Application of Photoshop Channel Calculation

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ABSTRACT

This paper introduces the concept and classification of the Photoshop channel, compares the differences between calculation and application image, and combines with character’s image of complex subject and numerous details to illustrate the method of Alpha channel matting and the application of channel calculation. It makes abstract channel concepts and applications easy to understand, and provides clear learning ideas and effective help for beginners to understand channel technology.

CHANNEL OVERVIEW

Channel is one of the most important contents in Photoshop CS4 and above. It can realize the storage and call of complex graph effect. This paper introduces the operation process of the channel matting and channel calculation, providing a more flexible way for users to edit images.

The main function of the channel is to preserve the color information of the image, and pluralities of color separation channels are superimposed together to form an image with a color hierarchy. The channel can also be used to store the selections and masks, enabling users to achieve complex graphics effects.

Each image contains three channels: color channel, Alpha channel and spot color channel. The color channel is used to hold the color information of an image, created automatically when an image is opened. The Alpha channel is used to store the selection information, including the location, size, eclosion value, etc [1]. The Spot color channel is used for additional plates of spot color ink printing.

THE DIFFERENCE BETWEEN CHANNEL CALCULATION AND APPLICATION IMAGE

Channel calculation and application image are used to produce the effect of the mixed channel, which requires that the processed images have the same pixel sizes and resolutions.

Application image is used to blend an image layer and a channel (source) with the layer and channel of the current image (target), and then forms a new mixed image on the current layer.

Channel calculation is used to blend two individual channels from one or more source images, and then applies the results to new images, new channels, or current selection. The channel calculation is similar to the application image, and the
difference is that the channel calculation can save the mixed result as a new image file or a new channel[2].

APPLICATION OF CHANNEL CALCULATION
Training Tasks

Pick the characters from the pictures shown in Figure 1.

Task Analysis

Matting characters as shown in Figure 1, the main difficulty facing is to pick the flowing hair, because the hair is irregular in shape, and the hair color is relatively shallow and hair end is thin. Channel matting can achieve some complex details such as matting flowing hair, feathers, wedding dress etc. Therefore, this case uses the channel matting to extract the hair, and gets the character’s hair channel.

Channel matting is actually to set the selection (non-transparent part) to white and the non-selection (transparent part) to black in the channel. The operation method is as follows: firstly, duplicate the color channel with the highest contrast to the alpha channel. Secondly, apply the brush tool, the deepening tool or the dodge tool to the foreground and background to make it more contrast, and then use the levels to further adjust the black and white distribution in the Alpha channel. Finally load the Alpha channel’s selection for matting [3].

Extracting the character’s face and body can use the pen tool or channel matting. So this case uses the channel matting to get the character’s main channel, and then uses the channel calculation to generate a new channel with the hair channel and the character’s main channel, namely the complete character channel, which can extract the character.

Figure 1. Original image of the character.       Figure 2. Green copy channel.

Operation Procedure
HAIR EXTRACTION

(1) Duplicate channels. Open the original image in Photoshop, while holding down the Ctrl+J key to copy the picture, and view the channel panel to contrast red, green and blue three RGB color channels one by one, and choose one of the most visible channels of the hair to compare with the background to copy. This case chooses to copy the green channel, as shown in Figure 2. Note that it cannot be modified on each color channel of the original image. This will damage the color of the original image,
so you need to copy the channel. The green copy is actually an Alpha channel that is used to store the selection and can be changed at will without damaging the original image.

(2) Reverse phase. The hair is black in the green copy channel as shown in Figure 2. The white area in the Alpha channel is the selection area. Therefore, click the reverse of the image menu bar to turn the hair into white, as shown in figure 3.

(3) Contrast enhancement. Use the levels or curves to adjust the black and white contrast of the green copy channel, making the black and white contrast obvious. In this example we use levels to deal with, until most of the hair turns white, the background is close to or becomes pure black. At the same time, appropriate left shift the gray slider, so that the details of the hair are much richer, as shown in Figure 4.

Figure 3. Green copy reverse channel.   Figure 4. Green copy channel after contrast Enhancement.

EXTRACT THE CHARACTER’S FACE AND BODY

(1) Duplicate channels. Check the channel panel, contrast red, green and blue three RGB color channels one by one, and choose one of the most visible channels of the character’s face and body to compare with the background to copy. This case chooses to copy the red channel, as shown in Figure 5.

(2) Contrast enhancement. Use the levels or curves to adjust the black and white contrast of the red copy channel, making the black and white contrast obvious, as shown in Figure 6.

(3) Brush painting. Use the brush to whiten the eyes, mouth, nose and the lace part of the dress, etc., as shown in Figure 7.

Figure 5. Red copy channel.   Figure 6. Red Copy channel after contrast Enhancement.
APPLICATION OF CHANNEL CALCULATION

(1) Open and set the calculation window. Select the red copy, click the calculation of the image menu bar to open the window. This example calculates the different channels of the same layer of the same image. Select the green copy in source one channel; select the red copy in source two channel; set the blending mode to Linear Dodge (add); set the opacity to 100%; and set the mixed results to create a new channel, as shown in Figure 8.

![Figure 7. Red copy channel after brush painted.](image1)
![Figure 8. Setting the calculation window.](image2)

(2) Generate new channels. In the window shown in Figure 8, click the OK button to complete the calculation of the two channels. At this point, a new channel Alpha 1 appears in the channel panel, as shown in Figures 9 and 10.

![Figure 9. New channel alpha 1.](image3)
![Figure 10. Channel panel.](image4)

(3) Load the character selection. Hold down the Ctrl key and click the shrink map of the Alpha 1 channel to load the graphical selection of the channel, as shown in Figure 11.

(4) Extract character. Go back to the layer panel, and select the character layer, and hold down the Ctrl+J key to create a new layer of the character, as shown in Figure 12.
CONCLUSIONS

Photoshop channels mainly preserve the color information and the selection information of the image, which is very powerful and difficult to master. This paper analyzes the Alpha channel, selects the channel with the largest contrast between black and white, uses the levels and other tools to further adjust the black and white distribution in the Alpha channel, and combines with channel calculation to extract the character with complex subject and numerous details. It explains the function of the channel and the practical application of character’s matting through the case in a simplified way, and lays a foundation for more complex graphic and image processing in the future.

REFERENCES