Improve Virtual Shopping Experience using Augmented Reality and Gesturing

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Abstract:
The Internet has become an essential part of daily life, and companies realize that the Internet can be a shopping channel to reach existing and potential consumers. An online shopping system that permits a customer to submit online orders for items or services from a store that serves both walk-in customers and online customers. The online shopping system presents an online display of order cut off time and an associated delivery window for items selected by the customer. With this consensus Online Shopping as a whole has rapidly grown. The biggest surprise is that clothing is one of the top categories purchased online. In this project with the better interactive features in clothing websites will boom sales over the internet. Here, the customer will be provided with additional facility of determining the actual view by making him upload his photos in various angles and then matching the photos with clothes available, sorted as per his choices. Customer can also choose different range of wrist watches, glasses and see that it match them perfectly on their uploaded photo or not. In this project, the main aim is to demonstrate that with better interaction features in clothing web sites could improve sales. With the help of our project the customer will be able to view his choices on screen according to him and thereby can make better decisions.

Keywords: Augmented Reality, Hand Gestures, E-Shopping.

I. INTRODUCTION

A virtual dressing room is the online equivalent of the near-ubiquitous in-store changing room – that is, it enables shoppers to try on clothes check one or more of size, fit or style, but virtually rather than physically. Having begun to emerge from 2005, fit technologies started to widely report from 2010, but are now available from an increasing variety of providers and are in use by a growing number of prominent retailers in their web stores. A fit technology may categorize according to the problem that it resolves (size, fit or styling) or according to technological approach. Virtual dressing rooms for the fashion industry and digital entertainment applications aim at creating an image or a video of a user in which she wears different garments than in the real world. We suggest an approach that allows users who are captured by a set of cameras to be virtually dressed with previously recorded garments in 2D. By using image-based algorithms, we can bypass critical components of other systems, especially tracking based on skeleton models. We rather transfer the appearance of a garment from one user to another by image processing and image-based rendering. Using images of real garments allows for realistic rendering quality with high performance.

II. PROPOSED SYSTEM

The proposed System will provide the user with ability to virtually try various products in user environment. The user will be provided with the ability to explore products and its details with the help of gestures. By providing various modes of interaction to the users the user interface of the system is made very simple and interactive. In general the customer shopping will be divided into three main tasks:

[A] Searching various products from the database.

Interacting with user interface such as try various sizes of the product through gestures.

[B] Gathering the product information such price details to buy the product. In this System we provide the user with the virtual menu so user can interact with the system. The hand gestures are recognized through webcam and the function associated with gesture is selected.

III. SYSTEM ARCHITECTURE

We propose a system that includes hand detection and recognition and data is retrieved from the database as highlighted in Figure 1. Each user can easily use system, control the system, view the previous and next Product and all information regarding that product through augmented reality based gesture recognition. First user access Application GUI, the webcam will start the process of Hand detection and Recognition. User just need to use gesture access the system within the Application GUI, and when user performs gesture to choose the different options, the system acquires the information from database. After accessing all information from database, the required information is visible on the screen. The hand gesture movement captured by Webcam as video feed. From video feed, frames are captured and sent for processing. In processing all captured images are blurred for better detection and then images are converted into HSV colour model for obtaining accurate colour. Next thresholding for converting image into binary form (Black and white image) and the blob detection from images are carried out. From blobs, gesture is recognized. The last step is preprocessing for recognizing gestures and information regarding to product which user demands is made available to the user.
FLOW OF ALGORITHMS FOR HAND GESTURES DETECTION AND RECOGNITION:

A. Blurring

Blur an Image When Web camera grabs images of user, all images get blurred to reduce sharpening effects. By reducing sharpening effects we get more accurate detection. We split all RGB value separately and calculate the RGB average of surrounding pixels and assign this average value to it. Repeat this above step for each pixel and finally we get blurred images of Hand Gestures.

The flow steps of blurring an image are as follows:

- Step 1: Traverse through entire input image array.
- Step 2: Read each and every single pixel colour value (24-bit).
- Step 3: Split colour value into individual R, G and B 8-bit values.
- Step 4: Calculate RGB average of all surrounding pixels and assign this average value to it.
- Step 5: Repeat above step for each pixel.
- Step 6: Store new value at same location in output image.

B. RGB to HSV (Grey scale)

RGB to HSV (Grey Scale) Conversion, After blurring the images, all blurred images are converted into HSV (Hue, Saturation, Value) model. HSV is stronger model than RGB because it offers a more intuitive representation of the relationship between colours. HSV selects more specific colour. In HSV model value of ‘H’ and ‘S’ remain constant if the value of ‘V’ changes. So we get True colour value. The flow steps for conversion of RGB to grey scale image are as follows:

- Step 1: Traverse through entire input image array.
- Step 2: Read individual pixel colour value (24-bit).
- Step 3: Split colour value into individual R, G and B components.
- Step 4: Split colour value into individual R, G and B 8-bit values.
- Step 5: Calculate the grey scale component (8-bit) for given R, G and B pixels using a conversion formula.
- Step 6: Compose a 24-bit pixel value from 8-bit grey scale value.
- Step 7: Store the new value at same location in output.

C. Thresholding

Thresholding is the simplest method of image segmentation. From grey scale image, thresholding can be used create binary images i.e. image with only black or white colors. It is usually used for feature extraction where required features of image are converted to white and everything else to black. (or vice-versa). The flow steps for grey scale image thresholding are as follows:

- Step 1: Traverse through entire input image array.
- Step 2: Read individual pixel colour value (24-bit) and convert it into grey scale.
Step 3: Calculate the binary output pixel value (black or white) based on current threshold.

Step 4: Store the new value at same location on output image.

**Figure 5. Threshold image**

### D. Blob Detection

After getting 1 bit black and white binary image. We get white blob or black regions (blob), we will detect these regions. Detecting these blobs starting from the first line of image and finding groups of one or more white (or black) pixels. This Group of one or more white pixels are called line blobs. Find X, Y co-ordinates of each these blob. Repeat this sequence for next line. While you are collecting line blobs, check whether the line blobs that were checked before this current line and see if these blobs overlap each other. If so, you merge these line blobs by using their X and Y co-ordinates to one blob it will treat as whole blob. Repeat this for every line and you have collection of blobs.

**Figure 6. Blob Detection**

### E. Gesture Detection

The gesture-detection module tracks moving hand features by using Image Subtraction, which difference in images thereby identifies the motion, and determine which option button is selected. Then according gesture associated response is generated, which then communicates with Augmented Reality based application GUI.

**Figure 7. Gesture Detection**

### F. Cloth Image Overlapping Algorithm

Image pixels of selected cloths will be overwritten/overlaid on live video feed frame.

It consists of following steps:

Step 1: Read foreground image from file.
Step 2: Read background image from file.
Step 3: Call overlay Images method to place foreground image over the background image.
Step 4: Write the overlaid image back to file.

**Figure 8. Cloth overlapping**

### V. CONCLUSION

Traditional e-commerce systems have reached limitation that needs to be overcome, because they do not provide enough direct information for online shoppers, especially when they are shopping for products like clothing, shoes, jewelry and other decorative products. In this study, we developed AR e-commerce system. This system provides user-friendly interface which would interactively receive information and perform actions by hand gestures. At this particular time, Our system is built on standalone system but the system can be built on client server architecture. As future work we can enhance the speed of interaction as well as we can develop it for online shopping websites.

### VI. REFERENCES


