ONLINE SHOPPING WITH AUGMENTED REALITY

[1]RAHUL MOHAN, [2]INDRAJIT SAHA

[1,2]Department of Computer Engg., Sinhgad Institute of Technology, Lonavala, Pune, Maharashtra
E-mail: rahulmohan.0809@gmail.com, indrajitsaha0101@gmail.com

Abstract- Online shopping is the need of hour, and entailing it with the most effective and efficient ways to reach the people is the challenge in the cut-throat competitive market where, time and ease are the prominent factors to decide the best among the best. The proposed system has glued the advantages of the contemporaries on a common platform, eliminating the shortcomings and, adding extra user friendly and secured features to make the shopping never experienced before. The proposed system provides a virtual view option using an Innovative Face Detection based on Skin Color Segmentation to provide real time shopping experience sitting at home. It also makes use of true random number generation technique for generation of coupon codes, multiple payment gateways, different guest and user account with different access rights.

Index Terms- augmented reality, true random number generation, strategy, security

I. INTRODUCTION

E-commerce in the form of online shopping has become the trend where the holders are trying to catch the customers with as much functionalities, ease of access and better technical compatibility. There are still a lot of areas that should be checked and lot more that can be introduced to make the access more user-friendly. There are advantages and disadvantages that the various websites hold. This paper analyses the various aspects and emphasizes on diminishing the disadvantages and consolidating the advantages with added functionality that could revolutionize the online shopping business.

II. NEW FEATURES

To start with the changes, that should be put which wouldkeep the customer's interest involved and not to lose them just because of traversal of multipage checkout or slow internet connection. The choice of multiple payment gateways would allow the customer to choose the payment option as per the one they feel secured with [4] . A separate guest and signed-in customer with respective access rights would draw the customers who are not ready to part with their personal information and yet, willing to buy the things. There could be one more idea of keeping the customer interested. They should be provided with some questions that would infer their likes and dislikes at the time of sign in. Now, by maintaining the balanced ratio of three factors – I. record of categories from which the products are regularly purchased, II. Current trend in those categories and, III. Likes and dislikes list from "sign in" record. This would bring the customer's interest into buying even if they just come across the website. The major difference between online and go-to-shop shopping is the option of trying the products like clothes, apparel and to check if it suits on the individual or not. This gap can be bridged by providing them with the real time trying-on facility.

III. AUGMENTED REALITY

The very idea of bringing the augmented reality into picture is to make this a real time experience where, customer can see if the clothes or apparel they are going for, would fit on them or not.

The algorithm used in making this functionality is "An Innovative Face Detection Based on Skin Color Segmentation"[1]. The algorithm follows the following steps-

- Normalization-

First of all a standard skin color model is obtained by taking 32500 skin samples from 17 color images in the chromatic color space [1]. It is then passed through a low pass filter to remove the noise. Chromatic colors are defined by normalization process using

$r=R/(R+G+B)$

$b=B/(R+G+B)$ where,$r+g+b=1$

Thus, a skin color distribution can be represented by a Gaussian model N (m,c), where:

mean: $m=E\{x\}$ where $x=(r\ b)^T$

Covariance: $C= E\{(x-m)(x-m)^T\}$

- Gray scale conversion –

With the help of Gaussian fitted skin color model, the likelihood of a pixel to be a skin can be precisely predicted [1]. This is obtained using the following:

Likelihood $=P(r,b)=\exp[-0.5(x-m)^T C^{-1}(x-m)]$

Where:$x=(r,b)^r$.

This method is called gray scale conversion.

- Skin segmentation –

The precision and the probability of a pixel to be a skin can befurther increase by this method. To achieve this, an Adaptive Thresholding process is applied [1]. Initially a threshold is set and, the skin segmented region is separated from non-skin region. This value is further decreased to see the rate at which pixels belong to skin segmented region. After

a keen observation of the decreasing threshold, there is a point reached when the increase in segmented region will decrease to minimum and further change in the threshold would make the skin region increase with unexpected rise. This is called optimal threshold and the region obtained just before the optimal threshold is the skin segmented region. The skin segmented pixels are assigned with binary value 1 and to other with 0.

- Face region detection –

The next step is the labeling of skin pixels. A label is an integer value. If any of the neighbors had a label, the current pixel is labeled with that label. If notthen, a new label is used. The number of distinct labels gives count of regions in the segmented image [1]. Now, region is marked with hole count greater thanone. Next is to check height and width ratio of the image and match it with the standard 1.2 to 1.6. Then, match the image with the standard template face.

- Orientation –

The alignmentof the image is checked. Some of the images have a slight inclination[1]. The center of mass of the region is calculated as follows:

$$\bar{x} = \frac{1}{A}\sum_{i=1}^{n}\sum_{j=1}^{m} jB[i,j]$$

$$\bar{y} = \frac{1}{A}\sum_{i=1}^{n}\sum_{j=1}^{m} iB[i,j]$$

The deviation of the image from the normal is calculated using the formula as follows:

$\alpha=1/2\text{atanb}/(a-c)$

$$a = \sum_{i=1}^{n}\sum_{j=1}^{m} (x'_{ij})^2 B[i,j]$$

$$c = \sum_{i=1}^{n}\sum_{j=1}^{m} (y'_{ij})^2 B[i,j]$$

$$b = 2\sum_{i=1}^{n}\sum_{j=1}^{m} x'_{ij}x'_{ij}B[i,j]$$

Now, the image is rotated towards the axis, considering the center of mass by the angle α.

- Final face preparation –

The final step involves erosion followed by dilation. Erosion thins or shrinks the objects in the binary image while dilation grows or thickens the objects in the binary image[2].

After erosion and dilation, it is now possible to obtain the contour points from which, on travelling radially outwards, the hair can also be detected.The image obtained is finally mapped with the original image so as to obtain the entire face.

- Virtual view –

The customer is provided with the option of either presenting his/her physical measurements or to select the body type that best matches with his/her body type. The selected body type is mounted with the face and is presented with the clothing or apparel chosen. Thus, they can have the feel of real time purchase.

IV. TRUE RANDOM NUMBER GENERATION

Coupons have always been the eye catcher of the customer inan online shopping system. The generation of coupon codes is based on random number generation.Random number generation takes place through two methods true random number and pseudo random number generation.The proposed system generates random numbers with the help of system time in seconds and two alphabets from the upper case English alphabets thus, forming a total of 84600*26*26=57189600 coupon codes.Moreover, the system also provides the provision to generate coupon codes manually on desired dates for special occasions and festivals.

V. DESIGNING STRATEGY

The key is to keep the pages simple and functionally explicit. The home page should be such that it should draw the web surfers who just hang around with no idea of what to purchase [3]. The vivid and clear pages with the ease of understanding the functionality by the users make it more comprehensive and dynamic.

The product details should be simple and self-explanatory. Along with the common categories, there should be one with different sale and discount options. It draws the users and leads to the selling of those products at a good rate which, on normal category, hardly get noticed.

The availability of live chat with the customer is highly appreciated form of value added customer service. There should be a tab of “Store Finder”[5]. Some conservative customers only use website to choose the product and find the nearest store to buy from there.

VI. SECURITY ASPECT

The extremely secure privacy technology must be guaranteed by online shopping system, that is, four elements of internet security must be ensured: information transmission privacy, data exchange security, non-repudiation of sent information, certainty of traders[6]. Data security also refers to other technologies and knowledge, like firewall, intrusion, hacking, virus protection and information hiding. The encryption algorithm, using hashing function, should be MD5and SHA-1.

CONCLUSION

The online shopping system has become an indispensible part of the e-commerce world today. The investors, realizing this huge market, are always finding ways to improve the shopping experience of the customers and find innovative ways to lure them. The proposed system takes into consideration an important aspect of shopping that is self-trial. This will give a clear picture about the apparel he or she is going to buy and leave no ambiguity on how it will look on them irrespective of their body type. Also, more options to pay will provide ease and assurance about the money being spent. A lot more development can be done in the existing system by incorporating dynamic augmented reality i.e.the view of the customer varies in the virtual view as he or she moves in reality which is also the future scope of this system.

REFERENCES

[1] KamarulHawari Bin Ghazali, Jie Ma, Rui Xiao "An Innovative Face Detection Based on Skin Color Segmentation" 2011.

[2] AmitPillay, Ravi Mattani "Facial Feature Detection" 2009

[3] Hye Young Lee, Minwoo Lee, Moon-Gill Yoon "Website Development Strategy for e-Commerce Success" 2011

[4] J.W.Palmer "Website Usability, Design and Performance Metrics" 2007

[5] www.hongkiat.com/blog/10 essential things your e-commerce site should have.html

[6] Linna, GuangzhongLiu "On Data Security in E-commerce"EEEsym 2012

★★★