Tailoring Management System using AR and 3D Modeling

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Abstract - *Almost 50 percent of the world population is using the internet and half of them are the urge of ready-made apparel has always been a charm in the industry. Virtual try-on of clothes has received much attention recently due to its commercial potential. In this paper, we present a mixed reality system for 3D virtual clothes try-on that enables a user to see herself wearing virtual clothes while looking at a mirror display, without taking off her actual clothes. The user can select various virtual clothes for trying-on. The system physically simulates the selected virtual clothes on the user's body in real-time and the user can see the virtual clothes fitting on the him/ her mirror image from various angles as he/ she moves. The major contribution of this paper is that we automatically customize an invisible (or partially visible) avatar based on the user's body size and the skin tone and use it for proper clothes fitting, alignment and clothes simulation in our virtual try-on system.*

Key Words: **Virtual Clothing, Interactive design, User Interface, apparel, Internet,3D-2D alignment, body customization, mixed reality, skin tone matching and Real-time cloth simulation, Virtual try-on.**

1. INTRODUCTION

Tailoring has been known to be dominated by unlearned people. The tailoring industry uses a traditional manual system to book their clients. The clients must go through a long and stressful process of getting their clothes stitched by traveling to the location of the tailor shop to get their measurements taken which are manually written on some piece of paper or on a book. Although this method is a huge threat to the information of the customer i.e. it can get lost or it can go through the hands of unauthorized people which can result in lack of data confidentially and integrity. Online tailoring management system will revolutionaries the system and solve these problems by automating the whole system and increase the accessibility irrespective of the customer's location provided they are connected to the internet facility. The custom-tailoring shop will be able to supply well fit clothing by using customization mode, but it has higher cost and lower productivity. Instead of manual measurements, body scan technology is being used to directly extract body measurements. However, such high cost equipment is unaffordable especially in ordinary enterprises. The obvious limitation is the privacy of client's body information. Therefore, proposed system is used as an online measurement app to take the customers body measurements.

2. LITERATURE SERVEY

2.1. Traditional Methods

For hundreds of years' people have depend upon the traditional method of sewing clothes Modern conveniences, such as interfacing and automatic buttonhole attachments, have made traditional sewing techniques optional for most garments. However, while the modern equivalent will get the job done in an acceptable manner, the results will never be equal: a properly hand sewn buttonhole will always look better than one created by machine. Online custom tailoring and then stitching by a tailor is the only solution to this problem.

In recent years, some interactive virtual try-on solutions using augmented reality technique have been reported A major challenging issue in pies the requirement of accurate pose recovery for fitting virtual clothes (or other accessories) on a user's physical structure.it provides an opportunity to dramatically increase the capabilities of virtual try-on solutions[2].Described an impressive virtual try-on system where a user's human model and cloth were reconstructed by deforming a SCAPE model [1] using a multiple-camera setup. The skeleton obtained from a Kinect camera is mapped to the SCAPE model so the model can follow the user's movements captured by the Kinect camera.

However, it is a time-consuming method and requires manual interventions to generate a 3Dmodel of a customer.

1) They have proposed a system that allows the user for trying-on various virtual clothes with one consumable RGB-D sensor [1].

As concluded from our user study, this system can help users to make their purchase decision without physically trying-on clothes [1].

2) Here automatically customize an invisible (or partially visible) avatar and use it for proper clothes fitting, alignment and clothes simulation.

This includes,

1. A body customization algorithm to modify the avatar based on the user's body sizes,

2. A method for adaptively matching the avatar's skin tone to the user's skin tone,

3. A method for robustly aligning the customized avatar with the user's physical structure.

2.2. The Proposed Try-On Scenarios

In this paper, they have presented three scenarios for virtual try-on of clothes, i.e.,

I.   Avatar Only (AO): virtual clothes on an avatar,

II. Dress Only (DO): virtual clothes on a user's physical structure,

III. Hybrid Version (HV): virtual clothes on an avatar blended with a user's physical structure,

If a user is a male or female, the system will show a male or female avatar model, correspondingly. Use a novel algorithm to properly align the 3D customized avatar with the user's image in real-time.

In the first scenario, they have removed the user's image from the screen and replace it with the clothed avatar.

In the second scenario, 3D virtual clothes [3] are augmented on the user's image without displaying the avatar.

In the third scenario, segment out the user's physical structure and replace it by a reconstructed background using pre-captured background image. Then the customized headless avatar wearing the virtual clothes is rendered on the screen. As a result, the user perceives his/ her look-alike avatar on the screen wearing virtual clothes.

In all three scenarios, the virtual clothes follow the user's movements, giving her a perception of trying-on virtual clothes in front of an actual mirror.

2.3. Body Customization

This system present a novel method to modify a generic avatar based on standard human body measurements for our virtual try-on system [1].Based on our experimental results, an accurate user's look-alike avatar can be created based on Twelve key human body measurements, i.e., height, shoulder width, bust girth, waist girth, hip girth, thigh girth, ankle girth, waist height, crotch height, knee height, upper arm length and forearm length.

Some of these measurements (such as height, shoulder width, waist height and arm lengths) can be obtained

directly from RGB-D sensor [1], and can be used to customize an avatar which is suitable for virtual try-on.

2.4. Skin-Tone Matching

According to the user's sizes, skin-tone matching is another requirement for creation of a look-alike avatar. This system uses the user's actual face skin color to adaptively change the avatar's body skin color. This system proposes a method to transfer the user's skin tone to the avatar, which consists of three steps.

In the first step, facial features are located using the active shape model (ASM) technique [1].

In the second step, proposed system uses piecewise linear curves to represent the cheek are a sand extract cheek patch.

Finally, this will apply a global color transfer method to shift the color of the face patches to the avatar body.

2.5. Aligning 3D Avatar With 2D User Images

In this system, the structure of the skeleton model obtained from an RGB-D camera [1]and the built-in skeleton structure of the avatar are not the same.

This is so, that other RGB-D cameras with different skeleton models can also be used in our system. To align the 3D avatar [2] with the user's body in every image sequence. The simplest way is to use the transformation matrix [1] that maps one joint from the avatar's skeleton (e.g., the center of the shoulders) to its corresponding joint from the RGB-D [1] camera skeleton. However, this solution is prone to misalignment errors for other body parts.

Parameters / Source/Apps	Login Module	3D Virtualization	Augmented/ Reality	Measurements	Notification Alert	Style/ Designing	SCAPE Module	Payment/ Billing
Tailor App	X	X	X	√	X	X	X	√
Tailor Master	X	X	X	√	X	X	X	√
Master Ji Tailor Online	√	X	X	√	√	√	X	√
TailorMate	√	X	X	√	√	√	X	X
The Mobile Tailor	X	X	√	√	√	√	X	X
Cambridge Tailor App	X	X	X	√	X	√	X	√
Tailor -Storing Cloth Measurement	X	X	X	√	X	X	X	X
MTailor	X	X	√	√	X	√	X	X
Tailor JSV	√	√	√	√	√	√	√	√

Chart 1-Taxonomy Chart

2.6 RELATED WORKS:

2.6.1 Tailor App:

This app is useful to keep all recorded of customer in just in user pocket, so every time when customer comes user can just press button and show recorded. This app is designed to help tailors and fashion designers organize task and optimize performance. Among other things, the software keeps records of all sewing tasks in a Tailoring shop.

2.6.2 Tailor Master:

Tailor master application is specially created for Tailor's who want to use customer register in android mobile instead of physical register books. The application gives an easy way to interact with customer detail.

2.6.3 Master Ji Tailor Online:

This app is custom crafted, bespoke tailoring application intended to offer quality sewed pieces of clothing, dress modifications, with guaranteed bother free fitting at moderate costs with free get and conveyance administrations.

2.6.4 TailorMate:

TailorMate app is CRM and Order Management solution designed for Tailoring Shops and Boutiques to manage orders in the Tailor Shop and Boutiques. TailorMate app has features like Order Management, Customer Management, Measurement Management, managing customer favorite Stitch Gallery, Reporting, Payments, Invoicing etc.

2.6.5 The Mobile Tailor:

Mobile Tailor is a commercial tailoring services company that offers direct tailoring to customers. Work with this team of skilled master tailors to bring custom tailoring services to the customer's door. They ensure the accuracy and quick turnaround of all these cuttings and sewing - from time to time. Consumer clothing reaches consumers within one to four weeks of fabric pickup.

2.6.6 Cambridge Tailor App:

This app can set the size of the area for women / gentlemen tailor at their convenience. Consumers collect measurements and bill receipts from bill number and date. Bijari, Nero Pants, as well as different souvenirs are made for each product. Depending on the amount of maintenance, profit, loss, account in each account, from one day to monthly / yearly.

2.6.7 Tailor - Storing Cloth Measurement:

This app is mainly created for communication between the Tailor and Customer. Here tailor fill about the customer details and cloth measurement in android mobile device.

2.6.8 Mtailor:

This app provides perfect fitting custom clothing. A user can measure 20% more accurately using a mobile device than a commercial teller in just 30 seconds. This app offers men's custom dress shirts, suits, blazers, pants, blue cotton knitwear, chinos, shorts and tees.

3. EXISTING SYSTEM:

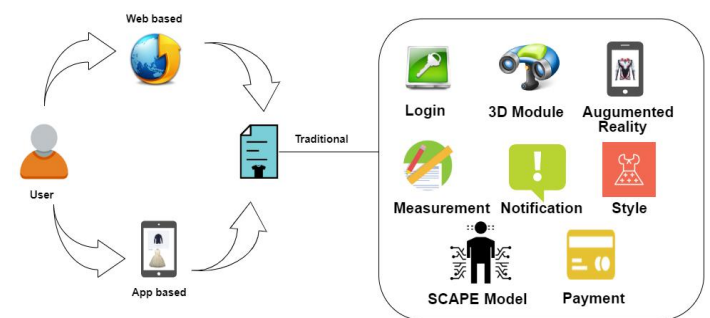Existing system provides us only Login module, Notification, Style module, Measurement and payment module.

Fig-1-Existing System Architecture
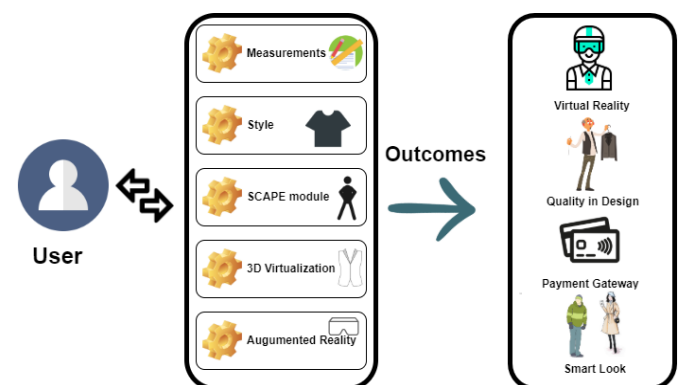
4. PROPOSED SYSTEM:

Fig-2-Proposed System Architecture

The proposed system is 3d virtual view are generated by using Augmented Reality (AR). The input of this application is users' different styles and thoughts.

4.1 Measurements

In the measurement module, Tailor take the measurements of the user or customer and stored it in Centimeter(cm) and Meter(m) format.

4.2 Style

This module taken input from customer or user. In the app different styles are available as per customer requirements they select different clothes styles and decide the styles.

4.3 SCAPE Model

SCAPE method (Shape Completion and Animation for People) is a data-driven method for building a human shape model that spans variation in both subject shape and pose. The method is based on a representation that incorporates both articulated and non-rigid deformations. They learn a pose deformation model that derives the non-rigid surface deformation as a function of the pose of the articulated skeleton. They also learn a separate model of variation based on body shape. These two models can be combined to produce 3D surface models with realistic muscle deformation for different people in different poses, when neither appear in the training set. They show how the model can be used for shape completion i.e. generating a complete surface mesh given a limited set of markers specifying the target shape. They present applications of shape completion to partial view completion and motion capture animation. In particular, our method is capable of constructing a high-quality animated surface model of a moving person, with realistic muscle deformation, using just a single static scan and a marker motion capture sequence of the person.

4.4 3D Virtualization

Nowadays digital 3D technologies are very powerful tools in many fields of application. Apparel industry has been adopting these technologies in order to optimize its design and fabrication processes. In this application this 3D virtualization module has been applied to try-on stages by using body scanners and are now foreseen for fitting of tailor-made garments. Virtual try-on consists of performing the registration of two 3D models: a physical structure on body and a garment model to try-on. Different methods of registration can be used, which have been well described in literature. The precision of the registration depends on the selected method. In the case where the old-fashion tailor-made work is involved, usually the tailor performs manual measurements using a measuring tape directly on the customer. Then a set of measurements is created and the tailor-made garment can be fabricated.

4.5 Augmented Reality

The augmented reality module (AR) is the interactive experience of a real-world environment where the objects are residing in the real world are enhanced by mobile-generated perceptual information. In the Augmented reality module is the natural environments or situations and offer perceptually enriched experiences, with the help of advanced AR technologies.

In this way the outcomes of the proposed application are the blueprint of virtual view of the physical structure of human body with various types of cloths as per customer requirement. There is an also provide the payment for easy online transaction.

5. CONCLUSION:

In this paper, we analyzed and offer a general view on 3D and AR based Tailoring App. Existing system were having only in traditional and distributed way. Our proposed system will overcome this, and user can have quality in design and smart look clothes with look and feel.

6. REFERENCES:

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