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(54) **INFORMATION PROCESSING METHOD FOR DISPLAY SCREEN, SYSTEM, AND STORAGE MEDIUM**

(57) The present application discloses an information processing method for a display screen, a system, and a storage medium. The method comprises: acquiring display information of a display screen when displaying a target image, wherein the display information comprises: luminance and chrominance information and uniformity information; acquiring temperature information of the display screen when displaying the display information, wherein the luminance and chrominance information and the uniformity information change with the temperature information of the display screen; acquiring a luminance and chrominance compensation coefficient and a uniformity compensation coefficient that correspond to the temperature information, wherein the luminance and chrominance compensation coefficient is determined on the basis of an association relationship between the luminance and chrominance information of the display screen and the temperature information of the display screen, and the uniformity compensation coefficient is determined on the basis of a pixel value in the target image; and compensating for the luminance and chrominance information on the basis of the luminance and chrominance compensation coefficient, and compensating for the uniformity information on the basis of the uniformity compensation coefficient. The present application solves the technical problem of low display quality of display screens.

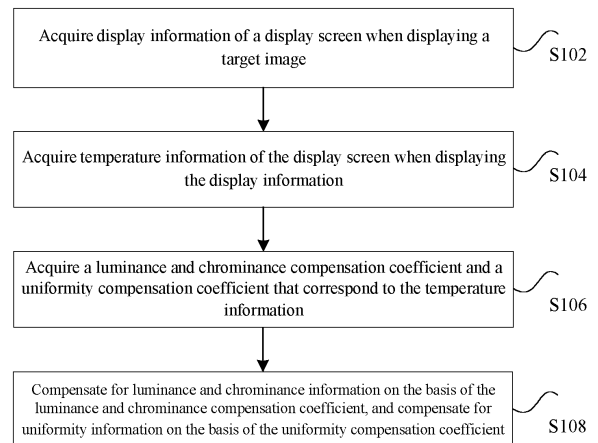


FIG. 1

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Description**CROSS-REFERENCE TO RELATED APPLICATIONS**

5 [0001] The present application claims priority to Chinese patent application No. 202311518279.8, filed with the China National Intellectual Property Administration on November 14, 2023, entitled "Information Processing Method for Display Screen, System, and Storage Medium", which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

10 [0002] The present application relates to the field of display screens implemented based on light emitting diodes (LEDs), and in particular, to an information processing method for a display screen, a system, and a storage medium.

BACKGROUND

15 [0003] At present, a display screen is composed of light emitting diodes, for example, an LED display screen. However, different regions composed of the light emitting diodes in the display screen have different temperatures, and the luminous intensity and chrominance of the display screen drift greatly with temperature, which causes the uniformity, overall luminance and chrominance of the display screen to change, thereby resulting in the technical
20 problem of degraded display quality of the display screen.

[0004] With respect to the above technical problem of degraded display quality of the display screen caused by the temperature problem, no effective solution has been proposed at present.

SUMMARY

25 [0005] Embodiments of the present application provide an information processing method for a display screen, a system, and a storage medium, so as to at least solve the technical problem of degraded display quality of the display screen.

30 [0006] According to one aspect of the embodiments of the present application, an information processing method for a display screen is provided. The method may include: acquiring display information of a display screen when displaying a target image, where the display information includes: luminance and chrominance information and uniformity information, the luminance and chrominance information includes luminance information and/or chrominance information of the display screen, and the uniformity information is used to represent a uniformity degree of the display screen when displaying the target image; acquiring temperature information of the display screen when displaying the display
35 information, where the luminance and chrominance information and the uniformity information change with the temperature information of the display screen; acquiring a luminance and chrominance compensation coefficient and a uniformity compensation coefficient that correspond to the temperature information, where the luminance and chrominance compensation coefficient is determined on the basis of an association relationship between the luminance and chrominance information of the display screen and the temperature information of the display screen, and the uniformity compensation coefficient is determined on the basis of a pixel value in the target image; and compensating for the luminance and chrominance information on the basis of the luminance and chrominance compensation coefficient, and compensating for the uniformity information on the basis of the uniformity compensation coefficient.

40 [0007] According to another aspect of the embodiments of the present application, an information correction method for a display screen is further provided. The method may include: displaying, on an operation interface, display information of a display screen when displaying a target image, where the display information includes: luminance and chrominance information and uniformity information, the luminance and chrominance information includes luminance information and/or chrominance information of the display screen, and the uniformity information is used to represent a uniformity degree of the display screen when displaying the target image; displaying, on the operation interface, temperature information of the display screen when displaying the display information, where the luminance and chrominance information and the uniformity information change with the temperature information of the display
45 screen; and in response to a compensation operation instruction acting on the operation interface, displaying, on the operation interface, compensated luminance and chrominance information and compensated uniformity information, where the compensated luminance and chrominance information is obtained by compensating for the luminance and chrominance information on the basis of a luminance and chrominance compensation coefficient, the compensated uniformity information is obtained by compensating for the uniformity information on the basis of a uniformity compensation coefficient, the luminance and chrominance compensation coefficient is determined based on an association relationship between the luminance and chrominance information of the display screen and the temperature information, and the uniformity compensation coefficient is determined based on a pixel value of a pixel in the target image.

[0008] According to another aspect of the embodiments of the present application, a thermal compensation correction method for a display screen is further provided. The method may include: acquiring color information of a display screen when displaying a target image; acquiring temperature information of the display screen when displaying the color information; acquiring a luminance and chrominance compensation coefficient that corresponds to the temperature information, where the luminance and chrominance compensation coefficient is determined based on an association relationship between luminance and chrominance information in the color information and the temperature information, and the luminance and chrominance information includes luminance information and/or chrominance information of the display screen; and compensating for luminance and chrominance information on the basis of the luminance and chrominance compensation coefficient.

[0009] According to another aspect of the embodiments of the present application, a thermal compensation correction system for a display screen is further provided. The system may include: a receiving device, configured to receive color information of a display screen when displaying a target image; a transmission device, configured to transmit the color information to a processing device; and a processing device, configured to acquire temperature information of the display screen when displaying the color information, and a luminance and chrominance compensation coefficient that corresponds to the temperature information, and control, based on the luminance and chrominance compensation coefficient, the display screen to compensate for luminance and chrominance information in the color information, where the luminance and chrominance compensation coefficient is determined based on an association relationship between the luminance and chrominance information and the temperature information, and the luminance and chrominance information includes luminance information and/or chrominance information of the display screen.

[0010] According to another aspect of the embodiments of the present application, a processing device is further provided. The processing device may include: a receiving module, configured to receive color information of a display screen when displaying a target image; a processing module, configured to acquire temperature information of the display screen when displaying the color information, and acquire a luminance and chrominance compensation coefficient that corresponds to the temperature information, where the luminance and chrominance compensation coefficient is determined based on an association relationship between luminance and chrominance information in the color information and the temperature information, and the luminance and chrominance information includes luminance information and/or chrominance information of the display screen; and a control chip, configured to control, based on the luminance and chrominance compensation coefficient, the display screen to compensate for the luminance and chrominance information.

[0011] According to another aspect of the embodiments of the present application, an information correction apparatus for a display screen is further provided. The apparatus may include: a first acquisition unit, configured to acquire display information of a display screen when displaying a target image, where the display information includes: luminance and chrominance information and uniformity information, the luminance and chrominance information includes luminance information and/or chrominance information of the display screen, and the uniformity information is used to represent a uniformity degree of the display screen when displaying the target image; a second acquisition unit, configured to acquire temperature information of the display screen when displaying the display information, where the luminance and chrominance information and the uniformity information change with the temperature information of the display screen; a third acquisition unit, configured to acquire a luminance and chrominance compensation coefficient and a uniformity compensation coefficient that correspond to the temperature information, where the luminance and chrominance compensation coefficient is determined based on an association relationship between the luminance and chrominance information of the display screen and the temperature information, and the uniformity compensation coefficient is determined based on a pixel value in the target image; and a compensation unit, configured to compensate for the luminance and chrominance information on the basis of the luminance and chrominance compensation coefficient, and compensate for the uniformity information on the basis of the uniformity compensation coefficient.

[0012] According to another aspect of the embodiments of the present application, a thermal compensation correction apparatus for a display screen is further provided. The apparatus may include: a sixth acquisition unit, configured to acquire color information of a display screen when displaying a target image; a seventh acquisition unit, configured to acquire temperature information of the display screen when displaying the color information; an eighth acquisition unit, configured to acquire a luminance and chrominance compensation coefficient that corresponds to the temperature information, where the luminance and chrominance compensation coefficient is determined based on an association relationship between luminance and chrominance information in the color information and the temperature information, and the luminance and chrominance information includes luminance information and/or chrominance information of the display screen; and a second compensation unit, configured to compensate for the luminance and chrominance information on the basis of the luminance and chrominance compensation coefficient.

[0013] According to another aspect of the embodiments of the present application, a computer-readable storage medium is further provided. The computer-readable storage medium includes a stored program, where when the program is running, a device where the storage medium is located is controlled to execute the information processing

method for a display screen of the embodiments of the present application.

[0014] In the embodiments of the present application, display information of a display screen when displaying a target image is first acquired, then temperature information of the display screen when displaying the display information is acquired, a luminance and chrominance compensation coefficient and a uniformity compensation coefficient that correspond to the temperature information are acquired, then the luminance and chrominance information is compensated for through the luminance and chrominance compensation coefficient, and the uniformity information is compensated for through the uniformity compensation coefficient, thereby achieving the purpose of compensating for the luminance and chrominance and the uniformity of the display screen, thus solving the technical problem of low display quality of the display screen, and further achieving the technical effect of improving the display quality of the display screen.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The drawings described herein are used to provide a further understanding of the present application and constitute a part of the present application. The illustrative embodiments of the present application and the description thereof are used to explain the present application, and do not constitute an improper limitation on the present application. In the drawings:

FIG. 1 is a flowchart of an information processing method for a display screen according to an embodiment of the present application;

FIG. 2(a) is a schematic diagram of an architecture of a control device for a display screen according to an embodiment of the present application;

FIG. 2(b) is a schematic diagram of an internal program architecture of an FPGA according to an embodiment of the present application;

FIG. 3 is a flowchart of a temperature compensation method according to an embodiment of the present application;

FIG. 4 is a flowchart of an information correction method for a display screen according to an embodiment of the present application;

FIG. 5 is a flowchart of a thermal compensation correction method for a display screen according to an embodiment of the present application;

FIG. 6 is a schematic diagram of a real-time compensation system for a display screen according to an embodiment of the present application;

FIG. 7(a) is a flowchart of a thermal correction method for a display screen according to an embodiment of the present application;

FIG. 7(b) is a flowchart of a data calibration method according to an embodiment of the present application;

FIG. 7(c) is a flowchart of a real-time compensation method for a display screen according to an embodiment of the present application;

FIG. 7(d) is a flowchart of a global luminance and chrominance compensation method for a display screen according to an embodiment of the present application;

FIG. 8 is a schematic diagram of a thermal compensation correction system for a display screen according to an embodiment of the present application;

FIG. 9 is a schematic diagram of an information correction apparatus for a display screen according to an embodiment of the present application;

FIG. 10 is a schematic diagram of another information correction apparatus for a display screen according to an embodiment of the present application; and

FIG. 11 is a schematic diagram of a thermal compensation correction apparatus for a display screen according to an embodiment of the present application.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0016] In order to enable those skilled in the art to better understand the solutions of the present application, the technical solutions in the embodiments of the present application are clearly and completely described below with reference to the drawings in the embodiments of the present application. Obviously, the described embodiments are merely a part of, rather than all of the embodiments. All other embodiments obtained by those of ordinary skill in the art based on the embodiments of the present application without making creative efforts should fall within the protection scope of the present application.

[0017] It should be noted that the terms "first", "second", etc. in the description and claims of the present application and in the drawings described above, are used to distinguish similar objects, and not necessarily to describe a

particular order or sequential order. It should be understood that data used in this way may be interchanged where appropriate, such that the embodiments of the present application described herein may be implemented in an order other than those orders illustrated or described herein. Moreover, the terms "include" and "having" as well as any variations thereof are intended to mean covered and non-exclusive inclusion, for example, a process, a method, a system, a product or an apparatus including a series of steps or units does not need to be limited by those explicitly listed, but may include other steps or units not explicitly listed or inherent to such process, method, product or apparatus.

[0018] The embodiments of the present application provide an embodiment of an information processing method for a display screen. It should be noted that the steps shown in the flowchart of the drawings may be executed in a computer system such as a set of computer-executable instructions, and although a logical order is shown in the flowchart, in some cases, the steps shown or described may be executed in an order different from the order here.

[0019] FIG. 1 is a flowchart of an information processing method for a display screen according to an embodiment of the present application. As shown in FIG. 1, the method may include the following steps:

Step S102 Acquire display information of a display screen when displaying a target image.

[0020] In the technical solution provided in the above step S102 of the present application, the display information may include: color information of the display screen, grayscale information of the display screen, content shown in an image of the display screen, image data of the display screen, luminance and chrominance information of the display screen, uniformity information of the display screen, and the like. The uniformity information may be used to represent a uniformity degree of the display screen when displaying the target image. For example, the luminance and chrominance information may include luminance information and/or chrominance (or, may also be referred to as color temperature) information of the display screen, the uniformity information may be used to represent whether the luminance and chrominance information is consistent when different display regions in the display screen display the target image, evaluation indicators of the uniformity information may include: pixel light intensity uniformity, display module luminance uniformity and module group luminance uniformity, and the image data may include three-primary-color (Red Green Blue, abbreviated as RGB) image data (or, may also be referred to as an RGB data signal), which is only used as an example for illustration and is not specifically limited.

[0021] In this embodiment, display information of the display screen when displaying the target image is acquired. For example, luminance information and/or chrominance information of the display screen when displaying the target image can be measured through a luminance tool. For example, the luminance tool can be used to measure the luminance and chrominance information in the target image. The luminance tool can be a photoelectric sensor, a colorimeter, etc., which is only used as an example for illustration and is not specifically limited. By performing pixel-level operations on the target image displayed on the display screen, color information of each pixel in the target image can be obtained. By performing grayscale conversion on the target image displayed on the display screen, a grayscale image that corresponds to the target image can be obtained. Then, by processing the grayscale image through methods such as a grayscale histogram, grayscale information can be obtained. In addition, by detecting different regions in the display screen through uniformity testing equipment, uniformity information can be obtained.

[0022] Step S104 Acquire temperature information of the display screen when displaying the display information.

[0023] In the technical solution provided in the above step S104 of the present application, the luminance and chrominance information and the uniformity information may change with the temperature information of the display screen. The temperature information may be used to represent a temperature at which the display screen is located under a certain power consumption. For example, the luminance information and/or the chrominance information, and the uniformity degree of the display screen when displaying the target image, may change with the temperature information of the display screen.

[0024] In this embodiment, after acquiring the display information of the display screen when displaying the target image, temperature information of the display screen when displaying the display information is acquired. For example, according to the display information of the display screen when displaying the target image, power consumption of the display screen under the current display can be calculated, and then according to the power consumption and a temperature prediction model, temperature information of the display screen when displaying the display information can be calculated, that is, the temperature at which the display screen is located under the current power consumption can be calculated.

[0025] Optionally, the power consumption may be used to represent power consumption of different display regions in the display screen at a current moment. According to the power consumption and the temperature prediction model, temperature information of the display screen when displaying the display information can be calculated. For example, by inputting the power consumption into the temperature prediction model for prediction processing, the temperature of the display screen under the current power consumption can be obtained.

[0026] Step S106 Acquire a luminance and chrominance compensation coefficient and a uniformity compensation coefficient that correspond to the temperature information.

[0027] In the technical solution provided in the above step S106 of the present application, the luminance and

chrominance compensation coefficient may be determined based on an association relationship between the luminance and chrominance information of the display screen and the temperature information, and the uniformity compensation coefficient may be determined based on a pixel value in the target image. For example, the luminance and chrominance compensation coefficient may also be referred to as a luminance and color temperature compensation coefficient, and the uniformity compensation coefficient may also be referred to as a thermal uniformity compensation coefficient.

[0028] In this embodiment, the association relationship between the luminance and chrominance information and the temperature information may be that a change in the temperature information and a change in the luminance and chrominance present a linear relationship. For example, for every 1°C increase in the temperature information of the display screen, relative change amounts of RGB tristimulus values in a pixel are also different. The pixel value may be a principal component of RGB collected by a camera in a cold-screen state, or the pixel value may be a principal component of RGB collected by a camera in a hot-screen state.

[0029] Optionally, after acquiring the temperature information of the display screen when displaying the display information, a luminance and chrominance compensation coefficient and a uniformity compensation coefficient that correspond to the temperature information are acquired. For example, according to the temperature information of the display screen when displaying the display information, a compensation coefficient required to eliminate a luminance and chrominance deviation brought by the temperature information at the temperature information can be calculated, that is, the luminance and chrominance compensation coefficient can be calculated; and according to the temperature information of the display screen when displaying the display information, a compensation coefficient required to eliminate uniformity inconsistency brought by the temperature information at the temperature information can be calculated, that is, the uniformity compensation coefficient can be calculated.

[0030] Step S108 Compensate for luminance and chrominance information on the basis of the luminance and chrominance compensation coefficient, and compensate for uniformity information on the basis of the uniformity compensation coefficient.

[0031] In the technical solution provided in the above step S108 of the present application, the compensation may be used to represent compensation performed on RGB data in the target image displayed on the display screen.

[0032] Optionally, after acquiring the luminance and chrominance compensation coefficient and the uniformity compensation coefficient that correspond to the temperature information, the luminance and chrominance information is compensated for based on the luminance and chrominance compensation coefficient, and the uniformity information is compensated for based on the uniformity compensation coefficient. For example, according to the luminance and chrominance compensation coefficient, the current luminance and chrominance information can be compensated for, and according to the uniformity compensation coefficient, the current uniformity information can be compensated for, thereby compensating for the RGB data, and thus completing correction of the display information of the display screen.

[0033] FIG. 2(a) is a schematic diagram of an architecture of a control device for a display screen according to an embodiment of the present application. As shown in FIG. 2(a), the control device for the display screen may be a receiving card. In this architecture, transformer (TF) modules 201 to 202 can receive data from a transmitting end through a fibre channel interface (FCI) high-density connector. The TF module 201 can send the data to a field programmable gate array (FPGA) module 205 through a port physical layer (PHY) module 203, and the TF module 202 can send the data to the FPGA module 205 through a PHY module 204. The FPGA module 205 can be used for algorithm processing and calculation, and sends processed data to a driver chip 206 of the LED display screen, thereby controlling display of the LED screen. A micro controller unit (MCU) 207 can be responsible for preprocessing of parameters, and data acquisition and obtaining of sensor parameters. A synchronous dynamic random access memory (SDRAM)/double data rate synchronous dynamic random access memory (DDR) 208 and an external flash memory 209 can be used for storage of some parameters.

[0034] FIG. 2(b) is a schematic diagram of an internal structure of an FPGA according to an embodiment of the present application. As shown in FIG. 2(b), the following submodules are provided in the FPGA module: a receiving submodule (e.g., a receive submodule) 2051, a bus control submodule (e.g., a bus control submodule) 2052, a conversion submodule (e.g., a convert submodule) 2053 and a scanning submodule (e.g., a scan submodule) 2054. The receiving submodule 2051 is configured to unpack and acquire image data, the bus control submodule 2052 is configured to store the image data, the conversion submodule 2053 is configured to process multiple serial algorithms, and the scanning submodule 2054 is configured to control the driver chip of the display screen.

[0035] Optionally, through the conversion submodule 2053, the luminance and chrominance information can be compensated for according to the luminance and chrominance compensation coefficient, and the uniformity information can be compensated for according to the uniformity compensation coefficient, thereby compensating for the RGB data, and thus completing correction of the display information of the display screen.

[0036] FIG. 3 is a flowchart of a temperature compensation method according to an embodiment of the present application. As shown in FIG. 3, the temperature compensation method may include the following steps:

[0037] Step S301 Count image content.

[0038] After counting the image content, proceed to step S302.

[0039] Step S302 Calculate screen temperature.

[0040] In this embodiment, according to the display information of the display screen when displaying the target image, power consumption of the display screen under the current display can be calculated, and then according to the power consumption and the temperature prediction model, temperature information of the display screen when displaying the display information can be calculated, that is, the screen temperature under the current power consumption can be calculated.

[0041] After calculating the screen temperature, proceed to step S303.

[0042] Step S303 Calculate a luminance and chrominance compensation coefficient.

[0043] In this embodiment, according to the temperature information of the display screen when displaying the display information, that is, according to the screen temperature under the current power consumption, a compensation coefficient required to eliminate a luminance and chrominance deviation brought by the temperature at the screen temperature can be calculated, that is, the luminance and chrominance compensation coefficient can be calculated.

[0044] After calculating the luminance and chrominance compensation coefficient, proceed to step S304.

[0045] Step S304 Compensate for the luminance and chrominance information.

[0046] In this embodiment, the luminance and chrominance deviation brought by the temperature is eliminated through the luminance and chrominance compensation coefficient, thereby compensating for the luminance and chrominance information.

[0047] After compensating for the luminance and chrominance information, proceed to step S305.

[0048] Step S305 Calculate a thermal uniformity compensation coefficient.

[0049] In this embodiment, according to the temperature information of the display screen when displaying the display information, that is, according to the screen temperature under the current power consumption, a compensation coefficient required to eliminate uniformity inconsistency brought by the temperature at the screen temperature can be calculated, that is, the thermal uniformity compensation coefficient can be calculated.

[0050] After calculating the thermal uniformity compensation coefficient, proceed to step S306.

[0051] Step S306 Compensate for the uniformity information.

[0052] In this embodiment, the uniformity inconsistency brought by the temperature is eliminated through the thermal uniformity compensation coefficient, thereby compensating for the uniformity information.

[0053] Optionally, the temperature compensation method may specifically include the following steps:

[0054] Step one: considering that power consumption is strongly correlated with the heating condition of the LED, first, according to actual display content on the screen (for example, color information and grayscale information), power consumption under the current display is calculated.

[0055] Step two: then, according to an established temperature prediction model, the screen temperature under the current display power consumption is calculated.

[0056] Step three: according to the screen temperature value calculated above, a compensation coefficient required to eliminate a luminance and chrominance deviation brought by the temperature at the current screen temperature is calculated.

[0057] Step four: the original display grayscale is compensated for using the above compensation coefficient, thereby solving the problem that luminance and color temperature brought by temperature are unstable with temperature and with time.

[0058] Step five: in addition to affecting luminance and color temperature as a whole, temperature also affects uniformity of the screen, and therefore, a uniformity compensation coefficient needs to be calculated.

[0059] Step six: the uniformity of the screen is compensated for using the uniformity compensation coefficient, thereby solving the problem of uniformity of screen display brought by temperature changes.

[0060] In the related art, uniformity is usually compensated for only in a thermal equilibrium state (that is, when the temperature on the screen no longer changes and tends to be stable), thereby ensuring that the problem of display non-uniformity caused by temperature in the thermal equilibrium state is solved. However, the above method does not take into account that the temperature on the screen changes with time. For example, from power-on to the thermal equilibrium state, the temperature of the screen gradually rises. During this process, the temperature of the screen keeps changing, and the uniformity degree of the display of the screen also changes with the temperature, thereby resulting in the technical problem of low display quality of the display screen.

[0061] In addition, in the related art, correction compensation coefficients are usually modified according to grayscale displayed on the screen. This solution assumes that display grayscale and temperature present an absolute linear relationship. In this solution, the larger the grayscale displayed by the LED, the higher the temperature of the screen, and vice versa. That is, this solution only takes temperature into consideration on the basis of the prior art, but does not take into account that heating and heat dissipation of the LED screen require a certain time response (also referred to as reaction). For example, when suddenly switching from a smaller grayscale to a larger grayscale, the

luminance on the screen will not suddenly rise instantaneously, but rather rises in a relatively slow process. Therefore, the technical problem of low display quality of the display screen still exists.

[0062] However, in the solution implemented by the above steps S102 to S108 of the present application, display information of a display screen when displaying a target image is first acquired, then temperature information of the display screen when displaying the display information is acquired, a luminance and chrominance compensation coefficient and a uniformity compensation coefficient that correspond to the temperature information are acquired, then the luminance and chrominance information is compensated for through the luminance and chrominance compensation coefficient, and the uniformity information is compensated for through the uniformity compensation coefficient, thereby achieving the purpose of compensating for the luminance and chrominance and the uniformity of the display screen, thus solving the technical problem of low display quality of the display screen, and further achieving the technical effect of improving the display quality of the display screen.

[0063] The above method of this embodiment is further introduced below.

[0064] As an optional implementation, the luminance and chrominance compensation coefficient is obtained by converting a sub-luminance and chrominance compensation coefficient, the sub-luminance and chrominance compensation coefficient is used to represent the association relationship between the luminance and chrominance information of the display screen and the temperature information, and/or the uniformity compensation coefficient is determined based on a sub-uniformity compensation coefficient of a pixel in the target image, and the sub-uniformity compensation coefficient is used to compensate for uniformity information that corresponds to the pixel.

[0065] In this embodiment, the sub-luminance and chrominance compensation coefficient may be used to generate the luminance and chrominance compensation coefficient, the sub-luminance and chrominance compensation coefficient may be used to represent the association relationship between the luminance and chrominance information of the display screen and the temperature information, the sub-uniformity compensation coefficient may be used to generate the uniformity compensation coefficient, and the sub-uniformity compensation coefficient may be used to compensate for the uniformity information that corresponds to the pixel. For example, the sub-luminance and chrominance compensation coefficient may be represented by a temperature compensation coefficient matrix $[\gamma]$, and the sub-uniformity compensation coefficient may be represented by a correction compensation coefficient matrix $[\alpha]$.

[0066] Optionally, by converting the sub-luminance and chrominance compensation coefficient, the luminance and chrominance compensation coefficient can be obtained, and/or according to the sub-uniformity compensation coefficient of the pixel in the target image, the uniformity compensation coefficient can be determined, thereby achieving the technical effect of compensating for the luminance and chrominance and the uniformity of the display screen.

[0067] In this embodiment, it is necessary to determine the luminance and chrominance compensation coefficient to perform luminance and chrominance compensation on the display information displayed on the display screen. How to determine the luminance and chrominance compensation coefficient is further introduced below.

[0068] As an optional implementation, the information processing method for a display screen may further include: acquiring a luminance and chrominance sample and a temperature sample of the display screen; acquiring a luminance and chrominance compensation coefficient that corresponds to the temperature information includes that the luminance and chrominance compensation coefficient that corresponds to the temperature information is determined based on the sub-luminance and chrominance compensation coefficient that corresponds to both the luminance and chrominance sample and the temperature sample.

[0069] In this embodiment, the luminance and chrominance sample and the temperature sample may satisfy an association relationship. The luminance and chrominance sample may include a luminance sample and/or a chrominance sample of the display screen. For example, the luminance and chrominance sample may be RGB tristimulus value data, and the temperature sample may be represented by T_{meai} .

[0070] Optionally, RGB tristimulus value data and a temperature sample T_{meai} are acquired, and then according to the RGB tristimulus value data and the temperature sample T_{meai} , the sub-luminance and chrominance compensation coefficient can be determined, that is, the temperature compensation coefficient matrix $[\gamma]$ can be determined. Then, according to the temperature compensation coefficient matrix $[\gamma]$ and the temperature information, the luminance and chrominance compensation coefficient that corresponds to the temperature information can be determined, thereby achieving the technical effect of performing luminance and chrominance compensation on the display information displayed on the display screen by determining the luminance and chrominance compensation coefficient.

[0071] Optionally, by performing linear fitting on the luminance and chrominance sample and the temperature sample, a slope matrix that corresponds to the RGB tristimulus value data can be obtained. For example, by performing linear fitting on the RGB tristimulus value data and the temperature sample T_{meai} , a slope matrix $[K]$ that corresponds to the RGB tristimulus value data can be obtained.

[0072] Optionally, the temperature compensation coefficient γ can be obtained through the following formula:

$$[\gamma] = [A] \cdot \begin{bmatrix} RX & GX & BX \\ RY & GY & BY \\ RZ & GZ & BZ \end{bmatrix}_s \quad (1)$$

[0073] [K] may be used to represent the slope matrix, and $\begin{bmatrix} RX & GX & BX \\ RY & GY & BY \\ RZ & GZ & BZ \end{bmatrix}$ may be used to represent red, green

and blue tristimulus values, where the slope matrix [K] can be obtained by performing linear fitting on the red, green and blue tristimulus values and corresponding temperature data Tmeai on the screen. The linear fitting process is a

process of fitting 9 components in the red, green and blue tristimulus values $\begin{bmatrix} RX & GX & BX \\ RY & GY & BY \\ RZ & GZ & BZ \end{bmatrix}$ respectively.

[0074] Optionally, for every 1°C increase in the temperature of the display screen, relative change amounts of the tristimulus values are also different.

[0075] Optionally, the above process is described by taking luminance and chrominance compensation as an example. If only luminance compensation is performed, the corresponding collected red, green and blue tristimulus

data is changed from $\begin{bmatrix} RX & GX & BX \\ RY & GY & BY \\ RZ & GZ & BZ \end{bmatrix}_i$ to $\begin{bmatrix} RX & 0 & 0 \\ 0 & GY & 0 \\ 0 & 0 & BZ \end{bmatrix}_i$, and corresponding non-main-diagonal ele-

ments in [K], $[\gamma]$ and $[\delta]$ are 0. Whether luminance compensation is performed or both luminance and chrominance compensation are performed is not limited in the present application, and can be selected according to requirements.

[0076] In this embodiment, it is necessary to determine the luminance and chrominance compensation coefficient according to the sub-luminance and chrominance compensation coefficient. How to determine the luminance and chrominance compensation coefficient according to the sub-luminance and chrominance compensation coefficient is further introduced below.

[0077] As an optional implementation, determining the luminance and chrominance compensation coefficient that corresponds to the temperature information on the basis of the sub-luminance and chrominance compensation coefficient that corresponds to both the luminance and chrominance sample and the temperature sample includes that the luminance and chrominance compensation coefficient that corresponds to the temperature information is determined at least based on the sub-luminance and chrominance compensation coefficient and a reference temperature of the display screen.

[0078] In this embodiment, the reference temperature may be used to represent temperature information at which the display screen is located when the luminance and chrominance information and/or the uniformity information are in a normal state. For example, the reference temperature may be represented by T_{LED_base} .

[0079] Optionally, after acquiring the luminance and chrominance sample and the temperature sample of the display screen, the luminance and chrominance compensation coefficient that corresponds to the temperature information is determined at least based on the sub-luminance and chrominance compensation coefficient that corresponds to both the luminance and chrominance sample and the temperature sample. For example, at least according to the sub-luminance and chrominance compensation coefficient determined by the luminance and chrominance sample and the temperature sample, the reference temperature of the display screen and current temperature information of the display screen, the luminance and chrominance compensation coefficient that corresponds to the temperature information can be determined, thereby achieving the technical effect of determining the luminance and chrominance compensation coefficient according to the sub-luminance and chrominance compensation coefficient.

[0080] Optionally, according to the sub-luminance and chrominance compensation coefficient determined by the luminance and chrominance sample and the temperature sample, the reference temperature of the display screen and the current temperature information of the display screen, the luminance and chrominance compensation coefficient that corresponds to the temperature information can be determined. For example, according to the slope matrix [K] that corresponds to the RGB tristimulus value data and the RGB tristimulus value data, the sub-luminance and chrominance compensation coefficient can be determined, that is, the temperature compensation coefficient matrix $[\gamma]$ can be determined. Then, according to the temperature compensation coefficient matrix $[\gamma]$, the reference temperature T_{LED_base} of the display screen and the current temperature information $T_{LED_k,i}$ of the display screen, the luminance and chrominance compensation coefficient can be determined, that is, a luminance and color temperature compensation coefficient $[\delta]_{k,i}$ can be determined.

[0081] In this embodiment, it is necessary to determine the luminance and chrominance compensation coefficient that corresponds to the temperature information at least on the basis of the sub-luminance and chrominance compensation coefficient and the reference temperature of the display screen. How to determine the luminance and chromi-

nance compensation coefficient that corresponds to the temperature information at least on the basis of the sub-luminance and chrominance compensation coefficient and the reference temperature of the display screen is further introduced below.

[0082] As an optional implementation, determining the luminance and chrominance compensation coefficient that corresponds to the temperature information at least on the basis of the sub-luminance and chrominance compensation coefficient and the reference temperature of the display screen includes that a changed temperature of the temperature information relative to the reference temperature is determined; and the sub-luminance and chrominance compensation coefficient is adjusted based on the changed temperature to the luminance and chrominance compensation coefficient that corresponds to the temperature information.

[0083] In this embodiment, the changed temperature may be used to represent an increment of the current temperature information of the LED screen relative to a certain reference temperature. For example, the changed temperature may be represented by $\Delta T_{LED_{k,i}}$.

[0084] Optionally, after acquiring the luminance and chrominance sample and the temperature sample of the display screen, a difference between the current temperature information of the LED screen and the reference temperature is determined as the changed temperature. Then, according to the changed temperature and the sub-luminance and chrominance compensation coefficient determined by the luminance and chrominance sample and the temperature sample, the luminance and chrominance compensation coefficient can be determined, that is, the luminance and color temperature compensation coefficient $[\delta]_{k,i}$ can be determined. Thereby, the sub-luminance and chrominance compensation coefficient can be adjusted to the luminance and chrominance compensation coefficient that corresponds to the temperature information, that is, the temperature compensation coefficient $[\gamma]$ can be adjusted to the luminance and color temperature compensation coefficient $[\delta]_{k,i}$, thus achieving the technical effect of determining the luminance and chrominance compensation coefficient that corresponds to the temperature information at least on the basis of the sub-luminance and chrominance compensation coefficient and the reference temperature of the display screen.

[0085] Optionally, the above process of adjusting the luminance and chrominance compensation coefficient can be implemented through the following formula:

$$[\delta]_{k,i} = [1 + [\gamma] \cdot \Delta T_{LED_{k,i}}]^{-1} \quad (2)$$

$$\Delta T_{LED_{k,i}} = T_{LED_{k,i}} - T_{LED_{base}} \quad (3)$$

[0086] $[\delta]_{k,i}$ may be used to represent the luminance and chrominance compensation coefficient of the i^{th} region at the k^{th} moment, $\Delta T_{LED_{k,i}}$ may be used to represent an increment of the current temperature of the LED screen of the i^{th} region at the k^{th} moment relative to a certain reference temperature, $[\]^{-1}$ may be used to represent an inverse of a matrix, and $[\gamma]$ may be used to represent the temperature compensation coefficient, where the luminance and chrominance compensation coefficient may be a 3×3 matrix.

[0087] Optionally, the luminance and chrominance information of the display screen can be compensated for through the following formula:

$$\begin{bmatrix} R_{out} \\ G_{out} \\ B_{out} \end{bmatrix} = [\delta] * \begin{bmatrix} R_{in} \\ G_{in} \\ B_{in} \end{bmatrix} \quad (4)$$

[0088] R_{in} , G_{in} and B_{in} may be used to represent the current luminance and chrominance information of the display screen, and R_{out} , G_{out} and B_{out} may be used to represent the compensated luminance and chrominance information of the display screen.

[0089] In this embodiment, it is necessary to determine the changed temperature of the temperature information relative to the reference temperature. How to determine the changed temperature of the temperature information relative to the reference temperature is further introduced below.

[0090] As an optional implementation, determining the changed temperature of the temperature information relative to the reference temperature includes that a changed temperature of temperature information of a sub-display region at a target moment relative to the reference temperature is determined.

[0091] In this embodiment, the display region of the display screen may include a sub-display region. For example, the sub-display region may be represented by the i^{th} region, and the target moment may be represented by the k^{th} moment.

[0092] Optionally, the changed temperature of the temperature information of the sub-display region at the target moment relative to the reference temperature is determined. For example, a difference between the temperature

information of the sub-display region at the target moment and the reference temperature of the sub-display region at the target moment is determined as the changed temperature, thereby achieving the technical effect of determining the changed temperature of the temperature information relative to the reference temperature.

[0093] Optionally, the difference between the temperature information of the sub-display region at the target moment and the reference temperature of the sub-display region at the target moment is determined as the changed temperature. For example, a difference between the current temperature of the LED screen of the i^{th} region at the k^{th} moment and a certain reference temperature of the LED screen of the i^{th} region at the k^{th} moment is determined as the changed temperature.

[0094] In this embodiment, specific steps of acquiring the uniformity compensation coefficient that corresponds to the temperature information need to be determined. How to acquire the uniformity compensation coefficient that corresponds to the temperature information is further introduced below.

[0095] As an optional implementation, acquiring the uniformity compensation coefficient that corresponds to the temperature information includes that the uniformity compensation coefficient that corresponds to the temperature information is determined based on a sub-uniformity compensation coefficient that corresponds to both a first luminance and chrominance sample and a second luminance and chrominance sample.

[0096] In this embodiment, the luminance and chrominance sample may include a first luminance and chrominance sample of the display screen in a cold-screen state and a second luminance and chrominance sample of the display screen in a hot-screen state. First temperature information of the display screen in the cold-screen state is less than second temperature information of the display screen in the hot-screen state. For example, the first temperature information may be represented by T_{cold} , and the second temperature information may be represented by T_{hot} .

[0097] Optionally, the uniformity compensation coefficient that corresponds to the temperature information is determined based on the sub-uniformity compensation coefficient that corresponds to both the first luminance and chrominance sample and the second luminance and chrominance sample. For example, the first luminance and chrominance sample of the display screen in the cold-screen state and the second luminance and chrominance sample of the display screen in the hot-screen state are acquired, and then according to the two different luminance and chrominance samples, the sub-uniformity compensation coefficient can be determined, that is, the correction compensation coefficient matrix $[\alpha]$ can be determined. Then, according to the correction compensation coefficient matrix $[\alpha]$, the first temperature information T_{cold} , the second temperature information T_{hot} and the current temperature information $T_{\text{LED}_{k,i}}$ of the display screen, the uniformity compensation coefficient that corresponds to the temperature information can be determined, that is, a thermal uniformity compensation coefficient $[\beta]_{k,i}$ can be determined, thereby achieving the technical effect of acquiring the uniformity compensation coefficient that corresponds to the temperature information.

[0098] Optionally, the sub-uniformity compensation coefficient in a luminance mode can be obtained through the following formula:

$$\begin{bmatrix} \alpha_{rr} & 0 & 0 \\ 0 & \alpha_{gg} & 0 \\ 0 & 0 & \alpha_{bb} \end{bmatrix} = \begin{bmatrix} RX & 0 & 0 \\ 0 & GY & 0 \\ 0 & 0 & BZ \end{bmatrix}_{\text{cold}} \cdot \begin{bmatrix} RX & 0 & 0 \\ 0 & GY & 0 \\ 0 & 0 & BZ \end{bmatrix}_{\text{hot}}^{-1} \quad (5)$$

$\begin{bmatrix} RX & 0 & 0 \\ 0 & GY & 0 \\ 0 & 0 & BZ \end{bmatrix}_{\text{cold}}$ may be used to represent a principal component of RGB collected by a camera in the cold-

screen state, and the screen temperature at this time is T_{cold} ; $\begin{bmatrix} RX & 0 & 0 \\ 0 & GY & 0 \\ 0 & 0 & BZ \end{bmatrix}_{\text{hot}}$ may be used to represent a principal component of RGB collected by the camera in the hot-screen state, and the screen temperature at this time is

T_{hot} ; and $\begin{bmatrix} \alpha_{rr} & 0 & 0 \\ 0 & \alpha_{gg} & 0 \\ 0 & 0 & \alpha_{bb} \end{bmatrix}$ may be used to represent the correction compensation coefficient in the luminance mode.

[0099] Optionally, the sub-uniformity compensation coefficient in a chrominance mode can be obtained through the following formula:

$$\begin{bmatrix} \alpha_{rr} & \alpha_{rg} & \alpha_{rb} \\ \alpha_{gr} & \alpha_{gg} & \alpha_{gb} \\ \alpha_{br} & \alpha_{bg} & \alpha_{bb} \end{bmatrix} = \begin{bmatrix} RX & GX & BX \\ RY & GY & BY \\ RZ & GZ & BZ \end{bmatrix}_{\text{cold}} \cdot \begin{bmatrix} RX & GX & BX \\ RY & GY & BY \\ RZ & GZ & BZ \end{bmatrix}_{\text{hot}}^{-1} \quad (6)$$

5 $\begin{bmatrix} RX & GX & BX \\ RY & GY & BY \\ RZ & GZ & BZ \end{bmatrix}_{\text{cold}}$ may be used to represent XYZ tristimulus values of RGB collected by the camera in the cold-

10 screen state, and the screen temperature at this time is T_{cold} ; $\begin{bmatrix} RX & GX & BX \\ RY & GY & BY \\ RZ & GZ & BZ \end{bmatrix}_{\text{hot}}$ may be used to represent XYZ

tristimulus values of RGB collected by the camera in the hot-screen state, and the screen temperature at this time is

15 T_{hot} ; and $\begin{bmatrix} RX & GX & BX \\ RY & GY & BY \\ RZ & GZ & BZ \end{bmatrix}_{\text{hot}}$ may be used to represent the correction compensation coefficient in the luminance mode.

20 **[0100]** Optionally, $[\alpha]$ may be used to represent the correction compensation coefficient matrix, where the correction compensation coefficient matrix may be a 3×3 matrix, and each pixel has its independent compensation coefficient. Whether the compensation coefficient in the luminance mode or the compensation coefficient in the chrominance mode is used is not limited in the present application, and can be selected according to requirements.

25 **[0101]** In this embodiment, it is necessary to determine the uniformity compensation coefficient that corresponds to the temperature information on the basis of the sub-uniformity compensation coefficient that corresponds to both the first luminance and chrominance sample and the second luminance and chrominance sample. How to determine the uniformity compensation coefficient that corresponds to the temperature information on the basis of the sub-uniformity compensation coefficient that corresponds to both the first luminance and chrominance sample and the second luminance and chrominance sample is further introduced below.

30 **[0102]** As an optional implementation, determining the uniformity compensation coefficient that corresponds to the temperature information on the basis of the sub-uniformity compensation coefficient that corresponds to both the first luminance and chrominance sample and the second luminance and chrominance sample includes that the uniformity compensation coefficient that corresponds to the temperature information is determined at least based on the sub-uniformity compensation coefficient and the reference temperature of the display screen.

35 **[0103]** In this embodiment, the uniformity compensation coefficient that corresponds to the temperature information is determined at least based on the sub-uniformity compensation coefficient and the reference temperature of the display screen. For example, at least according to the sub-uniformity compensation coefficient determined by the first luminance and chrominance sample and the second luminance and chrominance sample, the reference temperature of the display screen and the current temperature information of the display screen, the uniformity compensation coefficient that corresponds to the temperature information can be determined, thereby achieving the technical effect of determining the uniformity compensation coefficient that corresponds to the temperature information on the basis of the sub-uniformity compensation coefficient that corresponds to both the first luminance and chrominance sample and the second luminance and chrominance sample.

40 **[0104]** Optionally, at least according to the sub-uniformity compensation coefficient determined by the first luminance and chrominance sample and the second luminance and chrominance sample, the reference temperature of the display screen and the current temperature information of the display screen, the uniformity compensation coefficient that corresponds to the temperature information can be determined. For example, according to the correction compensation coefficient matrix $[\alpha]$, the reference temperature $T_{\text{LED}_{\text{base}}}$ of the display screen and the current temperature information $T_{\text{LED}_{k,i}}$ of the display screen, the uniformity compensation coefficient that corresponds to the temperature information can be determined, that is, the thermal uniformity compensation coefficient $[\beta]_{k,i}$ can be determined.

50 **[0105]** In this embodiment, it is necessary to determine the uniformity compensation coefficient that corresponds to the temperature information at least on the basis of the sub-uniformity compensation coefficient and the reference temperature of the display screen. How to determine the uniformity compensation coefficient that corresponds to the temperature information at least on the basis of the sub-uniformity compensation coefficient and the reference temperature of the display screen is further introduced below.

55 **[0106]** As an optional implementation, determining the uniformity compensation coefficient that corresponds to the temperature information at least on the basis of the sub-uniformity compensation coefficient and the reference temperature of the display screen includes that a changed temperature of the temperature information relative to the

reference temperature is determined; and the sub-uniformity compensation coefficient is adjusted based on the changed temperature and a temperature difference of the second temperature information relative to the first temperature information to the uniformity compensation coefficient that corresponds to the temperature information.

[0107] In this embodiment, a difference between the current temperature information of the LED screen and the reference temperature is determined as the changed temperature. Then, according to the changed temperature, the sub-uniformity compensation coefficient determined by the first luminance and chrominance sample and the second luminance and chrominance sample, and the temperature difference of the second temperature information relative to the first temperature information, the uniformity compensation coefficient that corresponds to the temperature information can be determined, that is, the thermal uniformity compensation coefficient $[\beta]_{k,i}$ can be determined. Thereby, the sub-uniformity compensation coefficient can be adjusted to the uniformity compensation coefficient that corresponds to the temperature information, that is, the correction compensation coefficient matrix $[\alpha]$ can be adjusted to the thermal uniformity compensation coefficient $[\beta]_{k,i}$ thus achieving the technical effect of determining the uniformity compensation coefficient that corresponds to the temperature information at least on the basis of the sub-uniformity compensation coefficient and the reference temperature of the display screen.

[0108] Optionally, the above process of adjusting the uniformity compensation coefficient can be implemented through the following formula:

$$[\beta]_{k,i} = ([\alpha] - 1) \cdot \Delta T_{LED} D_{k,i} / (T_{hot} - T_{cold}) + 1 \quad (7)$$

where $[\beta]_{k,i}$ may be used to represent the thermal compensation coefficient of the i^{th} region at the k^{th} moment, T_{hot} may be used to represent a thermal equilibrium temperature during calibration of thermal correction data of the LED screen, that is, T_{hot} may be a temperature when the temperature gradually rises to equilibrium in the case of displaying the brightest picture, and T_{cold} may be used to represent a temperature when the LED screen is powered off, where the thermal compensation coefficient may be a 3×3 matrix.

[0109] Optionally, the uniformity information of the display screen can be compensated for through the following formula:

$$\begin{bmatrix} R_{out2} \\ G_{out2} \\ B_{out2} \end{bmatrix} = [\beta] * \begin{bmatrix} R_{out1} \\ G_{out1} \\ B_{out1} \end{bmatrix} \quad (8)$$

[0110] R_{out2} , G_{out2} and B_{out2} may be used to represent the compensated display information of the display screen.

[0111] In this embodiment, it is necessary to determine a first principal component of a pixel and a second principal component of the pixel. How to determine the first principal component of the pixel and the second principal component of the pixel is further introduced below.

[0112] As an optional implementation, the first luminance and chrominance sample includes a first principal component of the pixel, the first principal component is collected from the display screen in a luminance mode in the cold-screen state, the second luminance and chrominance sample includes a second principal component of the pixel, and the second principal component is collected from the display screen in the hot-screen state in the luminance mode.

[0113] In this embodiment, the pixel value may include the first principal component or the second principal component. For example, the first principal component may be used to represent the principal component of RGB collected by the camera in the cold-screen state, and the second principal component may be used to represent the principal component of RGB collected by the camera in the hot-screen state.

[0114] Optionally, by collecting, through the camera, RGB components of the display screen in the cold-screen state, the first principal component of the pixel can be obtained, thereby obtaining the first luminance and chrominance sample. By collecting, through the camera, RGB components of the display screen in the hot-screen state, the second principal component of the pixel can be obtained, thereby obtaining the second luminance and chrominance sample, thus achieving the technical effect of determining the first principal component and the second principal component.

[0115] Optionally, the first principal component may be represented by $\begin{bmatrix} RX & 0 & 0 \\ 0 & GY & 0 \\ 0 & 0 & BZ \end{bmatrix}_{cold}$, and the second

principal component may be represented by $\begin{bmatrix} RX & 0 & 0 \\ 0 & GY & 0 \\ 0 & 0 & BZ \end{bmatrix}_{hot}$.

[0116] In this embodiment, it is necessary to determine a first tristimulus value of the pixel and a second tristimulus

value of the pixel. How to determine the first tristimulus value of the pixel and the second tristimulus value of the pixel is further introduced below.

[0117] As an optional implementation, the first luminance and chrominance sample includes a first tristimulus value of the pixel, the first tristimulus value is collected when the display screen is in a chrominance mode and in the cold-screen state, the second luminance and chrominance sample includes a second tristimulus value of the pixel, and the second tristimulus value is collected from the display screen in the hot-screen state in the chrominance mode.

[0118] In this embodiment, the first tristimulus value may be used to represent XYZ tristimulus values of RGB collected by the camera in the cold-screen state, and the second tristimulus value may be used to represent XYZ tristimulus values of RGB collected by the camera in the hot-screen state.

[0119] Optionally, by collecting, through the camera, XYZ tristimulus values of RGB of the display screen in the cold-screen state, the first tristimulus value of the pixel can be obtained, thereby obtaining the first luminance and chrominance sample. By collecting, through the camera, XYZ tristimulus values of RGB of the display screen in the hot-screen state, the second tristimulus value of the pixel can be obtained, thereby obtaining the second luminance and chrominance sample, thus achieving the technical effect of determining the first tristimulus value and the second tristimulus value of the pixel.

[0120] Optionally, the first tristimulus value may be represented by $\begin{bmatrix} RX & GX & BX \\ RY & GY & BY \\ RZ & GZ & BZ \end{bmatrix}_{cold}$, and the second tristimulus value may be represented by $\begin{bmatrix} RX & GX & BX \\ RY & GY & BY \\ RZ & GZ & BZ \end{bmatrix}_{hot}$.

[0121] In this embodiment, it is necessary to determine the temperature information of the display screen working under the power consumption. How to determine the temperature information of the display screen working under the power consumption is further introduced below.

[0122] As an optional implementation, acquiring the temperature information of the display screen when displaying the display information includes that power consumption of the display screen is determined based on the display information; and temperature information of the display screen working under the power consumption is determined.

[0123] In this embodiment, the power consumption may be used to represent current power consumption of the display screen when displaying the display information, where the power consumption is strongly correlated with the heating condition of the LED, and the heating condition (for example, temperature information) can affect the display information of the screen (for example, actual display content), that is, the power consumption can affect the display information. Conversely, according to the display information on the screen, the power consumption of the display screen under the current display can be calculated. From the above, it can be known that the larger the grayscale of the actual display content, the higher the luminance of the LED display screen, and the greater the power consumption thereof.

[0124] Optionally, the power consumption of the display screen is determined based on the display information, and the temperature information of the display screen working under the power consumption is determined. For example, according to the actual display content on the screen, the power consumption under the current display can be calculated, and then according to the power consumption and the temperature prediction model, the temperature information of the display screen when displaying the display information under the power consumption can be calculated, that is, the temperature information working under the current power consumption can be calculated, thereby achieving the technical effect of determining the temperature information of the display screen working under the power consumption.

[0125] In this embodiment, specific steps of determining the temperature information of the display screen working under the power consumption need to be clarified. The specific steps of determining the temperature information of the display screen working under the power consumption are further introduced below.

[0126] As an optional implementation, determining the temperature information of the display screen working under the power consumption includes that temperature information of a sub-display region at a target moment is determined based on an ambient temperature of an environment where the display screen is located at the target moment, power consumption of the sub-display region of the display screen at the target moment, and a temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region.

[0127] In this embodiment, the ambient temperature may be represented by T_{amb_k} , the power consumption may be represented by $P_{k,i}$, and the temperature may be represented by R_{ij} . For example, T_{amb_k} may indicate the ambient temperature at the k^{th} moment, $P_{k,i}$ may indicate the power consumption of the i^{th} region at the k^{th} moment, and R_{ij} may indicate a temperature increase value caused by unit power consumption dissipation of the j^{th} region when power is applied at the i^{th} LED region, where R_{ij} may represent the thermal resistance of a chip itself, that is, the

temperature increase value caused by unit power consumption dissipation of the chip itself.

[0128] Optionally, the temperature information of the sub-display region at the target moment is determined based on the ambient temperature of the environment where the display screen is located at the target moment, the power consumption of the sub-display region of the display screen at the target moment, and the temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region. For example, according to the ambient temperature T_{amb_k} , the power consumption $P_{k,i}$ of the sub-display region of the display screen at the target moment and the temperature increase value R_{ij} , the temperature information of the sub-display region at the target moment can be determined, that is, the current temperature of the LED screen of the i^{th} region at the k^{th} moment can be determined, thereby achieving the technical effect of determining the temperature information of the display screen working under the power consumption.

[0129] Optionally, the power consumption $P_{k,i}$ of the sub-display region of the display screen at the target moment can be determined through the following formula:

$$P_{k,i} = pr \cdot APL_R_{k,i} + pg \cdot APL_G_{k,i} + pb \cdot APL_B_{k,i} \quad (9)$$

[0130] $APL_R_{k,i}$, $APL_G_{k,i}$, $APL_B_{k,i}$ may be respectively used to represent luminance statistical values of red, green and blue luminance of the i^{th} partition at the k^{th} moment, and pr , pg , pb may be respectively used to represent power of red, green and blue unit luminance.

[0131] Optionally, the temperature of the LED screen can be calculated through the following formula:

$$\begin{bmatrix} T_LED_{k,1} \\ T_LED_{k,2} \\ \dots \\ T_LED_{k,i} \end{bmatrix} = \begin{bmatrix} R_{11} & R_{12} & \dots & R_{1i} \\ R_{21} & R_{22} & \dots & R_{2i} \\ \dots & \dots & \dots & \dots \\ R_{i1} & R_{i2} & \dots & R_{ii} \end{bmatrix} \cdot \begin{bmatrix} P_{k,1} \\ P_{k,2} \\ \dots \\ P_{k,i} \end{bmatrix} + T_amb_k \quad (10)$$

[0132] Optionally, according to the temperature prediction model established by the above formula, the screen temperature under the current display power consumption can be calculated, where the temperature is related to the heating condition, and heating affects the screen temperature. In order to obtain the thermal resistance matrix in the above model, it is necessary to calibrate temperature data of different regions under different power consumption to solve the above thermal resistance matrix.

[0133] In this embodiment, it is necessary to obtain the temperature information of the display screen working under the power consumption according to a mapping relationship. How to obtain the temperature information of the display screen working under the power consumption according to the mapping relationship is further introduced below.

[0134] As an optional implementation, the information processing method for a display screen may further include: temperature samples of a plurality of sub-display regions of the display screen are respectively acquired to obtain a plurality of temperature samples; power consumption samples of the display screen that correspond to different display information samples are acquired to obtain a plurality of power consumption samples; a target mapping relationship is established based on the plurality of temperature samples, the plurality of power consumption samples and an ambient temperature sample of the environment where the display screen is located; and determining the temperature information of a sub-display region at a target moment based on an ambient temperature of an environment where the display screen is located at the target moment, the power consumption of the sub-display region of the display screen at the target moment, and a temperature of the sub-display region that is adjusted due to influence of power consumption of regions in the display region of the display screen other than the sub-display region includes that the ambient temperature, the power consumption of the sub-display region at the target moment and the temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region are mapped based on the target mapping relationship into the temperature information.

[0135] In this embodiment, the power consumption samples may be used to cause the display screen to produce corresponding display information samples.

[0136] Optionally, the plurality of sub-display regions may be 9 partitions of the display screen, the temperature samples may be measured temperature data of the 9 partitions, the different display information samples may be used to represent information samples in different display patterns, the plurality of power consumption samples may be used to represent power in different display patterns, the ambient temperature sample may be used to represent an ambient temperature during calibration, and the target mapping relationship may be used to represent a functional relationship in the temperature prediction model. For example, the information samples in different display patterns

may be display contents of different colors and different grayscales, and the display pattern may be used to represent a pattern of color and grayscale represented by display content, which is only used as an example for illustration and is not specifically limited.

[0137] Optionally, temperature samples of the 9 partitions of the display screen are respectively acquired, power consumption samples that correspond to different display information samples are acquired, and then according to the temperature samples of the 9 partitions, the power consumption samples and the ambient temperature sample, the temperature prediction model can be determined. Then, the functional relationship in the temperature prediction model is determined as the target mapping relationship. Then, according to the target mapping relationship, the ambient temperature, the power consumption of the sub-display region at the target moment and the temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region are mapped into the temperature information, thereby achieving the technical effect of obtaining the temperature information of the display screen working under the power consumption according to the mapping relationship.

[0138] Optionally, the target mapping relationship may be shown as follows:

$$\begin{bmatrix} T_1 \\ T_2 \\ \dots \\ T_9 \end{bmatrix} = \begin{bmatrix} R_{11} & R_{12} & \dots & R_{19} \\ R_{21} & R_{22} & \dots & R_{29} \\ \dots & \dots & \dots & \dots \\ R_{91} & R_{92} & \dots & R_{99} \end{bmatrix} \cdot \begin{bmatrix} P_1 \\ P_2 \\ \dots \\ P_9 \end{bmatrix} + T_{amb} \quad (11)$$

[0139] The above formula is described by taking 9 partitions as an example, different test pictures are respectively displayed, and at the same time, temperature data of different regions is measured using temperature sensors, and

the ambient temperature T_{amb} is recorded. $\begin{bmatrix} T_1 \\ T_2 \\ \dots \\ T_9 \end{bmatrix}$ may be used to represent measured temperature data of the 9

partitions, $\begin{bmatrix} P_1 \\ P_2 \\ \dots \\ P_9 \end{bmatrix}$ may be used to represent power in different display patterns, that is, power under display contents of

different colors and different grayscales, and T_{amb} may be used to represent the ambient temperature during calibration. By substituting data of multiple calibrations into the above formula, the thermal resistance matrix can be solved, where the process of calibrating temperature data of different regions under different power consumption can be implemented by a computer.

[0140] Optionally, the different display patterns may be as shown in Table 1 below:

[0141] Table 1 Pattern Table

Pattern1	Pattern2	Pattern3
Pattern4	Pattern5	Pattern6
Pattern7	Pattern8	Pattern9

[0142] Optionally, the predicted temperature is processed in a manner shown in the following formula to mitigate deviation or noise of the predicted temperature:

$$T_{LED_{k,i}} = \sum_{t=0}^n \sum_{i=0}^m (\omega_t \cdot \varphi_i \cdot T_{LED_{k-t,i}}) \quad (12)$$

[0143] ω_t may be used to represent a time denoising weight factor, and φ_i may be used to represent a spatial denoising weight factor, and values of the above two denoising weight factors are both ≤ 1 .

[0144] In this embodiment, it is necessary to acquire the temperature information of the display screen when displaying the display information. How to acquire the temperature information of the display screen when displaying the display information is further introduced below.

[0145] As an optional implementation, acquiring the temperature information of the display screen when displaying the display information includes that the temperature information obtained by a temperature sensor that collects a

temperature of the display screen when producing the display information is acquired.

[0146] In this embodiment, the temperature obtained by the temperature sensor can be compatibly used to replace the calculated temperature value. For example, by collecting, through the temperature sensor, the temperature of the display screen when producing the display information, the temperature information of the display screen when displaying the display information can be obtained, thereby achieving the technical effect of acquiring the temperature information of the display screen when displaying the display information.

[0147] Optionally, by establishing a model relationship between image content and temperature offline and counting image content online, the temperature information of the display screen when displaying the display information can be predicted.

[0148] In this embodiment, it is necessary to determine compensated display information. How to determine the compensated display information is further introduced below.

[0149] As an optional implementation, compensating for the luminance and chrominance information on the basis of the luminance and chrominance compensation coefficient includes that a product of the luminance and chrominance compensation coefficient and the luminance and chrominance information is determined as the compensated luminance and chrominance information; and compensating for the uniformity information on the basis of the uniformity compensation coefficient includes that a product of the uniformity compensation coefficient and the uniformity information is determined as the compensated uniformity information.

[0150] In this embodiment, the product of the luminance and chrominance compensation coefficient and the luminance and chrominance information is determined as the compensated luminance and chrominance information. For example, a product of the luminance and color temperature compensation coefficient $[\delta]_{k,i}$ and the luminance and

chrominance information $\begin{bmatrix} R_{in} \\ G_{in} \\ B_{in} \end{bmatrix}$ is determined as the compensated luminance and chrominance information

$$\begin{bmatrix} R_{out1} \\ G_{out1} \\ B_{out1} \end{bmatrix}.$$

[0151] Optionally, the luminance and chrominance information of the display screen can be compensated for through the following formula:

$$\begin{bmatrix} R_{out1} \\ G_{out1} \\ B_{out1} \end{bmatrix} = [\delta] * \begin{bmatrix} R_{in} \\ G_{in} \\ B_{in} \end{bmatrix} \quad (4)$$

[0152] Optionally, the product of the uniformity compensation coefficient and the uniformity information is determined as the compensated uniformity information. For example, a product of the correction compensation coefficient matrix

$[\alpha]$ and the uniformity information is determined as the compensated uniformity information $\begin{bmatrix} R_{out2} \\ G_{out2} \\ B_{out2} \end{bmatrix}$, thereby achieving the technical effect of determining the compensated display information.

[0153] Optionally, the uniformity information of the display screen can be compensated for through the following formula:

$$\begin{bmatrix} R_{out2} \\ G_{out2} \\ B_{out2} \end{bmatrix} = [\beta] * \begin{bmatrix} R_{out1} \\ G_{out1} \\ B_{out1} \end{bmatrix} \quad (8)$$

[0154] In this embodiment, it is necessary to distinguish a normal state from an abnormal state of the display information. How to distinguish the normal state from the abnormal state of the display information is further introduced below.

[0155] As an optional implementation, the temperature information is used to cause the luminance and chrominance information and/or the uniformity information to be in an abnormal state, and the compensated luminance and chrominance information and/or the compensated uniformity information are in a normal state.

[0156] In this embodiment, if the temperature information of the display screen is too low or too high, the luminance and chrominance information and/or the uniformity information are caused to be in the abnormal state. If the luminance and chrominance information and/or the uniformity information are in the abnormal state, by performing lumi-

nance and chrominance compensation on the luminance and chrominance information and/or performing uniformity compensation on the uniformity information, the compensated luminance and chrominance information and/or the compensated uniformity information can be caused to be in the normal state, thereby achieving the technical effect of distinguishing the normal state from the abnormal state of the display information.

[0157] Optionally, since structures of different regions of an LED cabinet are different, heat dissipation of different regions is different, and heating of different regions is different, thereby causing temperature information of different regions of the screen to be different, and further causing luminance and chrominance and uniformity of different regions of the screen to be abnormal, where the temperature information has a great influence on the overall display performance of the LED screen, which is determined by physical properties of the structure of the display screen itself. For example, the chrominance of the display screen drifts greatly with the temperature of a light emitting device, and the temperature problem causes uniformity inconsistency of the display screen, deviation and instability of the overall luminance and chrominance, etc.

[0158] Optionally, if display is not performed according to expected luminance and chrominance information, it can be determined that the luminance and chrominance information is in the abnormal state. If display is performed according to the expected luminance and chrominance information, it can be determined that the luminance and chrominance information is in the normal state.

[0159] Optionally, if display is not performed according to expected uniformity information, it can be determined that the uniformity information is in the abnormal state. If display is performed according to the expected uniformity information, it can be determined that the uniformity information is in the normal state.

[0160] Optionally, the temperature of the screen can affect the uniformity of the screen, and cause inconsistency of luminance and color temperature of the screen. For example, self-heating of the screen body of the display screen, heating of different regions, and heat dissipation all affect the final temperature of the screen, and the final temperature affects changes in uniformity and luminance and chrominance. For example, the self-heating of the screen body of the display screen may include heating of light emitting devices, etc., heating of different regions may be affected by display content, that is, regions with rich color details have higher temperatures, and heat dissipation may be affected by a cabinet structure. For example, since structures of different regions of the cabinet are different, heat dissipation coefficients of different materials are also different.

[0161] FIG. 4 is a flowchart of an information correction method for a display screen according to an embodiment of the present application. As shown in FIG. 4, the method may include the following steps:

[0162] Step S402 Display, on an operation interface, display information of a display screen when displaying a target image.

[0163] In the technical solution provided in the above step S402 of the present application, the display information may include: color information of the display screen, grayscale information of the display screen, content shown in an image of the display screen, luminance and chrominance information of the display screen, uniformity information of the display screen, and the like. The uniformity information may be used to represent a uniformity degree of the display screen when displaying the target image. For example, the luminance and chrominance information may include luminance information and/or chrominance information of the display screen, and the uniformity information may be used to represent whether the luminance and chrominance information is consistent when different display regions in the display screen display the target image, which is only used as an example for illustration and is not specifically limited.

[0164] In this embodiment, the display information of the display screen when displaying the target image is displayed on the operation interface. For example, the color information, grayscale information, content shown in the image, luminance and chrominance information and uniformity information of the display screen when displaying the target image are displayed on the operation interface.

[0165] Step S404 Display, on the operation interface, temperature information of the display screen when displaying the display information.

[0166] In the technical solution provided in the above step S404 of the present application, the luminance and chrominance information and the uniformity information may change with the temperature information of the display screen.

[0167] In this embodiment, after displaying, on the operation interface, the display information of the display screen when displaying the target image, the temperature information of the display screen when displaying the display information is displayed on the operation interface. For example, the current temperature of the display screen when displaying the display information is displayed on the operation interface.

[0168] Step S406 In response to a compensation operation instruction acting on the operation interface, display, on the operation interface, compensated luminance and chrominance information and compensated uniformity information.

[0169] In the technical solution provided in the above step S406 of the present application, the compensated luminance and chrominance information may be obtained by compensating for the luminance and chrominance

information on the basis of a luminance and chrominance compensation coefficient, the compensated uniformity information may be obtained by compensating for the uniformity information on the basis of a uniformity compensation coefficient, the luminance and chrominance compensation coefficient may be determined based on an association relationship between the luminance and chrominance information of the display screen and the temperature information, and the uniformity compensation coefficient may be determined based on a pixel value of a pixel in the target image.

[0170] In this embodiment, after displaying, on the operation interface, the temperature information of the display screen when displaying the display information, in response to the compensation operation instruction acting on the operation interface, the compensated luminance and chrominance information and the compensated uniformity information are displayed on the operation interface. For example, if the operation interface receives the compensation operation instruction, in response to the compensation operation instruction acting on the operation interface, the luminance and chrominance information after chrominance compensation and the uniformity information after uniformity compensation are displayed on the operation interface.

[0171] FIG. 5 is a flowchart of a thermal compensation correction method for a display screen according to an embodiment of the present application. As shown in FIG. 5, the thermal compensation correction method for the display screen may include the following steps:

[0172] Step S502 Acquire color information of a display screen when displaying a target image.

[0173] In the technical solution provided in the above step S502 of the present application, the target image may be used to represent an image that corresponds to actual display content on the screen. The target image may be a normal image, or may be a dedicated test image picture. The color information may at least include luminance and chrominance information in the target image.

[0174] In this embodiment, color information of the display screen when displaying the target image is acquired. For example, when the display screen displays a certain image, color information of the image is acquired, that is, at least luminance and chrominance information of the image is acquired.

[0175] Optionally, through image processing technology, the luminance and chrominance information of the display screen when displaying the target image can be acquired in real time.

[0176] Step S504 Acquire temperature information of the display screen when displaying the color information.

[0177] In the technical solution provided in the above step S504 of the present application, the temperature information may be used to represent a temperature at which the display screen is located under a certain power consumption. For example, the luminance information and/or the chrominance information may change with the temperature information of the display screen.

[0178] In this embodiment, after acquiring the color information of the display screen when displaying the target image, temperature information of the display screen when displaying the color information is acquired. For example, according to the color information of the display screen when displaying the target image, power consumption of the display screen under the current display can be calculated, and then according to the power consumption and the temperature prediction model, temperature information of the display screen when displaying the color information can be calculated, that is, the temperature at which the display screen is located under the current power consumption can be calculated, where the temperature prediction model may be used to represent a mapping relationship among temperature samples of a plurality of sub-display regions of the display screen, power consumption samples that correspond to different display information samples and an ambient temperature sample of the environment where the display screen is located.

[0179] Optionally, the power consumption may be used to represent power consumption of different display regions in the display screen at a current moment. According to the power consumption and the temperature prediction model, temperature information of the display screen when displaying the color information can be calculated. For example, by inputting the power consumption into the temperature prediction model for prediction processing, the temperature information of the display screen under the current power consumption can be obtained.

[0180] Step S506 Acquire a luminance and chrominance compensation coefficient that corresponds to the temperature information.

[0181] In the technical solution provided in the above step S506 of the present application, the luminance and chrominance compensation coefficient may be determined based on an association relationship between the luminance and chrominance information in the color information and the temperature information. The luminance and chrominance information may include luminance information and/or chrominance information of the display screen.

[0182] In this embodiment, the association relationship between the luminance and chrominance information and the temperature information may be that a change in the temperature information and a change in the luminance and chrominance present a linear relationship. For example, for every 1°C increase in the temperature information of the display screen, relative change amounts of RGB tristimulus values in a pixel are also different. The pixel value may be a principal component of RGB collected by a camera in a cold-screen state, or the pixel value may be a principal component of RGB collected by a camera in a hot-screen state.

[0183] Optionally, after acquiring the temperature information of the display screen when displaying the color information, the luminance and chrominance compensation coefficient that corresponds to the temperature information is acquired. For example, according to the temperature information of the display screen when displaying the color information, a compensation coefficient required to eliminate a luminance and chrominance deviation brought by the temperature information at the temperature information can be calculated, that is, the luminance and chrominance compensation coefficient can be calculated.

[0184] Step S508 Compensate for the luminance and chrominance information on the basis of the luminance and chrominance compensation coefficient.

[0185] In the technical solution provided in the above step S508 of the present application, the compensation may be used to represent compensation performed on the luminance and chrominance information in the target image displayed on the display screen.

[0186] In this embodiment, after acquiring the luminance and chrominance compensation coefficient that corresponds to the temperature information, the luminance and chrominance information is compensated for based on the luminance and chrominance compensation coefficient. For example, according to the luminance and chrominance compensation coefficient, the current luminance and chrominance information can be compensated for in real time, thereby completing correction of the color information displayed on the display screen.

[0187] In this embodiment, specific steps involved in acquiring the temperature information of the display screen when displaying the color information need to be clarified. The specific steps involved in acquiring the temperature information of the display screen when displaying the color information are further introduced below.

[0188] Optionally, all the above steps can be implemented in a real-time compensation system of the display screen. FIG. 6 is a schematic diagram of a real-time compensation system for a display screen according to an embodiment of the present application. As shown in FIG. 6, the real-time compensation system of the display screen may include: a data calibration module 601, a model establishment module 602 and a real-time compensation module 603. In the data calibration module 601, the temperature of the display screen when displaying color information can be collected through a thermometer, the image picture displayed on the display screen can be collected through a camera, and the color information displayed on the display screen can be collected through a colorimeter. In the model establishment module 602, the following models can be established: a uniformity compensation model, a luminance and chrominance attenuation model and a temperature prediction model. In the real-time compensation module 603, the temperature of the screen can be acquired, and then according to the acquired temperature, by performing real-time compensation on the global luminance and chrominance of the display screen, the global luminance and chrominance of the display screen can be corrected. Then, according to the acquired temperature, by performing real-time compensation on the thermal uniformity of the display screen, the thermal uniformity of the display screen can be corrected point by point, where the uniformity compensation model may be used to represent a mapping relationship between the temperature information and the luminance and chrominance information, the luminance and chrominance attenuation model may be used to represent a mapping relationship between the temperature information and the uniformity information, and the temperature prediction model may be used to represent a mapping relationship between the power consumption and the temperature information.

[0189] Optionally, the temperature prediction model may be as shown in formula (10), the luminance and chrominance attenuation model may be as shown in formula (2), and the uniformity compensation model may be as shown in formula (7).

[0190] FIG. 7(a) is a flowchart of a thermal correction method for a display screen according to an embodiment of the present application. As shown in FIG. 7(a), the thermal correction method of the display screen may include the following steps:

[0191] Step S701 Calibrate various data in the display screen.

[0192] After calibrating the various data in the display screen, proceed to step S702, the following models are established: a uniformity compensation model, a luminance and chrominance attenuation model, and a temperature prediction model.

[0193] After establishing the following models: the uniformity compensation model, the luminance and chrominance attenuation model, and the temperature prediction model, proceed to step S703, global luminance and chrominance and thermal uniformity of the display screen are compensated for.

[0194] FIG. 7(b) is a flowchart of a data calibration method according to an embodiment of the present application. As shown in FIG. 7(b), the data calibration method may include the following steps:

[0195] Step S7011 Collect color information displayed on the display screen through a colorimeter.

[0196] In the technical solution provided in the above step S7011, luminance and chrominance information displayed on the display screen is collected through the colorimeter to acquire the luminance and chrominance information of the display screen and determine whether the luminance and chrominance information needs to be compensated for.

[0197] Step S7012 Collect a temperature of the display screen when displaying the color information through a thermometer.

[0198] In the technical solution provided in the above step S7012, the temperature of the display screen when displaying the color information is collected through the thermometer, or the temperature of the display screen when displaying the color information can be predicted through the temperature prediction model.

[0199] Step S7013 Collect an image picture displayed on the display screen through a camera.

[0200] In the technical solution provided in the above step S7013, the image picture displayed on the display screen is collected through the camera to acquire information content currently displayed on the display screen.

[0201] After the above collection steps, proceed to step S7014, acquiring the luminance and chrominance information and the temperature information of the display screen.

[0202] FIG. 7(c) is a flowchart of a real-time compensation method for a display screen according to an embodiment of the present application. As shown in FIG. 7(c), the real-time compensation method may include the following steps:

[0203] Step S7031 Predict a screen temperature of the display screen using the temperature prediction model and according to display content of the display screen.

[0204] After predicting the screen temperature of the display screen using the temperature prediction model and according to the display content of the display screen, proceed to step S7032, global luminance and chrominance of the display screen is compensated for using the luminance and chrominance attenuation model.

[0205] After compensating for the global luminance and chrominance of the display screen using the luminance and chrominance attenuation model, proceed to step S7033, thermal uniformity of the display screen is compensated for using the uniformity compensation model. For example, according to a uniformity compensation coefficient calculated by the uniformity compensation model, luminance and color temperature of different regions under the same grayscale are compensated for.

[0206] Optionally, when the temperature of the display screen is from 20°C to 60°C, the global luminance and chrominance of the display screen can be compensated for, and when the temperature of the display screen is around 60°C, the thermal uniformity of the display screen can be compensated for.

[0207] FIG. 7(d) is a flowchart of a global luminance and chrominance compensation method for a display screen according to an embodiment of the present application. As shown in FIG. 7(d), the global luminance and chrominance compensation method of the display screen may include the following steps:

[0208] Step S7034 Acquire a screen temperature in real time through a sensor, or predict the screen temperature using the temperature prediction model and according to display content.

[0209] After acquiring the screen temperature in real time through the sensor, or predicting the screen temperature using the temperature prediction model and according to the display content, proceed to step S7035, a compensation coefficient required to eliminate a luminance and chrominance deviation brought by the temperature at the current screen temperature is calculated according to the screen temperature acquired in real time or predicted.

[0210] After calculating, according to the screen temperature acquired in real time or predicted, the compensation coefficient required to eliminate the luminance and chrominance deviation brought by the temperature at the current screen temperature, proceed to step S7036, original display grayscale is compensated for using the calculated compensation coefficient.

[0211] As an optional implementation, acquiring the temperature information of the display screen when displaying the color information includes that power consumption of the display screen is determined based on the color information; and temperature information of the display screen working under the power consumption is determined.

[0212] In this embodiment, the power consumption may be used to represent current power consumption of the display screen when displaying the color information, where the power consumption is strongly correlated with the heating condition of the LED, and the heating condition (for example, temperature information) can affect the display information of the screen (for example, actual display content), that is, the power consumption can affect the display information. Conversely, according to the displayed color information on the screen, the power consumption of the display screen under the current display can be calculated. From the above, it can be known that the larger the grayscale of the actual display content, the higher the luminance of the LED display screen, and the greater the power consumption thereof.

[0213] Optionally, the power consumption of the display screen is determined based on the color information, and the temperature information of the display screen working under the power consumption is determined. For example, according to the actual displayed color information on the screen, the power consumption under the current display can be calculated, and then according to the power consumption and the temperature prediction model, the temperature information of the display screen when displaying the color information under the power consumption can be calculated, that is, the temperature information working under the current power consumption can be calculated, thereby achieving the technical effect of determining the temperature information of the display screen working under the power consumption.

[0214] In this embodiment, it is necessary to determine the temperature information of the display screen working under the power consumption. How to determine the temperature information of the display screen working under the power consumption is further introduced below.

[0215] As an optional implementation, determining the temperature information of the display screen working under the power consumption includes that temperature information of a sub-display region at a target moment is determined based on an ambient temperature of an environment where the display screen is located at the target moment, power consumption of the sub-display region of the display screen at the target moment, and a temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region.

[0216] In this embodiment, the ambient temperature may be represented by T_{amb_k} , the power consumption may be represented by $P_{k,i}$, and the temperature may be represented by R_{ij} . For example, T_{amb_k} may indicate the ambient temperature at the k^{th} moment, $P_{k,i}$ may indicate the power consumption of the i^{th} region at the k^{th} moment, and R_{ij} may indicate a temperature increase value caused by unit power consumption dissipation of the j^{th} region when power is applied at the i^{th} LED region, where R_{ij} may represent the thermal resistance of a chip itself, that is, the temperature increase value caused by unit power consumption dissipation of the chip itself.

[0217] Optionally, the temperature information of the sub-display region at the target moment is determined based on the ambient temperature of the environment where the display screen is located at the target moment, the power consumption of the sub-display region of the display screen at the target moment, and the temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region. For example, according to the ambient temperature T_{amb_k} , the power consumption $P_{k,i}$ of the sub-display region of the display screen at the target moment and the temperature increase value R_{ij} , the temperature information of the sub-display region at the target moment can be determined, that is, the current temperature of the LED screen of the i^{th} region at the k^{th} moment can be determined, thereby achieving the technical effect of determining the temperature information of the display screen working under the power consumption.

[0218] Optionally, the power consumption of the sub-display region of the display screen at the target moment can be determined through formula (9).

[0219] Optionally, the temperature of the LED screen can be calculated through formula (10). According to the temperature prediction model established by the above formula, the screen temperature under the current display power consumption can be calculated, where the temperature is related to the heating condition, and heating affects the screen temperature. In order to obtain the thermal resistance matrix in the above model, it is necessary to calibrate temperature data of different regions under different power consumption to solve the above thermal resistance matrix.

[0220] In this embodiment, it is necessary to predict the temperature information of the display screen working under the power consumption according to the temperature prediction model. How to predict the temperature information of the display screen working under the power consumption according to the temperature prediction model is further introduced below.

[0221] As an optional implementation, the method further includes that temperature samples of the plurality of sub-display regions of the display screen are respectively acquired to obtain the plurality of temperature samples; power consumption samples of the display screen that correspond to different display information samples are acquired to obtain the plurality of power consumption samples, where the power consumption samples are used to cause the display screen to produce corresponding display information samples; a target mapping relationship is established based on the plurality of temperature samples, the plurality of power consumption samples and an ambient temperature sample of the environment where the display screen is located; and determining the temperature information of the sub-display region at the target moment based on the ambient temperature of the environment where the display screen is located at the target moment, the power consumption of the sub-display region of the display screen at the target moment, and the temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region includes that the ambient temperature, the power consumption of the sub-display region at the target moment and the temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region are mapped based on the target mapping relationship into the temperature information.

[0222] In this embodiment, the power consumption samples may be used to cause the display screen to produce corresponding display information samples, and the target mapping relationship may be used to represent an association relationship among the plurality of temperature samples, the plurality of power consumption samples and the ambient temperature sample of the environment where the display screen is located.

[0223] Optionally, the plurality of sub-display regions may be 9 partitions of the display screen, the temperature samples may be measured temperature data of the 9 partitions, the different display information samples may be used to represent information samples in different display patterns, the plurality of power consumption samples may be used to represent power in different display patterns, the ambient temperature sample may be used to represent an ambient temperature during calibration, and the target mapping relationship may be a functional relationship in the temperature prediction model. For example, the information samples in different display patterns may be display

contents of different colors and different greyscales, which is only used as an example for illustration and is not specifically limited.

[0224] Optionally, temperature samples of the 9 partitions of the display screen are respectively acquired, power consumption samples that correspond to different display information samples are acquired, and then according to the temperature samples of the 9 partitions, the power consumption samples and the ambient temperature sample, the temperature prediction model can be determined. Then, the functional relationship in the temperature prediction model is determined as the target mapping relationship. Then, according to the target mapping relationship, the ambient temperature, the power consumption of the sub-display region at the target moment and the temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region are mapped into the temperature information, thereby achieving the technical effect of obtaining the temperature information of the display screen working under the power consumption according to the mapping relationship.

[0225] Optionally, the target mapping relationship may be as shown in formula (11).

[0226] Optionally, the predicted temperature is processed in a manner shown in formula (12) to mitigate deviation or noise of the predicted temperature.

[0227] In this embodiment, it is necessary to compensate for the uniformity information. How to compensate for the uniformity information is further introduced below.

[0228] As an optional implementation, the color information further includes: uniformity information, the uniformity information is used to represent a uniformity degree of the display screen when displaying the target image, and the method further includes that a uniformity compensation coefficient that corresponds to the temperature information is acquired, where the uniformity compensation coefficient is determined based on a pixel value in the target image; and the uniformity information is compensated for based on the uniformity compensation coefficient.

[0229] In this embodiment, the uniformity compensation coefficient may be determined based on the pixel value in the target image, and the uniformity information may be used to represent the uniformity degree of the display screen when displaying the target image. For example, the uniformity compensation coefficient may also be referred to as a thermal uniformity compensation coefficient.

[0230] Optionally, according to the temperature information of the display screen when displaying the color information, a compensation coefficient required to eliminate uniformity inconsistency brought by the temperature information at the temperature information can be calculated, that is, the uniformity compensation coefficient can be calculated. Then, according to the calculated uniformity compensation coefficient, the current uniformity information can be compensated for in real time, thereby compensating for RGB data, and thus achieving the technical effect of correcting the display information of the display screen.

[0231] In this embodiment, specific steps involved in acquiring the color information of the display screen when displaying the target image need to be clarified. The specific steps involved in acquiring the color information of the display screen when displaying the target image are further introduced below.

[0232] As an optional implementation, acquiring the color information of the display screen when displaying the target image includes that the luminance and chrominance information of the display screen when displaying the target image is acquired in real time; and uniformity information of the display screen when displaying the target image is acquired when the display screen is in a target display state.

[0233] In this embodiment, through image processing technology, the luminance and chrominance information of the display screen when displaying the target image can be acquired in real time. In addition, by judging whether the display screen is in the target display state, it can be determined whether to acquire the uniformity information of the display screen when displaying the target image. If it is judged that the display screen is in the target display state, the uniformity information of the display screen when displaying the target image is directly acquired. If it is judged that the display screen is not in the target display state, the uniformity information of the display screen when displaying the target image is temporarily not acquired, and the uniformity information of the display screen when displaying the target image continues to be acquired until the display screen is in the target display state, thereby achieving the technical effect of acquiring the color information of the display screen when displaying the target image.

[0234] In this embodiment, a collection manner of the uniformity information needs to be clarified. The collection manner of the uniformity information is further introduced below.

[0235] As an optional implementation, the uniformity information is collected by a collection device.

[0236] In this embodiment, the collection device may be a photometer, a colorimeter, an image sensor, etc., which is only used as an example for illustration and is not specifically limited.

[0237] Optionally, by collecting, through the collection device, the uniformity of the display screen when displaying the target image, the uniformity information can be obtained, thereby achieving the technical effect of collecting the uniformity information.

[0238] In this embodiment, an acquisition manner of the temperature information needs to be clarified. The acquisition manner of the temperature information is further introduced below.

[0239] As an optional implementation, acquiring the temperature information of the display screen when displaying the color information includes that the temperature information obtained by a temperature sensor that collects a temperature of the display screen when displaying the color information is acquired.

[0240] In this embodiment, the temperature sensor may be a temperature sensor, etc., which is only used as an example for illustration and is not specifically limited.

[0241] Optionally, by collecting, through the temperature sensor, the temperature of the display screen when displaying the color information, the temperature information of the display screen when displaying the color information can be obtained, thereby achieving the technical effect of acquiring the temperature information.

[0242] FIG. 8 is a schematic diagram of a thermal compensation correction system for a display screen according to an embodiment of the present application. As shown in FIG. 8, the system 80 for thermal compensation correction of the display screen may include: a first transmission device 81, a second transmission device 82, and a processing device 83.

[0243] The first transmission device 81 is configured to receive display information of a display screen when displaying a target image.

[0244] The second transmission device 82 is configured to transmit color information to the processing device.

[0245] The processing device 83 is configured to acquire temperature information of the display screen when displaying the color information, and a luminance and chrominance compensation coefficient that corresponds to the temperature information, and control, based on the luminance and chrominance compensation coefficient, the display screen to compensate for luminance and chrominance information in the color information.

[0246] In this embodiment, the luminance and chrominance compensation coefficient may be determined based on an association relationship between the luminance and chrominance information and the temperature information. For example, the luminance and chrominance information may include luminance information and/or chrominance information of the display screen. The first transmission device may be a TF module, the second transmission device may be a PHY module, and the processing device may be an FPGA module.

[0247] Optionally, by providing the first transmission device in the thermal compensation correction system of the display screen, display information of the display screen when displaying the target image can be received. At the same time, by providing the second transmission device in the thermal compensation correction system of the display screen, the color information can be transmitted to the processing device. Also, by providing the processing device in the thermal compensation correction system of the display screen, temperature information of the display screen when displaying the color information and the luminance and chrominance compensation coefficient that corresponds to the temperature information can be acquired, and based on the luminance and chrominance compensation coefficient, the display screen is controlled to compensate for the luminance and chrominance information in the color information in real time.

[0248] As an optional implementation, the processing device includes: a receiving module, configured to receive color information of a display screen when displaying a target image; a processing module, configured to acquire temperature information of the display screen when displaying the color information, and acquire a luminance and chrominance compensation coefficient that corresponds to the temperature information; and a control chip, configured to control, based on the luminance and chrominance compensation coefficient, the display screen to compensate for the luminance and chrominance information.

[0249] In this embodiment, the receiving module may be a Receive module in an FPGA in a receiving card, the processing module may be an algorithm processing module (for example, a Convert module) in the FPGA, and the control chip may be a control driver chip in the FPGA.

[0250] Optionally, by providing the receiving module in the processing device, color information of the display screen when displaying the target image can be received. At the same time, by providing the processing module in the processing device, temperature information of the display screen when displaying the color information can be acquired, and the luminance and chrominance compensation coefficient that corresponds to the temperature information can be acquired. Further, by providing a control chip in the processing device, the display screen can be controlled to perform real-time compensation on the luminance and chrominance information based on the luminance and chrominance compensation coefficient.

[0251] In this embodiment, display information of the display screen when displaying the target image can be received through the receiving device, temperature information of the display screen when displaying the display information can be acquired through the processor, the luminance and chrominance compensation coefficient and the uniformity compensation coefficient that correspond to the temperature information can be acquired, the luminance and chrominance information can be compensated for in real time according to the luminance and chrominance compensation coefficient, and the uniformity information can be compensated for in real time according to the uniformity compensation coefficient. Through the driving device, the display screen can be driven to display the target image according to the compensated luminance and chrominance information and the compensated uniformity information.

[0252] The above method of this embodiment first acquires display information of the display screen when displaying the target image, then acquires temperature information of the display screen when displaying the display information, acquires the luminance and chrominance compensation coefficient and the uniformity compensation coefficient that correspond to the temperature information, then compensates for the luminance and chrominance information in real time through the luminance and chrominance compensation coefficient, and compensates for the uniformity information in real time through the uniformity compensation coefficient, thereby achieving the purpose of compensating for the luminance and chrominance and the uniformity of the display screen, thus solving the technical problem of low display quality of the display screen, and further achieving the technical effect of improving the display quality of the display screen.

[0253] The embodiments of the present application further provide an information correction apparatus for a display screen. The information correction apparatus for a display screen of this embodiment can be used to execute the information processing method for a display screen shown in FIG. 1 of the embodiments of the present application.

[0254] FIG. 9 is a schematic diagram of an information correction apparatus for a display screen according to an embodiment of the present application. As shown in FIG. 9, the information correction apparatus 90 for a display screen may include: a first acquisition unit 91, a second acquisition unit 92, a third acquisition unit 93, and a first compensation unit 94.

[0255] The first acquisition unit 91 is configured to acquire display information of a display screen when displaying a target image, where the display information includes: luminance and chrominance information and uniformity information, the luminance and chrominance information includes luminance information and/or chrominance information of the display screen, and the uniformity information is used to represent a uniformity degree of the display screen when displaying the target image.

[0256] The second acquisition unit 92 is configured to acquire temperature information of the display screen when displaying the display information, where the luminance and chrominance information and the uniformity information change with the temperature information of the display screen.

[0257] The third acquisition unit 93 is configured to acquire a luminance and chrominance compensation coefficient and a uniformity compensation coefficient that correspond to the temperature information, where the luminance and chrominance compensation coefficient is determined on the basis of an association relationship between the luminance and chrominance information of the display screen and the temperature information of the display screen, and the uniformity compensation coefficient is determined on the basis of a pixel value in the target image.

[0258] The first compensation unit 94 is configured to compensate for the luminance and chrominance information on the basis of the luminance and chrominance compensation coefficient, and compensate for the uniformity information on the basis of the uniformity compensation coefficient.

[0259] Optionally, the information correction apparatus 90 for a display screen may further include: a fourth acquisition unit, configured to acquire a luminance and chrominance sample and a temperature sample of the display screen, where the luminance and chrominance sample and the temperature sample satisfy the association relationship, and the luminance and chrominance sample includes a luminance sample and/or a chrominance sample of the display screen.

[0260] Optionally, the third acquisition unit 93 may include: a first determination module, configured to determine the luminance and chrominance compensation coefficient that corresponds to the temperature information on the basis of a sub-luminance and chrominance compensation coefficient that corresponds to both the luminance and chrominance sample and the temperature sample.

[0261] Optionally, the first determination module may include: a first determination submodule, configured to determine the luminance and chrominance compensation coefficient that corresponds to the temperature information at least on the basis of the sub-luminance and chrominance compensation coefficient and a reference temperature of the display screen.

[0262] Optionally, the first determination submodule may determine the luminance and chrominance compensation coefficient that corresponds to the temperature information at least on the basis of the sub-luminance and chrominance compensation coefficient and the reference temperature of the display screen by executing the following steps: a changed temperature of the temperature information relative to the reference temperature is determined; and the sub-luminance and chrominance compensation coefficient is adjusted based on the changed temperature to the luminance and chrominance compensation coefficient that corresponds to the temperature information.

[0263] Optionally, the third acquisition unit 93 may include: a second determination module, configured to determine the uniformity compensation coefficient that corresponds to the temperature information on the basis of a sub-uniformity compensation coefficient that corresponds to both a first luminance and chrominance sample and a second luminance and chrominance sample.

[0264] Optionally, the second determination module may include: a second determination submodule, configured to determine the uniformity compensation coefficient that corresponds to the temperature information at least on the basis of the sub-uniformity compensation coefficient and the reference temperature of the display screen.

[0265] Optionally, the second determination submodule may determine the uniformity compensation coefficient that corresponds to the temperature information at least on the basis of the sub-uniformity compensation coefficient and the reference temperature of the display screen by executing the following steps: a changed temperature of the temperature information relative to the reference temperature is determined; and the sub-uniformity compensation coefficient is adjusted based on the changed temperature and a temperature difference of second temperature information relative to first temperature information to the uniformity compensation coefficient that corresponds to the temperature information.

[0266] Optionally, the second acquisition unit 92 may include: a third determination module, configured to determine power consumption of the display screen based on the display information; and a fourth determination module, configured to determine temperature information of the display screen working under the power consumption.

[0267] Optionally, the fourth determination module may include: a third determination submodule, configured to determine temperature information of a sub-display region at a target moment based on an ambient temperature of an environment where the display screen is located at the target moment, power consumption of the sub-display region of the display screen at the target moment, and a temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region.

[0268] Optionally, the information correction apparatus 90 for a display screen may further include: a fourth acquisition unit, configured to respectively acquire temperature samples of a plurality of sub-display regions of the display screen to obtain a plurality of temperature samples; a fifth acquisition unit, configured to acquire power consumption samples of the display screen that correspond to different display information samples to obtain a plurality of power consumption samples, where the power consumption samples are used to cause the display screen to produce corresponding display information samples; an establishment unit, configured to establish a target mapping relationship based on the plurality of temperature samples, the plurality of power consumption samples and an ambient temperature sample of the environment where the display screen is located; and a first determination unit, configured to determine temperature information of the sub-display region at the target moment based on the ambient temperature of the environment where the display screen is located at the target moment, the power consumption of the sub-display region of the display screen at the target moment, and the temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region, including: the ambient temperature, the power consumption of the sub-display region at the target moment and the temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region are mapped based on the target mapping relationship into the temperature information.

[0269] Optionally, the second acquisition unit 92 may include: a first acquisition module, configured to acquire the temperature information obtained by a temperature sensor that collects a temperature of the display screen when producing the display information.

[0270] Optionally, the first compensation unit 94 may include: a fourth determination module, configured to determine a product of the luminance and chrominance compensation coefficient and the luminance and chrominance information as compensated luminance and chrominance information; and a fifth determination module, configured to determine a product of the uniformity compensation coefficient and the uniformity information as compensated uniformity information.

[0271] The embodiments of the present application further provide another information correction apparatus for a display screen. The information correction apparatus for a display screen of this embodiment can be used to execute the information correction method for a display screen shown in FIG. 4 of the embodiments of the present application.

[0272] FIG. 10 is a schematic diagram of another information correction apparatus for a display screen according to an embodiment of the present application. As shown in FIG. 10, the apparatus 100 for correcting information of a display screen may include: a first display unit 101, a second display unit 102, and a third display unit 103.

[0273] The first display unit 101 is configured to display, on an operation interface, display information of a display screen when displaying a target image, where the display information includes: luminance and chrominance information and uniformity information, the luminance and chrominance information includes luminance information and/or chrominance information of the display screen, and the uniformity information is used to represent a uniformity degree of the display screen when displaying the target image.

[0274] The second display unit 102 is configured to display, on the operation interface, temperature information of the display screen when displaying the display information, where the luminance and chrominance information and the uniformity information change with the temperature information of the display screen.

[0275] The third display unit 103 is configured to, in response to a compensation operation instruction acting on the operation interface, display, on the operation interface, compensated luminance and chrominance information and compensated uniformity information, where the compensated luminance and chrominance information is obtained by compensating for the luminance and chrominance information on the basis of a luminance and chrominance compen-

sation coefficient, the compensated uniformity information is obtained by compensating for the uniformity information on the basis of a uniformity compensation coefficient, the luminance and chrominance compensation coefficient is determined based on an association relationship between the luminance and chrominance information of the display screen and the temperature information, and the uniformity compensation coefficient is determined based on a pixel value of a pixel in the target image.

[0276] The embodiments of the present application further provide a thermal compensation correction apparatus for a display screen. The thermal compensation correction apparatus for a display screen of this embodiment can be used to execute the thermal compensation correction method for a display screen shown in FIG. 5 of the embodiments of the present application.

[0277] FIG. 11 is a schematic diagram of a thermal compensation correction apparatus for a display screen according to an embodiment of the present application. As shown in FIG. 11, the thermal compensation correction apparatus 110 for a display screen may include: a sixth acquisition unit 111, a seventh acquisition unit 112, an eighth acquisition unit 113, and a second compensation unit 114.

[0278] The sixth acquisition unit 111 is configured to acquire color information of a display screen when displaying a target image.

[0279] The seventh acquisition unit 112 is configured to acquire temperature information of the display screen when displaying the color information.

[0280] The eighth acquisition unit 113 is configured to acquire a luminance and chrominance compensation coefficient that corresponds to the temperature information, where the luminance and chrominance compensation coefficient is determined based on an association relationship between luminance and chrominance information in the color information and the temperature information, and the luminance and chrominance information includes luminance information and/or chrominance information of the display screen.

[0281] The second compensation unit 114 is configured to compensate for the luminance and chrominance information on the basis of the luminance and chrominance compensation coefficient.

[0282] Optionally, the seventh acquisition unit 112 may include: a sixth determination module, configured to determine power consumption of the display screen based on the color information; and a seventh determination module, configured to determine temperature information of the display screen working under the power consumption.

[0283] Optionally, the seventh determination module may include: a fourth determination submodule, configured to determine temperature information of a sub-display region at a target moment based on an ambient temperature of an environment where the display screen is located at the target moment, power consumption of the sub-display region of the display screen at the target moment, and a temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region.

[0284] Optionally, the thermal compensation correction apparatus 110 for a display screen may include: a ninth acquisition unit, configured to respectively acquire temperature samples of a plurality of sub-display regions of the display screen to obtain a plurality of temperature samples; a tenth acquisition unit, configured to acquire power consumption samples of the display screen that correspond to different display information samples to obtain a plurality of power consumption samples, where the power consumption samples are used to cause the display screen to produce corresponding display information samples; an establishment unit, configured to establish a target mapping relationship based on the plurality of temperature samples, the plurality of power consumption samples and an ambient temperature sample of the environment where the display screen is located; and a second determination unit, configured to determine temperature information of the sub-display region at the target moment based on the ambient temperature of the environment where the display screen is located at the target moment, the power consumption of the sub-display region of the display screen at the target moment, and the temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region, including: the ambient temperature, the power consumption of the sub-display region at the target moment and the temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region are mapped based on the target mapping relationship into the temperature information.

[0285] Optionally, the thermal compensation correction apparatus 110 for a display screen may include: an eleventh acquisition unit, configured to acquire a uniformity compensation coefficient that corresponds to the temperature information, where the uniformity compensation coefficient is determined based on a pixel value in the target image; and a third compensation unit, configured to compensate for uniformity information on the basis of the uniformity compensation coefficient.

[0286] Optionally, the sixth acquisition unit 111 may include: a second acquisition module, configured to acquire luminance and chrominance information of the display screen when displaying the target image in real time; and a third acquisition module, configured to acquire uniformity information of the display screen when the display screen is in a target display state and displaying the target image.

[0287] Optionally, the seventh acquisition unit 112 may include: a fourth acquisition module, configured to acquire

the temperature information obtained by a temperature sensor that collects a temperature of the display screen when displaying the color information.

[0288] In this embodiment, the first acquisition unit is configured to acquire display information of the display screen when displaying the target image, where the display information includes: luminance and chrominance information and uniformity information, the luminance and chrominance information includes luminance information and/or chrominance information of the display screen, and the uniformity information is used to represent the uniformity degree of the display screen when displaying the target image; the second acquisition unit is configured to acquire temperature information of the display screen when displaying the display information, where the luminance and chrominance information and the uniformity information change with the temperature information of the display screen; the third acquisition unit is configured to acquire the luminance and chrominance compensation coefficient and the uniformity compensation coefficient that correspond to the temperature information, where the luminance and chrominance compensation coefficient is determined based on the association relationship between the luminance and chrominance information of the display screen and the temperature information, and the uniformity compensation coefficient is determined based on the pixel value in the target image; and the compensation unit is configured to compensate for the luminance and chrominance information on the basis of the luminance and chrominance compensation coefficient, and compensate for the uniformity information on the basis of the uniformity compensation coefficient, thereby achieving the purpose of compensating for the luminance and chrominance and the uniformity of the display screen, thus solving the technical problem of low display quality of the display screen, and further achieving the technical effect of improving the display quality of the display screen.

[0289] According to the embodiments of the present application, a computer-readable storage medium is further provided. The computer-readable storage medium includes a stored program, where when the program is executed by a processor, a device where the storage medium is located is controlled to execute the information processing method for a display screen of the embodiments of the present application.

[0290] According to the embodiments of the present application, a processor is further provided. The processor is configured to run a program, where when the program is running, the information processing method for a display screen of the embodiments of the present application is executed.

[0291] The serial numbers of the above embodiments of the present application are merely for description, and do not represent the superiority or inferiority of the embodiments.

[0292] In the above embodiments of the present application, the description of each embodiment has its own emphasis. For parts not described in detail in an embodiment, reference may be made to the relevant description of other embodiments.

[0293] In a plurality of embodiments provided in the present application, it should be understood that the disclosed technical content may be implemented in other ways. The apparatus embodiments described above are merely illustrative, for example, the division of the units is only based on the logical functions, and there may be other division manners in actual implementation, for example, a plurality of units or components may be combined or integrated into another system, or some features may be ignored or not executed. In addition, the shown or discussed mutual coupling or direct coupling or communication connection may be indirect coupling or communication connection through some interfaces, units, or modules, and may be in electrical or other forms.

[0294] The units described as separate components may or may not be physically separated, and the components shown as units may or may not be physical units, that is, the units may be located in one place or distributed onto a plurality of units. A part of or all of the units may be selected according to actual needs to achieve the objectives of the solutions of the embodiments.

[0295] In addition, the functional units in the various embodiments of the present application may be integrated into one processing unit, or each unit may exist alone physically, or two or more units may be integrated into one unit. The above integrated unit may be implemented in the form of hardware, or may be implemented in the form of a software functional unit.

[0296] When the integrated unit is implemented in the form of a software functional unit and sold or used as an independent product, the unit may be stored in a computer-readable storage medium. Based on such understanding, the technical solution of the present application in essence, or a part thereof contributing to the prior art, or all or part of the technical solution may be embodied in the form of a software product. The computer software product is stored in a storage medium and includes a plurality of instructions for causing a computer device (which may be a personal computer, a server, or a network device, etc.) to execute all or part of the steps of the methods of the various embodiments of the present application. The above storage medium includes a USB flash drive, a read-only memory (ROM), a random-access memory (RAM), a mobile hard disk, a magnetic disk, or an optical disk, and other media capable of storing program codes.

[0297] What are described above are merely preferred implementations of the present application. It should be noted that those of ordinary skill in the art may make a plurality of improvements and modifications without departing from the principles of the present application, and these improvements and modifications should also fall within the

protection scope of the present application.

Claims

1. An information processing method for a display screen, comprising:

acquiring display information of a display screen when displaying a target image, wherein the display information comprises: luminance and chrominance information and uniformity information, the luminance and chrominance information comprises luminance information and/or chrominance information of the display screen, and the uniformity information is used to represent a uniformity degree of the display screen when displaying the target image;

acquiring temperature information of the display screen when displaying the display information, wherein the luminance and chrominance information and the uniformity information change with the temperature information of the display screen;

acquiring a luminance and chrominance compensation coefficient and a uniformity compensation coefficient that correspond to the temperature information, wherein the luminance and chrominance compensation coefficient is determined on the basis of an association relationship between the luminance and chrominance information of the display screen and the temperature information of the display screen, and the uniformity compensation coefficient is determined on the basis of a pixel value in the target image; and

compensating for the luminance and chrominance information on the basis of the luminance and chrominance compensation coefficient, and compensating for the uniformity information on the basis of the uniformity compensation coefficient.

2. The method according to claim 1, wherein the luminance and chrominance compensation coefficient is obtained by converting a sub-luminance and chrominance compensation coefficient, the sub-luminance and chrominance compensation coefficient is used to represent the association relationship between the luminance and chrominance information of the display screen and the temperature information, and/or the uniformity compensation coefficient is determined based on a sub-uniformity compensation coefficient of a pixel in the target image, and the sub-uniformity compensation coefficient is used to compensate for uniformity information that corresponds to the pixel.

3. The method according to claim 2, further comprising:

acquiring a luminance and chrominance sample and a temperature sample of the display screen, wherein the luminance and chrominance sample and the temperature sample satisfy the association relationship, and the luminance and chrominance sample comprises a luminance sample and/or a chrominance sample of the display screen; and

acquiring a luminance and chrominance compensation coefficient that corresponds to the temperature information comprises: determining the luminance and chrominance compensation coefficient that corresponds to the temperature information on the basis of the sub-luminance and chrominance compensation coefficient that corresponds to both the luminance and chrominance sample and the temperature sample.

4. The method according to claim 3, wherein the determining the luminance and chrominance compensation coefficient that corresponds to the temperature information on the basis of the sub-luminance and chrominance compensation coefficient that corresponds to both the luminance and chrominance sample and the temperature sample comprises:

determining the luminance and chrominance compensation coefficient that corresponds to the temperature information at least on the basis of the sub-luminance and chrominance compensation coefficient and a reference temperature of the display screen.

5. The method according to claim 4, wherein the determining the luminance and chrominance compensation coefficient that corresponds to the temperature information at least on the basis of the sub-luminance and chrominance compensation coefficient and the reference temperature of the display screen comprises:

determining a changed temperature of the temperature information relative to the reference temperature; and adjusting, based on the changed temperature, the sub-luminance and chrominance compensation coefficient to the luminance and chrominance compensation coefficient that corresponds to the temperature information.

6. The method according to claim 5, wherein the determining a changed temperature of the temperature information relative to the reference temperature comprises:
determining the changed temperature of the temperature information of a sub-display region at a target moment relative to the reference temperature, wherein a display region of the display screen comprises the sub-display region.

7. The method according to claim 3, wherein the luminance and chrominance sample comprises a first luminance and chrominance sample of the display screen in a cold-screen state and a second luminance and chrominance sample of the display screen in a hot-screen state, first temperature information of the display screen in the cold-screen state is less than second temperature information of the display screen in the hot-screen state, and the acquiring the uniformity compensation coefficient that corresponds to the temperature information comprises:
determining the uniformity compensation coefficient that corresponds to the temperature information on the basis of the sub-uniformity compensation coefficient that corresponds to both the first luminance and chrominance sample and the second luminance and chrominance sample.

8. The method according to claim 7, wherein the determining the uniformity compensation coefficient that corresponds to the temperature information on the basis of the sub-uniformity compensation coefficient that corresponds to both the first luminance and chrominance sample and the second luminance and chrominance sample comprises:

determining the uniformity compensation coefficient that corresponds to the temperature information at least on the basis of the sub-uniformity compensation coefficient and a reference temperature of the display screen.

9. The method according to claim 8, wherein the determining the uniformity compensation coefficient that corresponds to the temperature information at least on the basis of the sub-uniformity compensation coefficient and the reference temperature of the display screen comprises:

determining a changed temperature of the temperature information relative to the reference temperature; and adjusting, based on the changed temperature and a temperature difference of the second temperature information relative to the first temperature information, the sub-uniformity compensation coefficient to the uniformity compensation coefficient that corresponds to the temperature information.

10. The method according to claim 7, wherein the first luminance and chrominance sample comprises a first principal component of the pixel, the first principal component is collected from the display screen in a luminance mode in the cold-screen state, the second luminance and chrominance sample comprises a second principal component of the pixel, the second principal component is collected from the display screen in the hot-screen state in the luminance mode, and the pixel value comprises the first principal component or the second principal component.

11. The method according to claim 7, wherein the first luminance and chrominance sample comprises a first tristimulus value of the pixel, the first tristimulus value is collected when the display screen is in a chrominance mode and in the cold-screen state, the second luminance and chrominance sample comprises a second tristimulus value of the pixel, and the second tristimulus value is collected from the display screen in the hot-screen state in the chrominance mode.

12. The method according to claim 1, wherein the acquiring temperature information of the display screen when displaying the display information comprises:

determining power consumption of the display screen based on the display information; and determining the temperature information of the display screen working under the power consumption.

13. The method according to claim 12, wherein

the determining the temperature information of the display screen working under the power consumption comprises: determining the temperature information of a sub-display region at a target moment based on an ambient temperature of an environment where the display screen is located at the target moment, the power consumption of the sub-display region of the display screen at the target moment, and a temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region;

the method further comprises: respectively acquiring temperature samples of a plurality of sub-display regions

of the display screen to obtain the plurality of temperature samples; acquiring power consumption samples of the display screen that correspond to different display information samples to obtain a plurality of power consumption samples, wherein the power consumption samples are used to cause the display screen to produce corresponding display information samples; establishing a target mapping relationship based on the plurality of temperature samples, the plurality of power consumption samples and an ambient temperature sample of the environment where the display screen is located; and determining the temperature information of the sub-display region at the target moment based on the ambient temperature of the environment where the display screen is located at the target moment, the power consumption of the sub-display region of the display screen at the target moment, and the temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region, comprising: mapping, based on the target mapping relationship, the ambient temperature, the power consumption of the sub-display region at the target moment and the temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region into the temperature information.

14. An information correction method for a display screen, comprising:

displaying, on an operation interface, display information of a display screen when displaying a target image, wherein the display information comprises: luminance and chrominance information and uniformity information, the luminance and chrominance information comprises luminance information and/or chrominance information of the display screen, and the uniformity information is used to represent a uniformity degree of the display screen when displaying the target image;

displaying, on the operation interface, temperature information of the display screen when displaying the display information, wherein the luminance and chrominance information and the uniformity information change with the temperature information of the display screen; and

in response to a compensation operation instruction acting on the operation interface, displaying, on the operation interface, compensated luminance and chrominance information and compensated uniformity information, wherein the compensated luminance and chrominance information is obtained by compensating for the luminance and chrominance information on the basis of a luminance and chrominance compensation coefficient, the compensated uniformity information is obtained by compensating for the uniformity information on the basis of a uniformity compensation coefficient, the luminance and chrominance compensation coefficient is determined based on an association relationship between the luminance and chrominance information of the display screen and the temperature information, and the uniformity compensation coefficient is determined based on a pixel value of a pixel in the target image.

15. A thermal compensation correction method for a display screen, comprising:

acquiring color information of a display screen when displaying a target image;

acquiring temperature information of the display screen when displaying the color information;

acquiring a luminance and chrominance compensation coefficient that corresponds to the temperature information, wherein the luminance and chrominance compensation coefficient is determined based on an association relationship between luminance and chrominance information in the color information and the temperature information, and the luminance and chrominance information comprises luminance information and/or chrominance information of the display screen; and

compensating for the luminance and chrominance information on the basis of the luminance and chrominance compensation coefficient.

16. The method according to claim 15, wherein the acquiring temperature information of the display screen when displaying the color information comprises:

determining power consumption of the display screen based on the color information; and

determining the temperature information of the display screen working under the power consumption.

17. The method according to claim 16, wherein the determining the temperature information of the display screen working under the power consumption comprises:

determining the temperature information of a sub-display region at a target moment based on an ambient temperature of an environment where the display screen is located at the target moment, the power consumption of the sub-display region of the display screen at the target moment, and a temperature of the sub-display region

that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region.

18. The method according to claim 17, further comprising:

respectively acquiring temperature samples of a plurality of sub-display regions of the display screen to obtain a plurality of temperature samples;
acquiring power consumption samples of the display screen that correspond to different display information samples to obtain a plurality of power consumption samples, wherein the power consumption samples are used to cause the display screen to produce corresponding display information samples;
establishing a target mapping relationship based on the plurality of temperature samples, the plurality of power consumption samples and an ambient temperature sample of the environment where the display screen is located; and
determining the temperature information of the sub-display region at the target moment based on the ambient temperature of the environment where the display screen is located at the target moment, the power consumption of the sub-display region of the display screen at the target moment, and the temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region, comprising: mapping, based on the target mapping relationship, the ambient temperature, the power consumption of the sub-display region at the target moment and the temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region into the temperature information.

19. The method according to claim 15, wherein the color information further comprises: uniformity information, the uniformity information is used to represent a uniformity degree of the display screen when displaying the target image, and the method further comprises:

acquiring a uniformity compensation coefficient that corresponds to the temperature information, wherein the uniformity compensation coefficient is determined based on a pixel value in the target image; and
compensating for the uniformity information on the basis of the uniformity compensation coefficient.

20. The method according to claim 19, wherein the acquiring color information of a display screen when displaying a target image comprises:

acquiring the luminance and chrominance information of the display screen when displaying the target image in real time; and
acquiring the uniformity information of the display screen when the display screen is in a target display state and displaying the target image.

21. The method according to claim 19, wherein the uniformity information is collected by a collection device.

22. The method according to claim 15, wherein the acquiring temperature information of the display screen when displaying the color information comprises:

acquiring the temperature information obtained by a temperature sensor that collects a temperature of the display screen when displaying the color information.

23. A thermal compensation correction system for a display screen, comprising: a first transmission device, a second transmission device, and a processing device, wherein

the first transmission device is configured to receive color information of a display screen when displaying a target image;
the second transmission device is configured to transmit the color information to the processing device; and
the processing device is configured to acquire temperature information of the display screen when displaying the color information, and a luminance and chrominance compensation coefficient that corresponds to the temperature information, and control, based on the luminance and chrominance compensation coefficient, the display screen to compensate for luminance and chrominance information in the color information, wherein the luminance and chrominance compensation coefficient is determined based on an association relationship between the luminance and chrominance information and the temperature information, and the luminance and chrominance information comprises luminance information and/or chrominance information of the display

screen.

24. The system according to claim 23, wherein
the processing device is further configured to acquire a uniformity compensation coefficient that corresponds to
the temperature information, and compensate for uniformity information in the color information on the basis of the
uniformity compensation coefficient, wherein the uniformity compensation coefficient is determined based on a
pixel value in the target image.
25. The system according to claim 24, wherein the luminance and chrominance compensation coefficient is obtained
by converting a sub-luminance and chrominance compensation coefficient, the sub-luminance and chrominance
compensation coefficient is used to represent the association relationship between the luminance and chromi-
nance information of the display screen and the temperature information, and/or the uniformity compensation
coefficient is determined based on a sub-uniformity compensation coefficient of a pixel in the target image, and
the sub-uniformity compensation coefficient is used to compensate for uniformity information that corresponds to
the pixel.
26. The system according to claim 25, wherein
the first transmission device is further configured to: receive a luminance and chrominance sample of the
display screen, wherein the luminance and chrominance sample comprises a luminance sample and/or a
chrominance sample of the display screen;
the second transmission device is further configured to: transmit the luminance and chrominance sample to
the processing device;
the processing device is further configured to: acquire a temperature sample, wherein the luminance and
chrominance sample and the temperature sample satisfy the association relationship; and
the processing device is configured to acquire the temperature information of the display screen when
displaying the color information, and the luminance and chrominance compensation coefficient that corre-
sponds to the temperature information, comprising: determining the luminance and chrominance compensa-
tion coefficient that corresponds to the temperature information on the basis of the sub-luminance and
chrominance compensation coefficient that corresponds to both the luminance and chrominance sample and
the temperature sample.
27. The system according to claim 26, wherein the processing device is configured to determine the luminance and
chrominance compensation coefficient that corresponds to the temperature information on the basis of the sub-
luminance and chrominance compensation coefficient that corresponds to the luminance and chrominance sam-
ple and the temperature sample, comprising:
the processing device is configured to determine the luminance and chrominance compensation coefficient that
corresponds to the temperature information at least on the basis of the sub-luminance and chrominance compen-
sation coefficient and a reference temperature of the display screen.
28. The system according to claim 27, wherein the processing device is configured to determine the luminance and
chrominance compensation coefficient that corresponds to the temperature information at least on the basis of the
sub-luminance and chrominance compensation coefficient and the reference temperature of the display screen,
comprising:
the processing device is configured to determine a changed temperature of the temperature information relative to
the reference temperature, and adjust, based on the changed temperature, the sub-luminance and chrominance
compensation coefficient to the luminance and chrominance compensation coefficient that corresponds to the
temperature information.
29. The system according to claim 28, wherein the processing device is configured to determine a changed tempera-
ture of the temperature information relative to the reference temperature, comprising:
the processing device is configured to determine the changed temperature of the temperature information of a
sub-display region at a target moment relative to the reference temperature, wherein a display region of the
display screen comprises the sub-display region.
30. The system according to claim 26, wherein the luminance and chrominance sample comprises a first luminance
and chrominance sample of the display screen in a cold-screen state and a second luminance and chrominance
sample of the display screen in a hot-screen state, first temperature information of the display screen in the cold-

screen state is less than second temperature information of the display screen in the hot-screen state, wherein the processing device is configured to acquire the uniformity compensation coefficient that corresponds to the temperature information, comprising: determining the uniformity compensation coefficient that corresponds to the temperature information on the basis of the sub-uniformity compensation coefficient that corresponds to both the first luminance and chrominance sample and the second luminance and chrominance sample.

31. The system according to claim 30, wherein the processing device is configured to determine the uniformity compensation coefficient that corresponds to the temperature information on the basis of the sub-uniformity compensation coefficient that corresponds to both the first luminance and chrominance sample and the second luminance and chrominance sample, comprising: determining the uniformity compensation coefficient that corresponds to the temperature information at least on the basis of the sub-uniformity compensation coefficient and a reference temperature of the display screen.

32. The system according to claim 31, wherein the processing device is configured to determine the uniformity compensation coefficient that corresponds to the temperature information at least on the basis of the sub-uniformity compensation coefficient and the reference temperature of the display screen, comprising: determining a changed temperature of the temperature information relative to the reference temperature, and adjusting, based on the changed temperature and a temperature difference of the second temperature information relative to the first temperature information, the sub-uniformity compensation coefficient to the uniformity compensation coefficient that corresponds to the temperature information.

33. The system according to claim 30, wherein the first luminance and chrominance sample comprises a first principal component of the pixel, the first principal component is collected from the display screen in a luminance mode in the cold-screen state, the second luminance and chrominance sample comprises a second principal component of the pixel, the second principal component is collected from the display screen in the hot-screen state in the luminance mode, and the pixel value comprises the first principal component or the second principal component.

34. The system according to claim 26, wherein the first luminance and chrominance sample comprises a first tristimulus value of the pixel, the first tristimulus value is collected when the display screen is in a chrominance mode and in the cold-screen state, the second luminance and chrominance sample comprises a second tristimulus value of the pixel, and the second tristimulus value is collected from the display screen in the hot-screen state in the chrominance mode.

35. The system according to claim 23, wherein the processing device is configured to acquire the temperature information of the display screen when displaying the display information, comprising: determining power consumption of the display screen based on the display information, and determining the temperature information of the display screen working under the power consumption.

36. The system according to claim 35, wherein

the processing device is configured to determine the temperature information of the display screen working under the power consumption, comprising: determining the temperature information of a sub-display region at a target moment based on an ambient temperature of an environment where the display screen is located at the target moment, the power consumption of the sub-display region of the display screen at the target moment, and a temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region;

the processing device is further configured to respectively acquire temperature samples of a plurality of sub-display regions of the display screen to obtain a plurality of temperature samples; acquire power consumption samples of the display screen that correspond to different display information samples to obtain a plurality of power consumption samples, wherein the power consumption samples are used to cause the display screen to produce corresponding display information samples; establish a target mapping relationship based on the plurality of temperature samples, the plurality of power consumption samples and an ambient temperature sample of the environment where the display screen is located; and determine the temperature information of the sub-display region at the target moment based on the ambient temperature of the environment where the display screen is located at the target moment, the power consumption of the sub-display region of the display screen at the target moment, and the temperature of the sub-display region that changes due to influence of

power consumption of regions in the display region of the display screen other than the sub-display region, comprising: mapping, based on the target mapping relationship, the ambient temperature, the power consumption of the sub-display region at the target moment and the temperature of the sub-display region that changes due to influence of power consumption of regions in the display region of the display screen other than the sub-display region into the temperature information.

37. The system according to any one of claims 24-35, wherein

the first transmission device is configured to receive color information of the display screen when displaying the target image, comprising: receiving luminance and chrominance information of the display screen when displaying the target image in real time, and receiving uniformity information of the display screen when the display screen is in a target display state and displaying the target image; and the second transmission device is configured to transmit the color information to the processing device, comprising: transmitting the luminance and chrominance information and the uniformity information to the processing device in real time.

38. The system according to any one of claims 23-35, wherein the first transmission device is a TF module, the second transmission device is a PHY module, and the processing device is an FPGA module.

39. A processing device, comprising:

a receiving module, configured to receive color information of a display screen when displaying a target image;
a processing module, configured to acquire temperature information of the display screen when displaying the color information, and acquire a luminance and chrominance compensation coefficient that corresponds to the temperature information, wherein the luminance and chrominance compensation coefficient is determined based on an association relationship between luminance and chrominance information in the color information and the temperature information, and the luminance and chrominance information comprises luminance information and/or chrominance information of the display screen; and
a control chip, configured to control, based on the luminance and chrominance compensation coefficient, the display screen to compensate for the luminance and chrominance information.

40. A computer-readable storage medium, comprising a stored program, wherein the program, when running, controls a device in which the computer-readable storage medium is located to perform the method according to any one of claims 1 to 22.

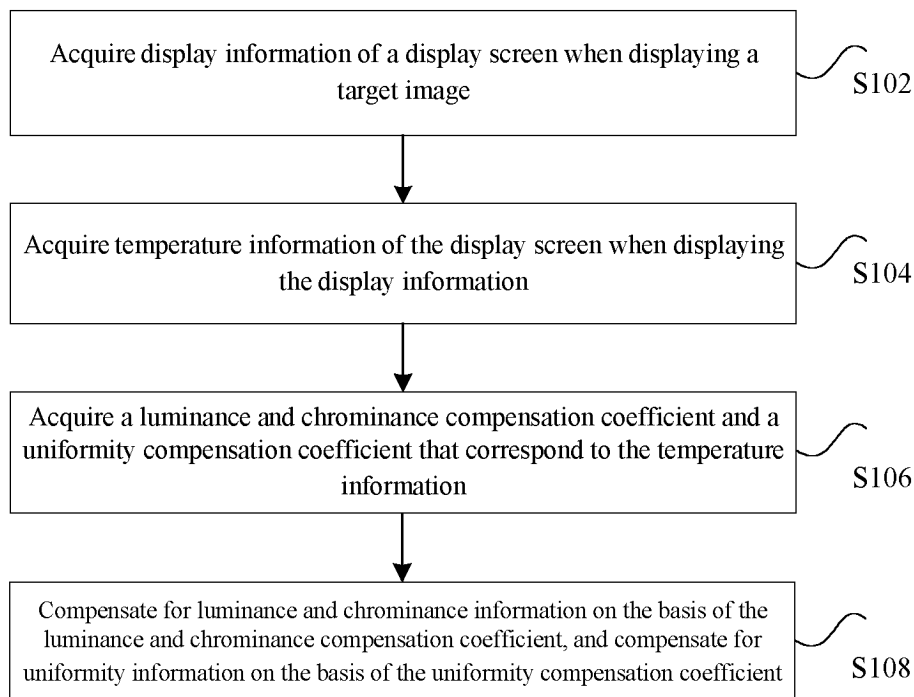


FIG. 1

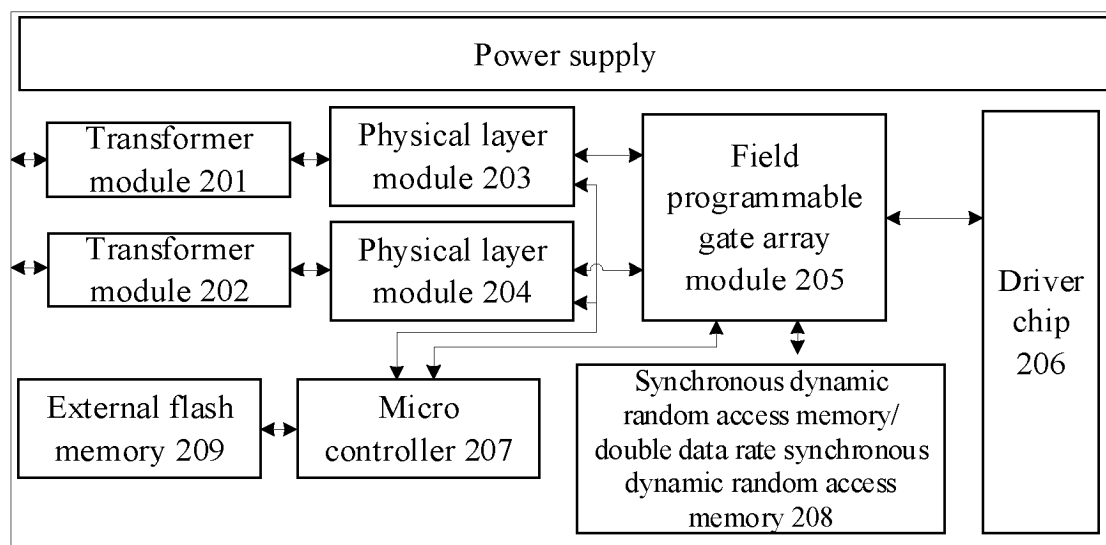


FIG. 2(a)

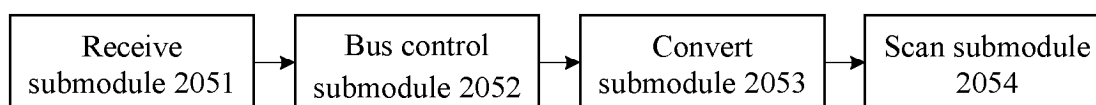


FIG. 2(b)

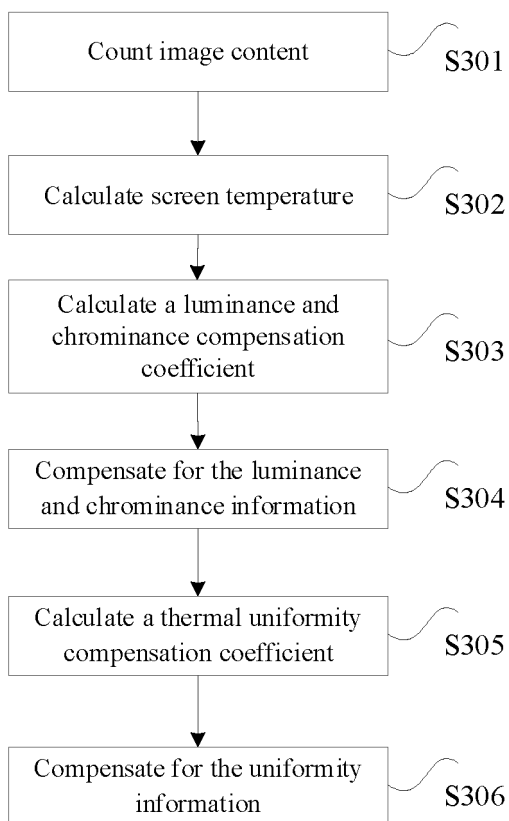


FIG. 3

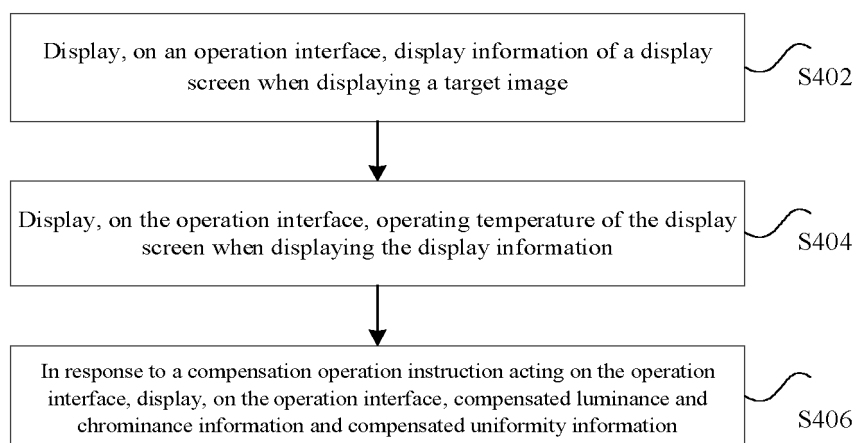


FIG. 4

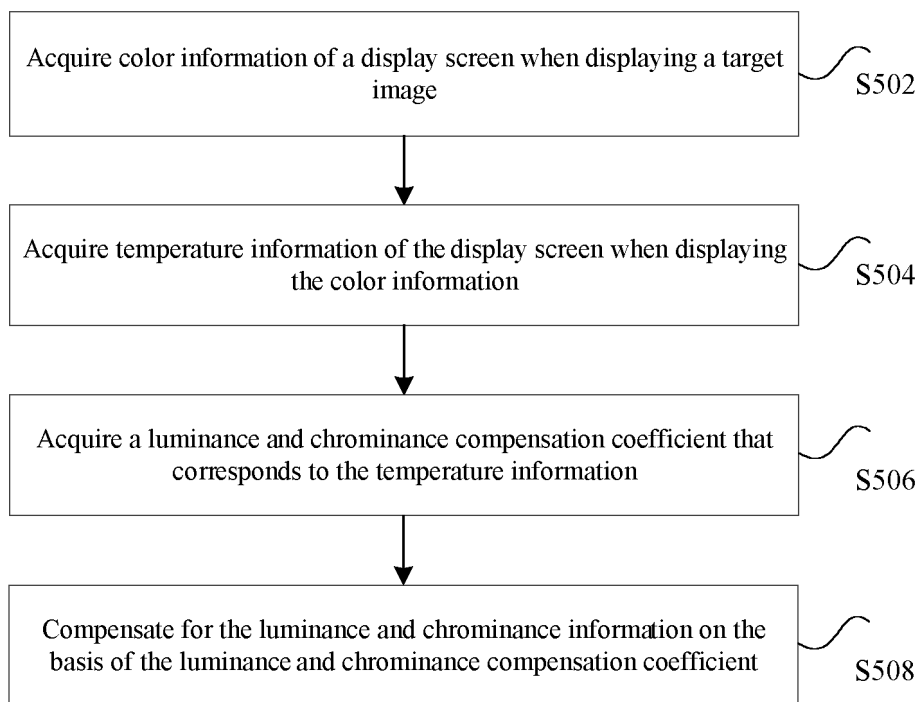


FIG. 5

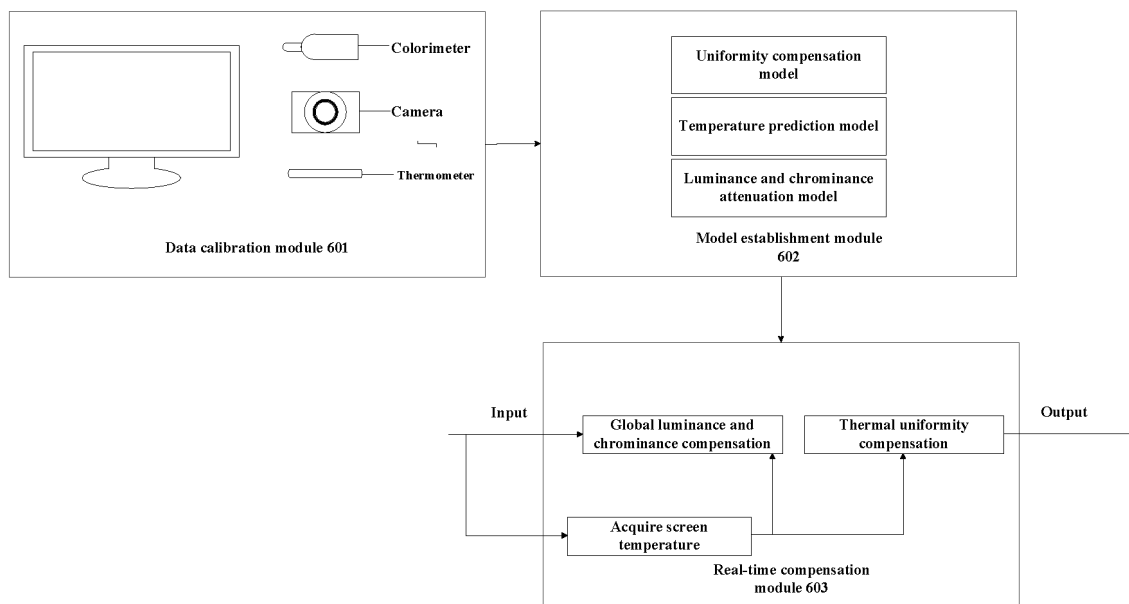


FIG. 6

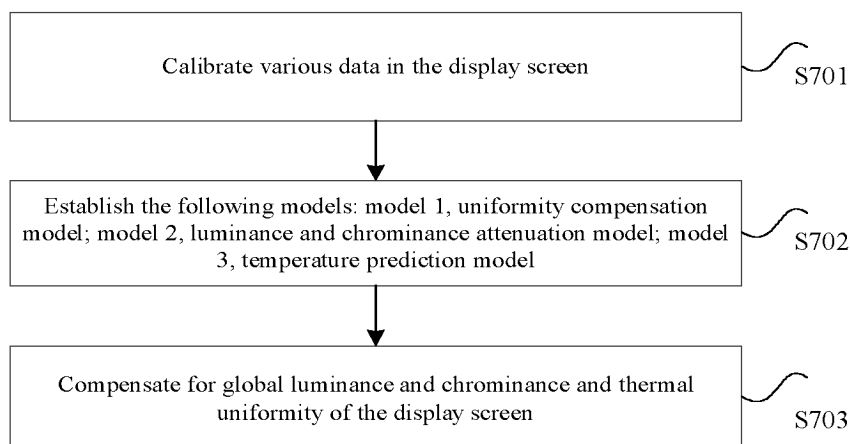


FIG. 7(a)

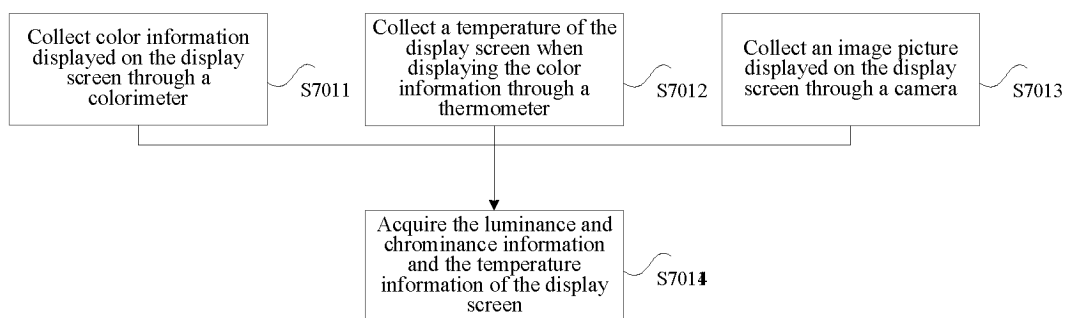


FIG. 7(b)

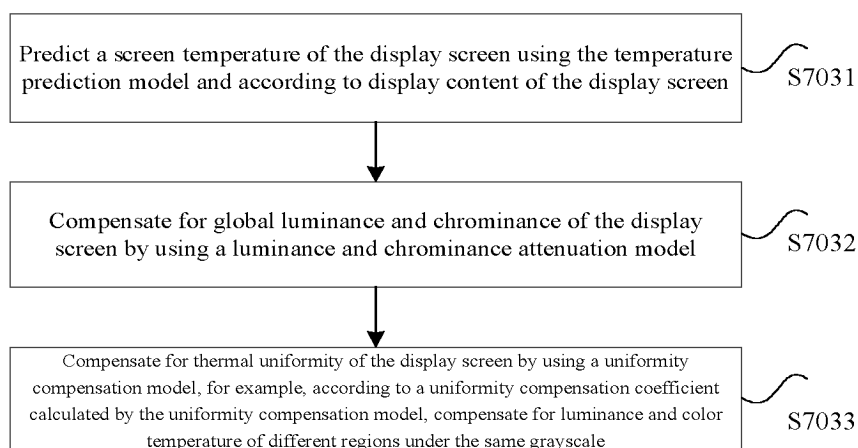


FIG. 7(c)

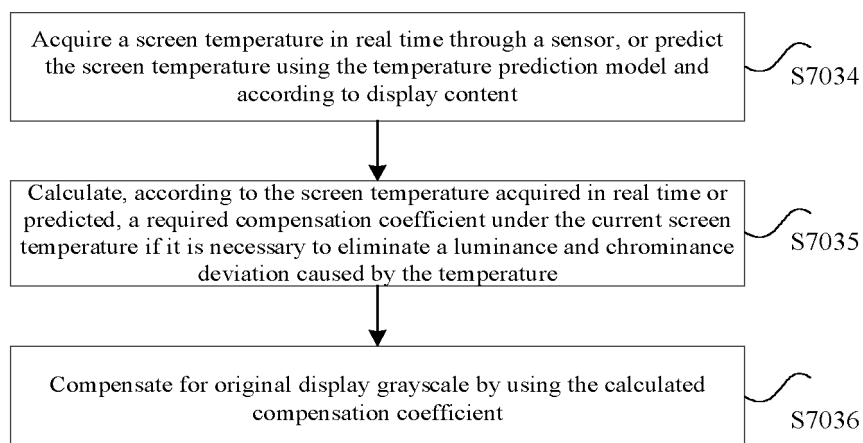


FIG. 7(d)

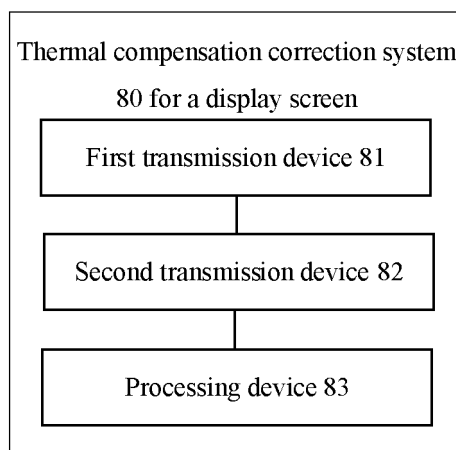


FIG. 8

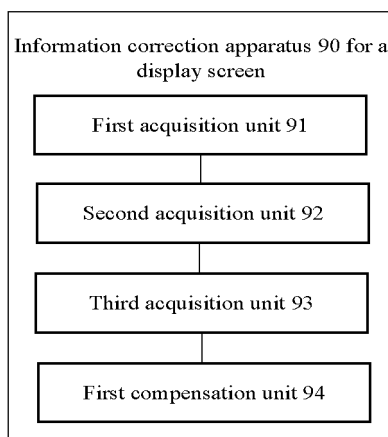


FIG. 9

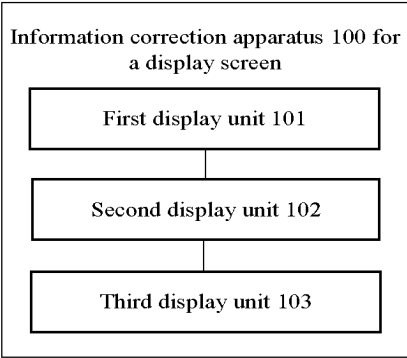


FIG. 10

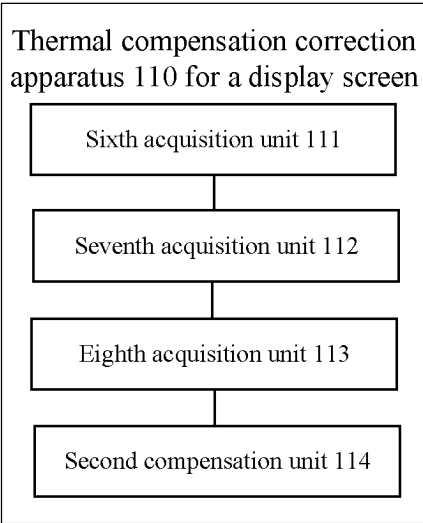


FIG. 11

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2024/097271

A. CLASSIFICATION OF SUBJECT MATTER

G09G3/32(2016.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: G09G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNTXT, ENTXTC, WPABS, CNKI, ENTXT: 诺瓦星云, 显示, 补偿, 校正, 校准, 修正, 亮色度, 亮度, 色度, 色温, 温度, 系数, 映射, 均匀, 均一, 颜色, 像素值, 功耗, 热屏, 冷屏, OLED, adjust+, bright+, compensation, parameter?, unevenness, adjust + 2d coefficient, screen, correction, uniform+, luminance, chrominance

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 117437877 A (XI'AN NOVASTAR TECHNOLOGY CO., LTD.) 23 January 2024 (2024-01-23) claims 1-25, description, paragraphs [0033]-[0329], and figures 1-11	1-40
X	CN 107452345 A (BOE TECHNOLOGY GROUP CO., LTD. et al.) 08 December 2017 (2017-12-08) description, paragraphs [0061]-[0148], and figures 1-6	15, 23, 38-40
Y	CN 107452345 A (BOE TECHNOLOGY GROUP CO., LTD. et al.) 08 December 2017 (2017-12-08) description, paragraphs [0061]-[0148], and figures 1-6	1-14, 16-22, 24-37
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☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"D" document cited by the applicant in the international application	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"E" earlier application or patent but published on or after the international filing date	"&" document member of the same patent family
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

21 August 2024

Date of mailing of the international search report

29 August 2024

Name and mailing address of the ISA/CN

China National Intellectual Property Administration (ISA/
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China No. 6, Xitucheng Road, Jimenqiao, Haidian District,
Beijing 100088

Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2024/097271

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2024/097271

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					US	2024054950	A1	15 February 2024
					CN	112951156	B	03 February 2023
CN	114694618	A	01 July 2022		WO	2023164978	A1	07 September 2023
					US	2024177646	A1	30 May 2024
					CN	114694618	B	27 June 2023
CN	113467739	A	01 October 2021		None			
CN	116469339	A	21 July 2023		None			
US	2022208065	A1	30 June 2022		JPWO	2020225906	A1	02 December 2021
					JP	7019100	B2	14 February 2022
					DE	112019007303	T5	24 March 2022
					WO	2020225906	A1	12 November 2020
CN	112614455	A	06 April 2021		None			

Form PCT/ISA/210 (patent family annex) (July 2022)

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