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Virtual Try of a Jewellery using Skin Classifiers

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ABSTRACT

The advancement in technology has increased the quest of automation among people. The government has also laid a bill on making the country smarter in terms of technology front. Making a city smarter is not only in terms of managing electricity, water resources and car parking but also includes the automated shops with the virtual view of things. Even a normal person should experience this advancement. The concept of smart city has influenced us to come up with the idea of virtual reality in the jewellery shops. This paper aims to provide virtual try-on of a jewellery in a real world. This provides customer satisfaction and reliability.

Keywords: Image Acquisition, Bayesian Classifier, Skin Classification, Augmented Reality.

1. INTRODUCTION

During festival seasons, jewellery shops will be too rush and the sellers will not be able to control the crowd. If two or more products demanded by the same customer the sellers will be not able to show the products for all. And also the jewellery may get damaged because customers will try wearing it. This should be avoided and even we should satisfy the customer's needs. So, Augmented Reality is used.

By using this, the jewel can be placed virtually. So, that we would be able to see how it look for us. Previously, it was done by using a marker[1]. Marker has many disadvantages such that it can be lost. Only, if the marker is present we would be able to see the view of the jewellery and many customers would not prefer this after some times. This virtual try on can be made more feasible and reliable to the user. It makes the user easy to access the application. Instead of markers, skin classifiers[5] can be used to detect the skin. Here we use Bayesian skin classifiers it uses probability to detect the skin pixel values and place the jewel virtually.

2. RELATED WORKS

In this paper we have discussed how the bangle looks virtually on our hand. The skin color of human begins various for every individual person. Generally there are two types of color one is the Indian color and other one is the American color. The hand is given as an input to the Bayesian classifier which detects the skin and non skin pixels.

2.1. Proposed Work

2.2.1. Dataset Collection

There will be set of images of ornaments (i.e. bangle in this case) at different angles which serves as a data set[1]. The data set can be obtained in two different types ways

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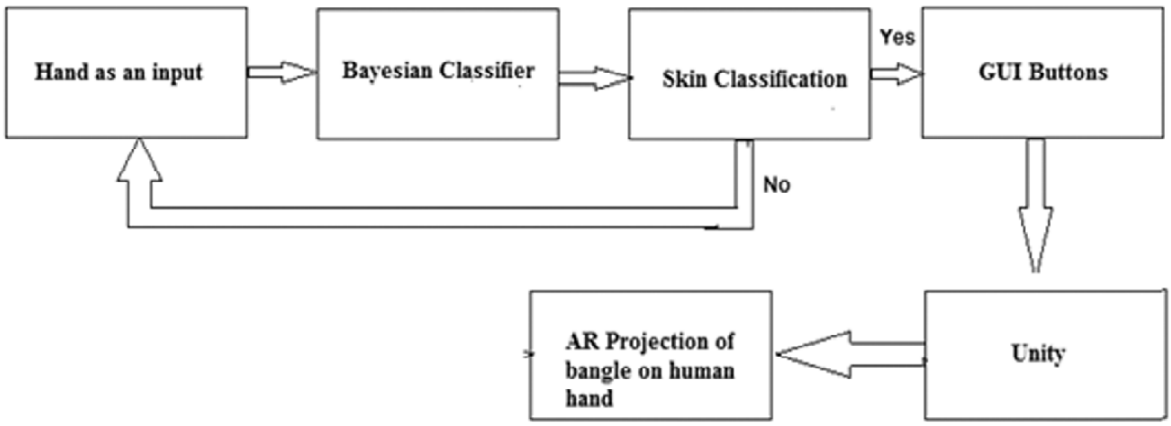

Figure 1: Proposed method

1. A camera is fixed on the table and a bangle is mounted on it.
2. To reduce the error we rotate the camera in a table which is fixed.

Then, images of the different designs of bangles are acquired at various angles. It is the data set to the images which is stored in the database.

2.2.2. Bayesian Classifiers and Skin Classification

The proposed method involves the skin detection using Bayesian method [5]which follows the probabilistic approach. The aim of this method [5]is to calculate the probability if the pixels present in the given region have hand color p(skin pixel| hand color).The mentioned term can be calculated using Bayes theorem

p(skin pixel| hand color) = (p(hand color| skin pixel) p(skin pixel))/ p(hand color) ———— (1)

Where,

p(skin pixel) – Probability of getting the color of a skin pixel

p(hand color) – probability of getting color of a pixel as hand color.

We must calculate the individual terms present in the above equation [i.e, p(hand color| skin pixel), p(skin pixel) & p(hand color)].

The probability of skin for each pixel is calculated and a threshold limit is set as usual from which skin map is created. Now, pixels having skin probability that are greater than the limit are considered as pixels of skin. Hence the term accuracy does not depend on the probability of skin p (skin color) because when the product of twice the p(skin color) is used rather than p(color), we use twice the product of limit value rather getting a similar output[5]. Calculating the probability of the skin is very difficult. T h e probability can be estimated by calculating the count of skin pixels present by total count of pixels in the overall training data. In cases[5] where, ratio between all the given images and the ones with the skin images does not equalize the ratio of those which have skin regions in the given dataset. Therefore the two parameters p(hand color| skin pi1xel) and p(hand color) are calculated. P(hand color%skin pixel) can be estimated by:

1. Create a set of data consisting of sample skin pixels
2. Find the ratio between the RGB color pixels to the pixel number in the given data to estimate the p(hand color|skin pixel) value.
3. For instance, we use the skin pixels in the given dataset of the compaq dataset to estimate p(hand color|skin pixel). Similarly we estimate p(hand color| 4 skin pixel) using the same method.

we calculate the p(hand color) by taking the ratio between the pixels in a particular color to the overall count of pixels when we the dataset is large enough. The following expression can be used which is as follows,

$$p(\text{hand color}) = p(\text{hand color}|\text{skin pixel})p(\text{skin pixel}) + p(\text{hand color}|\text{ non skin pixel})p(\text{non skin pixel}) \quad (2)$$

The p(hand color|skin pixel) depends upon the images which have the skin pixels whereas the p(hand color| non skin) depends on the images that is not a part of skin region.

The problem in this method:

1. We calculate p(skin) value.
2. Then, p(hand color|skin pixel) and p(hand color| 4 skin pixel) are calculated for two different data sets and combined. (2) holds good only when we calculate the probability on a specific input image . The final solution gives the creation of skin pixel region created as a part of overall data set.

2.2.3. Augmented Reality

The invention of 3d technology places an important role in today's technological growth. The 3 dimensional models is been implemented in real world using AR (Augmented Reality). The augmented reality is used in various applications such as virtual dressing rooms, virtual class room learning etc. The augmented reality can be implemented using software available. This can be used in both android and ios platform. After classifying the skin pixels, the bangle fits the hand it can be achieved using augmented reality. The particular design of an bangle can be selected using GUI buttons available.

2.2.4. Virtual Jewellery

This paper[5] mainly used to design to develop an 3D image of an jewellery which is displayed virtually on the real world. The people are very much interested in investing their money in jewels. They prefer wearing the jewels and see how it looks on them.

This may damage the jewel, to avoid this virtual try on of a jewellery can be implemented. This provides customer satisfaction and reliability to the customers. This can also be used to reduce the crowd in festival seasons. This can be achieved using Augmented Reality.

3. CONCLUSION

This paper has discussed about the algorithms and the techniques that can be used efficiently to achieve a Marker less method in the field of AR. The virtual jewellery when build as an application keeps the users at ease and gives a wholistic try of any jewellery of their choice. The future work of this project aims at creating a virtual room for all types of jewels that that would show the AR in the new dimension.

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