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KARIGAR SANSAAR

RURAL ARTISAN DIGITAL EMPOWERMENT PLATFORM

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Abstract: India has over seven million artisans, many of whom struggle to earn steadily because markets are hard to reach, digital skills are limited, and middlemen take a large share of the value they create. This project proposes a simple, sustainable system that lets artists showcase their work, sell directly, and keep more of their earnings. It protects traditional skills while encouraging modern designs and uses so the craft stays relevant and income grows fairly. At the center is an online marketplace that removes intermediaries and offers transparent pricing and payments. The platform invests in people through hands on training, workshops, and mentoring, and it links artisans to government schemes for added support. Buyers discover authentic, customizable pieces paired with each maker's story, turning purchases into a bridge between craft and culture. Smart search and personalized recommendations ease discovery, while a multilingual, voice enabled interface keeps access open to everyone. Community spaces help artisans collaborate, share resources, and support one another, strengthening livelihoods while preserving cultural heritage.

Index Terms **– Rural Artisans, Online marketplace, voice-enabled interface, Multilingual, Cultural Heritage**

I. INTRODUCTION

India is home to a vast range of traditional art forms however many of them are at the risk of disappearing. A large number of rural artisans and craftsmen struggle to reach wider markets despite their talent and skills. Factors like low digital literacy, limited access to online market, lack of resources and existence of middleman often hinder their income and long-term growth. As a result, their work remains largely restricted to regional boundaries and many artisans do not receive the visibility or recognition their creation deserves.

Karigar Sansaar aims to solve this issue by creating a digital platform where the artisans can display, promote and sell their handmade products. The platforms act as a direct bridge between the artisans and the buyer; it ensures that the creators get their fair returns while also promoting traditional art forms. In addition, the applications provide information related to government schemes, skill-development programs, and upcoming event. These features help the artisans to improve their capabilities and broaden their reach.

The application emphasizes simplicity and accessibility through features such as voice-assisted navigation, multilingual support, and a basic digital literacy module. This helps artisans engage with the digital world without facing technical difficulties. Karigar Sansaar encourages inclusivity and self-employment by enabling artisans to adopt digital tools at their own pace. Through the use of technology, the platform supports local craftsmanship while contributing to the preservation of cultural heritage and the overall economic growth of artisan communities.

II. RELATED WORK

Recent studies show how digital tools are a powerful change for rural artisans; they help in improving their visibility and opening the doors to wider markets which were previously out of reach. Initiatives like PARADISE and Crafts-Connect show how online platforms can break down geographical barriers and give artisans a space to share their work directly with interested buyers. These systems not only support economic growth but also help in protecting and preserving traditional art forms [1,2]. Moreover, the introduction of digital twin model for handmade toys like Channapatna further demonstrates that modern design technologies can blend in effectively with long-standing craft practices, improving accuracy and efficiency while still preserving the original aoof handmade craftsmanship [5].

Separately, other research is zeroing in on the practical side: making connectivity and access easier for these artisan communities. We see the Digital Cottage Hub being proposed as a kind of central, unified space where artisans, consumers, and even entrepreneurs can connect and work together [4]. Simple, mobile-based solutions, like the one tailored for Kondapalli artisans, highlight just how essential easy-to-use interfaces and support in local languages are for truly widespread digital adoption [3]. Even e-commerce platforms like Etsy and Craftsvilla are helpful to the artisans to show their art pieces, assisting with better product recommendations along with pricing insights and handling marketing tasks automatically.

Despite the positive outcome, the existing systems still have some serious gaps that needs to be addressed. For example, many such platforms are too complex and difficult for rural artisan to understand and navigate through. On the other hand, the Government portals lack engaging features or fail to provide clear and simple guidance. Essential features like simple voice assistance, proper multilingual support, and straightforward access to welfare schemes are often missing from most platforms. Furthermore, robust training and genuine community-building opportunities remain sparse. These persistent hurdles underscore the urgent need for a more inclusive and truly accessible solution—something that platforms like Karigar Sansaar are specifically trying to achieve.

III. METHODOLOGY

A. Abbreviations and Acronyms

Mostly consist of meaningful Tokens that includes:

1. RADEP – Rural Artisan Digital Empowerment Platform
2. UI – User Interface
3. AI – Artificial Intelligence
4. NPM – Node Package Manager
5. API – Application Programming Interface
6. CLI – Command Line Interface
7. AR – Augmented Reality

B. System Architecture

The proposed system architecture introduces a role-based digital platform that aims to connect artisans directly with consumers through an integrated online marketplace. It begins with a user onboarding and authentication, ensuring secure and personalized access. Customers can browse the marketplace, search and filter products, customers can also customize items, place orders, track deliveries, and provide feedback, thereby enabling a seamless end-to-end purchasing experience.

Artisans are provided with dedicated modules to upload and manage product information, respond to customer requests, track orders, and maintain inventory in an efficient manner. In addition, a generative AI–based module assists artisans in exploring innovative product designs and customization options, thereby supporting creativity and improving market relevance.

In addition to core e-commerce functionality, the platform integrates skill development resources and provides access to relevant government schemes to support the long-term professional growth of artisans. The overall system architecture is designed with an emphasis on modularity, scalability, and ease of use, making it well suited for the digital empowerment of traditional craft-based ecosystems.

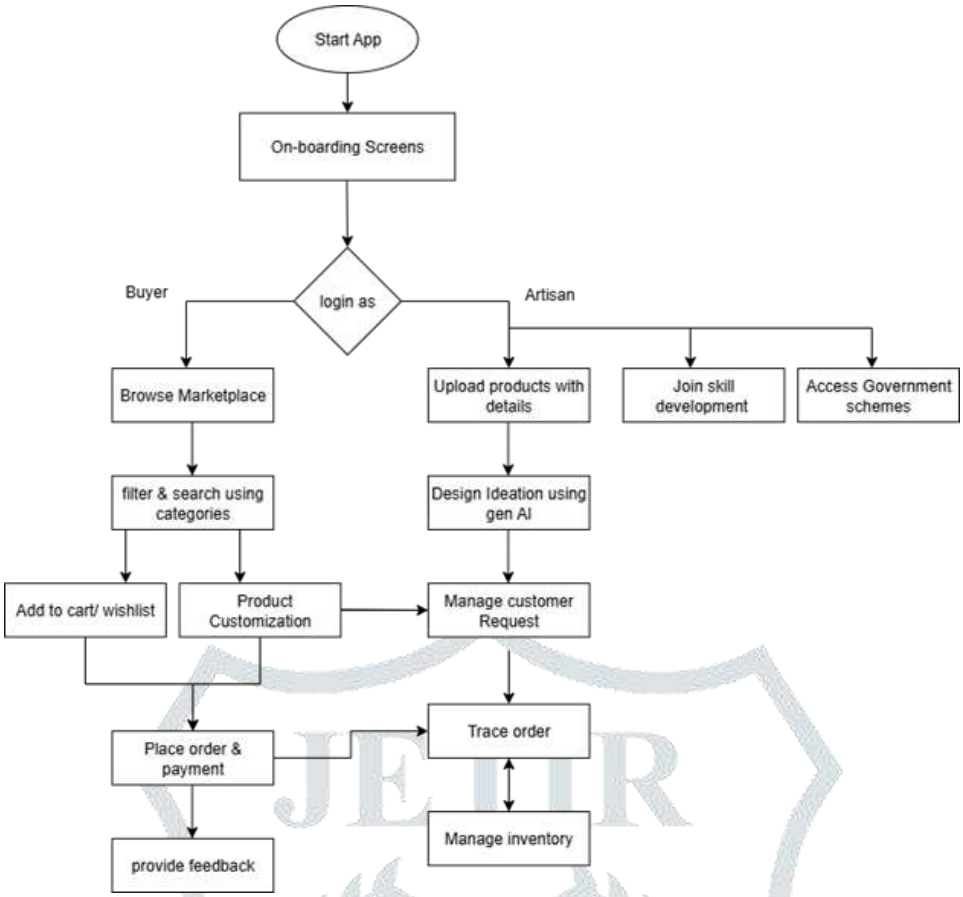

Figure 1: System Architecture

C. Software Requirement

To translate the proposed concept into a practical implementation, the technology stack was chosen with careful consideration of accessibility, system stability, and user experience. React Native, in combination with the Expo framework, was adopted for mobile application development as it enables a unified codebase while supporting efficient and consistent deployment across both Android and iOS platforms. This approach simplifies both development and long-term maintenance while ensuring a consistent user experience across platforms. Particular emphasis is placed on interface design to keep navigation intuitive and easy to use, especially for artisans who may have limited familiarity with digital technologies. On the server side, Node.js with the Express.js framework is used to handle application logic, data processing, and communication between the client and the database. MongoDB is selected as the primary data storage solution due to its ability to manage diverse data formats and scale efficiently as the number of artisans, products, and transactions increases. Cloudinary is integrated to support secure storage and optimized delivery of product images within the application. To further enhance user interaction, Google Gemini is incorporated as a chatbot-based assistant that provides guided support and design ideation, enabling artisans to explore creative product ideas through a conversational interface.

During development, the application is tested on mobile devices using Expo Go, which allows early detection of issues and ongoing performance optimization. Package and dependency management is handled using npm to ensure consistency and maintain updated libraries. Altogether, this technology stack enables Karigar Sansaar to function as a dependable digital marketplace that supports rural artisans while delivering a smooth and reliable experience for end users.

IV. MODULES

A. E-Commerce Module

The e-commerce module facilitates seamless interaction between the buyers and the artisans. Buyers can browse products and art pieces through categories, view detailed descriptions, add items to cart, complete the checkout process, track the orders and carry other basic tasks.

Artisans have to register on the platform using Aadhar-based authentication to ensure verified and secure access. Once registered, they can upload products, manage customer requests, monitor and main inventory and finances. This approach enhances transparency, builds trust between buyers and artisans, and ensures smooth transactions for both parties.

Figure 2: Buyer Home Page

Figure 3: Artisan Home Page

B. Skill Development and Gamification Module

This module provides skill development resources, where both the artisans and buyers can learn new skills. Artisans can also provide their own cources to get more recognition and extra income. Addition to this, the module also has digital literacy content which can be helpful for the rural artisans to navigate and use the application effectively. Gamification elements such as rewards and achievements are also included to encourage continuous engagement and learning.

C. Custom Request Module

This module allows buyers to directly communicate with the artisan about personalized or custom products. Buyers can specify design preferences, materials, size, budget, etc, enabling artisans to offer made-to-order, customized products.

D. Government Schemes Module

The custom request module allows buyers to directly communicate personalized requirements to artisans. Buyers can specify design preferences, materials, and dimensions, enabling made-to-order handcrafted products.

E. Design Ideation Module

The design ideation module assists artisans by providing inspiration and guidance for new product designs. It encourages innovation while maintaining traditional artistic elements.

Figure 4: Government Schemes

Figure 5: Design Ideation

F. Augmented Reality (AR) Module

The AR module allows buyers to visualize selected products in a real-world environment before purchase. This feature enhances buyer confidence and improves the overall shopping experience**.**

G. Events and Community Learning Module

This module provides information about exhibitions, workshops, training sessions, and cultural events. Events are accessible to both artisans and buyers, enabling cross-community interaction. Buyers can also participate in learning sessions to understand traditional art forms, fostering cultural awareness and appreciation.

V. RESULT AND DISCUSSION

A. System Evaluation and User Acceptance Results

The evaluation shows that Karigar Sansaar functions reliably across its main modules, including artisan onboarding, product listing, marketplace browsing, order handling, and access to support services.Most artisans were able to perform essential tasks, including product uploads, information updates, and order tracking, with minimal assistance. The clear layout of modules and straightforward navigation helped user complete tasks smoothly while reducing overall complexity.

User acceptance testing confirmed consistent performance under concurrent usage. The application remained responsive, and data handling was stable, confirming that the system architecture supports real-time interactions effectively. These results highlight the platform's user-focused design for individuals with limited digital familiarity. Voice-assisted navigation and multilingual support helped increase user confidence and engagement by minimizing dependence on text-based interaction. Overall, the results highlight the effectiveness of prioritizing simplicity, accessibility, and usability in the system design.

B. Impact on Artisan Empowerment

The platform demonstrates a positive impact on artisan empowerment by enabling direct interaction between artisans and buyers. By eliminating intermediaries, Karigar Sansaar ensures greater price transparency and fair compensation for handcrafted products. Artisans gain control over product representation, pricing, and customization requests, which enhances their autonomy and decision-making capability.

Beyond economic benefits, the integration of skill development modules, event listings, and government scheme information contributes to long-term capacity building. These features support artisans not only as sellers but also as learners and community members, fostering sustainable livelihood development and preserving traditional craftsmanship.

C. Limitation

Despite its advantages, the Karigar Sansaar platform has certain limitations. These include dependency on stable internet connectivity, limited regional language support, and challenges related to digital literacy among rural artisans. Additionally, logistics management and AR compatibility on low-end devices may affect user experience. Future improvements can focus on offline capabilities, expanded language support, and enhanced infrastructure for order fulfillment.

D. Future Scope

The Karigar Sansaar platform has a lot of room to grow in the future. There are a number of things that could be better to help it reach more people and make it easier and more fun for artists. One great way to make the platform better would be to link it to well-known online stores like Amazon and Flipkart. This would help those who manufacture things because these sites have a lot of customers, which would make their stuff more apparent and cut down on the need for separate marketing efforts.

Another key step forward would be to provide offline features to help people in rural regions deal with the problems they often have with the internet. This would enable artists keep track of their orders and things even when they aren't on the internet. The system would automatically sync updates when the internet connection is back up. It will also enable Indian craftsmen talk to clients from all over the world if they can sell things to people from other countries and ship and pay for them in a lot of different currencies. This would help traditional crafts get more attention in locations more than just local and national markets.

VI. CONCLUSION

Karigar Sansaar offers a technology-driven solution to the challenges faced by rural artisans, especially limited market access and difficulties in adopting digital tools. By providing a simple and user-friendly platform with features such as direct interaction between buyers and artisans, voice-assisted navigation, and multilingual support, the system helps artisans engage confidently in the digital marketplace. The application not only creates better opportunities for artisans by reducing their dependence on intermediaries, but also helps preserve traditional art forms by reaching a broader audience. The results of this work highlight that user-centric digital solutions can play a vital role in empowering local craftsmanship, encouraging self-reliance, and supporting both economic and cultural development.

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