Interactive Mirror System based on Personal Purchase Information

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Abstract. Virtual fitting system is highlighted again in fashion field as digital signage emerged a major media, that is coordinates the clothes as on virtual avatars of customer. Due to such paradigm, especially virtual fitting systems that adopt the augmented reality method are researched currently. However now that the information on the products of the brands that adopt the system can be checked only, the coordination with other brands or other clothing products cannot be carried out. Therefore, in this paper, augmented reality-based interactive mirror system that is capable of coordinating the clothing products in person the customers want through non-marker-based augmented reality that uses the characteristics like dot, line, edge and texture, etc. generated naturally from the input image is suggested.

Keywords: Digital Signage, Augmented Reality, Virtual Fitting.

1 Introduction

Virtual fitting system is the system that coordinates the clothes that the customers want on their virtual avatars and it can be the representative interactive digital signage, and the virtual fitting systems that adopt the augmented reality method are researched currently[1].

However, now that the information on the products of the brands that adopt the system can be checked only, the coordination with other brands or other clothing products cannot be carried out.

And in order to coordinate the clothing product using the existing system, basic coordination knowledge or the information like recent fashion trends should be secured, but it is difficult to perform the proper coordination now that most of users do not possess appropriate coordination knowledge in general. Therefore, in this paper, augmented reality-based interactive mirror system that is capable of coordinating the clothing products in person the customers want through non-marker-based augmented reality that uses the characteristics like dot, line, edge and texture, etc. generated naturally from the input image is suggested.

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2 Interactive Mirror System based on Personal Purchase Information

Fig 1 shows a diagram of interactive mirror system based on personal purchase information.

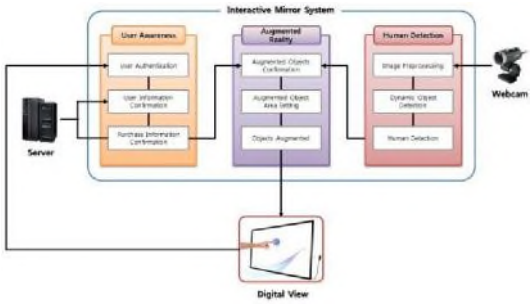

Fig. 1. Diagram of interactive mirror system based on personal purchase information

2.1 User Awareness Module

The system that this paper suggests produces the virtual coordination information of the users who connect in the order of the following figure to provide the personalized coordination information using the personal information of the users.

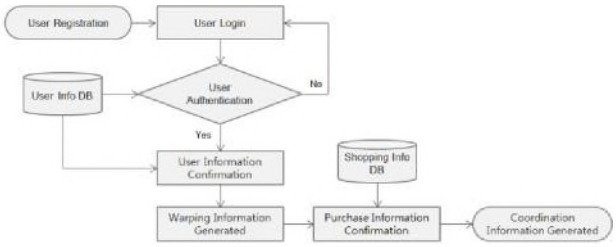

Fig. 2. Flowchart of user awareness

The users who connect to the system perform the user's registration through the subscription service prepared in web server, input the personal profile information and physical information and the registered users connect to the system through Digital View in shopping mall.

If the user connects to the system for correct matching between the user and the augmented object in output image, it produces the warping data with the augmented object for coordination working area through the physical information of the registered user.

If warping data is produced, it produces the appropriate coordination data for the user by checking shopping mall or the existing fashion item data that the user purchased and produces the augmented object for the existing fashion item.

2.2 Human Detection Module

In order to detect the man, the moving object should be extracted with priority. Therefore, in this paper, if coordination information is acquired through User Awareness Module, the candidate region of man would be extracted from the image input from web cam and set as ROI(Region of Interest) by using Gaussian Mixture Model[2] that extracts the moving object using the difference between the foreground of image and Gaussian distribution of background area.

It performs Histogram equalization on distributional direction of brightness against local area of ROI set by using HOG(Histogram of Oriented Gradient) and produces the feature vector for that and extracts a man by combining HOG feature vectors using Adaboost Classifiers shunt[3].

2.3 Augmented Reality Module

If the man is detected at Human Detection Module, it produces the virtual fitting model by augmenting fashion items in the order as following figure.

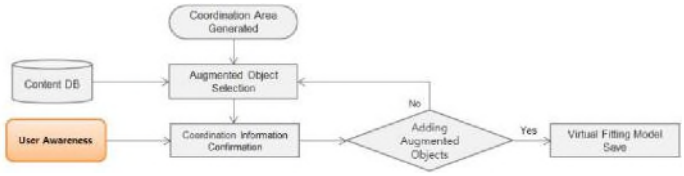

Fig. 3. Flowchart of augmented reality module

The outline of the man is become feature point in scale space is detected using DoG(Difference of Gaussian) and SIFT(Scale Invariant Feature Transform) algorithm from the extracted outline and the coordination area where the object will be augmented is set by recognizing standard physical features (head, upper and lower body, hands) of the man based on that. If coordination area is set, the user designates the fashion item to be augmented from fashion item list.

If the augmented object is selected, the detected feature point is regularized into the coordinates system in virtual space by estimating the distance between the coordination area and camera and change of pose through calibration method that initializes the size of article existed in specific distance from camera. The article in virtual space is produced in screen and object is augmented by performing projection transform on the regularized coordinates system in screen coordinates system finally.

If augments the object, it provides the recommended coordination data for the selected fashion item by checking coordination data acquired from User Awareness

Module and it enables to check if the existing fashion item that the user purchases can be matched with the selected item after implementing the additional augmentation[4]. If the user completes all fitting works by augmenting all fashion items, the completed virtual fitting model is saved.

3 Conclusion

In this paper, virtual reality-based interactive mirror system that provides the personalized coordination information was suggested to solve the problem of existing interactive mirror system that performs virtual coordination work. The users can carry out the virtual coordination work in person on the clothing product that they want through non-marker-based augmented reality. And it provides the basic coordination information about the personalized clothing product information and the selected product using purchasing information on the existing clothing product of the users and cloth trend information of the users.

But, in case of the suggested system, it is capable of performing fitting work by augmenting fashion item, but there is a problem it cannot be checked if the result of performing virtual coordination work goes well with other environment or not.

Therefore, the method that can check if the result of coordination goes well with virtual background space by setting virtual background through image synthesis method is willing to be studied later.

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