International Engineering Journal For Research & Development
Vol.5
Issue 5
E-ISSN NO:-2349-0721
Impact factor : 6.549

SMART VIRTUAL FITTING ROOM

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ABSTRACT

The virtual fitting room is an application in which we can do simulation of trying-on clothes, it is like video game pf dressing room only in which we can check which cloth is suitable for particular individual, by placing it in front of the camera. It has the ability to make us experience the virtual feature of an application because of which we can check whether it is satisfying customer requirement before buying them. A virtual fitting room basically is an alternative of changing room. It does not need physical presence of shopper. It works virtually rather than physically. As there is greater demand of online shopping nowadays, this alternative will help the shopper in terms of size fit or style as well. A virtual fitting room will be very helpful for people who prefer online shopping and to people who don't too as it will diminish the need of going out and shopping for apparels. For online marketers, this will be very profitable to showcase their products.

***Keywords*—Face detection, Haar classifier, Viola jones, Thresholding, Virtual try-on ,2D model**

INTRODUCTION

It has been observed that in recent years there has been a growth in usage of web applications. There is no fall in growth since the last few years. There are many people access the web network for various purpose. One of them is for online shopping which is improving day by day. E-application helps the producers in market to their verities of products to different age groups and genders in the easiest way. This enables the customer to know more about the product in terms of availability, shape, size etc. It lessens the burden of travelling as it is a service which provides you your product at the door. One drawback the existing applications have is that people don't know how the garment will look on them. A virtual dressing room is here to overcome this drawback and give the comfort ability of online shopping of clothes to consumers.The method consider in this paper can enhance the shopping involvement; in this paper we will introduce a smart virtual fitting roomsoftware which serves a solution for the mansion features. The application is built on software which is replace output from the frame, extraction from image (render from webcam). If the person is standing in front of the camera, the person is able to select desire attire. Also, in the future we extend are application to recommend some clothing based on persons tone which suits on them. The selected garment is then virtually appearing with the for more realistic. A system built on Kinect sensor and HD (High definition) camera. “This work has been developed in Singapore April 2002 to achieve a believable try-on experience”. This sensor is built by Microsoft and they are very expensive which are replace by HD camera which built in RGB camera to provide more realistic and depth picture to customer and HD video of the customer. Virtual try-on system holds vertical tv, a Microsoft Kinect sensor, an HD camera and desktop computer.

HAAR CLASSIFIER

The specialty of a facial image of a person can be done in many wayslike rendering an image of the face from noticeable range using a web-cam. Visible light plays an important or key role in facial recognition in visible light system extract the middle section of the facial expression using large variety of cameras.

```
faces = face_cascade.detectMultiScale(gray, 1.3, 5)

for (a,b,m,n) in faces:

cv2.rectangle(img,(a,b),(a+m,b+n),(255,0,0),2)

roi_gray = gray[b:b+n, a:a+m]

roi_color = img[b:b+n, a:a+m]

 eyes = eye_cascade.detectMultiScale(roi_gray)

 for (ea, eb,em,en) in eyes

 cv2.rectangle(roi_color, (ea,eb),(ea+em,eb+en),(0,255,0),2)

 cv2.imshow('img',img)

 cv2.waitKey(0)

cv2.destroyAllWindows() [7]
```

The Haar classifier contains weight values of two or three rectangle, Left and right value and threshold value. Each and every rectangle holds four points which has coordinates (a, b) left and up point, width m, and Hight n.using these points integral pixel value will becalculated from the integral buffer image. Since the all fundamental pixel value are store in the fundamental image buffer, All the integral pixel value simultaneously accessible for calculating integral pixels points of the rectangle of the Haar classifier.It saves memory access time. viola and jones proposed a method called object detection which is very effective object detection method of Haar cascade classifier. The light and dark areas are decided bydissimilarity between the pixel groups withtwo or morecontiguous groups with a comparative dissimilarity form a Haar-like feature. Haar feature explore the size of the pixel group which can be easily scale by increasing and decreasing structure. This feature is allowed to detect objects of various sizes.

A. Cascade classifier

Paul Viola 2001and John Wilson 2005 has proposed a method called “object detection” which calculate a feature extremely rapid and systematic, Classifier are trained with the sample view of object (i.e. face and car) which is calls as positive value that are scale to the same size (40*40) and negative value arbitrary image of same size. After training classifiers, it can be applied to the area of interest of an image as input then the classifiers output as “1” if the if the area is mostly to show the object which is car and face, Otherwise “0”. To search an object from a whole image it will search all windows (24*24) and every location of classifiers. Uniquely highest probability sub-images are allowed in cascading of the classifier for all the features of Haar that are determine an object.

METHODOLOGY

A. User Interaction

A picture of face capture from image or video. To create an augmented reality environment extraction of user from image and separate the user area from the image moving to virtual environment in the user interface. once the camera provide image device is working, image is segmented from background from the user. The background is merge with RGBA image with segmented image

B. Grey scale converter

The model is place at top of layer. After the extracting image from the video/image software start working on it by doing the conversion of color image to greyscale image(24 bits) into greyscale values (8 bit) and then into RGB color. The luminance of the pixel value of a greyscale ranges from 0 to 255 shown in figure [1].By using following equation RGB color image is converted into gray scale image. Image description equation I,

$$f(x,y) \rightarrow \tau \rightarrow g(x,y) = \tau[f(x,y)] \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

The simplest of an image enhancement technique formula is,

$$s = T^{*}r \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Where,

T: Transformation that links the value of pixel

r: onto a pixel value, Let $r = f(x,y)$ s= $g(x,y)$, r and s denoted gray level of f and g at (x,y). Image negative technique of image transformation, the negative of an image gray level which lies in the range $[0, \quad L-1]$ obtain by the given expression, where image generally involve 256 gray level

$$s = (L-1) = r \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

$$s = 255 - r \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

C. Histogram equalization

This is a technique of adjusting image contras by modifying the intensity distribution of the histogram. It will assign the intensity value of the pixel in the input image.it improves contrast and obtain a consistent histogram. The number of pixels of an image are drawn by histogram which are vertical axis and horizontal i.e. luminance because the graph contains information represent as pixel of an image. In this manner we convert gray scale image to histogram equalization by using following equation:Consider gray scale image as (x), Let n number of gray levels i, the possibility of a contingency of a pixel of degree I in the image is [2],

$$p_{x\,(i)=p(x=i)} = \frac{ni}{n}, 0 \leq i < L \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5)$$

Where,

L: Collective level of grey scale image

n: Collective level of pixels in the image

$P_x(i)$: histogram of image for pixel propertyi, a series [0, 1]

$$cdf_x(i) = \sum_{j=0}^{i} p_x(j) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (6)$$

Take the transpose of the y=T(x) to create new image {y}, image have straight increasing outcome over the value range, i.e.

$$cdf_y(i) = iK \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

For persistent K,

$$cdf_{(y')=cdf_y(T(k))=cdf_x(k)} \quad \ldots\ldots\ldots\ldots\ldots\ldots (8)$$

Where, K is varied between [0, L], T maps the level which vary between [0, 1], process to plot the value inside their original range, the following result need to be applied.

$$y' = y.(\max\{x\} - \min\{x\} + \min\{x\}) \quad \ldots\ldots\ldots\ldots\ldots\ldots (9)$$

D. Augmented reality

To create augmented reality environment the system removing user area from the image and merge it into virtual environment in the user interface.

SYSTEM DESIGN

A. Face detection

The technology used to recognition of face is a technique of recognizing the human face. A biometric system recognized the face and the map facial features from a photograph or video. Face have some easily recognizable features that are pair of eyes, nose and a mouth through this it will able to detect the face in the real-time. Camera focus on persons face which is primary subject to focus within the window.

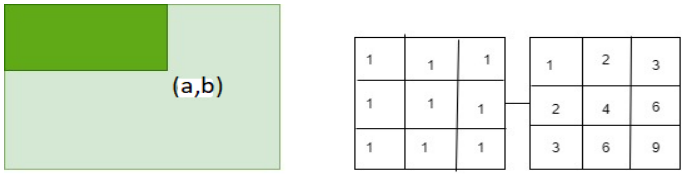

Figure1. Fundamental image generation.

The dark portiondenoted as the aggregate of the pixels till the point (a, b) of the image. Fundamental image representation is shown in the figure [1] which (4*4). Agraphical user interface which shows face of a person is in the rectangular portion of the original image. Normally, these user interface have a fixed size window (24×24 pixels). Graphical user interface are scales down to get the different sizes of the face. The algorithm watches the whole image of a user with this graphical user interface and indicatesevery individualportion a face of a person. In order to process the algorithm, it uses a fundamental image. Haar classifier classified each feature very efficiently.The stage comparator gets the output which is generated by Haar classifier. To determine the face, generated output by Haar classifier is used to calculate sum of the stage comparator and approximate this value with stage origin.

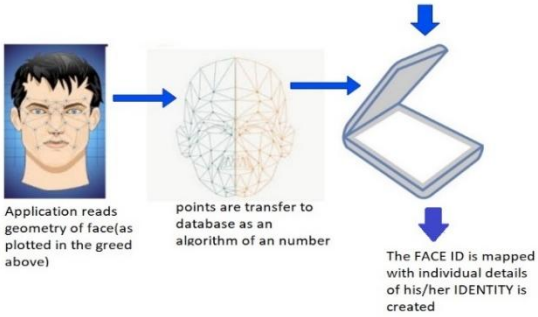

Figure2. Identification of face

SYSTEM ARCHITECTURE

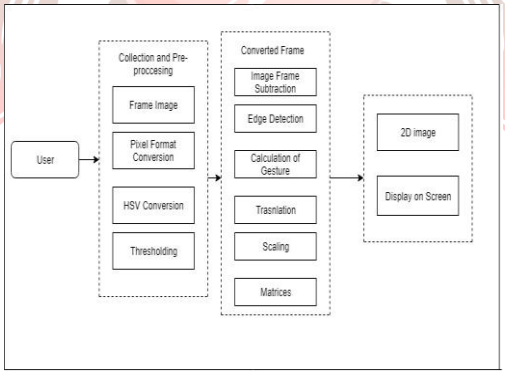

Figure 3. Architecture Diagram

The system architecture flows from user where user interact with the camera. Collection and pre-processing collect the data from user interaction which is image and then image is converted into frame by frame. After grabbing the images frame by frame, they converted into pixels to remove low contrast value. And then HSV (hue, saturation, value) which is used to remove the certain object which contain the high light intensity. These all frames are scaling down into specific value and calculated by matrices and display on the screen

PROPOSED SYSTEM

Initiated VFR is software based and design to be invariably compatible as long as the device has camera. The use of camera is cheapest alternative option to Kinect sensor and also with no extra hardware support is required. This system can use for the personal used also it provides real-time access as compare to other existing

VFR system. The system uses web camera to detect the human body. The body is divided into two part such as upper body and lower body, resizing of the image is done to superimpose the clothes image on the human body.

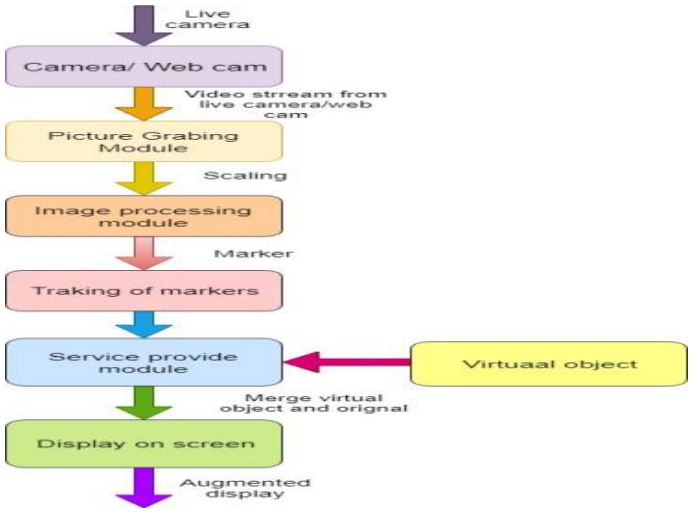

Figure4. Flowchart of system

1. Camera

A real-time video is getting capture as information(input) from web cam. Displaying the live video capturing from web cam is the reality in augmented reality.

2. Picture grabbing module

The live video feed from web cam which is used as input and give it to the picture taking module. The generated output will get analyses frame by frame and generate binary image. Typically,

Black and white color are used in this generated binary number. This binary numbers are provided as information(input) to image processing module.

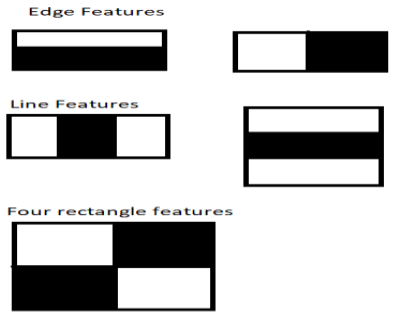

Figure5. Fundamental Picture

Each and every feature has single value. Which all pixels are subtracted from sum of the pixel from white rectangle to pixels above black rectangle. Rectangle contain white and black area which are pixels need to be added because each pixel has specific location and features for calculating each feature.

3. Image processing module

Using image processing technique binary image is forwarded to recognize AR marker. The place of a virtual object is determined by AR marker which plays key role. Once the AR Marker is recognized, location is providing to the tracking module as input.

4. Markers of Tracking

It calculates the real-time posture of camera. Six degree of freedom which is 2D location and object orientation is called as posture.

5. Service provide module

Service provide module has two input. One is for pose calculating from tracking module and the other one is augmented Virtual Object. Service module combine virtual object and original image calculate pose and fetch augmented image on the display of the computer screen.

CONCLUSION

There is various software are existing in the market in which the user has to adjust himself according to given image in the software that makes user worried and not flexible. In this, the software detects the human face automatically which makes the user more comfortable for usage. After detecting the face software capture the human body edges to take measurement of body to provide clothes according to given measurement. And also, the given jewelry is merge with given coordinates.This system is very helpful in e-shopping website which makes this software very reliable and efficient. Every e-shopping website can use this software for more customer satisfaction which makes user to buy more product according to their size and how the clothe look on them. It is an improvement to the existing application and also create a greater impact on success.

E-ISSN NO:2349-0721

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