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Smart Communication

Chitrika M[1], Anupama[2], Athmakuru Depthi[3], Dr. Srinivasan T R[4]

[1,2,3]B. Tech (Big Data), VII – Semester, Presidency University, Bengaluru,
[4]Professor at presidency university

Abstract

The initiative intends to construct an e-commerce platform for artisans utilizing the MERN (MongoDB, Express.js, React, Node.js) full-stack framework. E-shop is intended to empower rural artisans, especially those in the textiles and handicrafts industries, by offering a structured online marketplace to display and sell their handmade goods. The website uses MongoDB Atlas for its database solution, ensuring effective and secure data management, while React is employed to develop a user-friendly and responsive front end. The system allows artisans to sign up, showcase their items, and collaborate on joint projects such as event creation. Notable features include various payment methods, including Cash on Delivery (COD) and online payments, to reach a wider audience. Additionally, the event creation tool empowers artisans to plan and advertise their activities, boosting visibility and community engagement. The platform serves to connect artisans with global markets while providing smooth navigation, secure transactions, and an easy-to-use experience. By utilizing the MERN stack, this project strives to build a strong and scalable solution that supports the artisan community and advances their exceptional creations on an international level.

INTRODUCTION

Craftspeople, especially those in rural regions, frequently encounter difficulties in accessing global markets due to a lack of visibility and limited access to digital platforms. This initiative tackles these challenges by creating an e-commerce website for artisans based on the MERN (MongoDB, Express.js, React, Node.js) framework, establishing a smooth and scalable online marketplace for handmade goods. The platform enables artisans to display and sell their work, which includes textiles, home decor, and accessories, while offering various payment methods such as Cash on Delivery (COD) and electronic transactions. Moreover, it includes a tool for event creation that assists artisans in organizing and promoting their events, fostering collaboration and community involvement. Utilizing MongoDB Atlas for secure data management and React for a user-friendly front-end experience, the platform guarantees easy navigation and dependable performance. By linking artisans with a broader audience, this solution not only boosts their visibility and income but also helps preserve and promote traditional crafts on an international level.

LITERATURE REVIEW

a) According to Mackenzie (2018), e-commerce platforms enable craftspeople to showcase their items on a worldwide scale, overcoming regional and infrastructure constraints. Providing a digital storefront allows craftsmen to reach a broader customer base and operate more efficiently.
b) According to Basu (2019), rural artisans in India who used e-commerce platforms saw improved sales and better market access, notably in the textile and handicrafts industries.

c) Singh and Gupta (2020) emphasize that the MERN stack offers various benefits, including real-time data management, quicker development cycles, and adaptable data models, all of which are critical for the dynamic nature of e-commerce platforms. MongoDB, a NoSQL database, is well-suited for managing complicated product data in unstructured or semi-structured formats, meeting the needs of artisan products with varying designs and features. React's component-based architecture provides a responsive and dynamic user interface, which is critical for delivering a consistent shopping experience across devices.
d) Kumar et al. (2017) underline the relevance of digital transaction security for both buyers and sellers.
e) Patel et al. (2021) propose that a hybrid payment model that combines both online and offline payment methods (such as COD) can overcome trust difficulties and increase digital payment acceptance in rural areas.
f) According to Zhao and Wang (2020), digital platforms for artisans are not only used to sell items, but also as hubs for collaboration, knowledge exchange, and networking.
g) Sharma (2018) observes that platforms with language interfaces and multi-currency support are more likely to attract foreign purchasers, allowing artists to expand into new markets.
h) According to Jain and Sharma (2021), AI-driven recommendation systems that monitor user behavior and preferences increase user engagement and conversion rates dramatically.

RESEARCH PROBLEM

Rural artisans encounter restricted access to international markets and lack organized platforms to display their handmade goods, affecting their visibility and revenue. A scalable and easy-to-use e-commerce solution is necessary to fill this gap, facilitate secure transactions, and encourage collaboration while maintaining traditional crafts.

RESEARCH QUESTIONS

1. 1.In what ways can a MERN-based e-commerce platform assist rural artisans in displaying their products, facilitating secure transactions, and promoting collaboration?
2. What measures can the platform implement to provide secure and varied payment options?
3. How can it foster collaboration and facilitate event organization among artisans?

AIMS AND OBJECTIVES

The purpose of this research is to create and develop a scalable and user-friendly e-commerce platform utilizing the MERN (MongoDB, Express.js, React, Node.js) stack to tackle the challenges that rural artisans face in promoting their products, enabling secure transactions, and fostering collaboration. And To create a platform that allows rural artisans to successfully present and sell their handmade products to a broader audience. To implement a variety of secure payment options, including Cash on Delivery (COD) and online payment systems, to accommodate different user preferences. To add functionality for event creation that enables artisans to organize and publicize activities, promoting collaboration and increasing community involvement. To leverage MongoDB Atlas for secure, efficient, and scalable data management that meets the platform's specific needs. To ensure that the platform is both scalable and user-friendly through a responsive front-end interface powered by React.

LIMITATIONS

The proposed e-commerce platform encounters several challenges. Firstly, its success relies on stable internet connectivity, which could be scarce in rural areas, limiting artisans' ability to access the platform. Furthermore, gaps in digital literacy may create obstacles for artisans who are not familiar with online tools. Logistical concerns, like ensuring timely delivery of products to distant locations, could also emerge, complicating the user experience. Gaining initial traction for the platform may be gradual, as artisans might hesitate to shift away from traditional selling techniques. Although the MERN stack provides scalability, managing a large number of users may necessitate additional resources. Moreover, dependence on third-party payment gateways may result in transaction delays or complications in certain areas. Lastly, the platform will have to compete against established e-commerce platforms that possess greater resources and wider reach.

HYPOTHESIS

A MERN-based e-commerce platform will greatly enhance the exposure and sales of handmade products from rural artisans by offering an organized and easy-to-navigate online marketplace. The incorporation of secure payment methods, such as Cash on Delivery (COD) and online payments, will boost the confidence and transaction amounts among rural customers.

METHODOLOGY

This study utilizes a design and development methodology to build and assess an e-commerce platform for rural artisans by leveraging the MERN stack.

RESEARCH DESIGN

This research employs an exploratory and descriptive approach focused on creating and assessing a MERN-based e-commerce platform tailored for rural artisans. It will incorporate both qualitative and quantitative methods to gather and analyse information. Artisans and customers will participate in surveys and interviews to provide input on the platform's functionality, user-friendliness, and influence on business operations and purchasing experiences. Furthermore, data on user engagement, transaction activity, and event attendance will be collected through system logs and user analytics. A purposive sampling strategy will be implemented, targeting a group of 50 artisans and 200 customers for the data collection process. The analysis of data will feature thematic examination for qualitative inputs and descriptive statistics for quantitative data. Ethical aspects, including obtaining informed consent and ensuring data protection, will be prioritized throughout the study. The framework also recognizes possible limitations, such as the challenges of internet access and digital literacy faced by rural artisans, which may affect participation and the collection of data. Ultimately, this investigation will provide valuable insights into how an e-commerce platform can enhance artisans' market presence, encourage collaboration, and boost transaction security.

MERN BASED E-COMMERCE FOR ARTISANS

A MERN-based e-commerce platform (developed using MongoDB, Express.js, React.js, and Node.js) can help rural craftsmen by tackling important difficulties such as product display, transaction security, and collaboration

'Whether it is having a larger reach for their creations or demanding a better price for their crafts, these

online platforms help gifted rural artisans continue their livelihood.[1] '

A MERN-based e-commerce platform can considerably empower rural artisans by offering a dependable, scalable, and user-friendly digital infrastructure for showcasing their items to a worldwide market. Using React.js, the platform can provide an engaging and user-friendly interface that allows craftsmen to simply submit high-quality photographs of their crafts, generate personalized product descriptions, and organize virtual events to promote their products. MongoDB Atlas secures and efficiently stores product data, user profiles, and transaction records, while Node.js and Express.js allow for seamless back-end operations including real-time updates and API interfaces. The platform can handle secure transactions via encrypted payment gateways, and it includes features like Cash-on-Delivery (COD) to alleviate trust difficulties in rural areas. Furthermore, the platform's collaborative features, such as community forums and seller alliances, promote mutual learning and cooperative marketing, resulting in a helpful ecosystem for artists to expand their enterprises while maintaining their cultural legacy.

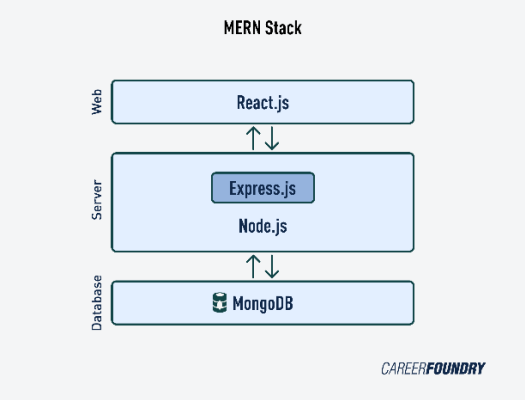

Fig: 1

MongoDB, a non-relational database with no schema, serves as the foundation of the MERN stack. Its file-oriented structure, with key-price pairs similar to JSON items, provides flexibility and speed. Customers can communicate with MongoDB using the Mongo shell, which provides a JavaScript interface for querying and modifying information. Explicit, a Node.js framework, streamlines back-end code while enhancing performance and scalability. By providing a strong API and supporting multiple middleware, we can enhance the creation of net packages and APIs. Its asynchronous and unmarried-threaded nature enhances its efficiency. React, a JavaScript library, specializes in creating personalized interfaces for unmarried web pages and mobile programs. React streamlines development by leveraging a digital DOM for fast performance, simplifying component-based UI, and facilitating the design of reusable components. Node.js provides a JavaScript runtime environment for server-side execution, allowing developers to run code outside the browser. Using npm (Node package management) allows users to access a large repository of programs, improving scalability and functionality. The combination of MongoDB, explicit, React, and Node.js in the MERN stack streamlines the improvement process and provides a comprehensive solution for current net improvement demands.[2]

[1] Nair, A. (2018) *These e-commerce platforms empower rural artisans by helping them earn better*, *YourStory*. Available at: https://yourstory.com/2018/07/e-commerce-platforms-empower-rural-artisans-helping-earn-better (Accessed: 18 December 2024).

[2] N, S. *et al.* (2023) *IJISRT*, *ijisrt.com*. Available at: https://www.ijisrt.com/assets/upload/files/IJISRT24JAN879.pdf (Accessed: 18 December 2024).

For the time being, the e-shop website accepts cash on delivery (COD). To ensure security in Cash on Delivery (COD) transactions, the platform contains a number of protections that build trust and reduce risks. To ensure order validity, customer and address verification is performed via OTP-based confirmation and address validation. Working with trustworthy courier businesses and ensuring that delivery personnel are fully authenticated improves the security of the delivery process. To reduce conflicts, fraud prevention tactics include blacklisting suspect persons based on previous behaviour and enabling real-time purchase tracking. Post-delivery safety is maintained by requiring digital acknowledgment of receipt and establishing a clear dispute resolution process for damaged or incorrect deliveries. Furthermore, client data security is prioritized by sharing only the essential information .

EVENT ORGANIZATION AMONG ARTISANS?

To encourage collaboration and make event management easier for artists, our platform has a function that allows vendors to log in and establish events by uploading event banners. These banners are put on the homepage to increase visibility and encourage participation from other craftsmen, buyers, and stakeholders. And serves as a collaborative hub by allowing artisans to directly promote events such as exhibitions, seminars, and product debuts via the platform. Artisans can interact with one another by discovering and attending events, discussing ideas, and sharing resources. This tool may also promote reciprocal growth by allowing craftsmen to co-host events, share expertise, and reach a larger audience together. Furthermore, the exposure of events on the homepage attracts buyers and other interested parties, providing opportunity for networking.

PROPOSED WORK

The proposed work aims to enhance the platform's functionality and usability by introducing several key features. To extend beyond the current Cash on Delivery (COD) option, secure online payment methods such as credit/debit cards, UPI, and digital wallets will be integrated, ensuring PCI-DSS compliance for data security. The event management system will be improved with options for RSVPs, scheduling tools, reminders, and real-time chat to facilitate better planning and collaboration among artisans. Sellers will benefit from user-friendly tools for inventory management, sales analytics, and bulk product uploads to streamline product management. To provide a personalized user experience, AI-based recommendation systems will suggest products and events tailored to individual preferences. Global accessibility will be prioritized by introducing multi-language support and currency conversion, allowing artisans to reach international audiences. Additionally, community-building features such as discussion forums and collaboration spaces will encourage knowledge sharing and joint initiatives among artisans. Enhanced buyer-seller interaction will be achieved through live chat, product Q&A sections, and feedback mechanisms to foster trust and improve communication. Finally, a mobile application will be developed to enhance accessibility and user engagement, offering seamless browsing, shopping, and event management capabilities. These enhancements aim to make the platform a comprehensive and scalable solution for artisans and buyers.[3]

Algorithm:

1. Search and Filter Algorithms
2. Authentication Algorithms

[3] Gupta, A., Gour, A., Rathore, A., & Keswani, A. (2023). E-commerce for Artisans. *INTERANTIONAL JOURNAL OF SCIENTIFIC RESEARCH IN ENGINEERING AND MANAGEMENT*. https://doi.org/10.55041/ijsrem18692.

3. Category-Based Product Sorting
4. Event Banner Display

FUTURE WORKS

Secure and Diverse Payment Options: Enable online payments with different gateways, including credit/debit cards, UPI, digital wallets, and bank transfers, while maintaining PCI-DSS compliance for secure transactions.

Advanced event management: Improve event planning and cooperation with advanced event management tools such as RSVPs, reminders, interactive calendars, and real-time chat.

Enhanced Seller Tools: Offer thorough sales statistics, inventory management, and tailored promotional campaigns to optimize sellers' operations.

Implementation of AI: Implement AI-driven product recommendations based on user browsing history, preferences, and purchase behaviours to increase engagement.

Enhance global accessibility: By offering multi-language assistance and currency conversion, attracting foreign users and expanding artisans' reach to new markets.

CONCLUSION

Rural craftsmen frequently lack exposure and connections to larger marketplaces, restricting their reach to potential clients. Traditional art lovers find it difficult to purchase artwork due to limited market accessibility. Local craftsmen, on the other hand, stand to benefit greatly from exposure on digital platforms, as internet commerce eliminates the need for middlemen, permitting direct sales. A specialized site allows craftsmen to register and sell their wares online, while smart marketing methods assist reach a larger audience. Digital platforms are simple to manage and serve a varied audience, allowing artists to demonstrate their actual abilities, achieve recognition, and receive the respect they deserve. Financially, selling directly through such channels allows craftspeople to earn better margins than working through middlemen.

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