

MCA Semester – IV
Interim Report

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Elective	FULL STACK DEVOLOPMENT
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Project Title

Research Project submitted to Jain Online (Deemed-to-be University) In partial fulfillment of the requirements for the award of:

Master of Computer Applications

Submitted by

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*Under the
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DECLARATION

I, *Srinivasa B L*, hereby declare that this Project Report has been prepared by me under the guidance of *Chandra Bhanu*. I declare that this Project is towards the partial fulfilment of the credit requirement for the course “Capstone Project,” which is part of the Master of Computer Applications degree given by Jain University, Bengaluru. I declare that the work done by me towards this Project is original in nature and is my own contribution.

Place: Tumkur

Date: 16/05/2025

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EXECUTIVE SUMMARY

VividHands: *Where Art Comes Alive, Crafted by Hand*

Overview:

VividHands is a carefully curated online marketplace that connects skilled artisans with buyers who appreciate handmade, ethical, and one-of-a-kind items. In a world dominated by mass production, VividHands creates space for meaningful, sustainable shopping rooted in creativity and cultural heritage.

Our platform is built to uplift independent creators by offering them visibility, fair opportunities, and essential tools to grow their businesses. Buyers, in turn, gain access to products that carry stories, reflect craftsmanship, and support ethical practices. Each item is carefully vetted to ensure it meets our standards of authenticity and sustainability.

To make shopping personal and inspiring, the platform features detailed artisan profiles, authenticity badges, and curated collections. Sellers benefit from zero-commission tiers, SEO training, and media tools like video storytelling to showcase their work effectively.

VividHands is developed using modern web technologies to ensure a smooth and secure experience. With a fast, user-friendly interface and seamless backend operations, the platform is designed for both scalability and performance.

Tech Stack:

- **Frontend:** React.js, Redux, Axios
- **Backend:** Spring Boot, Spring Security, JWT, Spring Data JPA
- **Database:** MySQL
- **Deployment:** Docker, AWS

Scope & Objectives

Scope:

- Build a responsive web app with role-based access
- Enable product browsing, cart management, payments, and order tracking

Objectives by Role:

- **Customers:** Discover and purchase products, manage carts and orders.
- **Sellers:** Upload products, manage inventory, and view performance.
- **Admins:** Oversee platform security, users, and operations.

Progress & Features Implemented

- **User Authentication:** Secure login and registration using JWT.
- **Customer Interface:** Browse products, filter by category, and manage shopping cart.
- **Seller Features:** Add, edit, and remove products, access a dashboard for sales tracking.
- **UI/UX:** Responsive interface with Redux for consistent global state.

Next Steps:

- Add admin control panel and moderation tools.
- Deploy fully on AWS for scalability and uptime.

Conclusion:

VividHands is not just an e-commerce site—it's a platform that honors craftsmanship and conscious shopping. By linking global artisans with mindful buyers, we aim to protect handmade traditions while creating economic opportunity. With a strong technical foundation and a mission rooted in purpose, VividHands is set to lead a more ethical, creative future in online retail.

TABLE OF CONTENTS

Title	Page Nos.
Executive Summary	1-2
Introduction	4-5
Project Scope and Objectives	6-7
Methodology	8
System Architecture and Design	9-10
Progress and Accomplishments	11-13
Future Work and Timeline	14-15
Conclusion	16

1.Introduction

Overview, Goals, and Significance

VividHands is a web-based marketplace designed to connect skilled artisans with buyers who appreciate hand-made, sustainable, and ethically sourced products. In contrast to mass-produced e-commerce platforms, Vivid Hands emphasizes craftsmanship, transparency, and cultural value. It serves as a dedicated space where creators can showcase their handmade items, and buyers can explore meaningful purchases backed by authentic stories.

Project Goals

- Empower independent artisans with digital tools to expand their reach.
- Deliver a secure and user-friendly platform for buyers seeking unique, handcrafted goods.
- Build a scalable and reliable full stack application using modern development technologies.

Significance

This project highlights how full stack development can address real-world problems by supporting ethical commerce and small business growth. VividHands combines technology and tradition, offering a digital solution that respects creativity and sustainability.

Problem Statement / Purpose of the Project

Artisans often struggle to gain visibility in global markets due to limited access to digital platforms. At the same time, buyers searching for genuine, handmade, and eco-conscious products face difficulty finding trustworthy sources. Existing platforms tend to prioritize volume and mass production over individual craftsmanship.

Purpose of the Project

- Bridge the gap between artisans and conscious buyers through a dedicated platform.
- Help buyers discover handmade items through transparent artisan profiles and curated collections.
- Deliver a seamless shopping experience with secure transactions and user-focused design.

This platform addresses these challenges by providing an accessible and meaningful alternative to conventional e-commerce.

3. Background and Relevance in Full Stack Development

The development of VividHands serves as a practical example of full stack web development. It integrates modern frontend and backend technologies to deliver a complete, responsive, and secure e-commerce solution.

Technical Stack

- **Frontend:** React.js and Redux for dynamic, responsive UI and global state management.
- **Backend:** Spring Boot with JWT and Spring Security for secure APIs and role-based access.
- **Database:** MySQL for structured data management.
- **Deployment:** Docker and AWS for scalable, cloud-based deployment.

Relevance

This project demonstrates key principles of full stack development, including building user-centric interfaces, implementing secure authentication, managing persistent data, and deploying robust web applications. VividHands is not only a marketplace—it's a real-world application of engineering skills aligned with ethical and cultural values.

2. Project Scope and Objectives

Scope and Boundaries

VividHands is a web-based marketplace designed to connect artisans with buyers who seek unique, handmade, and ethically crafted products. The platform enables artisans to display and sell their creations, while buyers can explore curated collections, securely purchase items, and engage with the stories behind each piece.

Objectives:

- Provide a seamless, user-friendly experience for browsing and purchasing handmade products.
- Enable artisans to manage their product listings and monitor sales.
- Implement secure authentication and role-based access for buyers, sellers, and admins.
- Ensure scalable, responsive deployment on a cloud platform like AWS.

Scope and Boundaries

In-Scope:

- Web application with role-based access for buyers, sellers, and admins.
- Features for product management, secure payment processing, and shopping cart functionality.
- Deployment on cloud platforms such as AWS using Docker for scalability.

Out-of-Scope:

- Mobile application development (web-based platform only for now).
- Advanced AI-driven features (to be considered in future iterations).
- Integration with third-party logistics or shipping services (for the initial phase).

Specific Objectives and Deliverables

Objectives:

- Create a streamlined e-commerce platform specifically for handmade and ethically sourced products.
- Provide artisans with an easy-to-use interface to list, update, and promote their products.
- Ensure secure, efficient transactions with an intuitive shopping experience for buyers.

Deliverables:

- Fully functional web application with user authentication and role management.
- Admin dashboard for platform monitoring and management.
- Deployment on a cloud platform (AWS) with scalable infrastructure.

Constraints and Limitations

- Fully functional web application with user authentication and role management.
- Admin dashboard for platform monitoring and management.
- Deployment on a cloud platform (AWS) with scalable infrastructure.

3. Methodology

Methodologies, Frameworks, and Tools Used

The **VividHands** project was developed using an **Agile workflow**, allowing for flexible and continuous updates across short development cycles. Each sprint focused on specific platform features, enabling early feedback and faster improvements.

Frontend Development was handled using:

- **React.js** for building a responsive and interactive interface,
- **Redux** to manage application-wide state,
- **Axios** for connecting the frontend with backend services.

Backend Development utilized:

- **Spring Boot** to build RESTful APIs for handling core functionalities,
- **Spring Security** with **JWT tokens** to ensure secure login and role-based access,
- **Spring Data JPA** for managing interactions with the **MySQL** database.

For **deployment**, the application was containerized using **Docker** and hosted on **AWS EC2** to ensure scalability and reliability in real-world use.

Version control was maintained using **Git** and **GitHub** for smooth collaboration and tracking changes throughout development.

Development Process

The project progressed in defined sprints:

- Sprint 1: Set up core infrastructure and implemented secure user authentication.
- Sprint 2: Added customer features such as product search, browsing, and cart functions.
- Sprint 3: Developed seller features including product uploads and inventory tools.
- Sprint 4 (current): Focuses on admin tools, payment systems, and order tracking.

Technologies and Languages Used

- **Frontend:** React.js, Redux, Axios
- **Backend:** Spring Boot, Spring Security, JWT, Spring Data JPA
- **Database:** MySQL
- **Deployment:** Docker, AWS EC2
- **Languages:** JavaScript (frontend), Java (backend), SQL (database).

4. System Architecture and Design

System Architecture and High-Level Design

The **VividHands** platform is structured around a **three-tier architecture**, clearly separating the presentation, business logic, and data layers to ensure modularity and performance:

- **Frontend:** Developed using **React.js** with **Redux** for managing global state. This layer handles all user interface elements, including browsing products, managing carts, and interacting with artisans. It communicates with the backend through **Axios-based REST API** calls.
- **Backend:** Built using **Spring Boot**, the backend is responsible for processing business logic, managing product and order data, and implementing secure, **JWT-based authentication** and **role-based access** for buyers, sellers, and administrators.
- **Database:** A **MySQL** database stores structured data including user details, artisan profiles, product listings, transactions, and reviews. Data operations are handled efficiently through **Spring Data JPA**.

Communication between the frontend and backend occurs via secure **RESTful APIs**, while the backend interacts with the database to perform CRUD operations.

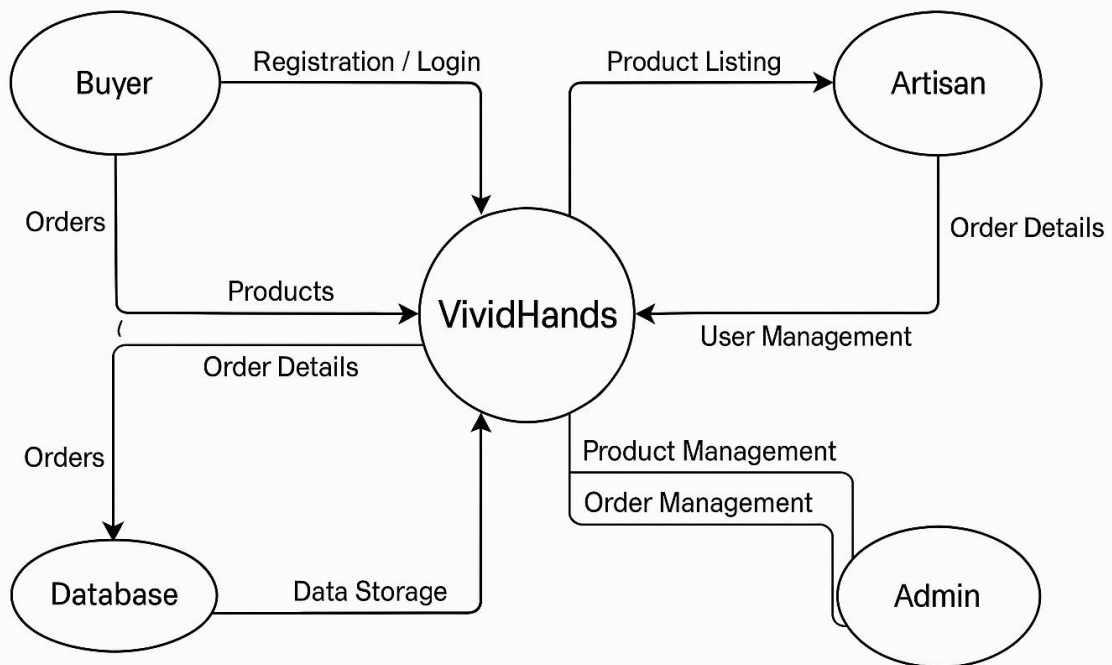
Architectural Patterns and Design Principles

Architectural Pattern:

- The platform follows a **Layered Architecture (N-tier model)**, separating the system into dedicated layers for presentation, service logic, and data handling. This structure improves scalability, clarity, and code maintenance.

Design Principles:

- **Separation of Concerns:** Different parts of the application handle distinct responsibilities (UI, logic, and data access).
- **Modularity:** React components and Spring services/controllers are modular, making the system easier to test and maintain.
- **Secure by Design:** Security measures like JWT authentication and role-based authorization are integrated early into the system.
- **Scalability:** The system is designed for future growth with Docker-based containerization and cloud deployment on AWS.
- **DRY (Don't Repeat Yourself):** Code is reusable, with centralized error handling and reusable UI components and backend services.



Data Flow Diagram

Data Flow Summary:

- The **Frontend** sends user requests (like login, product search) to the **Backend**.
- The **Backend** processes these requests, applies business logic, checks authentication/authorization, and interacts with the **Database** if needed.
- The **Database** responds with the necessary data, which the **Backend** then sends back to the **Frontend** for display to the user.

5. Progress and Accomplishments

1. Completed Tasks and Achievements:

- **User Authentication:**
 - Implemented secure user login and signup using JWT tokens for Buyers, Artisans, and Admins.
 - **Spring Security** was integrated to handle authorization, ensuring that role-based access controls are correctly applied.
 - **Evidence:** Login/Signup forms and successful user authentication via JWT (Fig. 1).
- **Buyer Features:**
 - Product listing pages built with **dynamic category filters** (e.g., Jewelry, Ceramics, Textiles).
 - Buyers can view product details, add/remove items to/from cart, and proceed to checkout (currently cash-based or simulated).
 - **Evidence:** Working product grid and cart flow (Fig. 2)
- **Artisan (Seller) Features:**
 - Developed artisan dashboard for managing listings: add, edit, delete products with fields like images, price, and stock.
 - Sellers can **track basic inventory**, view product performance, and check buyer activity
 - **Evidence:** Dashboard interface with live product management (Fig. 3).

2. Milestones Achieved:

- **Authentication and Security:**

The initial security and authentication setup was successfully completed, allowing users to securely log in and access their respective roles.
- **Basic Customer and Seller Interfaces:**

The product listing page, cart functionality, and Artisan dashboard are fully functional.

3. Challenges Encountered:

- **Redux State Synchronization:**

One of the challenges faced was syncing the cart state between the frontend and backend. This required careful handling of API responses and updates to ensure data consistency across sessions.
- **Spring Security and Role-based Access:**

Configuring Spring Security to correctly enforce role-based access control (Customer, Seller, Admin) posed some difficulties in ensuring secure API endpoints.

4. Evidence of Implemented Features

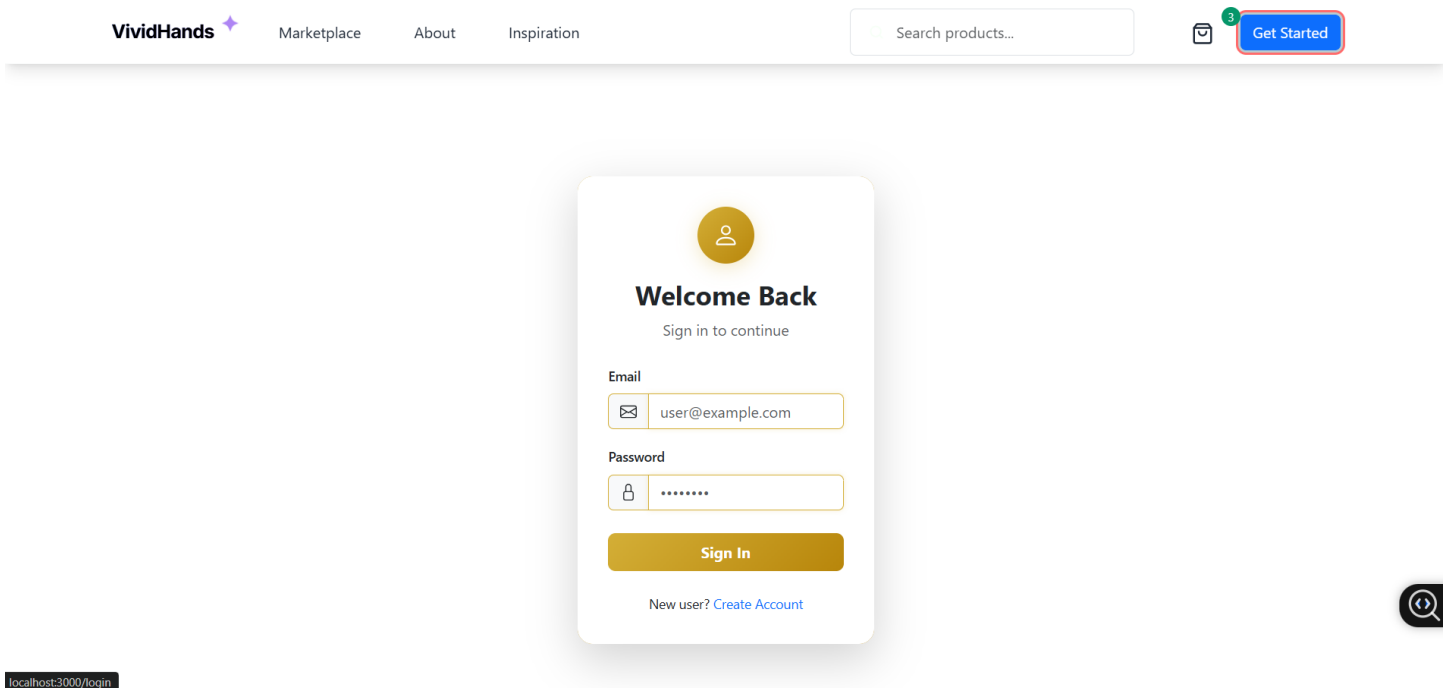


Fig1 :-User Login

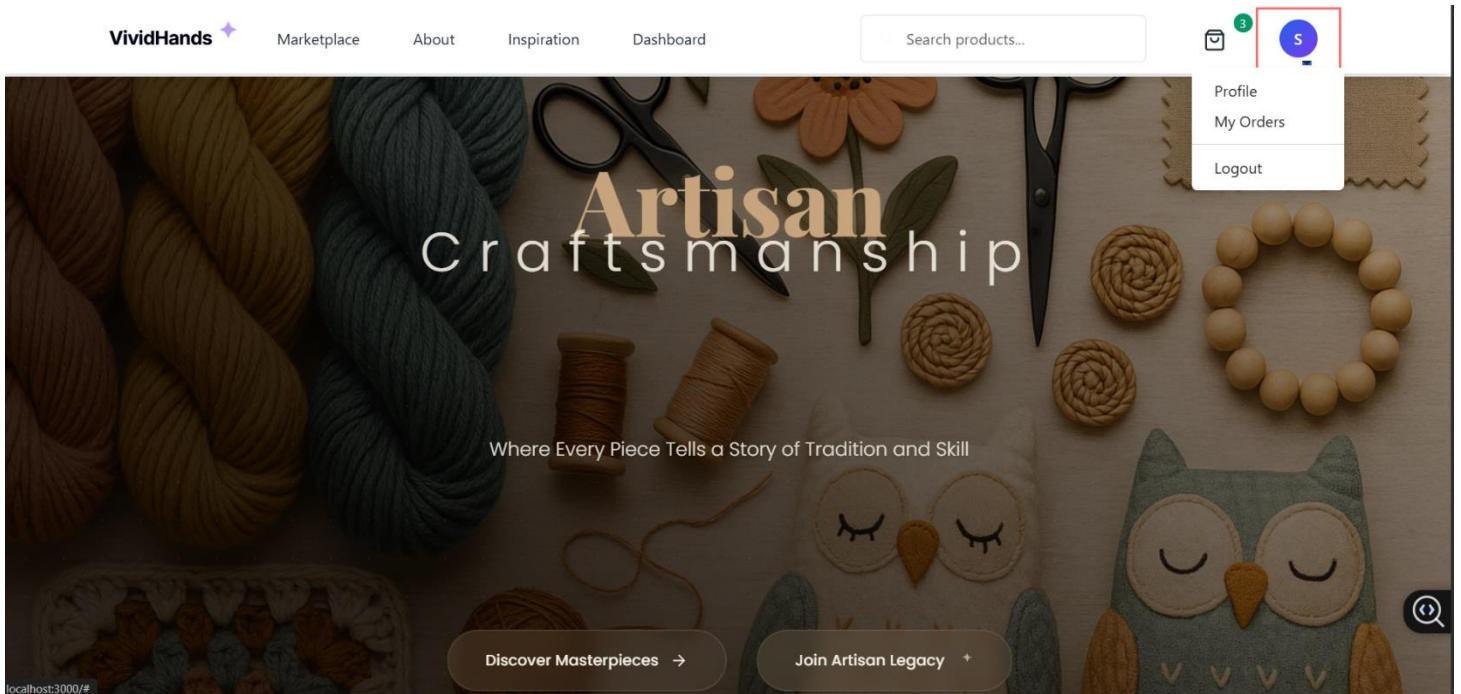


Fig1.1:-After User Login

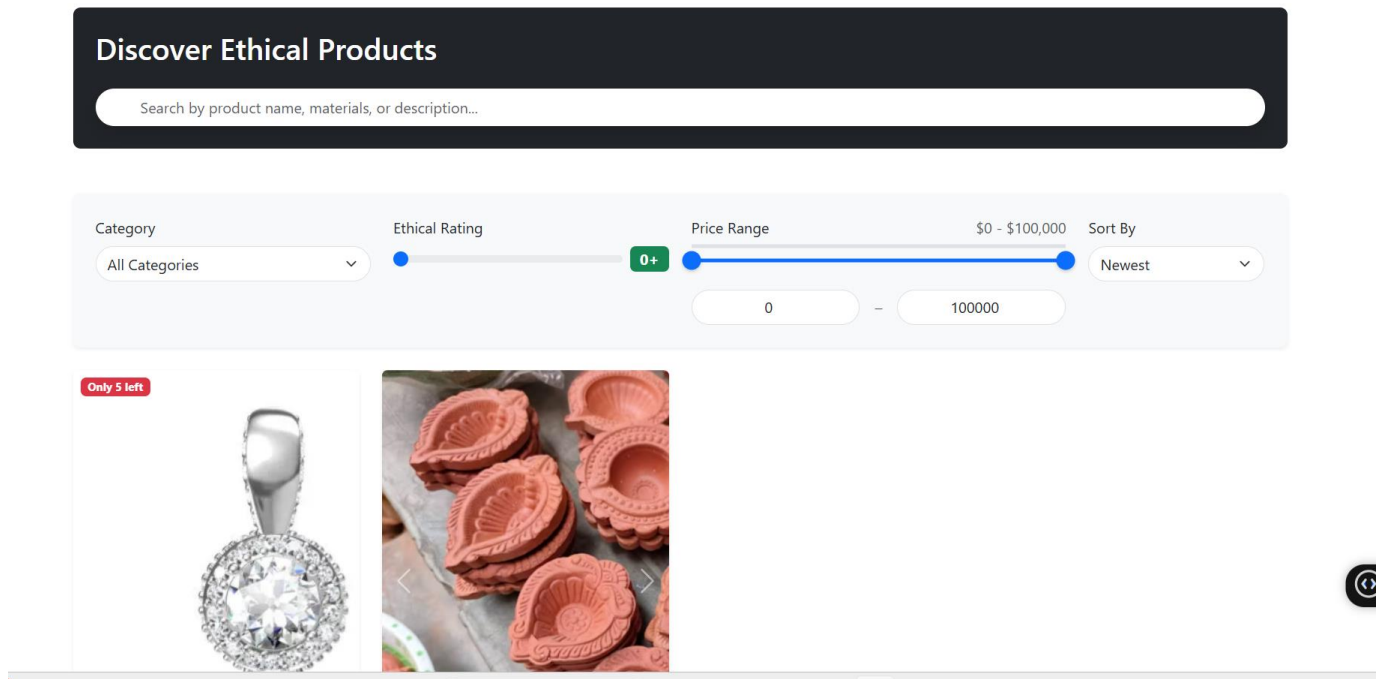


Fig 2:-Marketplace page with grid product listing and filters

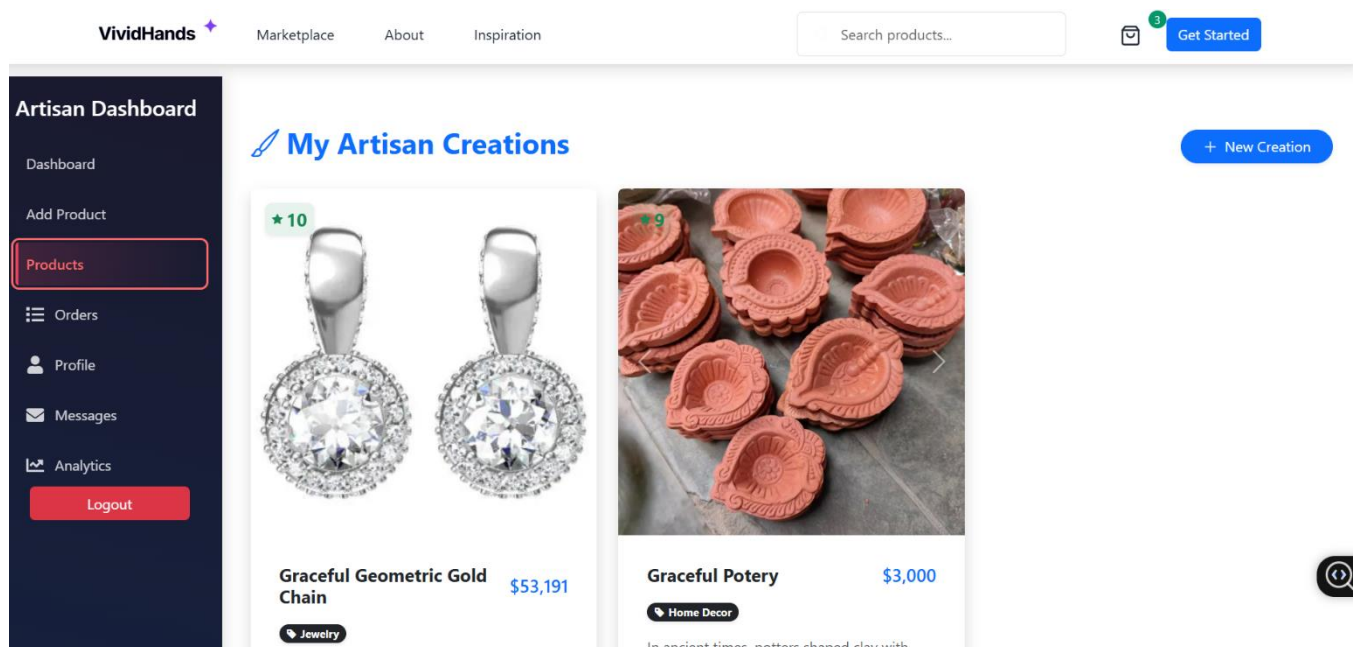


Fig 3:-Artisan Workflow

6. Future Work and Timeline

1.Remaining Tasks and Deliverables

1. Order Tracking Implementation

- Develop a user-friendly interface for customers to track the status of their orders in real time, providing updates on shipping, delivery status, and any delays.

2. Admin Features Development

- Create an admin dashboard for managing orders, tracking inventory, viewing customer data, and handling customer service requests. This feature will provide admins with control over the marketplace's operations.

3. Final Testing and Optimization

- Conduct comprehensive testing across various devices and browsers to ensure the website is fully functional. Address any bugs or UI issues and optimize website performance for speed and efficiency.

4.Deployment to AWS

- Deploy the finalized website to AWS, ensuring a secure and scalable environment. This will include setting up hosting on AWS EC2 or S3 (as per your needs), integrating databases, and configuring domain settings for a smooth live launch.

2.Updated Timeline (Deadline: May 20, 2025)

Task	Start Date	End Date	Duration	Status
Order Tracking Implementation	2025-05-14	2025-05-16	2 days	Pending
Admin Features Development	2025-05-14	2025-06-17	3 days	Pending
Final Testing and Optimization	2025-06-17	2025-06-19	2 days	Pending
Deployment to AWS	2025-06-19	2025-06-20	1 day	Pending

3.Risks and Challenges

1. Order Tracking Implementation

- Integration Delays: Tight timeline could cause delays in integrating with existing systems.
- Technical Bugs: Potential compatibility issues that might require quick fixes.
- Limited Testing Time: Insufficient time to thoroughly test the feature.

2. Admin Features Development

- Scope Creep: Additional features could extend the timeline.
- Concurrent Development Stress: Balancing admin features with other tasks could strain resources.
- Dependency Delays: Delays in other tasks may impact admin feature completion.

3. Final Testing and Optimization

- Time Pressure: Only 2 days for final testing may cause rushed checks.
- Last-Minute Bugs: New issues might surface late, reducing fix time.
- Performance Testing: Limited time to test system under heavy load.

4. Deployment to AWS

- Deployment Failures: Issues during AWS deployment could cause delays.
- Configuration Mistakes: Risk of errors during the final setup.
- Tight Timeline: One day for deployment may not be enough to address unforeseen issues.

7. Conclusion

VividHands is set to revolutionize the e-commerce industry by creating a marketplace that celebrates craftsmanship, sustainability, and ethical practices. By connecting independent artisans with a global customer base, VividHands provides a platform where distinctive, handcrafted goods can flourish. It bridges the gap between buyers who appreciate authenticity and quality and creators dedicated to their craft.

More than just an online store, **VividHands** is a dynamic platform that empowers artisans, offering them the tools and support they need to grow their businesses in an eco-conscious and sustainable way. Through initiatives such as zero-commission sales opportunities, increased exposure, and access to educational resources, artisans are equipped to expand their reach and thrive in a competitive market.

For shoppers, **VividHands** offers an experience rooted in connection, transparency, and trust. Every purchase is a step into the story of the artisan, where personalized shopping and artisan narratives provide deeper engagement. With features like authenticity certifications, handpicked collections, and an intuitive, secure checkout system, **VividHands** delivers a fulfilling and transparent shopping journey that prioritizes customer satisfaction.

As **VividHands** continues to grow, its mission remains clear: to cultivate a vibrant community that brings together artisans and customers with shared values of creativity, sustainability, and ethical commerce. By nurturing trust and long-term relationships, **VividHands** is not only transforming the way handmade products are sold but is also shaping the future of ethical shopping. Through innovation, empowerment, and an unwavering commitment to its principles, **VividHands** is paving the way for a more sustainable, inclusive, and conscious marketplace.

Ultimately, VividHands is creating a new standard for online commerce—one that values people, craftsmanship, and sustainability. It's more than a marketplace; it's a movement dedicated to a future where ethical business practices and genuine human connection are at the heart of every transaction.

Project Repository (Interim Submission):-

You may access the current version of the source code and supporting materials through the interim project repository linked below:

<https://github.com/Srinivasa-bl/ecommerce.git>

This repository currently includes:

- Initial implementation and core modules.
- Draft technical documentation and setup notes.
- Preliminary datasets, configurations, or related assets.