



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Futuristic Room

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Abstract— In today's fiercely competitive and dynamic retail landscape, cultivating extraordinary in-store customer experiences, encouraging loyalty and achieving large market differentiation are primary to retail success. An important number of people want more than just products; they want shopping experiences that are personal, efficient and memorable and that will make their lives better. The office experience is central to the decision-making process, because most buyers choose to purchase there. Our smart fitting room system uses barcodes to update the customary fitting room experience.

Keywords— Database, Internet of Things, Customer Experience, Barcode Technology, Technology Driven Solution, Modern Environment, Smart Fitting Room.

I. INTRODUCTION

With the intense competitiveness of the retail industry, no longer can customer experience be a differentiator. Retailers are focusing on selling not just quality products but also delivering efficient, engaging, and personalized shopping experiences that leave a mark. Fitting rooms, where the decision to buy is mainly made, are, therefore, of great importance in this journey. To overcome the challenges of a lack of product information, difficulty in finding other sizes, and inefficient communication with store associates, this project introduces a smart fitting room system. With the help of barcode technology and IoT-enabled solutions, the system changes the traditional fitting rooms into an interactive and digitally integrated environment that offers more convenience and satisfaction.

The barcodes attached to the items of clothing store crucial product information such as size, color, type, and care instructions. Upon scanning the barcode, a Raspberry Pi-based device shows the relevant data on an interactive touch screen, thus making it easier for the customer to make decisions. With the added feature of requesting alternative sizes or colors directly from the screen, the customer no longer has to leave the fitting room. Notifications sent to staff in the store ensure

quick service, reducing waiting times and making the shopping experience much better. Moreover, the system collects information

about Customer preferences and behaviors, which helps retailers optimize inventory, improve product placement, and design customized shopping strategies. Convenience, interactivity, and data-driven decision-making combined together aim to bring retail operations to a new level and make the customers loyal.

II. Literature Survey

The Smart Fitting Room concept offers a fresh way to improve in-store shopping experiences by combining the ease of online shopping with physical retail. Traditional fitting rooms often create bottlenecks, as they typically lack customer engagement, provide limited information, and require frequent staff assistance. However, advancements in barcode and IoT technologies have led to more interactive and efficient solutions, transforming the shopping experience into a more connected and data-driven process.

Interactive Retail Technology - Interactive retail technologies have highly favorable effects on customer satisfaction and engagement. Pantano and Servidio (2012) argued that the integration of interactive touch screens within fitting rooms lets customers touch and interact with merchandise directly, making the information instantly accessible to them. This leads to a richer shopping experience, making customers happy to be more informed and more attached to the product, and finally they buy it. Using these digital interfaces, the Smart Fitting Room can transform fitting rooms into information-rich spaces thereby enhancing the overall shopping experience..

Barcode and RFID Technologies in Retail - Barcode and RFID technologies have provided the means for inventory control and tracking. Although RFID is known for real-time information access, barcodes are still a more affordable and available solution. Pramatar and Theotokis (2009) stressed the effectiveness of RFID systems, but in the Smart Fitting Room application, barcodes are used instead as they are cheaper and easier to be integrated. Using the device barcode technology, the module ensures product information retrieval in an efficient way.

IoT-Based Notification Systems - The advent of IoT has revolutionized the course of retail operations, especially the way in which customers are engaged. According to Accenture, IoT systems improve operations and support active monitoring (Accenture 2017). In the Smart Fitting Room, IoT-enabled notification systems play an important role in informing in-store staff of customers' demands for various sizes or shades. This innovation enhanced the fitting room experience, translating into higher levels of customer satisfaction and negativity, thus harmful for abandonment. Moreover, the combination of technologies like barcode scanning, IoT, and data analytics in retail fitting rooms offers a groundbreaking solution to longstanding challenges. By extending these technologies Smart Fitting Room is providing an interactive, personal, and productive shopping experience customers have come to expect from retailers. Meanwhile, it has the effect of improving customer satisfaction and generating useful information to retail decision-making, thus driving the evolution of customer-centric retailing.

III. Block Diagram

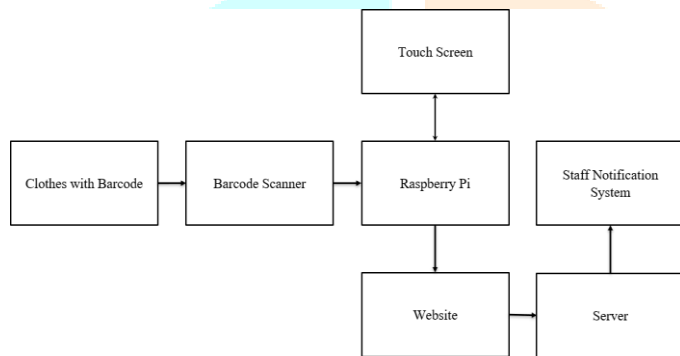


Figure 1 – Block Diagram

The block diagram of the Smart Fitting Room system visualizes the most important components of the system and the exchange of information between them. Every garment on sale at the store is labeled with a barcode containing size, color, brand, and price information. If a customer carries an item into the fitting room, it is scanned by a barcode scanner coupled with a Raspberry Pi which brings up this information. The Raspberry Pi functions as the main processing unit and displays the item details on a touchscreen screen found in the fitting room, such as item description, available size, color, and optional features. Resampling also results in systems establishing connections with a website or a database server to store and retrieve detailed product availability information. Furthermore, the system supports customer service in a module for user alerts. If a customer says,

In the Smart Fitting Room system configuration, the first step is to "I'd like this in a different size, a different color, or a related turn on the Raspberry Pi control center through the 5V power adapter. Connects a USB barcode scanner to any USB port that is product, the Raspberry Pi sends an alert to a notification system available and maintains continuous network connection via that prompts retail staff to get that item as soon as possible. The Ethernet. Connect the touchscreen display by connecting the DSI server enables the system to run smoothly by, among other things, ribbon cable between the Raspberry Pi's DSI port and the display. taking care of the database of all items, which can be updated and To deliver power to the screen, establish the 5V and GND GPIO retrieved in real time according to customer interaction, enabling on the Raspberry Pi with the power terminals of the screen. When good inventory management without an oversized infrastructure to perform server communication it is essential that the Raspberry Pi is on network either via Wi-Fi or Ethernet. Using this

investment and thus a valid solution for retailers.

IV. Flowchart

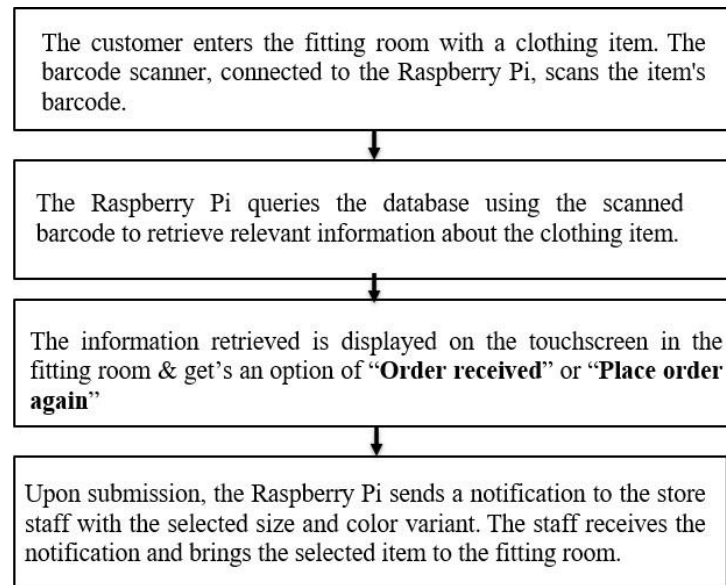


Figure 2 – Flowchart

The Smart Fitting Room system provides customers with a user-friendly shopping experience. Subsequent to a customer entering the fitting room with 1 garment, via a barcode scanner attached to the Raspberry Pi, the stored barcode image is read to obtain target parameter information. At this point the Raspberry Pi queries a database to obtain information of the type of choice available for that item, e.g., size, and color. The information is displayed on a touch screen, mounted in the fitting room, in order that the customer can easily observe it. If they want a different size or color, they can request one, and the system gives the store staff a notice. The staff then hands the item the user will need to the fitting room, so the whole process is fast and hasslefree.

V. Circuit Diagram

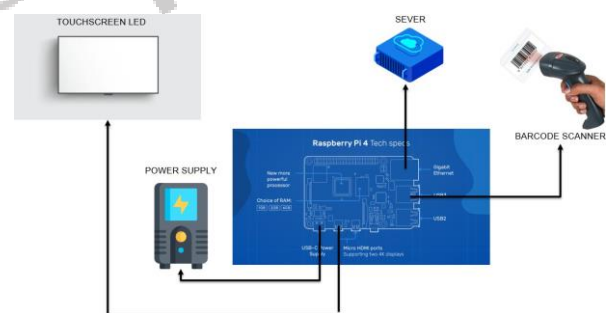


Figure 3 – Circuit Diagram

configuration, the Raspberry Pi is able to establish a successful communication with the server and retrieve item data and subsequently send alerts.

VI. Results

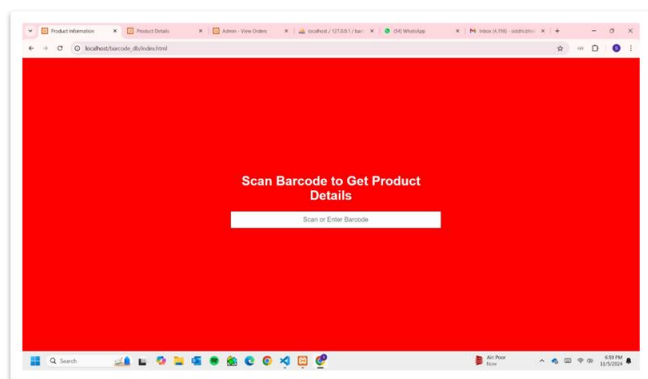


Figure 4 – Homepage

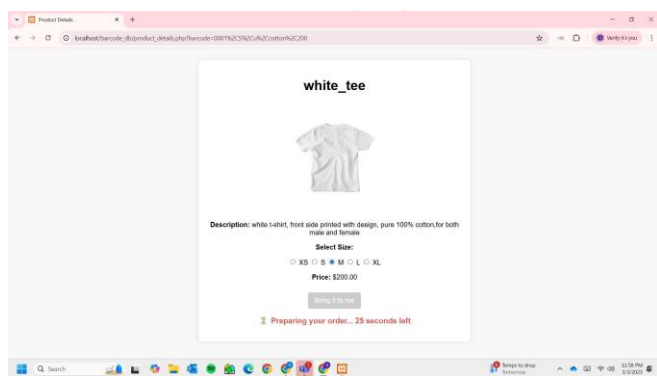


Figure 5 – User Interface

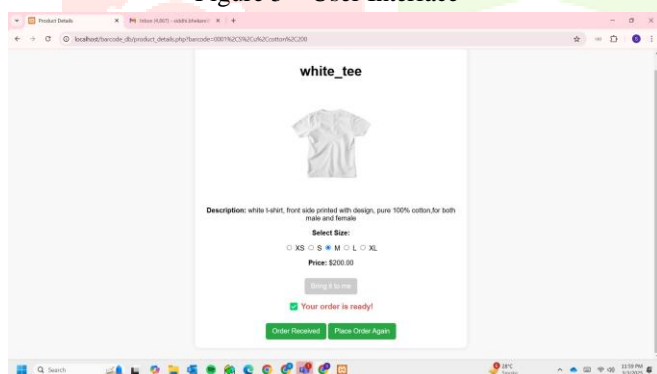


Figure 6 – User Interface after Order

Order ID	Product Name	Size	Price	Order Date
1	white_tee	M	\$200.00	2024-02-18 10:10
2	white_tee	S	\$200.00	2024-02-18 10:15
3	white_tee	L	\$200.00	2024-02-18 10:20
4	white_tee	XL	\$200.00	2024-02-18 10:25
5	white_tee	XS	\$200.00	2024-02-18 10:30
6	white_tee	M	\$200.00	2024-02-18 10:35
7	white_tee	S	\$200.00	2024-02-18 10:40
8	white_tee	L	\$200.00	2024-02-18 10:45
9	white_tee	XL	\$200.00	2024-02-18 10:50
10	white_tee	XS	\$200.00	2024-02-18 10:55

Figure 7 – Admin Portal

VII. Conclusion

The Futuristic Room project is a great step towards a better experience during retail shopping, especially in apparel shopping. Based on the raspberry PI as the master controller, we established an intuitive system, which involved the user and store personnel interaction. Selection of a USB barcode scanner provides a better order for the input flow and gives the customers an opportunity to scan items in a very simple way, and identify information to be entered in addition, without the need to "type" it. The touch panel display presents a simple to use user interface along with real time information about the size, color, and item inventory. That has the consequence of giving customers the power to choose, and thus the consequence of eliminating fitting room chuck, thus leading to a better experience for the customer.

Besides its server access, this system possesses many features. Wi-Fi enables the Raspberry Pi to retrieve data from a main database, which stores a large amount of data on product families. What this means is that real-time data acquisition is actually possible, and that that data can be used to keep customers informed of new product arrivals and their availability; this can prevent emotional overreaction at the point of sale.

In addition, the Futuristic Room project enhances the customer satisfaction while enhancing the operation efficiency of the retail space. Although things are narrowed down to basic customer requirements, instead, it will have at least a global shop efficiency contribution.

In conclusion, Futuristic Room is a new concept, which combines technologies and traditional methodologies to create new solutions in answer to the changing needs of consumers at every level of the retail chain. In this paper, the platform is laid out to create a more interactive, efficient, and customer friendly shopping space integrated with user interaction, point-and-click data retrieval, and enhanced staff interaction. As technology advances, the idea of Futuristic Room can be concretized and modified to fit the current situation in the retail market, which is a global trend.

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