Description

Field of the Invention

This invention relates to a color image processing method and apparatus which processes a color image signal to form a color image.

Background of the Invention

A color image recording apparatus is well known which records color image information using a recording method such as ink jet, heat transfer or eletrophotography.

Fig. 2 is a block diagram for processing a signal in a color image recording apparatus of this type. An image reader or an image data storage, not shown, outputs three color image signals 1a, 1b and 1c indicative of yellow, magenta and cyan, respectively, which are input to a color correction unit 2 which performs a color correction such as masking on these input signals. A gradation correction unit 3 performs a gradation correction on the corrected color signals from color correction unit 2. A printer 4 forms yellow, magenta and cyan images in accordance with the corrected gradation signals and records a color image.

An apparatus of this type is most desired to reproduce a color faithful to that of an input image. In some cases, it may be desired to output an image by changing a color of the input image. For example, in the design of a poster, it may be desired to reproduce an original image in various colors. Especially, it is strongly desired to change only a particular color portion of the original image to another color to output the resulting image.

U.S. Patent US-A-4,204,728 discloses an electronic color photography reproduction apparatus (color electrophotographic copying apparatus) which focuses an optical image passing through R-, G- and B-filters onto a photosensitive medium and develops the same using developers of cyan, magenta and yellow. In such related art, however, not only the particular color in the original image but also other colors containing the color components (Y, M, C) contained in the particular color may be changed. Even in a color image recording apparatus which temporarily changes a color image into color component signals and records the colors, if colors not corresponding to three color (yellow, magenta and cyan) signals are printed with the yellow, magenta and cyan color signals, an image different in color from the input image can be produced. For example, if magenta, cyan and yellow are printed with yellow, magenta and cyan signals, respectively, the red portion of yellow + magenta, the blue portion of magenta + cyan and the green portion of cyan + yellow will be reproduced with the blue of magenta + cyan + yellow will be reproduced with the blue of magenta + cyan, the green of cyan + yellow, and the red portion of yellow + magenta, respectively. However, according to such method, all colors of the input image except for three monochromatic elements, yellow, magenta and cyan, will be reproduced in different colors from those of the original image, so that it is impossible to replace only a particular color with another.

U.S. Patent US-A-4,538,182 discloses a color reproduction apparatus which reproduces a plurality of particular colors, for example, two colors (red and black) or three colors (red, blue and black), in which the original red will be changed to black or the original black will be changed to red. However, it is impossible to change a delicate color including a plurality of color components to another or to change a color to a plurality of delicate color components.

European patent application EP-A-0205332 discloses an arrangement for electronically modifying an electronic representation of an actual color image in order to, for example, correct imperfections in the color reproduction process. These imperfections arise, for example, because of the fact that the color filters which form part of the image reading apparatus and the colors used in the printing inks for reproducing the colored image do not match one another to a sufficient degree. This application discloses apparatus whose purpose is to apply color corrections as opposed to enabling an operator to substitute one color for another.

European application EP-A-0188098 is also concerned with a video retouching system which is aimed at overcoming the same problem with which European application EP-A-0205332 is concerned.

SUMMARY OF THE INVENTION

According to the present invention a method of processing a multi-color image in which a first color is selected, a second color is selected to replace the first color, an input color image signal from multi-color image is compared with the first color and if the same replaced by the second color, comprises the steps of:

a) identifying a desired point of the multicolored image which contains the first color by manually selecting said point;

b) machine reading said first color contained by the identified point, thereby deriving a color image signal representing said first color;

c) inputting said color image signal derived from the identified point;

d) storing said derived color image signal;

e) comparing the input color image signal from the multi-color image with the stored signal d) representative of the first color; and

f) replacing the input color image signal by the selected second color image signal if that input signal equates to the stored signal.

According to the present invention an apparatus

for processing a multi-color image in which a first color of the multi-color image is replaced by a second color, comprises:

a) manual selecting means for identifying a point of the multi-color image containing the first color to be changed;

b) machine reading means for reading said first color contained by the identified point, thereby deriving a color image signal representing said first color;

c) means for selecting the second color;

d) means for inputting said color image signal derived from the identified point;

e) means for storing the derived color image signal;

f) means for comparing an input color image signal with the stored signal representative of the first color; and

g) means for replacing the input color image signal by the selected color image signal if that input signal equates to the stored signal.

How the invention may be carried out will now be described by way of example only and with reference to the accompanying figure 4.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig.1 is a signal block diagram of a first arrangement which falls outside the scope of the present claims;

Fig.2 is a signal block diagram of a second arrangement which falls outside the scope of the present claims;

Fig.3 is a block diagram showing the basic structure of a third arrangement which falls outside the scope of the present claims; and

Fig.4 is a block diagram showing an embodiment of the present invention.

The arrangement of figures 1 & 2 will now be described like reference numerals denoting like elements or parts in Figs.1 & 2.

Three 6-bit color signals 1a, 1b and 1c. indicative of yellow, magenta and cyan, respectively, are input to a selector 5 via a color correction unit 2 and a gradation correction unit 3. Signals 1a - 1c are divided by 16 at dividing ROMs 6a, 6b and 6c to be converted to 4-bit signals 7a, 7b and 7c, respectively. Namely, if a color represented by three color signals is represented by (Y, M, C), there are a total of $64^3 = 262144$ colors (0, 0, 0) - (63, 63, 63) represented by 1a - 1c, and there are a total of $16^3 = 4096$ converted colors (0, 0, 0) - (15, 15, 15), represented by 7a -7c.

A switch SW1 selects a color in the input image to be replaced with another one among 24 colors herein. Terminals 8-1 to 8-24 are each given 12-bit data corresponding to a separate one of 24 colors so that the user can select a desired color freely among them. Each 12-bit data corresponding to a separate one of the 24 colors is determined in advance as follows.

For example, assume that the user selects orange and connects switch SW1 to terminal 8-2. If a combination of signals 7a - 7c representing orange is, for example, (5, 6, 2), a 12-bit signal

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└5┘└6┘└2┘

corresponding (5, 6, 2) is output from terminal 8-2.

In this way, 12-bit signals are determined corresponding to respective colors and stored in a ROM, not shown, and applied to the corresponding terminals.

A signal 9 selected by SW1 among such 12-bit signals is input to a coincidence detection unit 10 which also receives signals 7a - 7c after the division. Coincidence detection unit 10 includes an Exclusive-Or gate which compares 12 bits of signal 9 and 12 bits (4 x 3) of signals 7a - 7c on a bit-by-bit basis to output a signal 11 which will become high when all these compared bits coincide and will become low otherwise.

Switch SW2 selects which color a particular color of the original image should be changed to. To this end, there are also 24 colors prepared herein. Terminals 12-1 to 12-24 are given different 4-bit data outputs, the number of bits of which is determined in accordance with the number of colors selectable.

The signal 12 selected by SW2 is input as address data to ROMs 13a - 13c. Printer drive signals necessary for outputting the selected color are stored in the corresponding ROMs. For example, assume that a color be replaced and printed with green. In order to print this green, when three color signals to be input to the printer are (40, 20, 50) (assume that each color is one of 64 gradations 0-63.), the ROM outputs 14a -14c obtained when green is selected by SW2 are set so that 14a, 14b and 14c are 40, 20, 50, respectively. In this way, three color drive signals corresponding to each color are stored in ROMs 13a - 13c.

The respective ROM outputs 14a - 14c are input to selector 5 together with the respective outputs 15a - 15c of gradation correction unit 3. Selector 5 produces at its outputs 16a - 16c signals 15a - 15c when signal 11 is low and signals 14a - 14c when signal 11 is high.

Selector outputs 16a - 16c are input to printer 4 which forms yellow, magenta and cyan images in accordance with these signals and records a color image.

Description will now be made of the case in which such apparatus replaces only orange color of an input image with green and outputs the resultant image.

The user sets SW1 to orange and SW2 to green. As described above, signal 9 is 010101100010, and

signal 12 is a 5-bit signal corresponding to green. If an input image is not orange, signals 7a - 7c will not coincide with signal 9, so that the output 11 of coincidence detection unit 10 becomes low. Therefore, selector 5 outputs, as outputs 16a - 16c, signals 15a - 15c processed in a normal manner which outputs are supplied to the printer to thereby perform printing.

If the input image becomes orange, signals 7a - 7c will coincide with signal 9 and the output 11 of coincidence detection unit 10 becomes high. Selector 5 then supplies outputs 14a - 14c of ROMs 13a- 13c to printer 4 to print green.

In this way, an image can be output in which only orange of the input image is replaced with green. By freely changing SW1 and SW2, the color of an image portion to be replaced and a color to be printed therefor can be selected freely.

While in the above arrangement,dividing ROMs 6a - 6c which divide corresponding 6-bit signals by 16 to output 4-bit signals are used, only the 4 most significant bits of the 6-bit signals may be extracted. Alternatively, any means may be used which compresses the 6-bit signals to corresponding ones of bits fewer than 5.

Instead of a logic element such as an Exclusive-Or gate, the coincidence detection unit may be a ROM which receives signal 9 as the most significant address bits, signals 7a - 7c as the least significant address bits, stores 1 at addresses where the most and least significant bits are equal, 0 at addresses otherwise, and outputs the stored value as a signal 11.

So long as printer 4 can form a color image in accordance with signals 16a - 16c, it may be any of ink jet, heat transfer and electronic photography types.

While in the above arrangement the printer has been described as combining three colors yellow, magenta and cyan to form a color image, it may combine four or more colors which include black in addition to those three colors. Otherwise, it may be of the type which combines two colors such as red and black.

While in the above arrangement the kind of colors to be replaced and the kind of colors therefor to be printed are each shown as being 24 colors, they are not limited to them and any kinds of colors may be prepared.

Especially, if white and black are included in these colors, the following advantages will be obtained.

If white is included in colors to be replaced, for example, output images with various colors in their backgrounds can be obtained from the original picture with no colored background. If black is included, output images can be obtained which have characters of various colors from the original picture with black characters.

If white is included in colors to be printed, a picture can be output with no print in a portion corresponding to the original particular color portion and the no-print portion can be conveniently coated later with a color such as gold or silver which cannot be expressed by the printer. If black is included, it will be convenient to reverse the negative and positive of a white and black image.

As described above,
when 3 combined input color image signals become predetermined values, predetermined color signals are output to the printer to output an image in which only any particular portion of the input image is replaced with any designated color.

An embodiment of this invention will now be described with reference to figure 4. It includes image input means for providing an image to be recorded, in a combination of color signals, replaced-color input means for providing in a combination of color signals, a designated replaced color of the image to be recorded, memory means for storing the combination of color signals supplied by the replaced color input means, comparison means for comparing the combination of color signals read out of the memory means and the combination of color signals supplied by the image input means to output a signal representing a coincidence when both the combinations coincide, output color designation means for designating an output color substituted for the replaced color in a combination of color signals, signal selection means for selectively outputting a color signal from the image input means or a color signal from the output color designation means in accordance with the output from the comparison means, and image output means for forming an image of a plurality of colors in accordance with the output of the signal selection means.

Colors of an original document to be replaced are read and stored in advance. When signals indicative of the stored colors do not coincide with three color input image signals, an input image signal subjected to regular color and gradation correction is output to the recording unit while when they coincide, the previously selected color signal is output to the recording unit. Therefore, an image in which only a particular color portion of the input image is replaced with another particular color can be output to a recording medium.

Fig. 3 shows the basic structure of an arrangement which includes image input means a for providing an image to be recorded, in a combination of color signals, replaced-color input means b for providing, in a combination of color signals, a designated replaced color of the image to be recorded, memory means c for storing the combination of color signals supplied by the replaced-color input means, comparison means d for comparing the combination of color signals read out of the memory means c and the combination of color signals supplied by the image input means a to output a signal representing a coincidence when both the combinations coincide, output color designation means e for designating an output color

substituted for the replaced color in a combination of color signals, signal selection means f for selectively outputting a color signal from the image input means a or a color signal from the output color designation means e in accordance with the output from the comparison means, and image output means such as a color printer g for forming an image of a plurality of colors in accordance with the output of the signal selection means f.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Fig. 4 shows the circuit structure of the embodiment of the invention. In Figs. 1 and 4, like reference numeral denote like components.

In Fig. 4, a read unit 105 reads a color image in an original document, a color film or the like, using an image sensor such as a CCD (charge coupled device) provided therein and outputs it as three color signals of Y. M. C. respectively, shown by 1a, 1b, 1c. Dividing ROMs (read only memories) 106a, 106b, 106c divides, by 16, 6-bit color signals 1a, 1b, 1c, namely, converts same to corresponding 4-bit signals. - Three switches SW11, SW21 and SW31, ganged as a unit, select a destination to which output signals 107a, 107b, 107c from ROMs 106a, 106b, 106c, are connected to designate color to be changed. A RAM (random access memory) 109 temporarily stores signals 107a, 107b, 107c selectively supplied from dividing ROMs 106a - 106c via corresponding switches SW11 - SW31. Coincidence detection unit 110 compares the signals read from RAM 109 with the signals, as they are, supplied from dividing ROMs 106a - 106c to output a coincidence signal 116 when coincidence holds. An operation switch SW41 designates a color to be recorded among, for example, 24 colors, after color substitution. ROMs 113a, 113b, 113c output three corresponding combined color signals 114a - 114c corresponding to a designated color by switch SW41. The selection means including a selector 115 outputs to printer 4 the signals 114a, 114b, 114c from ROMs 113a, 113b, 113c when it receives a high or coincidence signal 116 from coincidence detection unit 110 and outputs signals 115a, 115b, 115c of gradation correction unit 3 when it receives no coincidence signal.

In operation, in a color designation mode (1) the user causes read unit 105 to read only a color portion to be replaced in an original document. Three 6-bit color (yellow, magenta and cyan) signals 1a - 1c representing the color components of the read color are divided by 16 at dividing ROMs 106a - 106c to be converted to 4-bit signals 7a - 7c. Namely, if a color to be represented by three color signals is (Y, M, C), there are a total of $64^3 = 262144$ colors (0, 0, 0) - (63, 63, 63), shown by 1a - 1c in the decimal notation, and there are a total of $16^3 = 4096$ colors (0, 0, 0) - (15, 15, 15) represented by signals 107a - 107c after conversion by dividing ROMs 106a, 106c.

In the color designation mode (1), switches SW11, SW21, SW31 are connected to contacts 108a, 108b, 108c and a total of 12 data bits represented by signals 107a - 107c from ROMs 106a - 106c is stored in RAM 109.

In the color designation mode (2), the user selects, by switch SW41, an output color to replace the original color. Namely, this switch SW41 selects that output color among 24 colors prepared in advance. Switch terminals 111-1 to 111-24 output different 4-bit data, the number of bits of which is determined in accordance with the number of colors to be selected.

A 4-bit signal 112 selected by switch SW41 is input as address data to ROMs 113a, 113b, 113c which store printer drive signals necessary for outputting the selected color.

For example, assume that the replaced color portion be printed with green. In order to print this green, when three color signals to be input to printer 4 are (40, 20, 50), each color being one of 64 gradations 0 - 63, data is stored in advance in ROMs 113a, 113b, 113c so that the outputs 114a, 114b, 114c of ROMs 113a, 113b, 113c obtained when green is selected by SW41 are "40", "20", "50", respectively.

In this way, three color drive signals corresponding to a respective one of colors are stored in ROMs 113a - 113c and outputs 114a - 114c corresponding to selective signal 112 form switch SW41 are input to selector 115.

When a print start button, not shown, is pressed to enter a print mode, the original document is read by read unit 105 and three color signals 115a - 115c corrected normally with respect to color and gradation by color and gradation correction units 2 and 3 are input to selector 115.

On the other hand, since in the print mode the ganged switches SW11, SW21, SW31 are connected to contacts 108d, 108e, 108f, respectively, the data read from the document and divided at ROMs 106a - 106c are input unchanged as 107a - 107c to coincidence detection unit 110. At the same time, the data on a color to be replaced and read already in the color selective mode (1) is read from RAM 109 to be compared with the document data 107a - 107c. Coincidence detection circuit 110 compares signals from RAM 109 and signals 107a - 107c from the document on a bit-by-bit basis, using its internal Exclusive-Or gate, not shown, which outputs to selector 115 a coincidence signal 116 which becomes high when all the compared bits coincide and low otherwise.

Selector 115 outputs to printer 4 the signals 114a - 114c from ROMs 113a -113c when signal 116 is high and outputs to printer 4 the signals 115a - 115c from gradation correction unit 3 when the coincidence signal 116 is low.

These signals 116a - 116c output from selector

115 are input to color printer 4 which may be an ink jet printer, a heat transfer printer of an electronic photography printer to reproduce a full color image printed in yellow, magenta and cyan.

As a result, when the color of the document read in the print mode does not coincide with the color read in the color designation mode (1) and stored in RAM 109, an image formation is performed using signals subjected to normal color and gradation corrections while when they coincide, an image containing the color designated in the color designation mode (2) is printed. In this way, only a particular color portion in the document read in the color designation mode (1) can be replaced by a desired color designated in the color designation mode (2) and output.

While in the above embodiment, the dividing ROMs 106a - 106c which divide 6-bit signals by 16 and outputs 4-bit signals are used, only the most significant 4 bits of each of the 6-bit signals may be output. Alternatively, any means which can compress 6-bit signals to ones of bits fewer than 5 may be used.

If the input image signals as they are should be input to RAM 109 without compression, possible slight changes in the input signals would prevent part of a color designated to be replaced from being replaced, so that it may be desirable to perform an appropriate compression.

Instead of using a logic device such as an Exclusive-Or gate, the coincidence detection unit 110 of Fig. 4 may include a ROM in which the signals from RAM 109 are input to the most significant address bits and the signals from original document are input to the least significant address bits, "1" is stored in advance to addresses where the most and least significant bits are equal, "0" is stored in advance in addresses where the most and least significant bits are not equal, and data "1" or "0" is output as a signal 116 to selector 115.

While in this embodiment the printer 4 has been described as combining three colors yellow, magenta and cyan to form a color image, it may combine four or more colors which include black in addition to those three colors. Otherwise, it may be of the type which combines two colors such as red and black.

While in the above embodiment the kind of colors which can be selected in the color designation mode (2) is shown as 24 colors, it is not intended in a limitative sense and any kinds of colors may be prepared. Especially, if white and black are included in these colors, the following advantages will be obtained. For example, if white is included in colors to be printed, a picture can be output with no print in a portion corresponding to the original particular color portion and the no-print portion can be conveniently coated later with a color such as gold or silver which cannot be expressed by the printer. If black is included, it will be convenient to reverse the negative and positive of a white and black image.

As described above, according to the embodiment of this invention, a color portion to be replaced in the original document is read and stored in advance. When the stored color signals do not coincide with three color input image signals, the input image signals subjected to regular color and gradation corrections are output to the record unit while when they coincide, the color signals selected in advance are output to the record unit. Therefore, an image in which a particular color portion in the image is replaced with another designated color can be output to a recording medium.

Claims

1. A method of processing a multi-color image in which a first color is selected, a second color is selected to replace the first color, an input color image signal from said multi-color image is compared with the first color and if the same replaced by the second color, comprising the steps of:
   a) identifying a desired point of the multicolored image which contains the first color by manually selecting said point;
   b) machine reading said first color contained by the identified point, thereby deriving a color image signal representing said first color;
   c) inputting said color image signal derived from the identified point;
   d) storing said derived color image signal;
   e) comparing the input color image signal from the multi-color image with the stored signal d) representative of the first color; and
   f) replacing the input color image signal by the selected second color image signal if that input signal equates to the stored signal.

2. A method as claimed in claim 1, including the step of outputting the second color image signal and displaying it as a second color image.

3. A method as claimed in claim 1 or 2, including the step of correcting the color of the input color image signal d).

4. A method as claimed in any of claims 1 to 3, in which the color image signal representative of the identified point is divided to reduce the number of bits present in each sample prior to the said storing of that signal.

5. A method as claimed in any previous claim, in which the desired point of the original color image is identified by means of a digitiser.

6. A method as claimed in any previous claim, in which the second color is selected from previous-

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115 are input to color printer 4 which may be an ink jet printer, a heat transfer printer of an electronic photography printer to reproduce a full color image printed in yellow, magenta and cyan.

As a result, when the color of the document read in the print mode does not coincide with the color read in the color designation mode (1) and stored in RAM 109, an image formation is performed using signals subjected to normal color and gradation corrections while when they coincide, an image containing the color designated in the color designation mode (2) is printed. In this way, only a particular color portion in the document read in the color designation mode (1) can be replaced by a desired color designated in the color designation mode (2) and output.

While in the above embodiment, the dividing ROMs 106a - 106c which divide 6-bit signals by 16 and outputs 4-bit signals are used, only the most significant 4 bits of each of the 6-bit signals may be output. Alternatively, any means which can compress 6-bit signals to ones of bits fewer than 5 may be used.

If the input image signals as they are should be input to RAM 109 without compression, possible slight changes in the input signals would prevent part of a color designated to be replaced from being replaced, so that it may be desirable to perform an appropriate compression.

Instead of using a logic device such as an Exclusive-Or gate, the coincidence detection unit 110 of Fig. 4 may include a ROM in which the signals from RAM 109 are input to the most significant address bits and the signals from original document are input to the least significant address bits, "1" is stored in advance to addresses where the most and least significant bits are equal, "0" is stored in advance in addresses where the most and least significant bits are not equal, and data "1" or "0" is output as a signal 116 to selector 115.

While in this embodiment the printer 4 has been described as combining three colors yellow, magenta and cyan to form a color image, it may combine four or more colors which include black in addition to those three colors. Otherwise, it may be of the type which combines two colors such as red and black.

While in the above embodiment the kind of colors which can be selected in the color designation mode (2) is shown as 24 colors, it is not intended in a limitative sense and any kinds of colors may be prepared. Especially, if white and black are included in these colors, the following advantages will be obtained. For example, if white is included in colors to be printed, a picture can be output with no print in a portion corresponding to the original particular color portion and the no-print portion can be conveniently coated later with a color such as gold or silver which cannot be expressed by the printer. If black is included, it will be convenient to reverse the negative and positive of a white and black image.

As described above, according to the embodiment of this invention, a color portion to be replaced in the original document is read and stored in advance. When the stored color signals do not coincide with three color input image signals, the input image signals subjected to regular color and gradation corrections are output to the record unit while when they coincide, the color signals selected in advance are output to the record unit. Therefore, an image in which a particular color portion in the image is replaced with another designated color can be output to a recording medium.

Claims

1. A method of processing a multi-color image in which a first color is selected, a second color is selected to replace the first color, an input color image signal from said multi-color image is compared with the first color and if the same replaced by the second color, comprising the steps of:
   a) identifying a desired point of the multicolored image which contains the first color by manually selecting said point;
   b) machine reading said first color contained by the identified point, thereby deriving a color image signal representing said first color;
   c) inputting said color image signal derived from the identified point;
   d) storing said derived color image signal;
   e) comparing the input color image signal from the multi-color image with the stored signal d) representative of the first color; and
   f) replacing the input color image signal by the selected second color image signal if that input signal equates to the stored signal.

2. A method as claimed in claim 1, including the step of outputting the second color image signal and displaying it as a second color image.

3. A method as claimed in claim 1 or 2, including the step of correcting the color of the input color image signal d).

4. A method as claimed in any of claims 1 to 3, in which the color image signal representative of the identified point is divided to reduce the number of bits present in each sample prior to the said storing of that signal.

5. A method as claimed in any previous claim, in which the desired point of the original color image is identified by means of a digitiser.

6. A method as claimed in any previous claim, in which the second color is selected from previous-

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ly-stored signals representative of a plurality of colors.

7. Apparatus for processing a multi-color image in which a first color of the multi-color image is replaced by a second color, comprising:
   a) manual selecting means for identifying a point of the multi-color image containing the first color to be changed;
   b) machine reading means (105) for reading said first color contained by the identified point, thereby deriving a color image signal representing said first color;
   c) means (SW41) for selecting the second color;
   d) means (105-108) for inputting said color image signal derived from the identified point;
   e) means (109) for storing the derived color image signal;
   f) means (110) for comparing an input color image signal with the stored signal representative of the first color; and
   g) means (113-116) for replacing the input color image signal by the selected color image signal if that input signal equates to the stored signal.

8. Apparatus as claimed in claim 7, including means (16,4) for outputting the second color image signal and displaying it as a second color image.

9. Apparatus as claimed in claim 7 or 8, including means (2) for correcting the color of the input color image signal.

10. Apparatus as claimed in claim 7, 8 or 9, including means (106) for dividing the data upstream of the said storage means (109) to reduce the number of bits present in each sample.

11. Apparatus as claimed in any one of claims 7 to 10, including means (SW11,SW21,SW31) for switching the output from the dividing means (106) between a first position in which the divided signal is fed to the said data store (109) and a second position in which the said signal is fed to a coincidence detection unit (110).

12. Apparatus as claimed in any one of claims 7 to 11, including means (SW41,111-1 to 111-24) to manually select one of a plurality of signals representative of a limited number of second colors.

Patentansprüche

1. Verfahren zum Verarbeiten eines mehrfarbigen Bildes, bei dem ein erster Farbton ausgewählt wird, ein zweiter Farbton zum Ersetzen des ersten Farbtons ausgewählt wird, ein eingegebenes Farbbildsignal von dem mehrfarbigen Bild mit dem ersten Farbton verglichen wird und, falls er derselbe ist, durch den zweiten Farbton ersetzt wird, mit folgenden Schritten:
   a) einem Bestimmen eines gewünschten Punktes des mehrfarbigen Bildes, das den erste Farbton enthält, durch manuelles Auswählen des Punktes,
   b) einem maschinellen Lesen des in dem bestimmten Punkt enthaltenen ersten Farbtons, wodurch ein Farbbildsignal hergeleitet wird, das den ersten Farbton darstellt,
   c) einem Eingeben des ersten Farbbildsignals, das von dem bestimmten Punkt hergeleitet wird,
   d) einem Speichern des hergeleiteten Farbbildsignals,
   e) einem Vergleichen des eingegebenen Farbbildsignals von dem mehrfarbigen Bild mit dem gespeicherten Signal d), das den ersten Farbton darstellt, und
   f) einem Ersetzen des eingegebenen Farbbildsignals durch das ausgewählte zweite Farbbildsignal, falls das eingegebene Signal dem gespeicherten Signal gleicht.

2. Verfahren nach Anspruch 1, das einen Schritt des Ausgebens des zweiten Farbbildsignals und seines Anzeigens als zweites Farbbild enthält.

3. Verfahren nach Anspruch 1 oder 2, das einen Schritt des Korrigierens des Farbtons des eingegebenen Farbbildsignals d) enthält.

4. Verfahren nach einem der Ansprüche 1 bis 3, wobei das Farbbildsignal, das den bestimmten Punkt darstellt, geteilt wird, damit vor dem Speichern des Signals die Anzahl der Bits verringert wird, die in jedem Abtastwert vorhanden sind.

5. Verfahren nach einem der vorangehenden Ansprüche, wobei der gewünschte Punkt des ursprünglichen Farbbildes durch einen Digitalisierer bestimmt wird.

6. Verfahren nach einem der vorangehenden Ansprüche, wobei der zweite Farbton von den im voraus gespeicherten Signalen ausgewählt wird, die eine Vielzahl von Farbtönen darstellen.

7. Vorrichtung zum Verarbeiten eines mehrfarbigen Bildes, bei dem ein erster Farbton des mehrfarbigen Bildes durch einen zweiten Farbton ersetzt wird, mit
   a) einer Manuell-Auswähleinrichtung zum Bestimmen eines Punktes des mehrfarbigen Bil-

des, das den ersten zu verändernden Farbton enthält,
b) einer maschinellen Leseeinrichtung (105) zum Lesen des in dem bestimmten Punkt enthaltenen ersten Farbtons, wodurch ein Farbbildsignal hergeleitet wird, das den ersten Farbton darstellt,
c) einer Einrichtung (SW41) zum Auswählen des zweiten Farbtons,
d) einer Einrichtung (105 bis 108) zum Eingeben des aus dem bestimmten Punkt hergeleiteten Farbbildsignals,
e) einer Einrichtung (109) zum Speichern des hergeleiteten Farbbildsignals,
f) einer Einrichtung (110) zum Vergleichen eines eingegebenen Farbbildsignals mit dem gespeicherten Signal, das den ersten Farbton darstellt, und
g) einer Einrichtung (113 bis 116) zum Ersetzen des eingegebenen Farbbildsignals durch das ausgewählte Farbbildsignal, falls das eingegebene Signal dem gespeicherten Signal gleicht.

8. Vorrichtung nach Anspruch 7, die eine Einrichtung (16, 4) zum Ausgeben des zweiten Farbbildsignals und zu seinem Anzeigen als zweites Farbbild enthält.

9. Vorrichtung nach Anspruch 7 oder 8, die eine Einrichtung (2) zum Korrigieren des Farbtons des eingegebenen Farbbildsignals enthält.

10. Vorrichtung nach Anspruch 7, 8 oder 9, die eine Einrichtung (106) zum Teilen der Daten vor der Speichereinrichtung (109) enthält, damit die Anzahl der Bits verringert wird, die in jedem Abtastwert vorhanden sind.

11. Vorrichtung nach einem der Ansprüche 7 bis 10, die eine Einrichtung (SW11, SW21, SW31) zum Schalten des Ausgangssignals aus der Teilungseinrichtung (106) zwischen einer ersten Stellung, bei der das geteilte Signal der Speichereinrichtung (109) zugeführt wird, und einer zweiten Stellung enthält, bei der das Signal einer Koinzidenz-Erfassungseinheit (110) zugeführt wird.

12. Vorrichtung nach einem der Ansprüche 7 bis 11, die eine Einrichtung (SW41, 111-1 bis 111-24) zum manuellen Auswählen eines aus einer Vielzahl von Signalen enthält, die eine begrenzte Anzahl von zweiten Farbtönen darstellen.

Revendications

1. Procédé de traitement d'une image multicolore dans lequel une première couleur est sélectionnée, une seconde couleur est sélectionnée pour remplacer la première couleur, un signal d'image en couleur d'entrée à partir de ladite image multicolore est comparé avec la première couleur et si celle-ci est remplacée par la seconde couleur, comportant les étapes suivantes:
a) identification d'un point souhaité de l'image multicolore qui contient la première couleur par sélection manuelle dudit point;
b) lecture en machine de ladite première couleur contenue par le point identifié, afin d'obtenir un signal d'image en couleur représentant ladite première couleur;
c) introduction dudit signal d'image en couleur obtenu à partir du point identifié;
d) stockage dudit signal d'image en couleur obtenu;
e) comparaison du signal d'image en couleur d'entrée en provenance de l'image multicolore avec le signal stocké d) représentatif de la première couleur; et
f) remplacement du signal d'image en couleur d'entrée par le second signal d'image en couleur sélectionné si ce signal d'entrée est égal au signal stocké.

2. Procédé selon la revendication 1, comportant l'étape de délivrance du second signal d'image en couleur et d'affichage de celui-ci sous la forme d'une seconde image en couleur.

3. Procédé selon la revendication 1 ou 2, comportant l'étape de correction de la couleur du signal d'image en couleur d'entrée d).

4. Procédé selon l'une quelconque des revendications 1 à 3, dans lequel le signal d'image en couleur représentatif du point identifié est divisé pour réduire le nombre de bits présents dans chaque échantillon avant ledit stockage de ce signal.

5. Procédé selon l'une quelconque des revendications précédentes, dans lequel le point souhaité de l'image en couleur originale est identifié au moyen d'un numériseur.

6. Procédé selon l'une quelconque des revendications précédentes, dans lequel la seconde couleur est sélectionnée à partir des signaux stockés précédemment représentatifs d'une pluralité de couleurs.

7. Appareil pour traiter une image multicolore dans lequel une première couleur de l'image multicolore est remplacée par une seconde couleur, comprenant:

a) des moyens de sélection manuelle pour identifier un point de l'image multicolore contenant la première couleur à changer;
b) des moyens (105) de lecture en machine pour lire ladite première couleur contenue par le point identifié, afin d'obtenir un signal d'image en couleur représentant ladite première couleur;
c) des moyens (SW41) pour sélectionner la seconde couleur;
d) des moyens (105-108) pour introduire ledit signal d'image en couleur obtenu à partir du point identifié;
e) des moyens (109) pour stocker le signal d'image en couleur obtenu;
f) des moyens (110) pour comparer un signal d'image en couleur d'entrée avec le signal stocké représentatif de la première couleur; et
g) des moyens (113-116) pour remplacer le signal d'image en couleur d'entrée par le signal d'image en couleur sélectionné si ce signal d'entrée est égal au signal stocké.

8. Appareil selon la revendication 7, comportant des moyens (16, 4) pour délivrer le second signal d'image en couleur et l'afficher sous la forme d'une seconde image en couleur.

9. Appareil selon la revendication 7 ou 8, comportant des moyens (2) pour corriger la couleur du signal d'image en couleur d'entrée.

10. Appareil selon la revendication 7, 8 ou 9, comportant des moyens (106) pour diviser le train de données desdits moyens (109) de stockage afin de réduire le nombre de bits présents dans chaque échantillon.

11. Appareil selon l'une quelconque des revendications 7 à 10, comportant des moyens (SW11, SW21, SW31) pour commuter la sortie des moyens de division (106) entre une première position dans laquelle le signal divisé est appliqué à ladite mémoire de données (109) et une seconde position dans laquelle ledit signal est appliqué à une unité (110) de détection de coïncidence.

12. Appareil selon l'une quelconque des revendications 7 à 11, comportant des moyens (SW41, 111-1 à 111-24) pour sélectionner manuellement l'un d'une pluralité de signaux représentatifs d'un nombre limité de secondes couleurs.