Online Trial Room (OTR)

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ABSTRACT-Technology has been growing at a very rapid rate. Among all the developing technology in various fields, e-commerce has been one of the most rapidly improving field. The shoppers are now moving online for purchase of any item including accessories, clothes and many more. However, purchase of dresses are still being a dilemma for the purchaser of whether the dress will suit or if the size of the dress fits them correctly. The "Beauty Line" application provides an interactive and great platform for the purchaser to view the dresses on them and adjust the size according to them. The 2d image of the dresses are projected over purchaser using projection-based spatial augmented reality. The 2d images are fed as an input to the ray casting algorithm. The projected dresses adjust itself to the size of the purchaser in front of the camera. This is achieved using landmark identification and scape model. The body metrics of the purchaser standing in front of the camera is submitted to the vendor for exact size.

I INTRODUCTION

The enormous improvement in the digital phase has given a way to a new level of shopping. All in one environment in online shopping has given an added advantage to the shoppers'- Shopping has proven to be a great platform for textile industry. It is an intriguing field as people can find various attires that suits. Purchasing dresses online makes life easier for people. It provides various choices of attires under affordable price. They tend to sit in a place and order dresses of their choice, pay bills,etc. However, the major drawback of the online shopping is that the customers tend to be disappointed when the dresses don't suit them. It leads to waste of time and money. But customers remain doubtful and uncertainty about the purchase. Sometimes you can find good quality dresses shown up but find something else when delivered. This creates a perfect havoc. Our mobile application the"Beauty Line" provides a solution to this difficulty faced by the customers. It allows the purchaser to trial the dresses virtually. This helps them to check if the dress suits them or not. Apart from that the application assist them in calculating the body metrics of the purchaser standing in front of the camera.

II EXISTING SYSTEM

M Tailor Application:

It is mobile application which gives measurements of a person. We need to place the mobile phone on the floor, take a full video of the body. From the recorded video, under 30 seconds the machine learning algorithm measure 17 different points for clothes that are 20% more accurate than a professional tailor.

3D Virtual Trial Room:

This is a software based and is designed to be universally compatible as long as the system has a camera. An android application is integrated with the concept ofaugmented reality. There the proposed technology is augmenting thevirtual cloths on a user's static image and the whole application is dumped in an android phone. This application simply captures the image of a user. Later the user chooses a dress, then the dress is been displayed on the image of the user. The implementation of virtual trial room application is proposed with the usage of a sensor known as Kinect sensor which mainly takes the bone measurement of a person which is a way to determine the size of user's body on which the virtual cloth has to be augmented. OpenCV uses colour contrast-based differentiation of objects by detecting the pixels which reside on the boundaries where colours change values significantly, but this process can't be fully accurate as in real world scenarios, images can be difficult to analyze based on colour differentiation.

An implementation of Virtual Dressing Room for Low - End Smartphones:

A Virtual Dressing Room for Low-End Smartphones is presented here. The proposed system uses Euclidean distance measurement

algorithm. It involves capturing image of the subject or the personwho wishes to try out the apparel. Systems similar to this have are in use in the West. They involve the use of Augmented Reality. Considering the PPP, GDP, etc. pricing factors of India, it is more expensive to deploy similar systems here. Hence to overcome this problem we came up with the solution that will enable everyone who owns at least a smartphone to benefit from the system. Basically the user will take their own photograph. Give the measurement of the reference object and place the points on their shoulder/height in image taken by smartphone camera.

Disadvantages Of The Existing System:

- The existing system allows the user to take a picture of themselves and then the dresses are made to fit on them. That is, the system is not dynamic.
- The picture taken by the user will stay online and hence may not provide full security to the user.
- The risk of pictures getting exposed is higher in the existing system.
- The exact size of the person may not be identified with proper accuracy.

III PROPOSED SYSTEM

This project involves creating an android application for the online shopping customers. It provides a platform where the buyer can try the clothes and check if it fits them and suits them. This helps them to overcome the worries of whether the purchased cloth fit them or not. The person standing in front of the camera is analyzed. Initially the application allows the user to choose a dress. The person should stand in front of the camera. The chosen dress is projected on the person using SAR [12]. The body metrics of the person is calculated using landmark algorithm and silhouettes of the person. This is implemented using parametric method of estimating body shapes. Parametric method of body shape estimation is done using a set of dressed human. Using the database, training samples which contains human silhouettes of a dressed person, initial 3D landmarks and target 3D landmarks. The 3D body which is undressed is combined with the human silhouettes of the dressed person using effective feature descriptor. In order to make the initial landmark to match the target landmark, regression is used on the training datasets. The human silhouettes of the dressed person and initial set of landmarks are given as input in the training phase. we regress target 3D naked body with training results as guidance. The chosen dress is made to be fit using the landmarks using SCAPE model [06]. The body metrics which includes neck,waist,chest,sleeve is automatically updated into the database of the vendor after confirmation of the item from the user.

IV SYSTEM ARCHITECTURE

The application allows the user to select the dress which is to be trialed. The 2D image of the dress is projected using spatial augmented reality. The

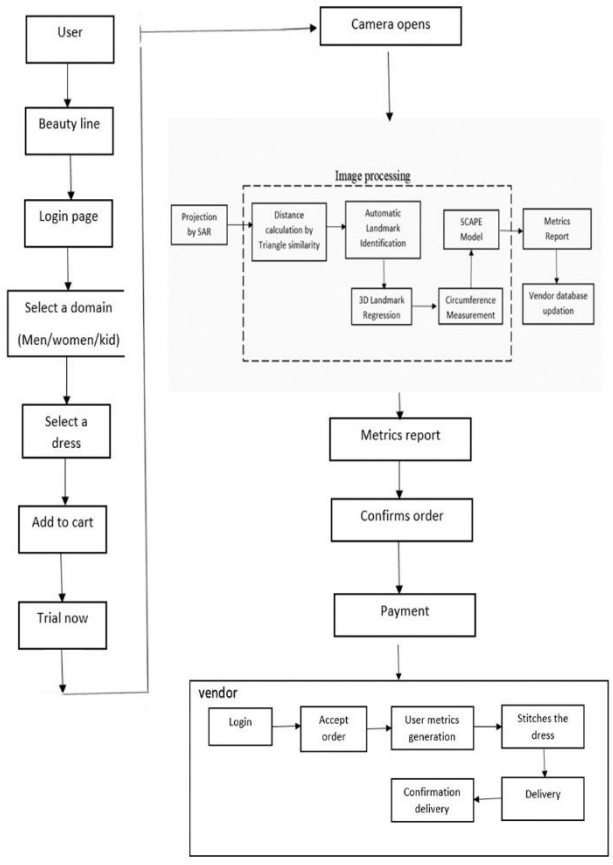

Fig 1: Block diagram of Online Trial Room

distance of the person from the camera is detected by triangular similarity formula. According to the distance the size differs. The size of the person is calculated by identifying landmark of the body parts. This is done using 3D landmark regression. Using the landmark, the circumference of neck,waist,hip and sleeve the dress is adjusted according to the landmarking of the body parts using SCAPE [6] model. These measurements are

generated and the database of the vendor is updated with the required sizes after the user confirms the item.

V WORKING OFTHEAPPLICATION

The user login into the application. once the login is done the users are viewed with dress choices. The user selects a dress and once the user presses the trial button they get directed to the camera.Theuser is supposed to stand in front of the camera such that their whole body is covered. As soon as the user sets the camera the distance of the user from the camera is calculated using triangular similarity.The distance between the camera and the user is calculated as the size varies as the distance varies.A user far away from the camera is seen to be smaller than a person near the camera.As a result there will be a large variation in the metrics due to the distance.The triangle similarity helps to alter the size correctly according to the distance of the user from the camera.Once the distance has been calculated the human body of the person standing is recognized.This is done using landmark identification. After the human body has been landmarked the dress is adjusted according to the landmark size. once the customer confirms the dress. The report generation of the body metrics are done. The vendor database consisting of information about the user gets updated with the size of the user automatically.

IMAGE PROCESSING:

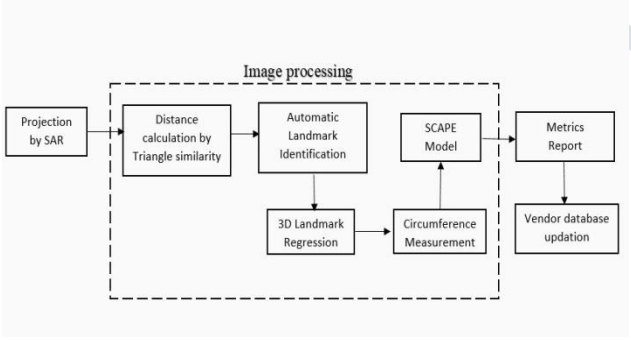

Fig 2: Image Processing

Once the camera has been opened, the human body is being identified using landmark identification. The body shapes are estimated using parametric method. The initial landmark and dressed human body silhouettes are trained. the testing samples are the data samples of human body without dress. The initial landmark is set on the person standing in front of the camera.The exact landmark is set using the testing samples.This is done by regression of the training set and testing set. The initial landmarks are combined with the undressed data samples and the target landmarking of human body is achieved.

MEASUREMENT

They take simultaneous pictures of person's front and side views. They analyzed 349 subjects (95 females and 254 males)The calibration of the cameras is performed using an algorithm developed by Tsai. They take simultaneous pictures of person's front and side views. They analyzed 349 subjects (95 females and 254 males) and the results were compared with those of trained anthropometrics. Six dimensions (stature, neck circumference, chest circumference, waist circumference, hip circumference and sleeve length) were selected because of their relevance to clothing sizing, which was the main purpose of their system. The neck circumference was taken at the Adam's apple perpendicular to the long axis of the neck, chest horizontally at the fullest part of the breast, and hip horizontally at the maximum protrusion of the buttock. The definitions for waist circumference were different: the traditional measurement of waist circumference was taken horizontally at the level of the navel, whereas the image-based system measured where individuals wear the belt of their trousers.

VI TECHNICAL DESCRIPTION

Software:

Spatial Augmented Reality:

Spatial Augmented reality uses Viewpoint Cursor, a technique for mapping 2D user input from devices such as mobile phones, trackballs, or computer mice, to 3D multi-projector spatial augmented reality systems. While the ubiquity of input devices such as these make them obvious choices for spatial augmented reality, their 2D nature makes them difficult to use. Existing VR

techniques rely on a display in front of the user's eyes on which to place virtual information. Immersive spatial augmented reality systems allow users to experience and interact with projected virtual information from any angle, using arbitrary placement of projectors. Viewpoint Cursor addresses these issues by mapping 2D input to a plane in front of the user's view. Ray casting is then used to find the 3D location for the cursor in the scene, which is then projected using the projection system. The user's position is tracked, with the input remapped accordingly, resulting in 2D input that matches what the user expects, regardless of their location.

Viewpoint cursor: Viewpoint Cursor works by remapping 2D input from input devices such as a touchpad to the point of view of the user. The user's position must be tracked in order to accomplish this. Viewpoint Cursor maintains a 2D Device Cursor and a 3D Scene Cursor. The 3D Scene Cursor is what the user sees projected in the environment. The 2D Device Cursor is used to maintain the mapping from the device to the user's viewpoint.

Controlling input: Input from the device is mapped to the Device Cursor on a viewpoint Plane in front of the user. This mapping onto the Viewpoint Plane ensures input to match what the user expects, based on their point of view. The Device Cursor initial position is in the centre of the user's view. However, the Scene Cursor does not appear until the user starts interacting with the system. The Scene Cursor is then placed in the scene. Both the user's position and orientation need to be tracked in order to maintain the Viewpoint Plane's position in front of the user. The user's position is provided directly by the tracking system. We have provided two ways of calculating the user's orientation.

Reverse Updates: This allows the user to freely move in the environment whilst keeping the cursor at a constant location. To prevent the cursor jumping to new locations, Viewpoint Cursor performs Reverse Updates as the user moves around in the environment and not interacting with the input device. Here, a ray is generated from the Scene Cursor's location, in the direction of the User. This ray is intersected against the Viewpoint Plane, and the Device Cursor's position is set to this new location.

Landmark Identification:

The training samples containing dressed-human silhouettes, initial 3Dlandmarks and target 3D landmarks[5]. An effective feature descriptor is proposedto combine 3D naked body landmarks with dressed-human silhouettes, andregressors are trained for guiding landmarks movements (from initial landmarksto target landmarks) according to dressed-human silhouettes with trainingsamples. In testing phase, given dressed-human silhouettes and a set of initiallandmarks as input, the targeted 3D naked body with training results asguidance is regressed. The regressed landmarks are used to constrain SCAPEmodel for body reconstruction.The body metrics of the person is calculated using landmark algorithm andsilhouettes of the person. This is implemented using parametric method ofestimating body shapes. Parametric method of body shape estimation is doneusing a set of dressed human. Using the database, training samples whichcontains human silhouettes of a dressed person, initial 3D landmarks and target3D landmarks. The 3D body which is undressed is combined with the humansilhouettes of the dressed person using effective feature descriptor. In order tomake the initial landmark to match the target landmark, regression is used onthe training datasets. The human silhouettes of the dressed person and initial setof landmarks are given as input in the training phase. we regress target 3D naked body with training results as guidance. The chosen dress is made to be fitusing the landmarks using SCAPE model. The body metrics which includesneck, waist, chest, sleeve is automatically updated into the database of thevendor after confirmation of the item from the user.

SCAPE (Shape Completion and Animation of People):

Graphics applications often require a complete surface model for rendering and animation. Obtaining a complete model of a particular person is often difficult or impossible[6]. Even when the person can be constrained to remain motionless inside of a Cyberware full body scanner, incomplete surface data is obtained due to occlusions. When the task is to obtain a 3D sequence of the person in motion, the situation can be even more difficult. Existing marker-based motion capture systems usually provide only sparse measurements at a small number of points on the surface. The desire is to map such sparse data into a fully animated 3D surface model. Range Scanning, Using a Cyberware WBX whole-body scanner the surface data is acquired. The scanner captures range scans from four directions simultaneously and the models contain about 200K points.

SOFTWARE REQUIREMENTS:

Android studio:

Android Studio is the officialintegrated development environment (IDE) for Google's Android operating system, built on JetBrains' IntelliJ IDEA software and designed specifically for Android development.It is available for download on Windows, macOS and Linux based operating systems. It is a replacement for the Eclipse Android Development Tools (ADT) as the primary IDE for native Android application development.

Project jupyter:

Project Jupyter is a non-profit created to "develop open-source software, open-standards, and services for interactive computing across dozens of programming languages". Spun-off from IPython in 2014 by Fernando Pérez, Project Jupyter supports execution environments in several dozen languages. Project Jupyter's name is a reference to the three core programming languages supported by Jupyter, whichare Julia, Python and R, and also an homage to Galileo's notebooksrecording the discovery of the moons of Jupiter.

VII INSTALLATION AND REQUIREMENTS

Matplotlib:

Matplotlib is a python library used to create 2D graphs and plots by using python scripts. It has a module named pyplot which makes things easy for plotting by providing feature to control line styles, font properties, formatting axes etc. It supports a very wide variety of graphs and plots namely - histogram, bar charts, power spectra, error charts etc. It is used along with NumPy to provide an environment that is an effective open source alternative for MatLab. It can also be used with graphics toolkits like PyQt and wxPython.

For importing matplotlib :from matplotlib import pyplot as plt

Python Numpy:

NumPy is a Python package which stands for 'Numerical Python'. It is a library consisting of multidimensional array objects and a collection of routines for processing of array. NumPy is often used along with packages like SciPy (Scientific Python) and Mat−plotlib (plotting library). This combination is widely used as a replacement for MatLab, a popular platform for technical computing. However, Python alternative to MatLab is now seen as a more modern and complete programming language.This project is implemented using cv2. CV2 python deals with images.

To import the cv2 python package :importcv2

Python Scipy:

The SciPy library of Python is built to work with NumPy arrays and provides many user-friendly and efficient numerical practices such as routines for numerical integration and optimization. Together, they run on all popular operating systems, are quick to install and are free of charge. NumPy and SciPy are easy to use, but powerful

enough to depend on by some of the world's leading scientists and engineers. In this project scipy Gaussian filter is imported in order to deal with random noise. key parameter is σ, which controls the extent of the kernel and consequently the degree of smoothing.

To import the Gaussian filter from SciPy:fromscipy.ndimage.filtersimportgaussian_filter

Caffee:

CAFFE (Convolutional Architecture for Fast Feature Embedding) is a deep learning framework; Caffe supports many different types of deep learning architectures geared towards image classification and image segmentation. It supports CNN, RCNN, LSTM and fully connected neural network designs.Caffe supports GPU- and CPU-based acceleration computational kernel libraries such as NVIDIA cuDNN and Intel MKL. Importing caffee:importcaffe

Hardware Reqirements:

Microsoft Windows 7/8/10 (32-bit or 64-bit)

- ·3 GB RAM minimum, 8 GB RAM recommended (plus 1 GB for the Android Emulator)
- 2 GB of available disk space minimum, 4 GB recommended (500 MB for IDE plus 1.5 GB for Android SDK and emulator system image)
- 1280 x 800 minimum screen resolution

VIII IMPLEMENTATION

MODULE DESCRIPTION:

User side:

- **Login:**Login module allows the user to create a new account if the user does not have an existing account or sign-in into the existing account.
- **Domain:** this module allows the user to choose on which domain the dress is to be chosen (men, women or kids)
- **Dress:** this module allows user to choose a dress of their choice and add it to the cart
- **Cart:** cart is a module which contains the list of dresses the user has chosen. The user can add or delete the dresses from the cart according to their choice.
- **Trial:** this module allows the user to trial the dresses chosen by the users. Trial module opens up the camera and projects the dresses over the user in such a way that the dress fits the customer
- **Size conformation:** The size of the user is generated automatically on to the vendor data base once confirmed by the user
- **Payment:** users pay for the chosen dress.

Vendor:

- **Login:** Allows the user to create a new account if the user does not have an existing account or sign-in into the existing account.
- **Accept request:** This module allows user to accept the request of purchase from the user.
- **Size view:** The vendor takes the values of the user metrics and makes the dress
- **Confirm delivery:** The vendor after delivery confirms the delivery of the dress.

CONCLUSION:

The online trial room will have a great impact on the future e-commerce industry. The “Beauty line” application will give a totally different experience for the customers to trail their clothes and purchase. This application will ensure a great digital advancement in the field of textiles giving a 100% satisfaction to the customers. The system can further be extended by implementing additional features such as dynamic suggestion of dresses using data analytics, direct update process via speech recognition.

REFERENCES:

[1] A Real-Time 2-D to 3-D Image Conversion Technique Using Computed Image Depth H. Murata, X Mori, S. Yamashita, A. Maenaka, S. Okada, K. Oyamada, S. Kishimoto Sanyo Electric Co., Ltd., Osaka, Japan.

[2] A Real Time 2D to 3D Image Conversion Techniques Miroslav NikolovGalabov.

[3] 7 Automatic human body feature extraction and personal size measurement-by TanXiaohui, PengXiaoyu,LiuLiwen.

[4] Find distance from camera to object/marker using Python and OpenCV by Adrian Rosebrock.

[5] Landmark automatic identification from three dimensional (3D) data by using Hidden MarkovModelJ.W. Niu ; X.H. Zheng ; M. Zhao ; N. Fan ; S.T. Ding.

[6] Building Statistical Shape Spaces for 3D Human Modeling Leonid Pishchulina,∗ , Stefanie Wuhrerb , Thomas Heltenc , Christian Theobalta , BerntSchielea.

[7] Development of Human Body Measurements Size System for Clothing-by Fadlelmoula Abd alla Hassan.

[8] Fast and Automatic Human Body Circular Measurement Based on A Single Kinect-by Nguyen-Luc Dao,TengDeng,Jianfei Cai.

[9] How to build an Augmented Reality Android App with ARCore and Android Studio-by Ayushjain.

[10] Augmented Reality in mobile devices-by Sneha KasettySudarshan.

[11] Measuring Accurate Body Parameters of Dressed Humans with Large-Scale Motion Using a Kinect Sensor-by Huanghao Xu, Yao Yu,* Yu Zhou,* Yang Li, and Sidan Du*.