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ENHANCING USER-TAILOR CONNECTIVITY: A MOBILE-BASED MANAGEMENT SOLUTION

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ABSTRACT

This research paper describes the design and implementation of the "Customer-Centric Tailor Automation System with AI and Augmented Reality Techniques," a game-changing technology that will transform the traditional tailoring industry. With the help of artificial intelligence, machine learning, and augmented reality, the solution may offer accurate measurements, tailored outfit recommendations, and smooth user-tailor interactions. A tailor-specific mobile application, an automatic measurement manipulation system, and an advanced recommendation system, all integrated into an intuitive user experience, are key components. The success of the system is based on its capacity to improve the user experience, streamline tailoring procedures, and build stronger customer-tailor connections. The research offers transformational possibilities for the fashion industry by merging AI and augmented reality, paving the path for novel collaborations and continual technical breakthroughs. Despite its promise, the research notes obstacles such as user acceptance, algorithmic bias, and data privacy, highlighting the importance of continued research and improvement to ensure ethical and just use. The research's results contribute to the continuing conversation about technological innovation in fashion by highlighting the system's impact on customer satisfaction,

industry evolution, and future research prospects.

Keywords: mobile application, tailoring, style, suggestions system, artificial intelligence, reinforcement learning machine learning, recommendation system, web application

INTRODUCTION

The fashion sector has seen significant transformation in recent years, owing to the increased popularity of online shopping and technical improvements in retail. The combination of cutting-edge technology and traditional skills has resulted in remarkable advancements in the fashion industry, revolutionizing the way clothing is made and created [1]. This research paper explores technological breakthroughs in the tailoring industry, focusing on the creation and execution of the "Customer-Centric Tailor Automation System with AI and Augmented Reality Techniques." This breakthrough system represents a paradigm shift in the way tailoring services are imagined, built, and provided, having been precisely crafted at the intersection of artificial intelligence (AI), augmented reality (AR), Laravel, PHP, and React Native. Our research investigates the seamless integration of AI algorithms and AR visualization tools into the tailoring process in today's fast-paced environment, where tailored experiences are important [2]. Using AI's capabilities

ensures accuracy and efficiency while giving customers perfectly fitted, custom apparel. In contrast, augmented reality provides clients with immersion in their chosen designs, increasing their involvement and understanding of the final product. The use of Laravel and PHP as the backbone of this revolutionary solution not only provides a powerful backend architecture but also ensures secure data management and simple interaction. Furthermore, React Native, a versatile JavaScript framework, allows for the building of responsive and intuitive user interfaces, ensuring a uniform experience across platforms [3].

The development process, implementation strategies, and effects of a customer-centric tailor automation system on the apparel sector are all thoroughly examined in this research. This system is set to revolutionize customer-seller interactions through the combination of AI-based measurement accuracy, AR visualization's immersive experience, and Laravel, PHP, and React Native's seamless communication. By navigating the complex details of this technological integration, we illuminate the revolutionary potential of these developments, which not only improve sewing process efficiency but also create stronger bonds between customers and tailors. Figure 1 shows how users and tailors understand their needs in the future of fashion design. So, tailor can see what the user does in the web application using tailor's mobile application.

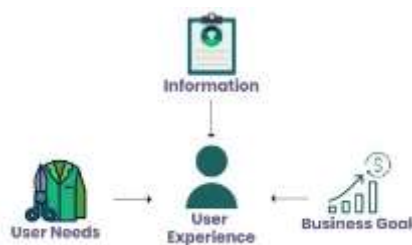


Fig. 1. Interaction user and tailor diagram

The paper describes research attempts to create a novel customer-centric tailor automation system that integrates mobility with cutting-edge technology like AI and AR. The purpose of this research is to assess if adding these elements to traditional tailoring systems could lead to improvements in precise manipulation. The mobile application will be designed to provide tailors with a seamless and personalized experience. Customers can input their measurements, preferences, and other relevant information into the web application, which will then be used to generate personalized recommendations and custom garments. An application that analyzes pre-purchase data from tailor shops to offer personalized purchasing recommendations to customers based on their own tastes and styles while also encouraging loyalty and long-term pleasure. The project's primary goal is to make recommendations and guarantee that energy is processed in an efficient, scalable, and flexible manner [4] [5].

Based on the Unity 3D game engine, Leap Motion Controller, and LeaPhysio app for Android OS, this study "Tailored virtual reality and mobile application for motor rehabilitation" proposes a measurement system for hand and finger motor rehabilitation, offering precise data for unbiased assessment [6]. Firstly, it created a 360°-3D model based on the customer's captured measurements, and then the customer could see the generated model on the web site. Then, the tailor can manage the customer's dress as per his experience. So, after that, it goes through customer satisfaction. The mobile application will also allow tailors to interact with customers, providing them with the necessary information to create custom garments that meet their needs and preferences [7]. Below, figure 2 shows how users get user-specific fashion satisfaction through the system using artificial intelligence and machine learning.

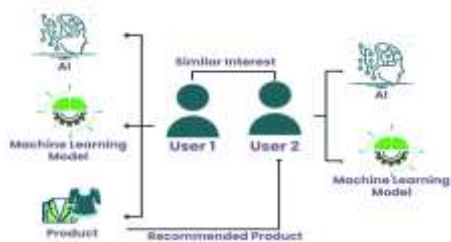


Fig. 2. User specific recommendation diagram

LITERATURE REVIEW

Augmented reality (AR) is a useful tool in manufacturing, reducing cognitive load and enhancing efficiency. However, current AR strategies, such as camera calibration and detection, are largely non-AI, limiting their practicality in controlled environments. To improve AR, AI strategies like deep learning, ontology, and expert systems can be incorporated. All of the AR system's component parts are covered in this study overview, which also identifies future research areas and provides critical evaluations and possible AI solutions [1]. By automating the tailoring industry, the "ONLINE TAILORING MANAGEMENT SYSTEM" project seeks to enhance security, record-keeping, data integrity, and a paperless workplace. With a login and password for security, users may access it and focus on managing client information and making decisions. Customers can check the status of their dresses, place orders, and leave feedback using this system. The government's 2030 vision of digitally literate individuals and the implementation of electronic governance across all ministries and sectors are in line with this project [2].

As a "A Machine Learning Recommender System to Tailor Preference Assessments to Enhance Person-Centered Care Among Nursing Home Residents" 255 NH individuals' responses to the PELI-NH were used to create a machine learning recommender

system that identified extra things that were significant to certain residents. In order to achieve high recall and precision, the system makes use of collaborative filtering and association rules, which supports person-centered care [4].

The "Clothing Recommendation System based on Visual Information Analytics" article from 2019 suggests a clothing recommendation system that makes recommendations for appropriate clothing based on body height, gender, and clothing style by utilizing characteristics recognition and body height recognition. Additionally, the system takes advantage of online texture modeling to offer a variety of options and support marketing tactics. The goal of this approach is to benefit both the fashion industry and customers [5]. A mixed reality system for 3D virtual garment try-ons is presented in the "Tailoring Management System using AR and 3D Modeling" journal. It lets users see themselves wearing virtual clothes while staring at a mirror display. The user can view the fittings from different perspectives as the system replicates the chosen virtual clothing on their body in real time. The primary contribution is the automatic creation of an invisible avatar that is customized according to the user's skin tone and body size. This enables accurate alignment, fitting, and simulating in the virtual try-on system [7]. According to Akhilendra Sonkar and Aravendan Muthusamy's 2023 article, visual merchandising is essential for retail establishments, particularly fashion labels, to draw clients and sway their judgments. It entails developing equity, expressing fashion trends, and designing eye-catching display designs. The purpose of this review of the literature is to examine the relationship between visual merchandising and clothing fashion trends, pinpoint areas of unmet research need, and suggest future lines of inquiry for the fashion apparel sector [8].

"Management web-based system" by Jonathan Sidi and Nur Shaheerah Binti

Mohamed Nor. A suggested system called the Seamstress Measurement System (SeaMeaS) is intended to help the garment industry manage its operations. The system was created using literacy data, and although seamstresses frequently use it, its features are not as helpful. Five seamstresses in Kuching, Sarawakto, were interviewed to learn about their needs and recommendations for the system. The system's primary purpose is to store order lists and customer information. It also lets seamstresses update customer information, which makes it simpler for clients to check the status of their orders and get in touch with the seamstress. Customers can use this system to see if their order is available for pickup or if it is still pending [9]. The "Tailoring Management System" illustration provides an SMS distribution system, a measuring template system, and a simple way to store customer information. Tailor shops can send offers to their frequent customers and cut down on the amount of time spent measuring the same customer. The software acts as a middleman between clients and tailoring suppliers by utilizing Visual Studio 2019, Microsoft SQL Server, ASP Dot Net Core, C#, and Bootstrap capabilities. By lowering the requirement for long-term memory recall, it contributes to a higher quality of life for tailor shops [10].

By automating manual tailoring management services, "Design and Implementation of a Tailoring Management System (Virilor)" seeks to increase productivity and safeguard data. Users will be able to log in using their username and password to place orders, check the progress of their outfits, and leave reviews. By helping tailors and clients alike, this technology would help Nigeria realize its 2030 objective of a digitally literate population and automated government agencies and ministries [11]. "Industry 4.0 in the Textile and Apparel Sector: A systematic literature review" examines how Industry 4.0 is developing

in the textile and apparel industry, with particular attention to IoT, cloud computing, Big Data, autonomous robots, 3D printing, augmented reality, virtual prototyping, cybersecurity, and system integration. Benefits like lower energy use and more efficiency are highlighted, along with newly emerging fields like real-time communication and sustainable development [12].

This "Systematic Literature Review of Machine Learning in Virtual Reality and Augmented Reality" examines its application in identifying objects and activities in mixed and augmented reality settings. The review reveals that machine learning is in high demand across various industries, but challenges like prediction latency and network connection need further study to overcome [13]. Sonkar and Muthusamy's study investigates how fashion trends affect visual merchandising, which is used to promote fashion apparel firms. It emphasizes how crucial visual merchandising is to sustaining client relationships and creating effective visual marketing goals. In order to better understand how fashion trends affect visual merchandising and fashion apparel brand promotion, the study used an exploratory research design in conjunction with descriptive research methods. It highlights how important it is for brands to build a strong brand image and interact with their audience according to their preferences [14].

This "Machine Learning for Object and Action Recognition in Augmented and Mixed Reality: A Literature Review" aims to enhance context awareness in immersive technologies. A review of 15 studies published between 2018 and 2022 reveals that machine learning is highly desired in various industries. However, real-time interactive systems still face challenges like prediction times and network connections. Further research is needed to understand how object and action recognition can improve context awareness in augmented reality

applications [15]. By converting the manual tailoring sector into a completely automated system, the "Online Selling and Sewing Clothes Management System for Tailor" seeks to enhance services, record keeping, quick searches, data integrity, security, and a paperless environment. Decision-making and the management of customer information are the main areas of emphasis. For security reasons, users must connect using distinct usernames and passwords. System administrators can manage client information and change records, while customers can place orders, check the status of their outfits, and leave feedback [16]. As "Parade in the Virtual Dressing Room" demonstrates, fashion is a popular topic among young people, who frequently struggle to find appropriate dressing styles. This software seeks to remedy this by allowing users to create virtual models by filling out profiles, providing body measurements, and uploading images. The key draw is the addition of business value to the application, with the goal of adapting to the new age of social networking. This novel technique attempts to make it easier for youngsters to interact and select appropriate wardrobe styles [17].

METHODOLOGY

A complete and systematic strategy was used to create the novel "Customer-Centric Tailor Automation System with AI and Augmented Reality Techniques" and meet the objectives under the many components of this system. Figure 3 represents the overall system diagram. This process includes creating a web application and a mobile application.

This section describes the essential actions and strategies used to attain the stated goals:

1. System Development and Implementation

The Customer-Centric Tailor Automation System was built on an effective technological core that included

Laravel, a well-known PHP framework, and React Native, a popular JavaScript framework. Laravel and PHP laid the foundations for rapid data processing, secure user authentication, and seamless database interaction. React Native built a responsive, cross-platform user interface that ensured a consistent experience for web and mobile users. The system architecture was unified and user-friendly as a result of leveraging various technologies, effectively serving the diverse needs of clients and tailors.

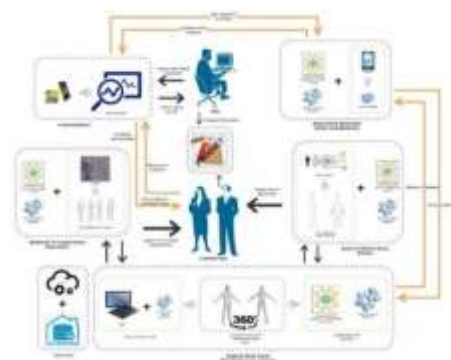


Fig. 3. Overall system diagram

2. Mechanisms for capturing human measurement and prediction systems

Data Collection and Preparation: To begin, a dataset of various human body measures was gathered in order to train and test machine learning algorithms. To guarantee accuracy and inclusion, our dataset covered a wide range of body types and dimensions. **Machine Learning Model Development:** To anticipate correct body measures, machine learning algorithms were trained on the obtained data. To improve prediction accuracy, feature engineering and model selection were used.

2. Mechanisms for designing a 360-degree 3D model and handling human interaction with a recommendation system

Integration of Augmented Reality (AR) and 3D Modeling: Augmented reality (AR) technology was integrated with the

mobile application to build a 360-degree 3D model of the customer's body. Real-time scanning and rendering techniques were used. Development of a Recommendation System: The AI-based recommendation system was created with the customer's body measurements, stylistic preferences, and user-item interactions in mind. To generate individualized apparel choices, collaborative filtering and content-based filtering approaches were used. User Interaction Testing: To provide an adaptive and intuitive experience, user interactions with the AR and recommendation system were tested and adjusted.

4. Enhancing User-Tailor Connectivity: A Mobile-Based Management Solution

Mobile Application Development: To simplify user-tailor interactions, customization requests, and order administration, a tailor-specific mobile application was created. AI/AR Integration: To allow automatic measurement manipulation and 3D modeling, the mobile application was outfitted with AI and AR technologies. Performance Evaluation: The system's performance was evaluated using rigorous testing, including stress testing, to verify its resilience and dependability in managing a wide range of client requirements.

5. Admin Dashboard

Sales Chart: For decision-making, the dashboard displays visual representations of sales data.

User and Tailor Profile Management: From the admin dashboard, you can manage and monitor user and tailor profiles. Order Management: The dashboard tracks and manages all client orders. Security Management: This dashboard is used to deploy and manage security measures such as IP address blocking. Admin Application Management: This module is in charge of

maintaining and updating the admin dashboard.

6. Mobile Application Features

User Request Management: The mobile application manages customer requests for tailoring services and adjustments.

User-Tailor-Admin Chat Management System: A chat system allows users, tailors, and administrators to communicate with one another, improving user-tailor connectedness. Push messages and alerts are handled to keep users and tailors up to date on their orders and interactions. Order Request Management: Tailors may examine and accept order requests, and the process is managed smoothly using the mobile app. To achieve the system's objectives and provide a seamless experience for all stakeholders involved, the methodology used for the development and implementation of the "Customer-Centric Tailor Automation System with AI and Augmented Reality Techniques" includes a data-driven approach, rigorous testing, and user-centric design. This all-encompassing strategy guarantees that the system provides accurate measurements, individualized apparel recommendations, and quick user-tailor interactions, eventually improving consumer happiness and brand loyalty.

RESULTS

The "Customer-Centric Tailor Automation System with AI and Augmented Reality Techniques" met its goals, as stated in "Enhancing User-Tailor Connectivity: A Mobile-Based Management Solution." The use of AI and AR technology, together with the creation of a tailor-specific smartphone application, has transformed the tailoring process. These technological advances in tailoring can increase consumer happiness, promote brand loyalty, and streamline the tailoring business. The increased user-tailor experience has resulted from smooth communication

channels and effective management tools, making the customizing process more customized and responsive.

A. Development of a Tailor-Specific Mobile Application

The creation of a tailor-made mobile application for addressing consumer modification requests was a watershed moment. It offers an easy-to-use interface that streamlines order development and administration procedures. This has considerably increased the user-tailor connection and the tailoring service's overall efficiency. The mobile application of our system enables tailors to rapidly produce and handle customer orders, resulting in easier interactions and, ultimately, higher customer satisfaction.

B. Design and Implementation of an Automated Measurement Manipulation System

The deployment of an automated measurement manipulation system in our system, which makes use of AI and AR technologies, has generated encouraging results. Machine learning algorithms have demonstrated their ability to provide accurate and speedy body measurements, reducing mistakes in the tailoring process and ensuring clothing fits properly. As figure 4 below shows, the use of augmented reality visualization techniques has allowed for 3D representations of selected clothing on the customer's body. This tool provides consumers with a visual depiction of their designs and increases their participation in the customization process.

Fig. 4. Measurements manipulated system using mobile app

C. Analysis of System Performance

Our thorough examination of the system's performance reveals that it routinely delivers on its promises. AI algorithms generate apparel recommendations that are personalized to the preferences and body types of clients. This tool has improved the entire tailoring experience by ensuring that consumers receive outfits that match their personal style and preferences. The real-time development of tailored suggestions based on reliable data analysis has expedited the tailoring process, delivering unique advice to specific customers and ensuring an excellent fit.

D. Admin Dashboard

The admin dashboard has proven to be an invaluable tool for managing various aspects of our system. It offers insight into sales trends through sales charts, streamlines user and tailor management, and optimizes order processing, as shown in figure 5.



Fig. 5. Admin Dashboard

Security management, including the ability to block users by IP address, has bolstered system security. Meanwhile, the



process.

F. User-Tailor-Admin Chat Management System

As figure 6, chat management system allows users, tailors, and administrators to communicate in real time. This functionality has been critical in responding to consumer questions, quickly resolving issues, creating a smooth experience for all stakeholders



Fig. 6. Chat management system

G. Notification Management

As figure 7, notification management system has proven to be useful in informing users, tailors, and administrators about order updates and chat messages. This proactive communication has resulted in increased customer satisfaction and operational efficiency.

H. Order Request Management

Efficient order request management has improved client order acceptance and fulfillment. As figure 8, the system monitors order status to ensure timely deliveries and improve overall customer service.

Fig. 7. Notification Management System

Fig. 8. Order Request Management

DISCUSSION

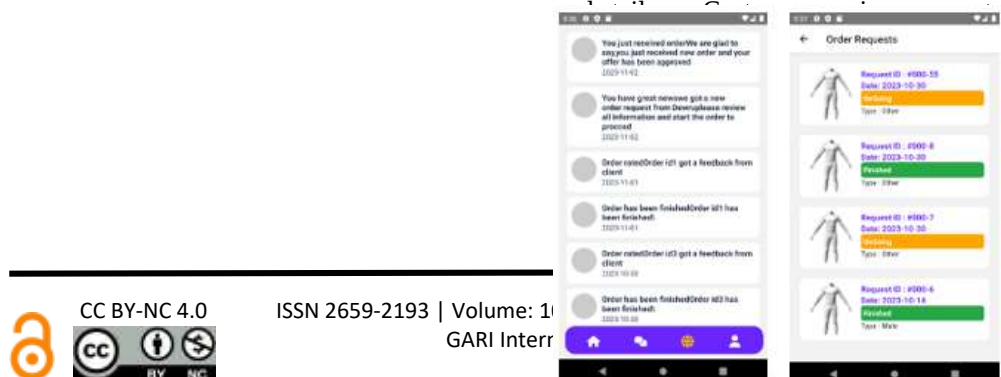
The "Customer-Centric Tailor Automation System with AI and Augmented Reality Techniques" represents an evolution in the way tailors and clients communicate and do business, and its creation and execution represent a significant advancement in the tailoring industry. In this part, we explore the consequences and possible effects of our approach on the user experience, technological innovation, and the tailoring industry.

A. Transforming the Tailoring Industry

The incorporation of AI and augmented reality technology into our system has the potential to transform the traditional tailoring industry. The solution reduces human errors by automating measurements and improving visualization using AR, resulting in exact fittings and client satisfaction. This transformational strategy has the potential to broaden the industrial embrace of technology, paving the way for more complex and efficient tailoring procedures.

B. Enhancing User Experience

One of our system's primary goals is an improved user experience for both clients



stronger customer-tailor ties, resulting in higher customer loyalty and favorable brand perception.

C. Implications for Technological Innovation

This system's successful combination of AI-based algorithms with augmented reality visualization techniques illustrates the potential of emerging technology to affect the future of fashion-related businesses. Expect more advances as these technologies advance, such as predictive fashion trend research, virtual try-on experiences, and AI-based design support. The integration of AI, AR, and the fashion business creates opportunities for creative collaborations and technological improvements, encouraging innovation and continuous improvement of culture.

D. Overcoming Obstacles and Adopting Sustainability

Even though this system has a lot of potential, resolving issues is necessary for its general acceptance. We are aware of the issues around user acceptability, algorithmic biases, and data privacy. It is essential to conduct ongoing study and development to guarantee the system's moral and just use. In addition, in order to support a wider user base, future efforts will concentrate on improving scalability, increasing customization choices, and improving measurement accuracy.

CONCLUSION

The Customer-Centric Tailor Automation System was built on a solid technological foundation that included Laravel, a prominent PHP framework, and React Native, a popular JavaScript framework. Laravel and PHP laid the groundwork for rapid data processing, secure user authentication, and seamless database interaction. React Native built a responsive, cross-platform user interface that ensured a consistent experience for web and mobile users. The system architecture was unified and user-friendly as a result of leveraging various technologies, effectively serving the

diverse needs of clients and tailors. This research advances technical improvements by emphasizing user-centered design and smooth connectivity among users, tailors, and administrators. The mobile app, which features effective conversation management and personalized recommendations, enhances the user experience, develops customer-tailor interactions, and increases brand loyalty. The effective application of this strategy opens new avenues for research at the interface of technology and fashion. The fashion business is on the edge of a technological revolution, combining customization, efficiency, and customer satisfaction, as AI, AR, and cross-platform frameworks are investigated. This tailoring future promises limitless possibilities, stimulating innovation and creativity, and benefiting both businesses and consumers.

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