EVALUATION OF USER ATTITUDES TOWARDS SMART FITTING ROOMS IN TERMS OF CONVENIENCE, SECURITY, AND PRIVACY

Meenu[1], Ashish Hooda[2]
[1]M.Tech Scholar, Department of Fashion Technology, BPS Mahila Vishwavidyalaya Khanpurkalan, Sonipat, Haryana
[2]Assistant Professor, Department of Fashion Technology, BPS Mahila Vishwavidyalaya Khanpurkalan, Sonipat, Haryana

Abstract
Smart Fitting Rooms have a lot of promise to improve the shopping experience for customers in retail clothing shops. In order to do this, they use auto-id technology to track consumer product choices and offer additional types of assistance in light of these singles out shows inside the Smart Fitting Room lodges. (e.g., item suggestions or Omni channel services) We concentrate on the pertinence of software-based ways of separating between things in individual lodges, though present executions for the most part rely upon equipment based ways to deal with precisely recognize client's item choice. Moreover, we show how software-based techniques might be utilized to orchestrate things in fitting rooms as per their significance to the client, which is critical information for offering additional services.

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1. INTRODUCTION

Retail establishments are increasingly using smart fitting rooms to provide clients a unique and practical method to try on clothing. To improve the shopping experience, these smart fitting rooms make use of technologies like RFID, cameras, and interactive mirrors. Consumers have voiced worries about security and privacy, as with any technology.Customers may be concerned about their personal information being collected and used due to privacy concerns. Clothing sizes, desired styles, and even biometric data like face recognition might be collected in smart changing rooms. Consumers could feel uneasy about their data being gathered, utilized for marketing, or perhaps shared with other parties.The safety of users of smart fitting rooms is another issue. There is a chance that personal data might be exposed as a result of hacking or data breaches. Also, customers can be concerned about covert cameras or other types of monitoring that might jeopardize their privacy

Fig.1. Fitting Room

Notwithstanding these issues, a lot of clients are drawn to the comfort and customized experience that smart fitting rooms provide. Customers may save time and effort by using these fitting rooms, which can make suggestions and offer complementing goods. Moreover, many things may be tried on simultaneously by customers within the dressing room, which eliminates the need to change into and out of garments.In general, opinions of smart fitting rooms differ depending on how private, secure, and convenient each person perceives them to be. Businesses must put customers' security and privacy first while simultaneously figuring out how to make purchasing more convenient and customized.

1.1. Extending the smart fitting room

More features may be added to make smart changing areas even better. For instance, you could:

- Let buyers alter the lighting in the room so they can view how the clothes would seem in various circumstances.
- Provide it possible for a stylist to provide suggestions through a video conference.
- Make it possible for buyers to read product evaluations on screens rather than via mobile devices.
- Enable them to store products on their phone so they may decide later whether to buy them.

1.2. How this benefits customers

Let's examine a normal fitting room experience to comprehend why smart fitting rooms are so appealing to customers: 70% of clients must return to the fitting room more than once to try on clothing.

The client looks around the shop and chooses a few things to try on. They visit a fitting room where they learn that although some goods are fantastic, they need a different size or prefer a different hue. Or maybe they selected a product they adore, but they now want something else to complement it. The pleading "Honey, can you go and get me the blue one?" request from behind the curtain is one that many long-suffering spouses are acquainted with.

If the customer isn't accompanied by a cooperative companion, they must get dressed, gather their belongings, leave the changing area, place the unwanted items on a rack, browse again, and repeat the process until they find what they want. Of course, there is no guarantee that the size or color they want is actually in stock. When they return, if the changing rooms are crowded, they must wait for someone else to finish. Finally, they must wait in line to check out and pay. No one's shopping trip would be enjoyable or stress-free if it went like that. Families with children find it to be an even greater hardship. Customers get irate and leave, or they purchase things they didn't want and have to return them.

All of these sources of contention are resolved by an elegant fitting room.

It is aware of the products the consumer brought. Without having to leave the fitting room, the client may check availability from the screen and request that a different item be given to them if they wish to try on a different color or size. The same is true for related products: the screen may suggest appropriate apparel and accessories, and the consumer can request delivery of such goods as well. Customers may select to have an item delivered to their house if it is not available in-store; therefore it is not an issue.

When they're done, customers choose the products they wish to buy and make their payments within the dressing room rather than heading to a checkout.

In fact, a smart fitting room may go much farther to improve and customize the client experience across all channels. Customers may arrange their vacation in advance by using e-commerce and appointment scheduling. They may schedule a fitting room and choose from a variety of goods online. So that they are ready for the customer's arrival, the staff may get ready. When the client comes, they sign in, get directly to their fitting room, and may begin selecting clothing immediately.

- **"Smart" for the customer**

a. displays several product pairings
b. provides product suggestions
c. Check for article availability
d. displays the complete selection of articles for you to read
e. More data, videos, and social media integration
f. Adapting to the needs of the customer (Article-Bring-Service)
g. allows for the facilitation of digital purchases
h. Directly ordering or reserving goods
i. Various distribution methods (delivery to home address, from another store, etc.)

1.3. How do smart fitting rooms work?

A stylish changing room may serve a variety of functions. But it all began around ten years ago with RFID tags, which among other things make it possible to control the whole supply digitally.These self-adhesive labels using radio

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frequency technology make it easier for smart changing rooms to operate. Thanks to RFID tagging, the mirror in the changing area can identify every item that the client wishes to try on. As a result, using the screen, you may find recommended accessories to go with that outfit as well as alternative sizes and colors. When not in use, the screen may be used as a mirror or to show films and pictures.On the market, there are several varieties of smart fitting rooms. As a result, we may discuss, for instance, augmented reality and 3D technology-based virtual dressing rooms:

- They use software and a scanner to detect the person's shape.
- You may try on the chosen virtual clothing to see how you appear in them, and you can even snap a picture to save or share.
- Place the clothing in your online shopping basket, pay, and use a QR code to finish the transaction.

The capacity to translate text into several languages is one of the smart fitting rooms' additional features. By the way, there are no cameras in smart dressing rooms. Customers may be certain that their privacy is secured as a result.

1.4. Advantages of using smart fitting rooms in physical stores

The main advantageous features of smart fitting rooms—particularly for the customer—have been covered throughout this essay. The following benefits are seen from the brand or physical store's perspective:

- It enables you to stand out from the competition by providing a unique and tailored buying experience.
- Facilitates in-store client assistance.
- Provides in-depth information about the things the consumer decides to purchase, the materials and colors they like, and the clothing they choose. It can, for instance, calculate how long a customer spends at a shop.

The physical channel is able to catch up to e-commerce in terms of big data by collecting all of this information. By providing, for instance, individualized suggestions, it will be able to further develop the connection with the customer as a result of the analysis of this data. All of this is done to boost in-store sales and compete with online shopping as this sort of shopping experience combines the best of both the online and offline worlds with a very unique service.

Smart mirrors are being introduced outside of the fitting room since it is such a cutting-edge technology, allowing clients to virtually try on clothing.

2. LITERATURE REVIEW

Consumer experience (CE) is defined as "the sum of feelings, perceptions, and attitudes formed during the entire process of decision making through interaction with people, objects, processes, and environment" (Jain &Bagdare, 2009, p. 34). Shoppers experience upgrades all through their buying trip, including channel, gadget, and client exercises in the context of fitting (Grewal, Duty, and Kumar, 2009; Grewal, Roggeveen, and Nordfalt, 2017). In view of their mental and profound appraisals of the utilitarian and tangible perspectives and portions of the upgrades, buyers' encounters with these boosts might evoke either certain or negative responses (Schmitt, 2003; Velázquez, Blasco, Contr, and Saura, 2009). Regardless of the meaning of the client experience, there is relatively little consumer experience-related research on virtual fitting rooms (Smart fitting rooms).

Smart fitting rooms were first created and progressed to provide substitutes for the traditional physical fitting and to address the problem that online retailers have by not allowing customers to physically engage with the items. (Blazquez, 2014) Consumers are known to engage in cross-channel behaviors (such as web rooming and show rooming) throughout the purchasing process due to this inherent problem. (Flavian, Gurrea, &Orus,

2016)The pith of smart fitting rooms is that clients 'take a stab at' items on virtual models, which are straightforwardly recreated or by implication picked in view of clients' body estimations managed by clients themselves or procured through devices like body examining machines or camera-based innovation (Javornik et al., 2016; Kim & Forsythe, 2008). Given that customers now need a sophisticated and accurate means to judge fit, smart fitting rooms may significantly assist consumers by serving a practical purpose. (Blazquez, 2014) Fit is more difficult to study than metric sizes since it involves an emotional choice about what size someone thinks looks well on them rather than just evaluating the congruence of sizing. (Lee, Kim, & Fiore, 2010) Additionally, functional, aesthetic, and socio-psychological aspects may all have an impact on perceived fit. (Shin &Damhorst, 2017) Similarly, Shin and Chang (2017) discovered that there is confound between the genuine and seen body sizes of design purchasers, making it trying to survey fit. In this sense, smart fitting rooms' capacity to visually see fit and interact with items will greatly help customers' correct assessments of fit and size, especially in the online channel. (Gao et a., 2014). Consumer confidence may be increased by the improved functioning, which can also reduce the perceived dangers associated with online purchases. Additionally, it may make shopping at brick-and-mortar businesses more convenient for customers by removing the need for them to visit fitting rooms and physically try on the items. (Grieder et al., 2014; Javornik, 2016).In the meanwhile, Smart fitting rooms can provide customers a range of experiences across channels by using a number of tools, technical advancements, and complementing technologies. (Lee &Leonas, 2018)Smart fitting rooms might give clients fascinating and incorporated encounters by giving a scope of intuitive services, from picture extension and blend and-match frameworks to additional refined intelligent innovations like snap and-gather administration and social sharing framework. Additionally, by immersing customers in Smart fitting rooms, VFR may be a useful sensory tool for creating enjoyable and hedonic shopping experiences. (Lau & Lee, 2016; Merle et al., 2012) Prior studies suggested that users of Smart fitting rooms might have hedonic advantages through feeling positive emotions like enjoyment and pleasure as a result of utilizing the technology (Beck &Crié, 2018; Kim & Forsythe, 2008).

3. LIMITATIONS OF CURRENT IMPLEMENTATIONS

Retailers have already been experimenting with changing rooms that provide clients with extra services. Radio Frequency Identification (RFID) technology is used by some of these stores while others provide consumers barcode scanners to identify products. RFID automatically recognizes and tracks tags that are affixed to items using electromagnetic waves. For the robotized distinguishing proof of strategic units in upstream and behind the stage activities, the innovation is now broadly utilized in retail supply chains. Dissimilar to optical standardized tag examining, which just considers the ID of a solitary thing, RFID labels take into account the recognition of the quantity of items in a specific item class? Furthermore, RFID-based thing ID empowers for concurrent mass location of a few items and needn't bother with an immediate view between the tag and perused gear. Thiesse et al., Melià-Segu et al., and Wong et al. examine pilot projects involving RFID innovation in Smart Fitting Rooms. However, using RFID to such operations is difficult and prone to mistakes. This is due to the fact that there are a lot more moving things than there are regulated processes in different segments of the production network. The way that goods are moved, the unpredictability of client foot traffic, and poor shop layouts all add to the complexity. The majority of currently used systems depend on hardware-based strategies to address these problems. To ensure that main things inside the lodges are distinguished by the RFID frameworks, these procedures require the establishment of one RFID perused framework for each lodge as well as the arrangement of protecting measures, (for example, safeguarding paint and thick fitting room walls from floor to roof). Current implementations also have the limitation of only being able to identify all items inside them and being unable to discern between relevant products (such as those being worn at the time) also, others. (e.g., items that holds tight a coat snare). Retailers would undoubtedly benefit from having this information since it would, for instance, enable them to only provide suggestions for products that consumers are now intrigued.

4. SMART FITTING ROOM ARTIFACT DESCRIPTION

A smart dressing room is a cutting-edge, technologically advanced fitting room that offers clients a customized, interactive shopping experience. Modern changing rooms come with a variety of gadgets and features, including RFID readers, touchscreens, interactive mirrors, and cameras that take pictures and record information about the customer's preferences and physical characteristics.The dressing room can show details about the apparel, such as its material, size, and color, thanks to the RFID scanner that scans the tags on the garments. The interactive mirror, which often has a touch screen, enables the user to see how they look under various lighting conditions and attire. Also, students may choose various dress styles and colors to see how they might seem.The smart dressing room has cameras that can be used for face recognition or to take pictures of the consumer. These photographs may then be used to build a virtual wardrobe or propose complementary goods. Customers in certain modern dressing rooms may also adjust the lighting to see how the garments will appear in various lighting conditions with tailored suggestions and a quick method to try on garments, a smart dressing room leverages cutting-edge technology to improve the shopping experience for consumers. Moreover, it assists businesses in gathering information about consumer preferences and purchasing trends that may be utilized to enhance inventory control and marketing plans.

Figure 2: Three fitting room lodges and roof mounted RFID framework for testing

Table 1: Excellent data sample

EPC	Timestamp	RSSI	Doppler	Frequency	Power	Antenna
E28011606…	1465992659	-66.0	25.187	867.5	30.0	51
E28011606…	1465992660	-64.0	30.875	867.5	30.0	2

In view of the low-level RFID data accumulated by the equipment part, the main software part utilizes managed AI and probabilistic models to perceive products in specific lodges. Utilizing the indoor situating approach "Scene Investigation," which works out the area of articles by contrasting their ongoing estimations and "fingerprints" at different destinations, we first locate the positions of the tagged things. In order to do this, we use multiclass classification approaches, which call for segmenting the fitting room into framework fields and assembling preparing data for each field. Here, the quantity of framework fields indicates how many classes the data mining model took into account. To increase positioning accuracy, we take into account the design of the fitting room space and the features of the procedures there in a subsequent phase. The last option depends on the possibility that particular groupings of thing situations during a given time span are more plausible than others. The previous, for example, contains data on the area of fitting room walls. Clothing in evolving rooms (i.e., the dress perceived by the primary software part) is arranged by importance utilizing administered AI techniques in the second software part. To do this, we extricate highlights from the crude data that incorporate insights concerning noticed certifiable events. The highlights viable should be assembled utilizing information on the novel business process and are appropriately RFID-explicit. Models incorporate the amount of labels read, the RSSI values' standard deviation, or the middle of a label's Doppler recurrence changes during a specific timeframe.

5. CONCLUSION

Our preliminary analysis demonstrates that software-based methods may be used to address the present solutions' drawbacks. Without the use of shielding, our artifact can find things in cabins and arrange them according to how important they are to the consumer. We need to evaluate our ancient rarity in a few test settings pushing forward. Here, we wish to focus on confounded conditions, for example, huge quantities of purchasers and things inside the radio wires' understanding reach or different client development rates. Albeit first discoveries are empowering, we guess that further testing will introduce new challenges. Our main goal is to validate the viability of our strategy in practical settings.

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