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A METHOD FOR DISPLAYING AND MODIFYING IMAGES OF HAIR COLOR

Field of the Invention

[001] The present invention generally relates to the displaying and modifying of images of hair color. In particular, the invention relates to a method for displaying and modifying digital images of hair color realistically.

Background of the Invention

[002] Cosmetic and fashion industries today have gone high tech with a variety of “virtual dressing rooms” and “virtual hair salon”. These “virtual” products allow consumers to try out and preview services or products without physically being involved in the process.

[003] In US Patent No. 4,539,585 discloses an apparatus for previewing fashion items to be worn on a person’s body. Such fashion items would include jewelry or even apparel. Images of a person is generated with a variety of poses and the relevant desired fashion images superimposed over the generated images for previewing.

[004] In US Patent No. 4,823,285 a method for representing a person with a modified hairstyle is disclosed. An image of a person’s head or face is first generated and displayed on a screen. Thereafter, a series of new hairstyles may be superimposed onto the image of the person’s head to allow him to view himself/herself with the “new” hairstyle.

[005] However, a consumer today is not limited to merely cutting the hair or simply changing or modifying the hair style. There is also the very popular option of dyeing or tinting the hair. Commercial dyeing or tinting of hair is a service readily available

in almost all hair salons today. There are even commercially available kits that can be bought off the shelf that allows a consumer to tint or dye his/her own hair in the comfort of home.

[006] When dyeing one's hair, it is not restricted to just a single color and also not to all the hair on one's head. A variety of colors may be added in different stages and with different intensities and at different locations. One also can choose to dye hair only in a specific regions of hair on the head. This is sometimes referred to as highlighting.

[007] However, one of the concerns with dyeing one's hair is that a person will never really going to know how they will look like till the dye has been applied and dried. By the then, it would be too late to decide on a different color of dye or even the position or the color of the highlight. Several attempts may have to used to find the preferred color and position of the highlight before the consumer is satisfied.

[008] It can thus be seen that present versions of "virtual salons" or previewing systems do not address this need to provide a visual representation of realistically tinted or dyed hair.

Summary of the Invention

[009] The present invention seeks to provide a method for displaying and modifying images of hair color.

[0010] Accordingly, in one aspect, a method for simulating the dyeing of a user's hair by modifying the appearance of a parent image of the user, the method comprising the steps: receiving user selection of a model image from the parent image; receiving a user input for a desired plurality of replicate images; receiving a

user input for desired Hue, desired angle of rotation and desired translation for the plurality of replicate images; replicating the model image to produce the plurality of replicate images having the desired angle of rotation and the translation; analyzing the plurality of replicate images; calculating and applying calculated Hue to the plurality of replicate images to produce a second image; and superimposing the second image onto parent image to produce a final image; wherein the second image is superimposed onto the parent image in the region where the model image was selected.

[0011] In another aspect, the present invention provides, a method for simulating the dyeing of a user's hair by modifying the appearance of a parent image of the user, the method comprising the steps: receiving user selection of an image of a strand of hair from the parent image; receiving a user input for a desired plurality of replicate images of the strand of hair; receiving a user input for desired Hue, desired angle of rotation and desired translation for the plurality of replicate images; replicating the user selection of the image of a strand of hair to produce the plurality of replicate images having the desired angle of rotation and the translation; analyzing the plurality of replicate images; calculating and applying calculated Hue to the plurality of replicate images to produce an image of a bush of dyed hair; superimposing the image of the bush of dyed hair onto parent image to produce a final image; wherein the image of the bush of dyed hair is superimposed onto the parent image in the region where the user selection of the image of a strand of hair was selected.

Brief Description of the Drawings

[0012] A preferred embodiment of the present invention will now be more fully described, with reference to the drawings of which:

[0013] FIG.1 illustrates a flowchart of a method in accordance with the present invention;

[0014] FIG.2 illustrates the selection of a model image of FIG.1;

[0015] FIG.3 illustrates a final image of FIG.1; and

[0016] FIG.4 illustrates a flowchart of the analyzing step of FIG.1.

[0017] FIG.5 illustrates a plurality of image pixels representing a hair strand;

[0018] FIG.6 illustrates an image pixel divided into sixteen subpixels; and

[0019] FIG.7 illustrates a flowchart of the calculating and applying step of FIG.1.

Detailed description of the Drawings

[0020] A method for displaying and modifying hair color with a preferred embodiment is described. In the following description, details are provided to describe the preferred and the alternate embodiment. It shall be apparent to one skilled in the art, however that the invention may be practiced without such details. Some of the details may not be described at length so as not to obscure the invention.

[0021] Referring to FIG.1, FIG.2 and FIG.3, the method for displaying and modifying images of hair color in a preferred embodiment starts with the receiving 110 of a parent image 10. The parent image 10 comprises of a person's head showing the facial features and particularly the hair on the person's head. The parent image 10 would likely be a full color image to better reflect the effect of color modification on the hair.

[0022] Next, the step of receiving 115 a user selection of a model image 15 from a parent image 10 is carried out. The user by using a plurality of selection points 16 selects the desired hair strand for the model image 15 from the parent image 10. Another user input is received 120 for the desired number of replicates of the model image 15.

[0023] Following which, the step of receiving 125 yet another user input for the desired Hue, desired angle of rotation and desired translation for the plurality of replicate images is performed. The model image is then replicated 130 according to the desired number of replicates to produce a plurality of replicate images having the desired angle of rotation and desired translation. These plurality of replicate images are essentially replicates of the model image 15 that was selected by the user.

[0024] Color values can generally be defined using the properties of Hue, Intensity and Saturation. Collectively they are often referred to simply as an acronym HIS. By varying the values of each property, millions of colors with varying degrees of shades and gradations can be described.

[0025] The color value that is user determinable is the Hue, while Intensity and the Saturation values would be retained so that the original shading and effects of light on the hair in the parent image 10 would remain unchanged. This results in the realistic look of the second image 20 especially if it is superimposed 145 onto to the parent image 10 in the region where the model image 15 was first selected.

[0026] The angle of rotation determines the angle of the first replicate image to the last replicate image and thus the spread of the plurality of replicate images to form the second image which is the bush of hair. The translation determines the distance the first replicate image to the last replicate image may reside in. The plurality of

replicates are then randomly spaced within this desired translation and also randomly within this desired angle.

[0027] Next, the step of analyzing 135 the plurality of replicate images is performed. Using the desired Hue, a calculated Hue is calculated 140 and applied to the replicate images to produce a second image 20. The second image 20 comprises an image of a bush of realistic looking hair strands with a modified color to simulate the tinting or dyeing of a bush of hair according to the desired Hue. This second image 20 is then superimposed 145 onto the parent image in the region where the model image 15 was first selected from producing the final image 25. The final image 25 is thus the parent image 10 of the person's head showing the facial features and particularly the hair on the person's head with a bush of hair having a modified and desired color to simulate the tinting or dyeing of a bush of hair on the head.

[0028] Referring to FIG.4, FIG.5 and FIG.6, the analyzing step 135 of the replicate images start with the step of determining 410 the image pixels 30 that form each of the replicate images. All representation of graphics and pictures by computers are in pixels, which are the smallest unit of representation in computer graphics. The replicate images which are images of several strands of hair each be represented by a plurality of image pixels 30 stretched out in a line as shown in FIG.5. Next, the image pixels 30 which have been determined 410 to form the replicate image is divided 415 into a predetermined number of subpixels 32.

[0029] Following which, the step determining 420 the number of subpixels 32 that form the replicate images is performed. Typically, the width of a hair strand is smaller than a single image pixel 30 and may comprise a plurality of subpixels 32 instead. The actual number of subpixels 32 that form the hair strand in the image pixel 30 are typically less than the predetermined number of subpixels 32. Referring to FIG.6, the image pixel 30 illustrated has a replicate image 17 of a hair strand taking up about eleven subpixels 32 of the sixteen subpixels 32 in the image pixel 30.

[0030] After determining 420 the number of subpixels 32 forming the replicate image 17, the step of applying 425 the desired Hue to the subpixels 32 that form the replicate image 17 is performed.

[0031] If all 430 the image pixels 30 have been analyzed, the analyzing step 135 of the replicate image moves on to the next 445 replicate image until all replicate images are analyzed 135. When all 440 the replicate images have been analyzed, the analyzing step 135 of the replicate images ends. However, if not 430 all the image pixels 30 have been analyzed, then the next 435 image pixel is addressed and the step of dividing 415 the image pixel 30 into subpixels 32 is repeated until the step of applying desired Hue to subpixels 32 is complete.

[0032] Referring to FIG.7, the step of calculating 140 and applying the calculated Hue further comprises the steps of determining 710 the average Hue of the subpixels 32 in the image pixel 30 that form the replicate image 17. Next, the average Hue is applied 715 to the image pixel 30. When all 720 the image pixels have the average Hue color applied 715, the step of calculating 140 and applying the calculated Hue ends. Else, the next 725 image pixel is addressed and the step of determining 710 the average Hue is performed until the step of applying 715 the average Hue is completed.

[0033] The second image 20 which comprises an image of a bush of realistic looking hair strands with a modified color to simulate the tinting or dyeing of a bush of hair according to the desired Hue. This second image 20 is then superimposed 145 onto the parent image in the region where the model image 15 was first selected from producing the final image 25. The final image 25 is thus the parent image 10 of the person's head showing the facial features and particularly the hair on the person's head with a bush of hair having a modified and desired color to simulate the tinting or dyeing of a bush of hair on the head. The modified and desired color is based on the

desired Hue received from the user input 125 while the Intensity and Saturation have been retained.

[0034] It will be appreciated that various modifications and improvements can be made by a person skilled in the art without departing from the scope of the present invention.

Claims

1. A method for simulating the dyeing of a user's hair by modifying the appearance of a parent image of said user, said method comprising the steps:

- a. receiving user selection of a model image from said parent image;
- b. receiving a user input for a desired plurality of replicate images;
- c. receiving a user input for desired Hue, desired angle of rotation and desired translation for said plurality of replicate images;
- d. replicating said model image to produce said plurality of replicate images having said desired angle of rotation and said translation;
- e. analyzing said plurality of replicate images;
- f. calculating and applying calculated Hue to said plurality of replicate images to produce a second image; and
- g. superimposing said second image onto parent image to produce a final image;

wherein said second image is superimposed onto said parent image in the region where said model image was selected.

2. The method in accordance with claim 1, wherein step e. further comprises the steps:

- i. determining plurality of image pixels that form said plurality of replicate images;
- ii. dividing said plurality of image pixels into predetermined number of subpixels;
- iii. determining number of subpixels that form each of said plurality of replicate images in each of said plurality of image pixels; and
- iv. applying desired Hue to subpixels that form each of said plurality of replicate images in each of said plurality of image pixels.

3. The method in accordance with claim 2, wherein step f. further comprises the steps:
 - i. determining average Hue of subpixels in image pixel that forms said replicate image; and
 - ii. applying said average hue to said each of said plurality of image pixels of each of said plurality of replicate images .
4. The method in accordance with claim 1, wherein each of said replicate images is an image of a strand of hair.
5. The method in accordance with claim 1, wherein said second image is an image of a bush of hair having a modified color.
6. A method for simulating the dyeing of a user's hair by modifying the appearance of a parent image of said user, said method comprising the steps:
 - i. receiving user selection of an image of a strand of hair from said parent image;
 - ii. receiving a user input for a desired plurality of replicate images of said strand of hair;
 - iii. receiving a user input for desired Hue, desired angle of rotation and desired translation for said plurality of replicate images;
 - iv. replicating said user selection of said image of a strand of hair to produce said plurality of replicate images having said desired angle of rotation and said translation;
 - v. analyzing said plurality of replicate images;
 - vi. calculating and applying calculated Hue to said plurality of replicate images to produce an image of a bush of dyed hair;
 - vii. superimposing said image of said bush of dyed hair onto parent image to produce a final image;

wherein said image of said bush of dyed hair is superimposed onto said parent image in the region where said user selection of said image of a strand of hair was selected.

7. The method in accordance with claim 6, wherein step e. further comprises the steps:

- i. determining plurality of image pixels that form said plurality of replicate images;
- ii. dividing each of said plurality of image pixels into predetermined number of subpixels;
- iii. determining number of subpixels that form said plurality of replicate images in each of said plurality of image pixels; and
- v. applying desired Hue to subpixels that form each of said plurality of replicate images in each of said plurality of image pixels.

8. The method in accordance with claim 6, wherein step f. further comprises the steps:

- i. determining average Hue of subpixels in image pixel that forms said replicate image; and
- ii. applying said average hue to said each of said plurality of image pixels of each of said plurality of replicate images .