International Journal of Research in Advent Technology (E-ISSN: 2321-9637) Special Issue
National Conference "NCPCI-2016", 19 March 2016
Available online at www.ijrat.org

Virtual Try-0N System

Abrar I Shaikh,Suraj S Gaikwad,Ketan M Bhujbal ,Shruti S More and prof.S.E.Pawar
Department(IT),Trinity college of Engineering and Research
Email: abrar9503@gmail.com,surajgaikwad04@gmail.com

Abstract- Virtual try-on of different things such as shirts,pants,skirts etc has received much attention now a days due to its commercial potential. It can be used for various purposes such as online shopping or intelligent shopping to narrow down the selections to a very less number of designs and sizes. In this paper, we are presenting mixed reality system for 3D virtual clothes try-on that enables a user or shopper to see herself/himself wearing virtual clothes just by looking at a mirror display, without removing his/her actual clothes. The user can select multiple number of virtual clothes for trying-on. The system physically simulates the selected virtual clothes on the user's body in real-time which help the user to see virtual clothes fitting from multiple angles as he/she moves. The major contribution of this paper is that according to the user's body size and skin color we are automatically simulating the cloths on the user body .so that it can be used for proper alignment and fitting of the virtual cloths.

Index Terms- *body customization , skin color matching, mixed reality and real-time cloth simulation, virtual try-on*.

I. INTRODUCTION

P HYSICAL try-on of several clothes is an headache as well as its a time consuming procedure in retail shopping. It requires try-on of several clothes
before the shopper can make decision on color, design and
size of the apparel that satisfies him/her. Virtual try-on can be used
to speed-up the process as the shopper can see the clothes on
her/him body without actually wearing them, or narrow down her
selections before physical try-on. Furthermore, it can be useful to enhance
the user's shopping experience through new features, such as simultaneous
viewing of outfits from different angles and side-by-side comparison of various clothes .

In literature some earlier systems using image processing techniques have been reported. The system presented in [1] took a user's picture in minimum clothes and covered it with those segmented from a picture of a model wearing target clothes. Hilsmann and Eisert described a dynamic texture overlay method from monocular images for real-time visualization of garments in a virtual mirror environment [1]. In [2], fiducial markers were used to change the texture of a user's shirt. [4] presented a virtual clothing system, in which a user is scanned and registered to the system once, and then clothes can be simulated on the reconstructed model. In [3], a pre-generated 3D human model in target clothes was superimposed on a user's 2D picture.

In recent years, some interactive virtual try-on solutions which were using augmented reality technique have been reported. A major challenging issue in augmented reality based systems is the requirement of accurate pose recovery for proper fitting of virtual clothes (or other accessories) on a user's image [2], [11]. Today with the release of a new generation of sensing technologies capable of providing high quality videos of both depth and color, it[12] provides an opportunity to increase the capabilities of virtual try-on solutions. [13] described an impressive virtual try-on system where a user's cloth and human model were reconstructed by deforming a SCAPE [10] model using a multiple-camera setup. Next, 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. The main of this method is that the system enables a users to enjoy a private virtual try-on experience at their own homes. However, it is a time-consuming method and requires offline manual interventions to generate a 3Dmodel of a user.

II. PREVIOUSLY PROPOSED TRY-ON SCENARIOS

In paper[16],They presented three scenarios for virtual try-on of
clothes, i.e i) Dress Only (DO): virtual clothes on a user's image,
ii) Avatar Only (AO): virtual clothes on an avatar and iii)
Hybrid Version (HV): virtual clothes on an avatar blended with
a user's face image,fig 1shows respectively. If a user is a male or female, the system will show a male or female avatar model, correspondingly. Fig. 2 shows the architectures of these three scenarios. According to the user's body sizes and its skin color a generic 3D avatar is customized automatically and then it is matched to the user's face skin color.

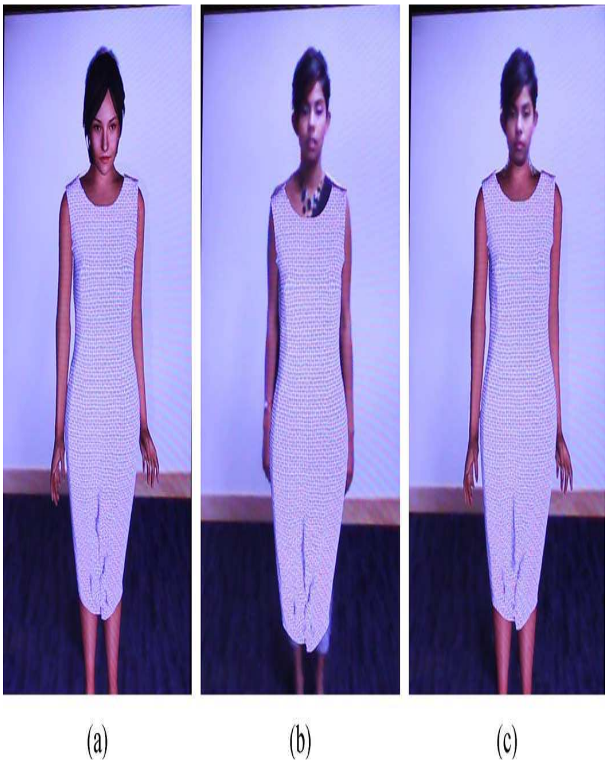


Fig .1

As in [5] they proposed three try-on scenarios: (a) Avatar Only (AO): virtual
clothes on an avatar, (b) Dress Only (DO): virtual clothes on a user's image,
and (c) Hybrid Version (HV): virtual clothes on an avatar blended with a user's
face image.

Then a novel algorithm is used to properly align the 3D customized avatar with the
user's image in real-time.In the first scenario, we remove
the user's image from the screen and replace it with the clothed
avatar. In the second version, without displaying the avatar 3D virtual clothes are augmented on the user's image. For the third
version, we first segment out the user's image below the neck
and replace it by a reconstructed background using a pre-captured
background image. Then the customized headless avatar
wearing the virtual clothes is rendered on the screen. As a result,
the user sees her look-alike avatar on the screen wearing
virtual clothes. In all three scenarios, the virtual clothes follow
the user's movements, giving him/ her a perception of trying-on virtual
clothes in front of an actual mirror.

[A]. BODY CUSTOMIZATION

In paper[16] Customization of avatar is a strong tool in simulation and modelling application.Instead of creating models with different sizes and shapes for a specific application,it is much time saving and efforts saving ,if a generic model can be modified as per the parameters.we present method to modify a generic avatar based on measurements for thier try-on system.They modified the avatar by scaling vertices locally and globally.This method is faster and is able to produce natural looking results.

[B]. SKIN-TONE MATCHING

Besides editing the mesh geometry according to the user's sizes,skin color matching is the another requirement for creating a lool alike avatar.In our method we are using the user's face skin color to adaptively change the avatar's body skin color.This transformation consist of three steps .In first step facial features are located using the active shape model(ASM)technique[26].In the second step,we are using piecewise linear curves represent the cheek areas and the extract cheep patches.finally we are applying global color transfering method[27] to shift the color of the avatar body face patches.

To capture face skin patches, one common technique is applied
for transfer the RGB images to YCbCr color space
and threshold the chrominance components. The pixels with
their chromatic value falling in a certain range are classified as
skin-color pixels. However, in most uncontrolled environments,
some background clothes or hair may have similar colors as
face. Moreover, the lips and the areas between eyebrows and
upper eyelids (or even the eyebrows in some cases) are easily
misclassified as skin areas which are not perfect skin patches to
be used for skin-tone transfer. Another problem in skin tone extraction
is that the appearance of skin is usually quite different
under different viewing and lighting conditions. Additionally,
due to different scattering properties of skin, cellular and 3D
topographic structure of the face, there are usually highlights in
the forehead, nose and chin areas.

[C].ALIGNING 3D AVATAR WITH 2D USER IMAGES

In a virtual system, accurate and proper alignment between a 3D clothed avatar

with a 2D user image stream is of very importance. In this paper, the structure of
the skeleton model is obtained from an RGB-D camera and the built-in skeleton
structure of the avatar are not the same , so that other RGB-D cameras with
different skeleton models can also be used in system. To align the 3D avatar with
the user's body in every frame, we need to estimate a projection matrix that
projects the avatar onto the user's image properly. The simplest way is to use the
transformation matrix that maps one joint from the avatar's skeleton (e.g., the
center of the shoulders) to its corresponding joint from the RGB-D camera
skeleton. In this section, in this paper propose an efficient method which can
properly align a 3D clothed avatar with a real user's image in real-time using an
RGB-D sensor (e.g., a Kinect camera in our system) as described below.

[I]. Initial Alignment

To robustly align a 3D life-size avatar with a user's 2D image sequence, here to
need to establish a sufficient set of 3D-2D point correspondences between the 3D
avatar model and the user's image in the current frame. However, automatic
initialization is necessary in a virtual try-on system. In paper, the user to stand and
look straight in front of a display in a standard pose at the beginning
for few seconds until the augmented clothed avatar is scaled properly and aligned
with her image on the screen. Then save this image as a keyframe in system that
will be used later for continuous body tracking and robust alignment.

[II]. Robust 3D-2D Alignment

To improve robustness and smooth the movements of the rendered clothes, it is
desirable to have more 3D-2D point correspondences for the current frame . In
system, we rely on silhouette contours and feature points to establish more 3D-2D
correspondences. Use the RGB-D camera to segment the user and extract the user
silhouette. To meet real-time performance, we only consider the contours of the
user's two shoulders. For the feature point correspondences, we need to establish
the 3D-2D correspondences in real-time between the keyframe and the current
frame . Use the keypoint recognition method , where matching is formulated as an
image classification problem. In this method, each class is trained with all the
possible appearances that an image feature may take under large perspective and
scale variations. The major advantage of the learning-based matching method is
that it is very fast and is therefore suitable for applications that require real-time
performance.

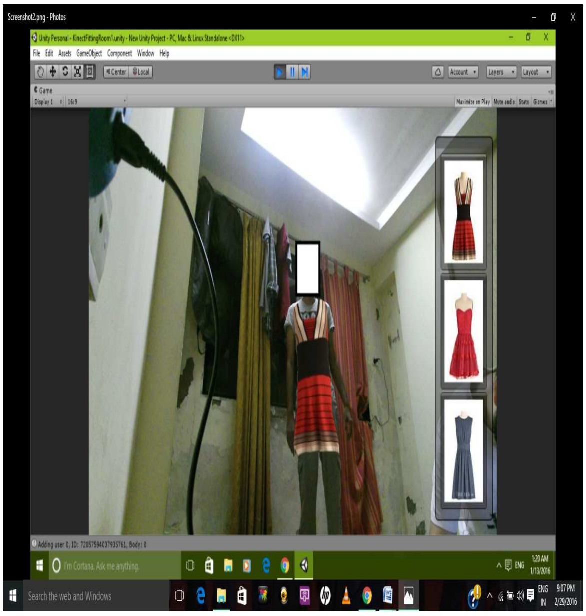
[III] IMPLEMENTATION

In this paper, we are implementing the virtual mirror by using kinect sensor ,speech recognition ,Google API for Upload / Download snaps or video .These Modules are used for the implementation for the Try_On system.

[A].User's Body Detection using Kinect Sensor

Kinect sensor camera is made of RGB camera .This Kinect camera is used for detecting the body parts, capturing the real time views ,it also used to recording the 360 degree video.Kinect camera is most used in Gaming . By using Kinect sensors its easy to detect the players physical movements in the game play system.

In our project we are using kinect sensor camera for detecting the user's body.
For detection of body parts user have to stand in T-pose. After this users's body parts are detected which is then used for cloth simulation of the user's body .User can now see how he/she looks in the clothes and they even can compare the clothes. Fig [3] show the system implemented by using Kinect sensor.



Fig[3].Use of Kinect Sensor

[B]. Speech recognition

This module is used to recognize the voice of user .It is used at client side.In this the user can give the commands to application.In this paper we are implementing the commands such as NEXT ,PRIVIOUS, TAKE SNAP .This commands are usually in voice .The application converts the voice command into text file .Then this text file is compared with the database and according the system gives its output such as NEXT command will give you the next cloth on user body.Similarly PREVIOUS command will stimulate the previous cloth which is the queue.Take snap command is used for taking a snap of the user along with the virtual cloths.We are using the google speech recognition API in our system.

[IV].ARCHITECTURE

The Architecture of the system is showed in the fig.[4] RGBD camera is used for real time input.RGBD camera detects the users body as well as it detects the user body parts.This inputs i.e users size,heght ,width are used by the application.Applicaton uses this input for measuring the body size.RGBD camera detects the users body in real time which helps for detecting users various poses.Google API's are used for detecting the voice command given by the user .The system converts the voice command in its appropriate text format .This text file is compared with the database .According to the result from database the cloths are virtually stimulated on the user's body

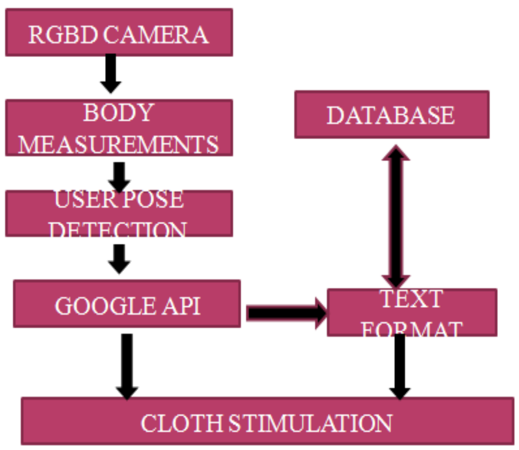


Fig.[4].Architecture

[V] CONCLUSION

In this paper, we described a mixed reality based virtual
clothes try-on system using one consumable RGB-D camera
(i.e Kinect). The major contribution of this paper was that we are implementing automatic virtual Try-on system . User's body size is used for proper clothes fitting, alignment and clothes simulation in our virtual try-on system. Google API's are used for voice recognisation .Hence it can be used to narrow down the selection process and to save time

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