

# A Method For Trialing A Virtual Sari Before Physical Manufacturing

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**Abstract-** The objective of this work is to introduce image processing technique to promote handloom sector in all over the world. The main difference between handloom sari and meal sari is that individual handloom sari can be customized according to the user's choice but incase of meal sari, it is not possible to customize each individual sari. These customization properties have been focused in this work. The objective of this work is to design a virtual sari, so that user can see herself how she looks with that sari. If she satisfied with that sari trial then she gives the order with the specification and weaver will produce the specified sari.

**Index Terms**—Component, formatting, style, styling, insert.  
(key words)

## 1. INTRODUCTION

India has a rich cultural heritage of handloom industry and world famous workmanship of hand-woven textiles. The processing and manufacturing of textiles was the second largest occupation of India after agriculture [1]. India has the largest handlooms industry in the world. The handloom sector, with a long tradition of excellence in craftsmanship, not only plays an important role in preserving the country's heritage and culture, it also makes a major contribution to the economy. As per studies, it has been found out that the weaving industry of India provides employment to approximately 12.5 million people. There are 32,88,556 household looms, and 1,97,752 non-household looms in India. Over 38, 00,000 weaving industries have been built throughout India. It is estimated that the weaving industry in India will grow by 25% to over 35 million tons by the year 2010 [2]. Basically this work will be focused on the socio economic development in handloom sector in rural India. The goal of this work will be to increase the demand of "Sari" and create huge employment, so that poor weaver can earn more. To facilitate the weaver a survey is required. Survey on retail sari-shop reveals that lack of design is one of the cause of poor demand of sari. Here one GUI based application will be developed, where input is selection of a sari. Dealer will show the sari to the customer through this application. Then if customer satisfies with that sari then they give order for the sari. With this application if customer is not satisfied with that sari then they can change the color, create some new design on the sari and then place the order. Sometimes weaver make very costly sari and they give very hard labor on it.

Instead of this hard work sari would not sale for the customer satisfaction. It results misuse of money and labor. To reduce this kind of misuse virtual sari trailing may be very helpful before placing the order to the weaver. That means before making a high cost sari weaver took the confirmed permission from the dealer of sari so that from weavers perspective no wastage of labor and he/she would get the money. From dealers perspective they would sure profit form the customer.

## 2. DETAIL DESIGN

The entire work is divided into several steps like image Acquisition, Extract the color component, Find the hue enhancement of the image, conversion from color image to binary image and finally find the region of interest. It is shown in Figure 1.

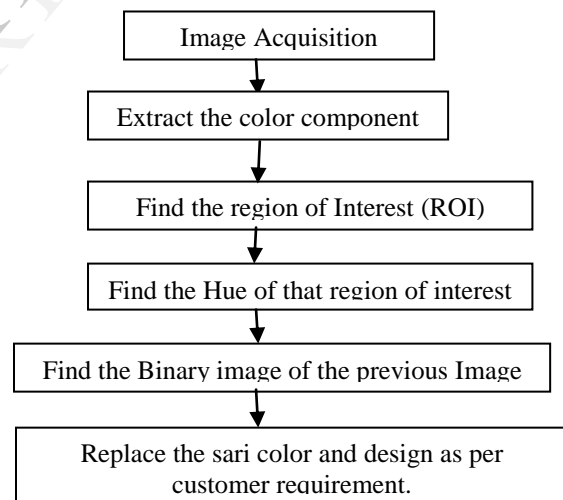


Fig 1: Block diagram of Entire Design

### a. IMAGE ACQUISITION

Image acquisition is the first step. Here some image of full sari has been collected to store in the computer for further use in BMP format.

### b. IMAGE ENHANCEMENT

The images obtained from the camera are not in good quality. Edge detection plays a major role in sari area

detection and segmentation so Laplacian Filter is used to sharpen the edges of the objects in the image.

The Laplacian gradient at a pixel position (x,y) is denoted by  $\nabla^2 f(x,y)$  and it is defined as.

$$\nabla^2 f(x,y) = \frac{\partial^2}{\partial x^2} f(x,y) + \frac{\partial^2}{\partial y^2} f(x,y) \quad (1)$$

This equation is applied on all points (x,y) of the image through convolution. The Laplacian filter is applied separately on Red, Green and Blue components of the colour images. After that the sari region is segmented from the sharpened colour image. The detection of sari area is discussed next.

### c. SEGMENTATION OF SARI REGION FROM BACKGROUND IMAGE

The row and column positions of small block in sari region have been supplied by the mouse pointer, to the main operational block. System analysis the value of red, green and blue components of that region and also determine the logic to highlight the sari region. The logic is to sort the values of average red, green and blue components of the selected block. Subtracted logic is equivalent to the difference between highest value component and the lowest value component.

Figure2 shows the input image. The sari region is bluish so blue component is the highest value. So it is extracted from the input image. It is shown in the figure3. Red component has the lowest value and it is also extracted from the input image. It is shown in the figure4. After extracting the blue and red component from the input image, the subtracted image has been calculated which highlights the exact sari region. It is shown in the figure5.



Fig2: Input Image



Fig3: Blue Component



Fig4: Red Component



Fig5: Extracted sari region.

Using threshold algorithm this subtracted image will be converted into binary image to obtain the sari region mask.

### Algorithm1: Threshold calculation Technique

Step1: Select an initial estimate for T (A suggested initial estimate is the mid point between the minimum and maximum and maximum intensity value in the input image)

Step2: Segment the image using T. This will produce two groups of pixels:  $G_1$  consisting of all pixels with intensity values  $\geq T$

And  $G_2$  consisting of pixels with values  $< T$ .

Step3: Compute the average intensity values  $\mu_1$  and  $\mu_2$  for the pixels in regions  $G_1$  and  $G_2$

Step4: Compute a new threshold value

$$T = (\mu_1 + \mu_2) / 2$$

Step5: Repeat steps2 through 4 until the difference in  $T$  successive iterations is the smaller than a predefined parameter  $T_0$ .

After that only sari region is extracted by multiplying to obtain mask and original colour image. This is shown in figure6.



Fig6: Binary Image (Used as a mask)

#### d. CHANGE THE SARI COLOUR ACCORDING TO USER CHOICE.

Sari shaded colour changes for folding and light direction so it is not so easy to detect and change a sari colour form RGB colour format. HIS colour format is used to resolve the un-uniform light intensity problem. Where H stands for Hue i.e. Pure colour, S for saturation, i.e. the degree by which the pure colour is diluted using white light and I for intensity i.e. Gray level. Calculate hue value of all pixel of the sari regions by applying Eq2 and store that values into a vector namely colour\_vector. Algo2 is used to change the sari colour.

$$H = \begin{cases} \theta & \text{if } B \leq G \\ 360^\circ - \theta & \text{otherwise} \end{cases} \quad (2)$$

Where,

$$\theta = \cos^{-1} \left\{ \frac{\frac{1}{2}[(R - G) + (R - B)]}{\sqrt{[(R - G)(R - G) + (R - B)(G - B)]}} \right\}$$

$$S = 1 - \frac{3}{(R + G + B)} [\min(R, G, B)] \quad (3)$$

$$I = \frac{1}{3}(R + G + B) \quad (4)$$

Where RGB stands for red, green and blue and makes up onscreen colour. RGB code has 24 bits format (bits 0..23).

#### Algorithm2: Is used to change the sari color.

Step1: Find the maximum, minimum and mean of the hue value from colour\_vector and store them into maximum\_colour, minimum\_colour and average\_colour respectively.

Step2: convert the entire RGB colour image into HIS colour image and store them in sari\_HSI 3D matrix.

Step3: Determine the hue value of new sari. And store it into new\_hue.

Step4: value\_to\_be\_added = average\_colour - new\_hue

Step5: For i=1 to row\_no\_sari - HIS

For j=1 to col\_no\_sari - HIS

If (sari - HIS[1][j][1] <= maximum\_colour AND

Sari - HIS[i][j][1] >= minimum\_colour)

then

New\_Sari-HIS[i][j][1]=sari-HIS[i][j][1]+value\_to\_be\_added

New\_Sari-HIS[i][j][2]=sari-HIS[i][j][2]+value\_to\_be\_added

New\_Sari-HIS[i][j][3]=sari-HIS[i][j][3]+value\_to\_be\_added

Else

New\_Sari-HIS[i][j][1]=sari-HIS[i][j][1]

New\_Sari-HIS[i][j][2]=sari-HIS[i][j][2]

New\_Sari-HIS[i][j][3]=sari-HIS[i][j][3]

End If

End For

End For

Step6: Stop

#### e. RECONSTRUCT THE RGB IMAGE FROM HIS IMAGE

RGB image reconstruction is required to show the image and calculate thread coloring process.

Eq 5 to

#### Algorithm3: Converting colors from HSI to RGB

Step1 Consider the values of HSI in the interval [0; 1]

H should be multiplied by 360 (or 2Pi) to recover the angle; further computation is based on the value of H

$$\text{RG sector } - 0^\circ \leq H < 120^\circ \quad (5)$$

$$B = I(1 - S)$$

$$R = I \left[ 1 + \frac{S \cos H}{\cos(60^\circ - H)} \right]$$

$$G = 3I - (R + B)$$

$$\text{GB sector } 120^\circ \leq H < 240^\circ \quad (6)$$

$$H' = H - 120^\circ$$

$$R = I(1 - S)$$

$$G = I \left[ 1 + \frac{S \cos H'}{\cos(60^\circ - H')} \right]$$

$$B = 3I - (R + G)$$

$$\text{BR sector } 240^\circ \leq H < 360^\circ \quad (7)$$

$$H' = H - 240^\circ$$

$$G = I(1 - S)$$

$$B = I \left[ 1 + \frac{S \cos H'}{\cos(60^\circ - H')} \right]$$

$$R = 3I - (G + B)$$

### 3. SIMULATION AND RESULTS

For simulation MatLab is used. For the particular sensed image shown in fig 2 the result is correct. And it is shown in fig 7 to figure 11



Fig7



Fig8



Fig9 (Another Example)



Fig10 (Another Example)

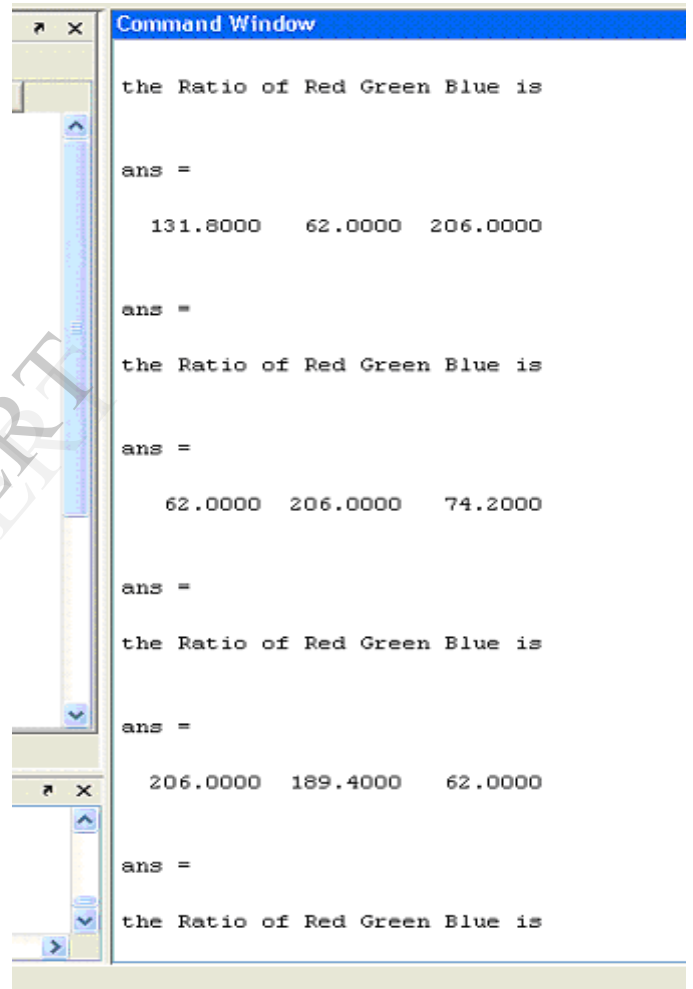


Fig11

#### 4. CONCLUSIONS

India has the largest handlooms industry in the world. The handloom sector, with a long tradition of excellence in craftsmanship, not only plays an important role in preserving the country's heritage and culture, it also makes a major contribution to the economy. The objective of this work is to design a virtual sari through image processing method.

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