IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
Impact Factor: 7.301
Volume 3, Issue 6, May 2023

Virtual Trial Room using AI and AR

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Abstract: The phrase refers to a Virtual Trial Room application that uses Augmented Reality (AR) and Artificial Intelligence (AI) to let users virtually try on clothing. The virtual garments are used to map or determine the user's dimensions or alignment. The lighting intensity of the clothing render is adjusted to fit ambient lighting conditions, and the clothing moves and folds realistically. By employing 2D clothing models in addition to 2D photos, the offered application outperforms comparable augmented reality applications.

Keywords: Augmented Reality, 2D image, Alignments of clothing, Machine Learning.

I. INTRODUCTION

1.1 BACKGROUND

Many customers have reported having a difficult time buying ready-made clothing from a high-end store, particularly during busy times like the weekends. It's a very terrible experience because of the long lines, various restrictions, and huge crowds. clients must wait for a long time since there are not enough trial rooms to accommodate the large number of clients, which ultimately causes discontent. The number of clothes that can be brought in for trial at one time is likewise limited for security considerations. Due to several visits from the shelves to the trial rooms, it extends the total amount of time spent shopping.

According to the boutique, smuggling clothing inside the trial room accounts for a significant portion of thefts. Additionally, they are unable to display to the customers the new inventory that is scheduled to arrive at the store in the upcoming days. We suggest a Virtual Trial Room as a solution to these issues.

The goal of this topic is to build an augmented reality changing room. Real-time body dimension tracking and accurate virtual clothing are needed for this. In contrast to the marker-based or picture feature-based tracking that is typically used in augmented reality applications, the Microsoft Kinect sensor is employed for pose tracking since it provides a more thorough and precise tracking of the user's pose [1]. We developed a collection of 2D models for the apparel that may be rendered into the environment. This project's main goal is to create a realistic user-virtual clothing interaction.

1.2 Relevance/Motivation

Most early programmes made an attempt to achieve this by superimposing a static image of clothing over a picture of the user taken with a camera or any other type of digital camera. However, the virtual trial chamber contained a range of options, from the most straightforward to others that were more in line with reality. In actuality, this is the primary driving force behind any augmented reality application. The alignment of clothes with the user and the realism of the clothing are the two primary areas in which the virtual trial room has advanced.

II. SPECIFICATIONS

2.1Problem Statement

In shopping malls due to crowd, there is also a restriction on the number of garments that can be taken at one instance of time for trial.

2.2 Hardware Requirements:

1. Processor - Intel i3/i5/i7
2. Speed - 1.1 GHz
3. RAM - 2 GB(min)

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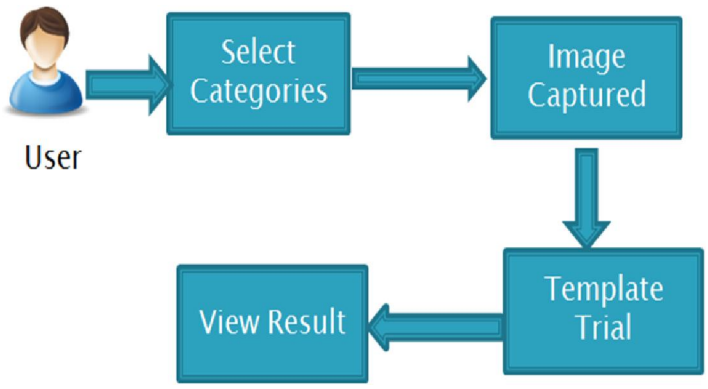
4. Hard Disk - 40 GB
5. Key Board - Standard Windows Keyboard
6. Mouse - Two or Three Button Mouse
7. Monitor - SVGA

2.3 Software Requirements:

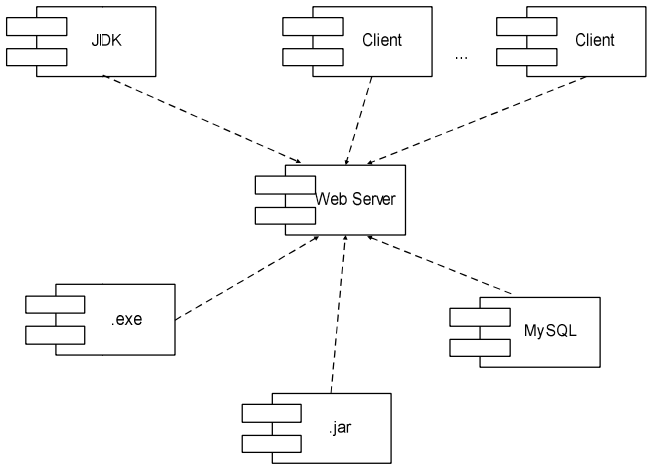
1. Operating System - Windows 7/8/10
2. Application Server - Apache Tomcat7/8/9
3. Front End - AWT ,Swing
4. Language - Java.
5. Database - My SQL
6. IDE - Eclipse

III. DESIGN

3.1 System Architecture



3.2 Software Component Diagram



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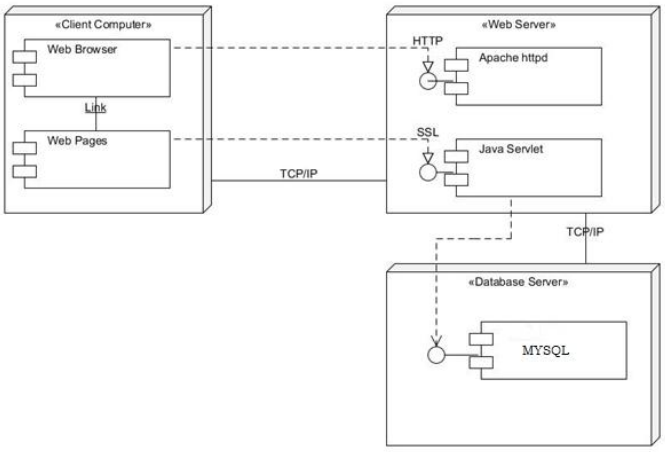
3.3 Deployment Diagram



IV. IMPLEMENTATION

4.1 Alignment of Clothing

You know you're out of alignment when you feel uneasy or ugly in your clothes. Instead of the opposite, the user's alignment was the main emphasis of the first Virtual Trial Room attempt. The only thing that was shown on the screen in this really basic application was a static representation of apparel. The user has to line himself with the image of the outfit in order to experience wearing it visually.

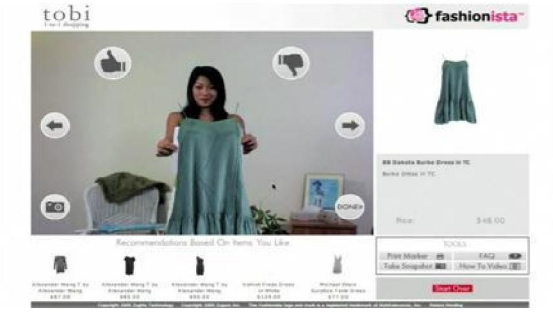


Fig. 2 - Depth sensing using markers

The location, rotation, and scale of the garment should be adjusted to the tracked user for a more suitable method of aligning the apparel. The ability to extract some 2D information from RGB photos using a standard camera was made possible by the user's usage of hand-held markers in combination with video tracking and image identification techniques. The marker was moved, as illustrated in Figure 2[9][12], to change the position, rotation, and scale.

4.2 Realism of Clothing

A virtual dressing room's main objective is to provide a realistic visual experience of putting on various outfits. In addition to the alignment of the clothing, the realism of the movement of the garment is crucial for creating a dressing experience. Regarding the type of cloth or clothing, different materials have varying patterns or gestures. Leather or silk, for instance, have different gestures. The initial iterations just had 2D static photos of the clothing. The only angle from which the garments could be viewed was from the front. A more realistic experience was offered by increasingly sophisticated dressing rooms, such the one made by FaceCake, where it was possible to turn around and view the apparel from various perspectives. The only interaction with the apparel is to change its location, rotation, and scale; otherwise, it remains static.

The present method of employing 2D photographs is constrained in a number of ways compared to our technique, which makes use of 2D models of clothing created using Blender [Figure 3]. The garment rotates in set intervals rather

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than smoothly since it is only captured from a select few angles, but a 2D model can be freely rotated. Additionally, 2D models can be used to simulate cloth, causing it to move and fold in response to the user's movements. This enables physical interaction between the user avatar and the virtual clothing, which is not possible with 2D photos.

FIG 3 - 2D MESH

V. RESULTS AND EVALUATIONS

5.1 Testing

Testing of project problem statement using generated test data (using mathematical models, GUI, Function testing principles, if any) selection and appropriate use of testing tools, testing of UML diagram's reliability.

Module-ID:-01

Modules to be tested:-Registration

1. Enter the case insensitive Username click on Submit button.
Expected: It should display error.
2. Enter the case sensitive Username click on Submit button.
Expected: It should accept.
3. Enter the case insensitive Password click on Submit button.
Expected: It should display error.
4. Enter the case sensitive Password click on Submit button.
Expected: It should accept.
5. Enter the case insensitive Mobile Number click on Submit button.
Expected: It should display error.
6. Enter the case sensitive Mobile Number click on Submit button.
Expected: It should accept.
7. Enter the wrong address and click on Submit button.
Expected: It should display error.
8. Enter the correct address and click on Submit button.
Expected: It should accept.

Test Case_ID	Description	Test case I/P	Actual Result	Expected result	Test case criteria (P/F)
101	Enter the case insensitive Username click on Submit button.	Username	Error comes	Error Should come	P
102	Enter the case sensitive Username click on Submit button.	Username	Accept	Accept Username	P

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201	Enter the case insensitive Password click on Submit button.	Password	Error comes	Error Should come	P
202	Enter the case sensitive Password click on Submit button	Password	Accept	Accept	P
301	Enter the case insensitive Mobile Number click on Submit button	Mobile Number	Error comes	Error Should come	P
302	Enter the case sensitive Mobile Number click on Submit button.	Mobile Number	Accept	Accept	P

Table1: Test Cases

Module-ID:-2

Modules to be tested:- Login

1. Enter the correct username and wrong password click on Submit button.

Expected: It should display error.

2. Enter the wrong username and correct password and click on Submit button.

Expected: It should display error.

3. Enter the correct username and password and click on Login button.

Expected: It should display welcome page.

4. After login with valid credentials click on back button.

Expected: The page should be expired.

5. After login with valid credentials copy the URL and paste in another browser.

Expected: It should not display the user's welcome page.

6. Check the password with Lower case and upper case.

Expected: Password should be case sensitive.

Test Case_ID	Description	Test case I/P	Actual Result	Expected result	Test case criteria (P/F)
001	Enter the correct username and wrong password click on Login button.	Username Password	Error comes	Error Should come	P
002	Enter the wrong username and correct password click onLogin button,	Username Password	Error comes	Error Should come	P
003	Enter the correct username and password and click on Login button.	Username Password	Accept	Accept	P

Table 2: Test Cases

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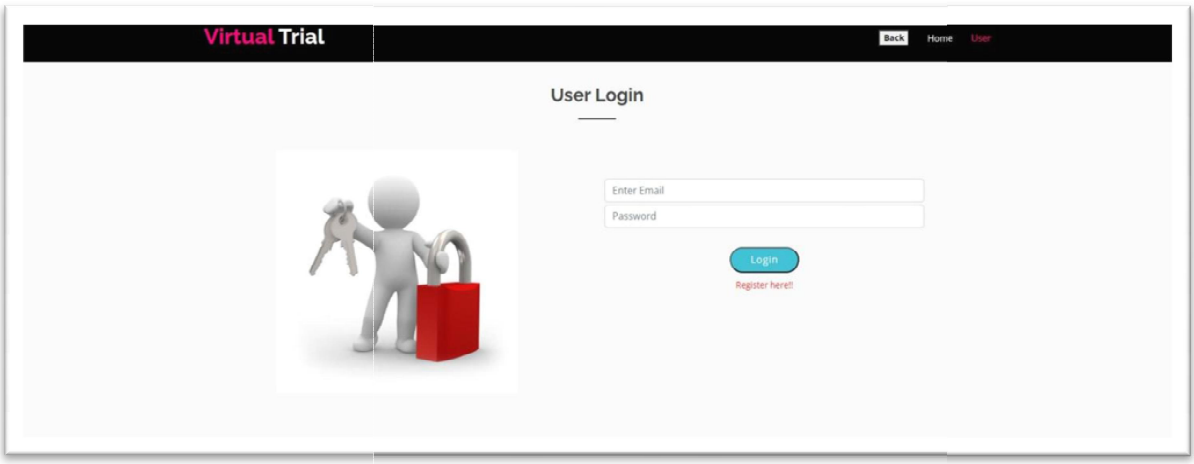
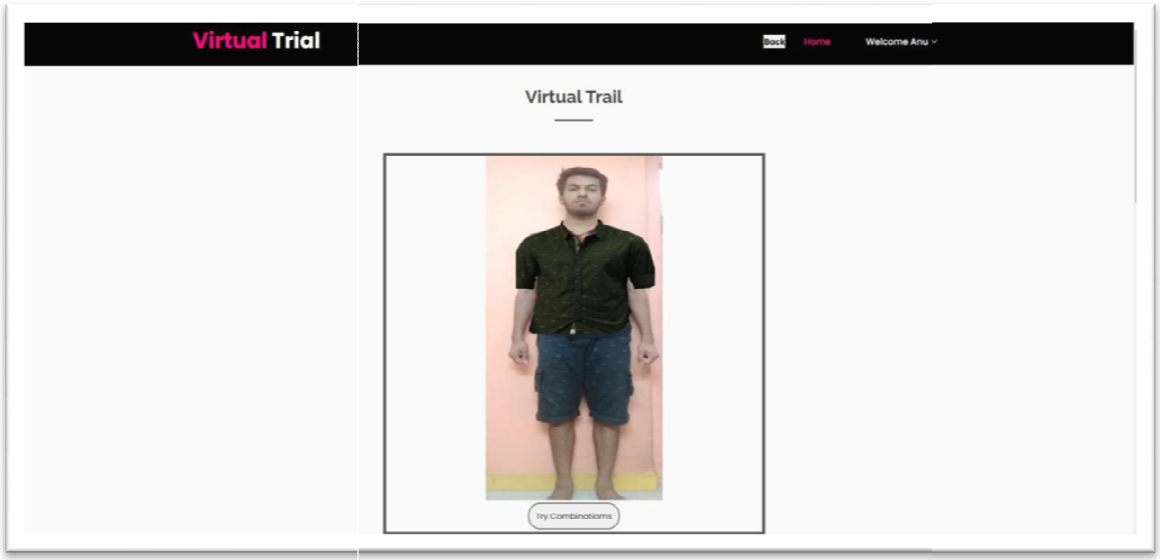
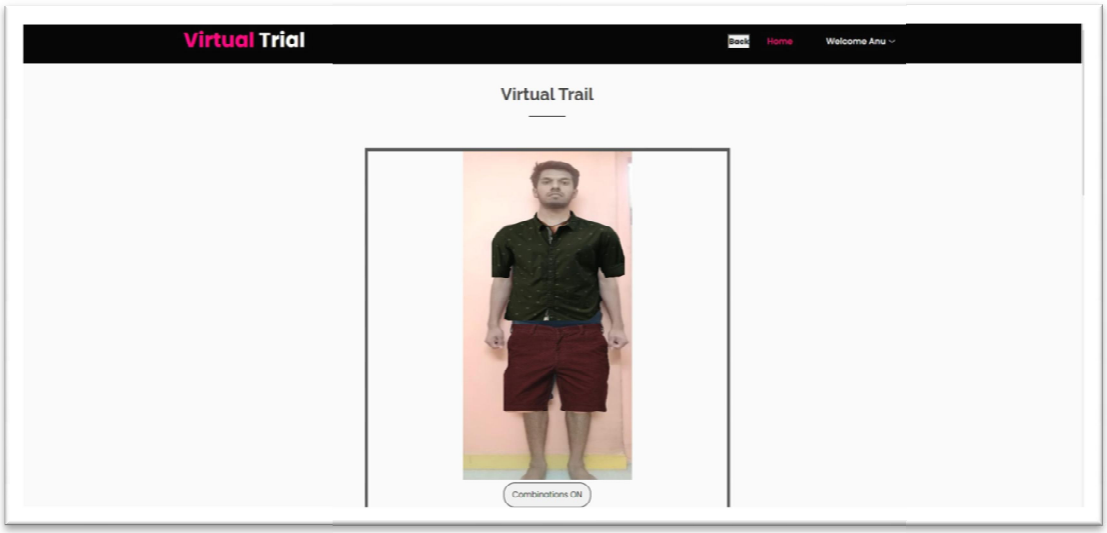
5.2 Output Screens



Login Page



Virtual Trial on a Male



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Combination Trial of Shirt and Pant

Virtual Trial on a Female

Combination Trial of T-Shirt and Pant

VI. CONCLUSION

The title specifies augmented reality application where in the users are made to try out clothing that is rendered on a screen over the image of the user. The lightning is adapted to match the intensity of the user's environment. The clothes are properly aligned according to the user's positions and movements. The system is an improvement to the existing system where the tracked user is able to try 2D clothes that include cloth simulation and can be viewed from different angles and react as real clothes.

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