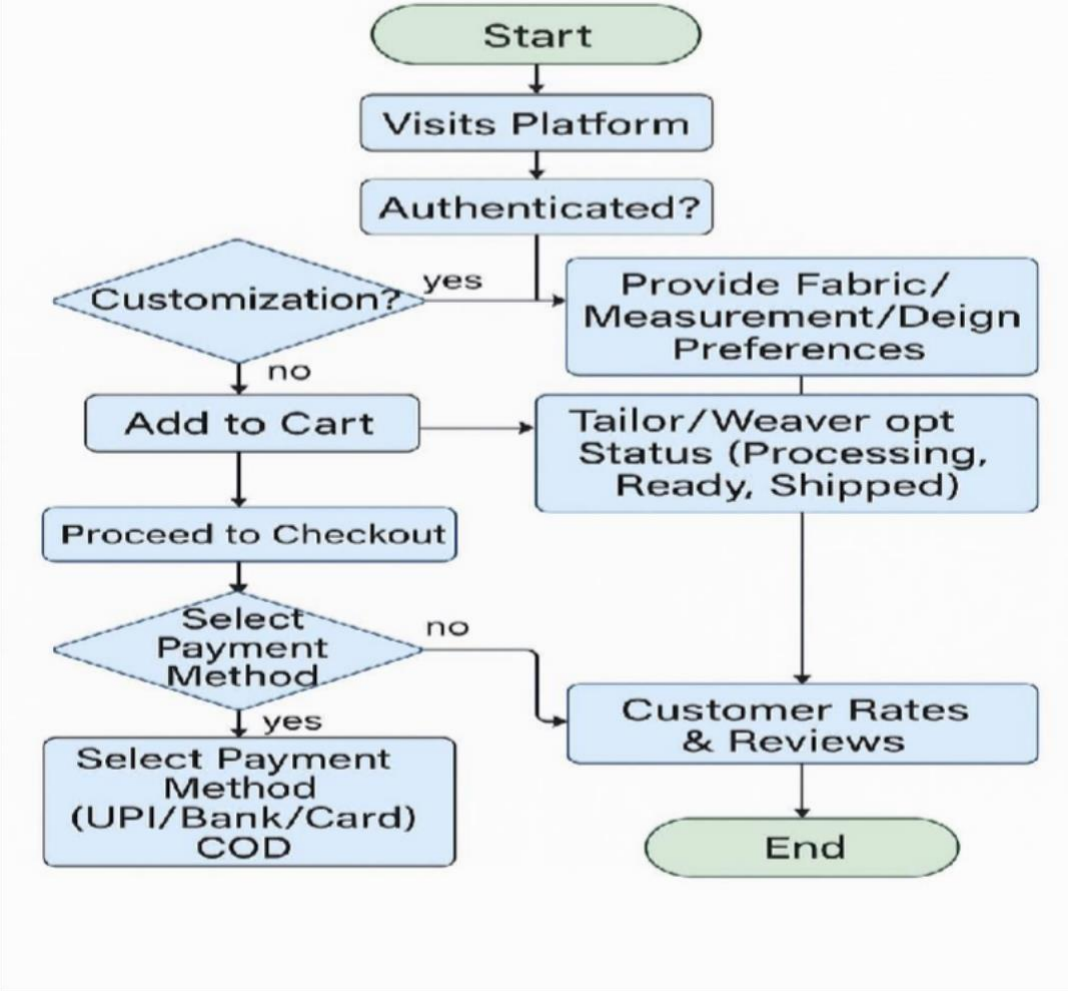

Fig. 4.3 Process flow chart

User Registration & Authentication:

The platform supports multiple user roles—customers, tailors, weavers, and admins. Registration begins with users filling out relevant information based on their role. Tailors and weavers are required to submit additional verification documents such as ID proofs and sample work, ensuring the authenticity of service providers. Admins review these details and approve profiles after successful verification. Once approved, users can securely log in using their credentials. Authentication is handled via JSON Web Tokens (JWT), ensuring a secure session. Role-based access control (RBAC) further ensures that each user sees only the functionalities relevant to their role.

Product Selection & Customization:
Customers can explore a wide range of ready-to-wear clothes and beautifully handwoven sarees. The platform allows intuitive navigation, search, and filters to find products easily. For tailoring, customers can select fabrics and request a home visit by a tailor for measurements. For weaving services, customers can upload their own designs and select preferred weaving styles like Pochampally or Kancheepuram. The customization options help provide a deeply personalized experience tailored to the customer's unique preferences.

Order Placement & Payment:
After finalizing products or customization requests, customers can add items to their cart. They are guided through a smooth checkout process where multiple payment options are available including UPI, debit/credit cards, net banking, and even cash on delivery (COD). The Razorpay API integration ensures secure and seamless transactions. Upon successful payment, the system generates an official order receipt, a unique tracking ID, and sends a confirmation notification to the customer. This ensures transparency and trust in the order process.

Order Tracking & Notifications:

Real-time order tracking is a critical feature of the platform. Customers receive status updates at every stage, such as “Tailor Assigned,” “Measurements Completed,” “Stitching in Progress,” or “Shipped for Delivery.” These updates are delivered via multiple channels including email, SMS, and in-app push notifications. The tracking dashboard allows users to visually see the progress of their orders, improving engagement and customer satisfaction. Artisans also receive alerts about deadlines and upcoming tasks.

Order Delivery & Confirmation:
Upon completion of the tailoring or weaving process, the finished product is packed and dispatched through partnered delivery services. Customers are notified about the expected delivery window and receive a tracking link. After receiving the product, they are prompted to confirm delivery via the platform, which updates the order status to “Delivered.” This confirmation ensures that service providers receive their payment and the order is successfully closed in the system.

Reviews & Feedback:
After receiving their product, customers are encouraged to rate their experience and provide detailed feedback. They can review both the product quality and service quality (tailor/weaver professionalism, punctuality, etc.). Reviews are displayed on artisan profiles to help future customers make informed choices. The admin panel monitors these reviews and flags any inappropriate content. If customers report issues, the admin can investigate and offer refunds or corrective actions.

Admin Monitoring & Management:

The admin dashboard provides a comprehensive view of all system operations. Admins can monitor user activities, manage product listings, approve artisan profiles, and handle escalations. They are also responsible for resolving payment disputes, issuing refunds, and ensuring the overall quality of services.

Feedback and analytics tools help admins understand user behavior and platform performance, enabling data-driven decisions for improvements and feature rollouts. Regular inventory updates and fraud detection mechanisms are also managed here to maintain platform integrity.

IMPLEMENTATION

5.1 System Architecture and Technology Stack

The platform adopts a robust three-tier architecture to ensure modularity, scalability, and secure operations. The frontend layer is built using React.js for the web and React Native for the mobile interface, providing a seamless and responsive user experience across devices. The backend layer, powered by Node.js and Express.js, handles business logic and API routing. It serves as the core engine for authentication, product handling, and order lifecycle management. The database layer utilizes MongoDB, a NoSQL document-based database, hosted on MongoDB Atlas for high availability and horizontal scalability. To handle payments securely, the platform integrates Razorpay, supporting multiple methods such as UPI, credit/debit cards, and net banking. Hosting is distributed with the frontend deployed on Vercel for rapid delivery and the backend on AWS EC2, ensuring robust uptime and performance.

5.2 Frontend Development

The frontend of the application is designed to deliver a rich and intuitive experience to users, including customers, tailors, and weavers. Developed using React.js and Tailwind CSS, it ensures responsiveness and aesthetic consistency across all screen sizes. The Landing Page and Homepage highlight featured products, trending collections, and custom tailoring services. The Product Catalog showcases sarees and clothes with filtering options, detailed descriptions, prices, customization inputs, and reviews. A dynamic Shopping Cart and Checkout Flow allow users to manage their orders easily and securely. Each User Profile provides tailored views based on roles — customers can track orders and view invoices, while artisans can manage inventory and view earnings. Authentication is seamlessly integrated using JWT for session management, enabling secure login, logout, and role-based access to different sections.

5.3 Backend Development

The backend functions as the operational core of the application, developed using Node.js and Express.js. It manages core functionalities such as authentication, inventory control, order flow, and payment processing. For User Management, the backend supports secure registration and login for different user roles including customers, weavers, tailors, and admins. The Product Management system allows weavers to create, edit, and remove saree listings, while tailors can manage fabrics and stitched items. A well-defined Order Lifecycle ensures that when a customer places an order, it is routed to the appropriate artisan, with automated status updates.

Payment Processing is tightly integrated with Razorpay APIs, allowing real-time payment verification and secure transaction handling. RESTful APIs are crafted to facilitate efficient communication with the frontend, following best practices for scalability and maintainability.

5.4 Database Management and Security

A highly structured and scalable MongoDB database was implemented to store and manage users, products, orders, reviews, and transaction histories. Hosted on MongoDB Atlas, the database benefits from

cloud scalability, replication, and built-in monitoring. Mongoose, an ODM (Object Data Modeling) library, is used to define schemas and manage relationships between entities like products, users, and orders. To ensure security, bcrypt.js is used for password encryption, safeguarding user credentials. The application implements JWT-based authentication to prevent unauthorized access to protected routes and sensitive information. Additionally, Role-Based Access Control (RBAC) is enforced across routes, ensuring only authorized users can perform operations such as managing inventory or accessing admin dashboards.

5.5 Payment Gateway Integration

To provide customers with a reliable and seamless payment experience, Razorpay was integrated as the platform's primary payment gateway. It supports a wide array of payment methods including UPI, credit/debit cards, wallets, and bank transfers. The backend uses Razorpay's secure APIs to generate orders, verify payments, and send transaction confirmations. On successful payment, an auto-generated invoice is sent to the customer, and the order status is updated in the system in real time. Payment verification logic ensures that only successfully paid orders proceed to order fulfillment. This integration not only boosts customer trust but also ensures legal and financial compliance through secure and traceable transactions.

5.6 Order Processing and Logistics

The platform supports an end-to-end order processing system with integrated logistics and real- time tracking. When a customer places an order, it is automatically assigned to the corresponding tailor or weaver based on product type. The system updates the order status at various stages — such as "Order Confirmed", "Processing", "Shipped", and "Delivered" — which are reflected on the customer dashboard. Real-time notifications (via WebSockets or polling) keep customers informed of order movements, improving transparency. Artisans receive alerts when new orders are assigned, helping them plan their schedules. The logistics
data, including estimated delivery timelines and tracking details, is stored and served dynamically
for enhanced order visibility and customer satisfaction.

5.7 Testing and Debugging

A rigorous testing strategy was adopted to ensure platform reliability, functionality, and performance under real-world conditions. Unit Testing was performed on both backend and frontend components to validate individual functions and logic. Integration Testing ensured that interactions between components such as database operations, APIs, and UI behavior were seamless and error-free. Additionally, User Testing was conducted with real customers, weavers, and tailors to simulate real- world scenarios and identify usability issues. Debugging tools like Chrome DevTools, Postman, and Node.js's built-in debugger were used throughout development. This comprehensive QA process helped eliminate bugs and ensure a stable production environment.

5.8 Deployment and Maintenance

The platform was deployed using modern cloud infrastructure to ensure reliability, scalability, and fast global access. The frontend is hosted on Vercel, which automatically handles builds, optimizations, and CDN-based delivery for fast page loads. The backend is hosted on AWS EC2, offering scalable computing power with control over security and deployment environments. The MongoDB database is deployed on

MongoDB Atlas, ensuring robust performance with backups, replication, and monitoring. After deployment, a structured maintenance strategy was adopted — this includes monitoring server logs, tracking frontend performance using analytics tools, and applying regular updates. User feedback is collected to continuously improve the platform and add new features based on real usage patterns.

5.9 Backend Implementation (Node.js + Express)

The backend was meticulously developed using Node.js and Express.js, ensuring it could handle a variety of complex operations efficiently. Each module is structured to be independent and scalable, following RESTful design principles. Authentication middleware validates JWT tokens before allowing access to protected routes. Controllers handle key logic for tasks like user registration, login, product creation, order updates, and payment callbacks. Multer is used for handling image uploads, and Cloudinary integration stores those files securely. Routes are clearly defined and versioned (e.g.,/api/v1/orders) to ensure extensibility. This architecture not only ensures fast response times but also lays a foundation for future integrations like analytics, notifications, and role-based dashboards.

RESULT

The successful implementation of the WeaverMart E-Commerce App resulted in a fully functional, scalable, and user-friendly platform.

Key Achievements:

Empowered Artisans: Traditional weavers now have a platform to sell their handcrafted products directly to customers. This reduces their reliance on middlemen and increases their profits. By cutting out intermediaries, artisans can build their own brand identity and customer base.

Global Reach: The platform enables handwoven products to be showcased and sold across the globe. Customers from various countries can now explore and purchase unique ethnic textiles. This expansion has opened new markets and opportunities for rural artisans.

Enhanced User Experience: Customers enjoy a smooth shopping experience with features like easy browsing, product customization, and a secure checkout. The user interface is intuitive and responsive, making it simple for anyone to explore and place orders.

Secure Transactions: Integrated payment gateways ensure all transactions are processed securely. Customers can choose from multiple payment options, including UPI, cards, and COD. This builds trust and encourages repeat purchases.

Efficient Order Management: With real-time order tracking and instant notifications, customers stay informed at every stage. This transparency enhances satisfaction and reduces order-related queries. Tailors and weavers can also manage incoming orders more effectively.

Sustainability & Cultural Preservation: By supporting handmade, eco-friendly products, the app contributes to sustainable fashion. It also preserves the cultural heritage of handloom weaving by bringing attention to traditional techniques and regional artistry.

By combining modern technology with traditional craftsmanship, the WeaverMart E- Commerce App has

successfully created a sustainable digital marketplace, ensuring long- term growth for weavers, tailors, and customers alike.

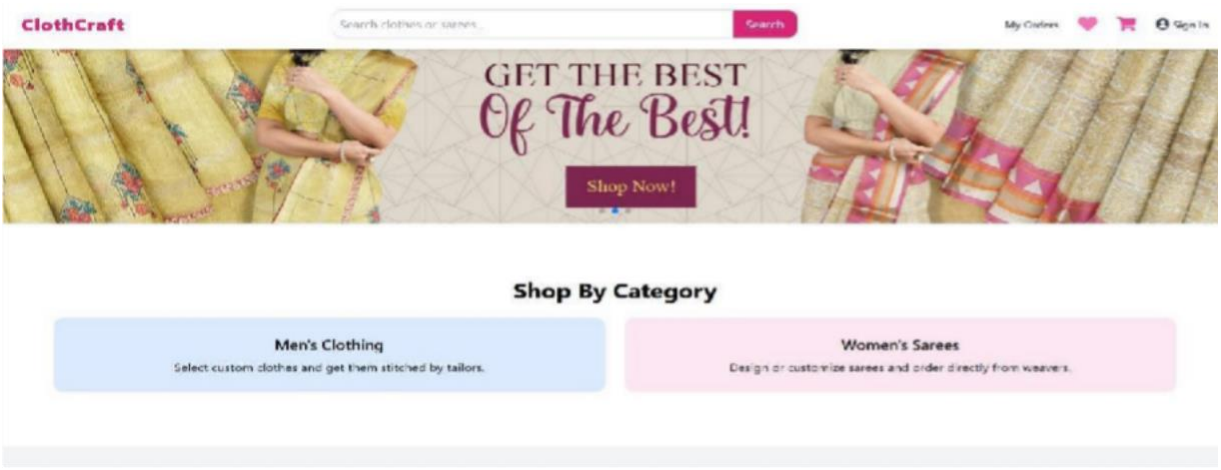

fig.5.1 home page

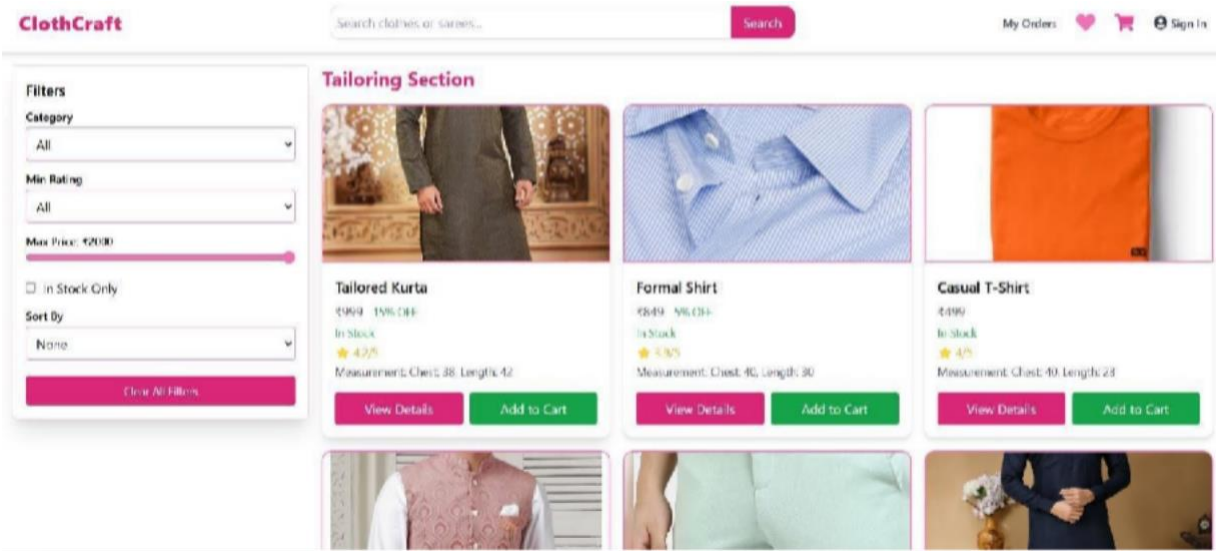

fig. 5.2 products page

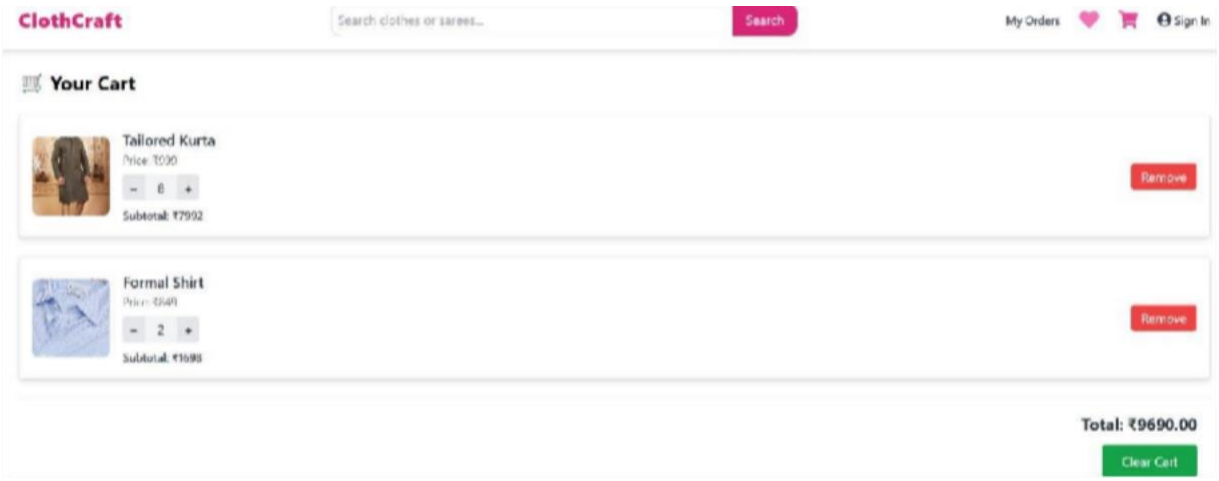

Fig. 5.3 cart page

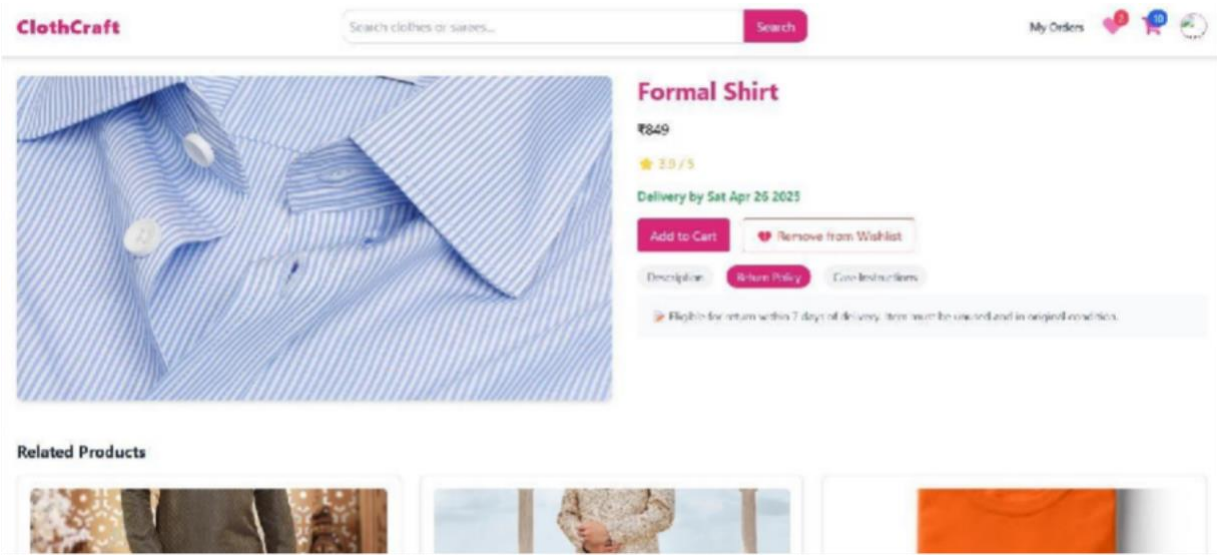

Fig. 5.4 Details page

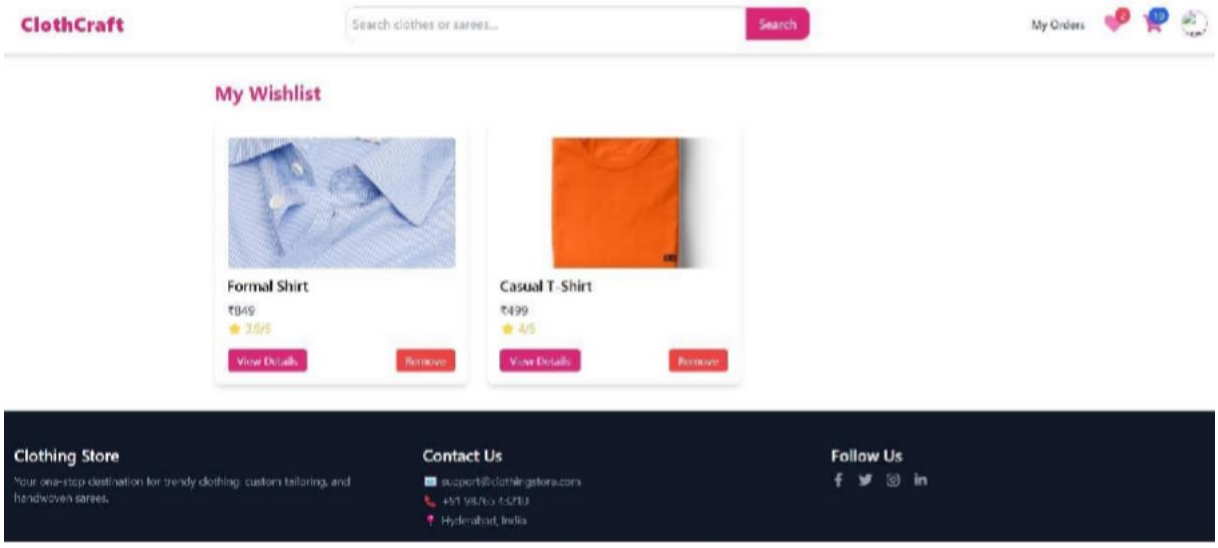

Fig. 5.5 wishlist page

CONCLUSION

The WeaverMart E-Commerce App is a revolutionary platform that seamlessly integrates traditional craftsmanship with modern digital commerce, fostering a direct connection between artisans and consumers. By eliminating middlemen, WeaverMart ensures that weavers and tailors receive fair compensation for their work while providing customers with authentic, high- quality handcrafted products at competitive prices. The platform not only enhances the visibility of India's rich textile heritage but also enables artisans to expand their reach beyond local markets to a global audience. With features like real-time order tracking, secure payment gateways, and personalized customization, WeaverMart ensures a smooth and transparent shopping experience for both artisans and buyers.

One of the platform's standout features is its custom tailoring module, which allows customers to personalize measurements, designs, and fabrics, catering to their unique fashion preferences. Additionally,

the built-in review and rating system fosters trust between buyers and sellers, helping artisans build their brand and credibility. The integration of AI-driven recommendations enhances the user experience by suggesting products based on browsing history and preferences. Mobile optimization and multilingual support make the platform accessible to a diverse user base, ensuring ease of use for artisans with limited digital experience.

To address challenges in logistics and payment security, the app has incorporated automated order processing and fraud detection mechanisms, ensuring reliability and safety. Training programs and workshops have been conducted to educate artisans on digital selling, pricing strategies, and financial literacy, empowering them to scale their businesses effectively. Looking ahead, WeaverMart plans to introduce AR-powered virtual try-ons, enabling customers to visualize how a product would look before making a purchase. Sustainability is also a key focus, with efforts to promote eco-friendly fabrics, reduce waste, and support ethical sourcing.

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