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Display panel having reduced signal load

Abstract

The embodiments of present the application disclose a display panel. The display panel includes a substrate disposed with a plurality of scanning lines and a plurality of data lines. A light-emitting component includes three scanning lines and two light-emitting units, and a light-emitting unit includes a plurality of sub light-emitting pixels. A number of the data lines is less than a number of the sub light-emitting pixels in the light-emitting unit, and a product of the number of the data lines and the number of the scanning lines is greater than or equal to the number of the sub light-emitting pixels. By electrically connecting the two light-emitting units with the three scanning lines, a load of the data lines is reduced and display effects are improved.

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Background/Summary

CROSS REFERENCE TO RELATED APPLICATIONS

(1) This application is a National Phase of PCT Patent Application No. PCT/CN2022/093311 having International filing date of May 17, 2022, which claims the benefit of priority of Chinese Patent Application No. 202210405989.9, filed Apr. 18, 2022, the contents of which are all incorporated herein by reference in their entirety.

FIELD OF INVENTION

(2) The present application relates to a field of display, in particular, to a display panel.

Description of Prior Art

(3) In a traditional pixel architecture design process of display panels, a plurality of sub light-emitting pixels are distributed on a substrate in an array, and correspondingly, a plurality of scanning lines and a plurality of data lines are also distributed on the substrate in an array. Among them, a number of the scanning lines corresponds to a number of rows of the sub light-emitting pixels, and a number of the data lines corresponds to a number of columns of the sub light-emitting pixels, that is, one of the scanning lines is arranged between two adjacent rows of the sub light-emitting pixels, and one of the data lines is arranged between two adjacent columns of the sub light-emitting pixels. When the number of rows of the sub light-emitting pixels is large, the number of the sub light-emitting connected to each data line is large, resulting in a large load on a data line, and a light-emitting difference between the sub light-emitting pixels connected to the data line is large, resulting in poor overall display effects of the display panel.

Technical Problem

(4) The embodiments of the present application provide a display panel, which can solve a problem of poor overall display effect of existing display panels.

SUMMARY

(5) The Embodiments of the Present Application Provide a Display Panel, Comprising: a substrate disposed with a plurality of scanning lines and a plurality of data lines, wherein the plurality of scanning lines extend along a first direction and are arranged in parallel along a second direction, the plurality of data lines extend along the second direction and are arranged in parallel along the first direction, and the first direction is at an included angle with the second direction; a plurality of light-emitting components arranged on the substrate in parallel along the first direction, wherein each of the light-emitting components comprises three of the data lines and two light-emitting units arranged in parallel along the first direction; each of the light-emitting units comprises a plurality of light-emitting pixels arranged in parallel along the second direction, and each of the light-emitting pixels comprises a plurality of sub light-emitting pixels arranged in parallel along the second direction; each of the sub light-emitting pixels is electrically connected with one of the data lines of the light-emitting components; wherein a number of the scanning lines is less than a number of the sub light-emitting pixels in one of the light-emitting units; a product of the number of the scanning lines and a number of the data lines in one of the light-emitting components is greater than or equal to a number of the sub light-emitting pixels in one of the light-emitting components.

(6) Alternatively, in some embodiments of the present application, two of the data lines of one of the light-emitting components are arranged between the two light-emitting units of the one of the light-emitting components; one of the light-emitting units of the light-emitting components is

arranged between two of the data lines of the one of the light-emitting components.
(7) Alternatively, in some embodiments of the present application, along the first direction, two of the data lines and one of the data lines are alternately arranged between adjacent two of the light-emitting units in turn.
(8) Alternatively, in some embodiments of the present application, the two light-emitting units of at least part of the light-emitting components are arranged between two of the data lines of the light-emitting components, respectively.
(9) Alternatively, in some embodiments of the present application, along the first direction, one of the data lines and two of the data lines are alternately arranged between adjacent two of the light-emitting units in turn.
(10) Alternatively, in some embodiments of the present application, distribution modes of the three of the data lines in the plurality of the light-emitting components are same.
(11) Alternatively, in some embodiments of the present application, the three of the data lines of one of the light-emitting components are located between the two light-emitting units of the one of the light-emitting components.
(12) Alternatively, in some embodiments of the present application, the first direction is perpendicular to the second direction.
(13) Alternatively, in some embodiments of the present application, the first direction is a column direction and the second direction is a row direction.
(14) Alternatively, in some embodiments of the present application, each of the light-emitting pixels comprises three of the sub light-emitting pixels, at least part of the light-emitting pixels is electrically connected with two of the scanning lines, and each of the sub light-emitting pixels in the part of the light-emitting pixels is electrically connected with one of the two of the scanning lines.
(15) Alternatively, in some embodiments of the present application, any one of the light-emitting pixels is electrically connected with two of the scanning lines.
(16) Alternatively, in some embodiments of the present application, each of the scanning lines is arranged between adjacent two of the sub light-emitting pixels in the light-emitting pixels.
(17) Alternatively, in some embodiments of the present application, part of the light-emitting pixels is electrically connected with the two of the scanning lines, and part of the light-emitting pixels is electrically connected with three of the scanning lines.
(18) Alternatively, in some embodiments of the present application, the substrate is further disposed with a plurality of control switches, and a number of the plurality of control switches is equal to the number of the plurality of sub light-emitting pixels; the sub light-emitting pixels are electrically connected with the control switches in a one-to-one correspondence, and the control switches are electrically connected with the scanning lines and the data lines.
(19) Alternatively, in some embodiments of the present application, the plurality of scanning lines and the plurality of data lines form a plurality of cross areas, a number of the plurality of the cross areas is equal to the number of the control switches, and each of the cross areas is disposed with one of the control switches.
(20) Alternatively, in some embodiments of the present application, each of the control switches is located at a position near a correspondingly connected one of the sub light-emitting pixels in the cross areas.
(21) Alternatively, in some embodiments of the present application, each of the control switches comprises a gate electrode, a source electrode, and a drain electrode, the gate electrode is electrically connected with one of the scanning lines, the source electrode is electrically connected with one of the data lines, and the drain electrode is electrically connected with one of the sub light-emitting pixels.
(22) Alternatively, in some embodiments of the present application, each of the control switches comprises a gate electrode, a source electrode, and a drain electrode; the gate electrode is

electrically connected with one of the scanning lines, the drain electrode is electrically connected with one of the data lines, and the source electrode is electrically connected with one of the sub light-emitting pixels.
(23) Alternatively, in some embodiments of the present application, the gate electrode is arranged on a same layer as the scanning lines.
(24) Alternatively, in some embodiments of the present application, the source electrode and the drain electrode are arranged on a same layer as the data lines.
(25) In the embodiments of the present application, the display panel comprises a substrate, and the substrate is disposed with a plurality of scanning lines and a plurality of data lines. the plurality of scanning lines extend along a first direction and are arranged in parallel along a second direction. the plurality of data lines extend along the second direction and are arranged in parallel along the first direction, and the first direction is at an comprised angle with the second direction. A plurality of the light-emitting components are arranged on the substrate in parallel along the second direction, each of the light-emitting components comprises three of the data lines and two light-emitting units arranged in parallel along the first direction. Each of the light-emitting units comprises a plurality of light-emitting pixels arranged in parallel along the second direction, and each of the light-emitting pixels comprises a plurality of sub light-emitting pixels arranged in parallel along the second direction. A number of the scanning lines is less than a number of the sub light-emitting pixels in one of the light-emitting units. A product of the number of the data lines and a number of the scanning lines is greater than or equal to a number of the sub light-emitting pixels. In the present application, In the present application, by electrically connecting two light-emitting units with three data lines, the number of the data lines can be increased, the load of each data line can be reduced, and the large light-emitting difference between the sub light-emitting pixels connected on one data line can be avoided, so as to improve the overall light-emitting effect of the display panel.

Description

BRIEF DESCRIPTION OF DRAWINGS
(1) In order to explain the technical solutions in the embodiments of the present application more clearly, the following will briefly introduce the drawings needed in the description of the embodiments. Obviously, the drawings in the following description are only some embodiments of the present application. For those skilled in the art, other drawings can be obtained based on these drawings without creative work.
(2) FIG. **1** is a schematic diagram of a pixel architecture of a display panel provided by embodiments of the present application.
(3) FIG. **2** is a schematic diagram of a pixel architecture of another display panel provided by the embodiments of the present application.
(4) FIG. **3** is a schematic diagram of a pixel architecture of another display panel provided by the embodiments of the present application.
(5) FIG. **4** is a schematic diagram of a pixel architecture of another display panel provided by the embodiments of the present application.
(6) FIG. **5** is a schematic diagram of a pixel architecture of another display panel provided by the embodiments of the present application.
(7) FIG. **6** is a schematic diagram of a pixel architecture of another display panel provided by the embodiments of the present application.
(8) FIG. **7** is a schematic diagram of a pixel architecture of another display panel provided by the embodiments of the present application.
(9) FIG. **8** is a schematic diagram of a display device provided by the embodiments of the present

application.

DESCRIPTION OF REFERENCE MARKS

(10) TABLE-US-00001 reference reference mark part name mark part name 10 display device 130 scanning line 100 display panel 140 cross area 110 substrate 150 control switch 120 light-emitting component X first direction 121 data line Y second direction 122 light-emitting unit 200 control circuit 1221 light-emitting pixel 300 housing 1221a sub light-emitting pixel

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

(11) In the following, the technical scheme in the embodiment of the present application will be described clearly and completely in combination with the drawings. Obviously, the described embodiments are only a part of the embodiments of the present application, rather than all the embodiments. Based on the embodiments of the present application, all other embodiments obtained by those skilled in the art without creative work fall within the protection scope of the present application. In addition, it should be understood that the specific embodiments described herein are only used to explain the present application and are not used to limit the present application. In the present application, in the absence of a contrary explanation, the location words used, such as “up” and “down”, usually refer to the up and down under the actual use or working state of the device, specifically the drawing direction in the attached drawings. The “inside” and “outside” are for the contour of the device.

(12) The embodiments of the present application provide a display panel and a display device. The following are described in detail. It should be noted that an order of description of the following embodiments is not a limitation of the preferred order of the embodiments.

(13) First, the embodiments of the present application provide a display panel. As shown in FIG. **1**, the display panel **100** comprises a substrate **110**. The substrate **110** is used as a bearing structure of the display panel **100** to support other functional film layers in the display panel **100** to ensure structural stability of the display panel **100**.

(14) The substrate **110** is disposed with a plurality of scanning lines **130** and a plurality of data lines **121**. The plurality of scanning lines **130** extend along a first direction X and are arranged in parallel along a second direction Y. The plurality of data lines **121** extend along the second direction Y and are arranged in parallel along the first direction X, and the first direction X is at an included angle with the second direction Y, that is, the plurality of scanning lines **130** and the plurality of data lines **121** are crossedly arranged on the substrate **110** in a distribution direction.

(15) Among them, the first direction X can be defined as a column direction, and the second direction Y can be defined as a row direction, and the first direction X is perpendicular to the second direction Y. That is, the plurality of scanning lines **130** are distributed as multiple rows and the plurality of data lines **121** are distributed in multiple columns. Hence, the scanning lines **130** and the data lines **121** are distributed in multiple rows and multiple columns, so as to facilitate connection designs between subsequent structures and the scanning lines **130** and the data lines **121**.

(16) It should be noted that in the embodiments of the present application, the scanning lines **130** and the data lines **121** are located on different film layers of the display panel **100**, and “crossedly arranged in the distribution direction” refers to a spatial cross, not a direct cross connection, so as to ensure that no electrical crosstalk occurs between the scanning lines **130** and the data lines **121**.

(17) The display panel **100** comprises a plurality of light-emitting components **120**. The light-emitting components **120** are arranged on the substrate **110** in parallel along the first direction X, that is, a distribution direction of the light-emitting components **120** is consistent with the distribution direction of the data lines **121**. Each of the light-emitting components **120** comprises three data lines **121** and two light-emitting units **122** arranged in parallel along the first direction X, that is, a light-emitting component **120** comprises three data lines **121** and two light-emitting units **122** distributed in columns. A position of the data lines **121** in one light-emitting component **120** relative to the light-emitting units **122** can be adjusted accordingly according to design

requirements.
(18) Each of the light-emitting units **122** comprises a plurality of light-emitting pixels **1221** arranged in parallel along the second direction Y. And each of the light-emitting pixels **1221** comprises a plurality of sub light-emitting pixels **1221***a* arranged in parallel along the second direction Y, that is, a distribution direction of the light-emitting pixels **1221** and a distribution direction of the sub light-emitting pixels **1221***a* in one light-emitting unit **122** are consistent with a distribution direction of the scanning lines **130**. That is, one light-emitting component **120** comprises three data lines **121** and two columns of multi-row sub light-emitting pixels **1221***a*.
(19) Each of the sub light-emitting pixels **1221**A in one of the light-emitting components **120** is electrically connected with one of the data lines **121** in the one of the light-emitting components **120**. By adjusting distribution modes of the three data lines **121** in the one of the light-emitting component **120**, connection modes between the sub light-emitting pixels **1221***a* and the data lines **121** can be designed to prevent mutual interference between the plurality of sub light-emitting pixels **1221***a* while ensuring that the plurality of sub light-emitting pixels **1221***a* can all be electrically connected with one of the data lines **121**.
(20) It should be noted that when each of the sub light-emitting pixels **1221***a* is electrically connected with one data line **121**, the sub light-emitting pixel **1221***a* also need to be electrically connected with one scanning line **130** at a same time to realize a regulation of the light-emitting condition of the sub light-emitting pixel **1221***a*. By adjusting the distribution modes of the scanning lines **130** and the data lines **121**, a regulation of the connection modes of the sub light-emitting pixels **1221***a* can be realized.
(21) Alternatively, a number of the scanning lines **130** is less than a number of the sub light-emitting pixels **1221***a* in one of the light-emitting units **122**, that is, the number of the scanning lines **130** is less than a number of rows of the sub light-emitting pixels **1221***a*. In the embodiments of the present application, one light-emitting component **120** comprises two light-emitting units **122** and three data lines **121**. Compared with a conventional method of each light-emitting unit **122** corresponding to one data line **121**, a layout number of the data lines **121** is increased, so that a number of the sub light-emitting pixels **1221***a* connected to each data line **121** can be reduced accordingly, so as to reduce the load on each data line **121** and prevent a large light-emitting difference between the sub light-emitting pixels **1221***a* due to an excessive load when a signal is input on the data line **121**, thereby affecting an overall display effect of the display panel **100**.
(22) Wherein a product of the scanning lines **130** and the data lines **121** in one of the light-emitting components **120** is greater than or equal to a number of the sub light-emitting pixels **1221***a* in the one of the light-emitting components **120**. In an actual design process, each sub light-emitting pixel **1221***a* needs to be electrically connected with a scanning line **130** and a data line **121**, and only one sub light-emitting pixel **1221***a* is connected with a same scanning line **130** and a same data line **121** at a same time, so as to realize an independent control of each sub light-emitting pixel **1221***a*. However, a plurality of sub light-emitting pixels **1221***a* can be connected to one scanning line **130** at a same time, and a plurality of sub light-emitting pixels **1221***a* can also be connected to one data line **121** at a same time, so as to reduce distribution numbers of the scanning lines **130** and the data lines **121** and simplify the distribution modes. By arranging the product of the scanning lines **130** and the data lines **121** in one of the light-emitting components **120** to be greater than or equal to the number of the sub light-emitting pixels **1221***a* in the one of the light-emitting components **120**, it can be ensured that each sub light-emitting pixel **1221***a* in the one of the light-emitting components **120** can be electrically connected with the scanning line **130** and the data line **121**.
(23) In the embodiments of the present application, the distribution direction of the sub light-emitting pixels **1221***a* of the light-emitting units **122** is consistent with the distribution direction of the scanning lines **130**, and the two light-emitting units **122** and the three data lines **121** form a light-emitting component **120**, so that the sub light-emitting pixels **1221***a* in the light-emitting component **120** are respectively connected with one of the three data lines **121**, and the number of

the scanning lines **130** is less than the number of the sub light-emitting pixels **1221***a* of the light-emitting units **122**. Hence, compared with the traditional structure in which distribution modes of the scanning lines **130** and the data lines **121** are consistent with a distribution mode of the sub light-emitting pixels **1221***a*, this structural design can increase the number of the data lines **121**, reduce the load on each data line **121**, prevent the large light-emitting difference between the sub light-emitting pixels **1221***a* connected on one data line **121**, and improve the overall display effect of the display panel **100**.

(24) Alternatively, as shown in FIGS. **1** and **6**, two data lines **121** of the light-emitting component **120** are arranged between the two light-emitting units **122** of the light-emitting component **120**. Since the number of the scanning lines **130** is less than the number of the sub light-emitting pixels **1221***a* of one of the light-emitting units **122**, that is, the number of the scanning lines **130** is less than the number of rows of the sub light-emitting pixels **1221***a*, one data line **121** cannot connect a whole column of the sub light-emitting pixels **1221***a* at a same time. Arranging two of the three data lines **121** of the light-emitting component **120** between the two light-emitting units **122** is conducive to electrical connection between the light-emitting unit **122** and the adjacent scanning lines **130**, so as to prevent mutual crosstalk in a connection process caused by a long distance between the data lines **121** and the sub light-emitting pixels **1221***a* in the light-emitting units **122**, which affects the regulation of the light-emitting condition of each sub light-emitting pixel **1221***a*.

(25) One of the light-emitting units **122** of the light-emitting component **120** is arranged between two data lines **121** of the light-emitting component **120**, that is, the light-emitting component **120** has opposite sides in the first direction X, and a remaining data line **121** in the light-emitting component **120** is arranged on one side edge of the light-emitting component **120** so that one of the two light-emitting units **122** is located between the two data lines **121**. The remaining data line **121** is used to electrically connect with the sub light-emitting pixels **1221***a* in an adjacent light-emitting unit **122**, so as to save a use of two data lines **121** between the two light-emitting units **122**, and prevent that the sub light-emitting pixel **1221***a* far away from the data line **121** located on the one side edge of the light-emitting component **120** needs to be connected across pixels, thereby preventing mutual crosstalk between the sub light-emitting pixels **1221***a*.

(26) Alternatively, in the first direction X, two data lines **121** and one data line **121** are alternately arranged between two adjacent light-emitting units **122** in turn. That is, if the plurality of light-emitting components **120** are regarded as a whole, one side edge of the whole in the first direction X is disposed with a data line **121**. According to a direction indicated by an arrow in the first direction X in FIGS. **1** to **5**, the two data lines **121** and the one data line **121** are alternately arranged between the two adjacent light-emitting units **122** in turn.

(27) That is, the two data lines **121** are arranged between the light-emitting unit **122** in a first column and the light-emitting unit **122** in a second column, and the one data line **121** is arranged between the light-emitting unit **122** in the second column and the light-emitting unit **122** in a third column; the two data lines **121** are arranged between the light-emitting unit **122** in the third column and the light-emitting unit **122** in a fourth column, and so on. In addition, a data line **121** is arranged on a side of the first column of the light-emitting units **122** away from the second column of the light-emitting units **122**, or a data line **121** is arranged on a side of a last column of the light-emitting units **122** away from a penultimate column of the light-emitting units **122**. This structural design makes the plurality of data lines **121** on the substrate **110** distribute regularly as a whole, which is helpful to an overall structural design of the display panel **100** and improve production efficiency.

(28) Alternatively, as shown in FIG. **7**, in the embodiments of the present application, two light-emitting units **122** of at least part of the light-emitting components **120** are respectively arranged between the two data lines **121** of the part of the light-emitting components **120**. That is, for the part of the light-emitting components **120**, the data lines **121** and the light-emitting units **122** are arranged alternately, so that the two light-emitting units **122** are respectively sandwiched between

the two data lines **121**. This structural design can reduce the data lines **121** arranged between the two light-emitting units **122** of a single light-emitting component **120**, so that each sub light-emitting pixel **1221***a* can be electrically connected with its adjacent data line **121** directly, so as to reduce a risk of the mutual crosstalk between the sub light-emitting pixels **1221***a*.

(29) In some embodiments, one data line **121** and two data lines **121** are alternately arranged between two adjacent light-emitting units **122** in turn in the first direction X. That is, if the plurality of light-emitting components **120** are regarded as a whole, a data line **121** is arranged on opposite edges of the whole in the first direction X, respectively. According to a direction indicated by an arrow in the first direction X in FIG. **7**, the one data line **121** and the two data lines **121** are alternately arranged between the two adjacent light-emitting units **122** in turn.

(30) That is, the one data line **121** is arranged between the light-emitting unit **122** in the first column and the light-emitting unit **122** in the second column, and the two data lines **121** are arranged between the light-emitting unit **122** in the second column and the light-emitting unit **122** in the third column; the one data line **121** is arranged between the light-emitting unit **122** in the third column and the light-emitting unit **122** in the fourth column, and so on. In addition, a data line **121** is arranged on the side of the first column of the light-emitting units **122** away from the second column of the light-emitting units **122** and the side of the last column of light-emitting units **122** away from the penultimate column of light-emitting units **122**, respectively.

(31) This structural design enables the sub light-emitting pixels **1221***a* in each light-emitting unit **122** to be electrically connected with the adjacent data line **121** directly without connecting cross pixels or cross data lines **121**, so as to further reduce the risk of mutual crosstalk between the sub light-emitting pixels **1221***a*.

(32) Alternatively, in the embodiments of the present application, the distribution modes of the three data lines **121** in the plurality of light-emitting components **120** are same. That is, the connection modes between the sub light-emitting pixels **1221***a* of each light-emitting component **120** and the corresponding data lines **121** are same. Hence, an overall connection mode of the plurality of light-emitting components **120** is in regular distribution, which is helpful to simplify a design of the pixel structure in the display panel **100**, reduce production difficulty, and improve the production efficiency.

(33) In some embodiments, the distribution modes of the three data lines **121** in the plurality of light-emitting components **120** can also be different, or a form of alternating design of multiple distribution modes in the above embodiments can be adopted, and its specific structure can be adjusted accordingly according to actual production requirements. There is no special restriction here, but only to ensure an effective regulation of the light-emitting mode of the plurality of sub light-emitting pixels **1221***a* in the display panel **100**.

(34) It should be noted that in the embodiments of the present application, the three data lines **121** of the light-emitting component **120** can all be located between the two light-emitting units **122** of the light-emitting component **120**. Part of the sub light-emitting pixels **1221***a* in the two light-emitting units **122** are electrically connected with the adjacent data lines **121** directly, and part of the sub light-emitting pixels **1221***a* are electrically connected with a middle one of the three data lines **121**. This structural design makes the distribution of the data lines **121** on the substrate **110** relatively concentrated and relatively less affected by the distribution mode of the sub light-emitting pixels **1221***a*, which is conducive to improving flexibility of the connection mode between the sub light-emitting pixels **1221***a* and the data lines **121**.

(35) Alternatively, in the embodiments of the present application, the light-emitting pixel **1221** comprises three sub light-emitting pixels **1221***a*, at least part of the light-emitting pixels **1221** is electrically connected with two scanning lines **130**, and the sub light-emitting pixels **1221***a* in the light-emitting pixels **1221** are electrically connected with one of the scanning lines **130**, respectively. As shown in FIGS. **1** to **7**, taking multiple columns of three-row sub light-emitting pixels **1221***a* as a unit, the three-row sub light-emitting pixels **1221***a* can be electrically connected

with only two scanning lines **130**. Compared with a tradition that three rows of the sub light-emitting pixels **1221***a* need to be connected with three scanning lines **130**, it can reduce a distribution amount of the scanning lines **130** and increase a distribution amount of the data line **121**, so as to reduce the load on each data line **121**, prevent the large light-emitting difference between the sub light-emitting pixels **1221***a* connected on one data line **121**, and improve an overall light-emitting effect of the display panel **100**.

(36) In some embodiments, any one light-emitting pixels **1221** is electrically connected with two scanning lines **130**. According to a direction indicated by an arrow in the second direction Yin FIG. **1**, every three rows are divided into a group, and each group is disposed with two scanning lines **130**. Compared with a traditional distribution mode of the scanning lines **130**, one scanning line **130** can be reduced in each group. Hence, the load on each data line **121** is further reduced and the overall light-emitting effect of the display panel **100** is improved.

(37) It should be noted that according to the different distribution modes of the data lines **121**, part of the light-emitting pixels **1221** can be electrically connected with the two scanning lines **130**, and part of the light-emitting pixels **1221** still retains the traditional setting mode of electrically connecting with the three scanning lines **130**. This setting mode can increase selectivity of the connection mode between the sub light-emitting pixels **1221***a* and the scanning lines **130** and the data lines **121** and reduce the risk of mutual crosstalk between the sub light-emitting pixels **1221***a* due to line designs.

(38) Alternatively, when one light-emitting pixel **1221** is electrically connected with two scanning lines **130**, the scanning lines **130** can be arranged between two adjacent sub light-emitting pixels **1221***a* in the light-emitting pixels **1221**, so that each sub light-emitting pixel **1221***a* can be electrically connected with the adjacent scanning line **130**, so as to prevent cross pixel connection and reduce the risk of mutual crosstalk between the sub light-emitting pixels **1221***a*.

(39) When each light-emitting pixel **1221** is electrically connected to only two scanning lines **130**, and the scanning lines **130** are arranged between two adjacent sub light-emitting pixels **1221***a* in the light-emitting pixel **1221**, in the second direction Y, it is equivalent to that no scanning line **130** is arranged between the two adjacent light-emitting pixels **1221**. Hence, connections between each row of the light-emitting pixels **1221** and the scanning lines **130** are independent of each other, which is helpful to simplify an overall layout design of the connection modes between the sub light-emitting pixels **1221***a* and the scanning lines **130**.

(40) Wherein, each light-emitting pixel **1221** comprises three sub light-emitting pixels **1221***a*, which are red pixels, green pixels, and blue pixels respectively. In the embodiments of the present application, in the second direction Y, the light-emitting pixel **1221** comprises red pixels, green pixels, and blue pixels arranged in sequence. In the first direction X, the sub light-emitting pixels **1221***a* in a same row are pixels of a same color, so that when the sub light-emitting pixels **1221***a* are produced by a printing process, the printing can be carried out row by row, so as to improve printing efficiency.

(41) It should be noted that in the second direction Y, a color order of the three sub light-emitting pixels **1221***a* in the light-emitting pixel **1221** can be adjusted accordingly according to design requirements, as long as colors of the sub light-emitting pixels **1221***a* located in a same row along the first direction X are same, and there is no special restriction here.

(42) It can be understood that the connection modes of the plurality of sub light-emitting pixels **1221***a* in each light-emitting component **120** with the scanning lines **130** and the data lines **121** are diverse, and specific connection modes can be adjusted accordingly according to an actual design situation. Changes made only to the connection modes are within the protection scope of the embodiments of the present application. Several of these connection modes will be described in detail below.

(43) As shown in FIG. **1**, in a light-emitting component **120**, a first data line **121** is arranged on one side of the first column of the light-emitting pixels **1221**, and a second data line **121** and a third

data line **121** are arranged between two columns of the light-emitting pixels **1221**. Each light-emitting pixel **1221** comprises three sub light-emitting pixels **1221***a*, the scanning lines **130** is successively arranged between the two adjacent sub light-emitting pixels **1221***a* in the light-emitting pixels **1221**, and the scanning lines **130** is not arranged between the two adjacent light-emitting pixels **1221**. Three columns of the scanning lines **130** and two rows of the data lines **121** can be electrically connected with six sub light-emitting pixels **1221***a* in one light-emitting component.

(44) Wherein, any two sub light-emitting pixels **1221***a* of each light-emitting pixel **1221** in the first column are electrically connected with the first data line **121**. Any two sub light-emitting pixels **1221***a* of each light-emitting pixel **1221** in the second column are electrically connected with the third data line **121**. Remaining sub light-emitting pixels **1221***a* in the first column and the second column are electrically connected with the second data line **121**. Meanwhile, the sub light-emitting pixels **1221***a* in the first row are electrically connected with the first scanning line **130**. The sub light-emitting pixels **1221***a* in the third row are electrically connected with the second scanning line **130**. And half of the sub light-emitting pixels **1221***a* of the second row are electrically connected with the first scanning line **130** and another half of the sub light-emitting pixels **1221***a* of the second row are electrically connected with the second scanning line **130**. This setting method can not only ensure full utilization of the scanning lines **130** and the data lines **121**, but also prevent the mutual crosstalk between the sub light-emitting pixels **1221***a*.

(45) As shown in FIG. **7**, in one light-emitting component **120**, the first data line **121** is arranged on one side of the first column of the light-emitting pixels **1221**. The second data line **121** is arranged between two columns of the light-emitting pixels **1221**. The third data line **121** is arranged on another side of the second column of the light-emitting pixels **1221**. The scanning line **130** is successively arranged between the two adjacent sub-light-emitting pixels **1221***a* in the light-emitting pixels **1221**, and the scanning line **130** is not arranged between the two adjacent light-emitting pixels **1221**.

(46) Wherein, connection rules between each sub light-emitting pixel **1221***a* and the scanning line **130** and the data line **121** are consistent with connection rules in FIG. **1** above, which will not be repeated here. This setting mode enables the sub light-emitting pixels **1221***a* of each row to be electrically connected with the adjacent data lines **121** directly without connecting across the data lines **121**, which can further reduce the risk of mutual crosstalk between the sub light-emitting pixels **1221***a*.

(47) Alternatively, the substrate **110** is further disposed with a plurality of control switches **150**. A number of the plurality of control switches **150** is equal to a number of the plurality of sub light-emitting pixels **1221***a*. The sub light-emitting pixels **1221***a* are connected with the control switches **150** in a one-to-one correspondence, and each of the control switches **150** is electrically connected with the scanning line **130** and the data line **121**, so as to realize electrical connections of the sub light-emitting pixels **1221***a* with the scanning lines **130** and the data lines **121**.

(48) The control switch **150** is used to electrically connect the sub light-emitting pixel **1221***a* with the scanning line **130** and the data line **121**, so that on and off of the corresponding control switch **150** can be controlled by changing input signals on the scanning line **130** and the data line **121**, so as to control light emission of the corresponding sub light-emitting pixel **1221***a*. In addition, through a design of connection modes between the control switch **150** and the scanning line **130** and the data line **121**, the light emission of the sub light-emitting pixel **1221***a* can also be controlled.

(49) Alternatively, the plurality of scanning lines **130** and the plurality of data lines **121** on the substrate **110** form a plurality of cross areas **140**. Each cross area **140** can be used as a connection point between the sub light-emitting pixel **1221***a* and the scanning line **130** and the data line **121**. An arranging position of the control switch **150** can be adjusted according to a position of the cross area **140** to facilitate the electrical connection between the sub light-emitting pixel **1221***a* and the

scanning line **130** and the data line **121**.
(50) A number of the plurality of cross areas **140** is equal to the number of the plurality of control switches **150**, and the control switches **150** are arranged in each cross area **140**, so that the plurality of sub light-emitting pixels **1221***a* correspond to the plurality of cross areas **140** in the one-to-one correspondence, that is, the product of the number of the plurality of scanning lines **130** and the number of plurality of the data lines **121** is equal to the number of the plurality of sub light-emitting pixels **1221***a*, so that a utilization rate of the scanning lines **130** and the data lines **121** reaches a maximum.
(51) It should be noted that a position of the control switch **150** in the cross area **140** can be adjusted according to a position of the corresponding sub light-emitting pixel **1221***a* connected thereto, so that the control switch **150** is located at a position close to the corresponding sub light-emitting pixel **1221***a* connected thereto in the cross area **140**, so as to shorten wiring between the sub light-emitting pixel **1221***a* and the corresponding control switch **150**, reduce the risk of crosstalk between the sub light-emitting pixels **1221***a*, and reduce production cost.
(52) Alternatively, in the embodiments of the present application, each of the control switch **150** comprises a gate electrode, a source electrode, and a drain electrode. The gate electrode is used for electrical connection with one of the scanning lines **130**, the source electrode is used for electrical connection with one of the data lines **121**, and the drain electrode is used for electrical connection with one of the sub light-emitting pixels **1221***a*. Through a regulation of a scanning signal on the scanning line **130** and a data signal on the data line **121**, conduction or disconnection between the source electrode and the drain electrode can be controlled, so as to control whether the sub light-emitting pixel **1221***a* emits light or not, so as to realize a regulation of the overall light-emitting effect of the display panel **100**.
(53) In some embodiments, the drain electrode of the control switch **150** is used for electrical connection with one of the data line **121**, and the source electrode is used for electrical connection with one of the sub light-emitting pixel **1221***a*. The specific connection mode is related to a type and a line design mode of the control switch **150**, which can be adjusted accordingly according to the specific situation, and there are no special restrictions here.
(54) The gate electrode of the control switch **150** can be arranged on a same layer as the scanning lines **130** to reduce a number of film layers of the display panel **100** and reduce an overall thickness of the display panel **100**. At a same time, a routing number between the gate electrode and the corresponding scanning line **130** can also be reduced and the production cost can be reduced.
(55) In some embodiments, the gate electrode of the control switch **150** and the scanning line **130** are located in different film layers, the gate electrode and the scanning line **130** are separated by an insulating layer, and then a via is provided at a corresponding position on the insulating layer to realize an electrical connection between the gate electrode and the corresponding scanning line **130**. This structural design can reduce the risk of mutual crosstalk between the control switches **150** and ensure the display effect of the display panel **100**.
(56) Similarly, the source electrode and the drain electrode of the control switch **150** can also be arranged on a same film layer or on different film layers with the data lines **121**. The specific setting mode can be adjusted according to an actual design situation, and there is no special restriction here.
(57) Secondly, the embodiments of the present application also provide a display device. The display device comprises a display panel. For a specific structure of the display panel, please refer to the above embodiments. Since the display device adopts all technical solutions of all the above embodiments, it has at least all beneficial effects brought by the technical solutions of the above embodiments, which will not be repeated here.
(58) As shown in FIG. **8**, the display device **10** comprises a display panel **100**, a control circuit **200**, and a housing **300**. The housing **300** is connected with the display panel **100** to support and fix the display panel **100**. The control circuit **200** is arranged in the housing **300**, and the control circuit

200 is electrically connected with the display panel **100** to control the display panel **100** to perform screen display.
(59) The display panel **100** can be fixed to the housing **300** to form a whole with the housing **300**, and the display panel **100** and the housing **300** form a closed space to accommodate the control circuit **200**. The control circuit **200** can be a main board of the display device **10**. At a same time, the control circuit **200** can also integrate one or more of the functional components such as a battery, an antenna structure, a microphone, a speaker, a headset interface, a universal serial bus interface, a camera, a distance sensor, an ambient light sensor, a receiver, and a processor, so that the display device **10** can be adapted to various application fields.
(60) It should be noted that the display device **10** is not limited to above contents, but can further comprise other devices, such as a camera, an antenna structure, a fingerprint unlocking module, etc., so as to expand its scope of use, which is not limited here.
(61) The display device **10** in the embodiments of the present application has a wide range of applications, comprising a TV, a computer, a mobile phone, a flexible display and lighting such as a foldable and curlable display screen, as well as a wearable device such as a smart bracelet and a smart watch, which are all within the application field of the display device **10** in the embodiments of the present application.
(62) The display panel and the display device provided by the embodiments of the present application are introduced in detail. In this paper, specific examples are applied to elaborate the principle and embodiment of the invention. The description of the above embodiment is only used to help understand the technical scheme and core idea of the invention. Those of ordinary skill in the art should understand that they can still modify the technical scheme recorded in the above embodiments, or equivalent replace some of the technical features. These modifications or substitutions do not separate the essence of the corresponding technical scheme from the scope of the technical scheme of each embodiment of the present application.

Claims

1. A display panel, comprising: a substrate provided with a plurality of scanning lines and a plurality of data lines, wherein the plurality of scanning lines extend along a first direction and are arranged in parallel along a second direction, the plurality of data lines extend along the second direction and are arranged in parallel along the first direction, and the first direction is at an included angle with the second direction; and a plurality of light-emitting components arranged on the substrate in parallel along the first direction, wherein each of the plurality of light-emitting components comprises three data lines of the plurality of data lines and two light-emitting units arranged in parallel along the first direction, each of the two light-emitting units comprises a plurality of light-emitting pixels arranged in parallel along the second direction, each of the plurality of light-emitting pixels comprises a plurality of sub light-emitting pixels arranged in parallel along the second direction, and each of the plurality of sub light-emitting pixels is electrically connected with one of the three data lines in a same one of the light-emitting components; and wherein a number of the scanning lines electrically connected with each of the light-emitting units is less than a number of the sub light-emitting pixels in a corresponding one of the light-emitting units; a product of the number of the scanning lines electrically connected with each of the light-emitting components and a number of the data lines in a corresponding one of the light-emitting components is greater than or equal to a number of the sub light-emitting pixels in the corresponding one of the light-emitting components; and the three data lines in each of the plurality of light-emitting components comprises a first data line, a second data line, and a third data line arranged in sequence along the first direction, one of the two light-emitting units in each of at least part of the light-emitting components is arranged between the first data line and the second data line in the corresponding one of the light-emitting components, and another one of the

two light-emitting units in each of at least part of the light-emitting components is arranged between the second data line and the third data line in the corresponding one of the light-emitting components.

2. The display panel according to claim 1, wherein along the first direction, one of the plurality of data lines and two of the plurality of data lines are alternately arranged between adjacent two of the light-emitting units in turn.

3. The display panel according to claim 1, wherein the three data lines in each of the plurality of light-emitting components are arranged in a same distribution mode.

4. The display panel according to claim 1, wherein the first direction is perpendicular to the second direction.

5. The display panel according to claim 4, wherein the first direction is a column direction and the second direction is a row direction.

6. The display panel according to claim 1, wherein each of the light-emitting pixels comprises three sub light-emitting pixels, each of at least part of the light-emitting pixels is electrically connected with two scanning lines of the plurality of scanning lines, and each of the sub light-emitting pixels in each of the at least part of the light-emitting pixels is electrically connected with one of the two scanning lines electrically connected with a corresponding one of the at least part of the light-emitting pixels.

7. The display panel according to claim 6, wherein each of the light-emitting pixels is electrically connected with two scanning lines of the plurality of scanning lines.

8. The display panel according to claim 7, wherein each of the two scanning lines is arranged between adjacent two of the sub light-emitting pixels in a corresponding one of the light-emitting pixels.

9. The display panel according to claim 6, wherein each of a part of the light-emitting pixels is electrically connected with two of the plurality of scanning lines, and each of another part of the light-emitting pixels is electrically connected with three of the plurality of scanning lines.

10. The display panel according to claim 1, wherein the substrate is further provided with a plurality of control switches, and a number of the plurality of control switches is equal to a number of the sub light-emitting pixels of the display panel; each of the sub light-emitting pixels is electrically connected with a corresponding one of the plurality of control switches, and each of the plurality of control switches is electrically connected with a corresponding one of the plurality of scanning lines and a corresponding one of the plurality of data lines.

11. The display panel according to claim 10, wherein the plurality of scanning lines and the plurality of data lines form a plurality of cross areas, a number of the plurality of cross areas is equal to the number of the plurality of control switches, and each of the cross areas is provided with one of the control switches.

12. The display panel according to claim 11, wherein each of the plurality of control switches is located at a position near a correspondingly connected one of the sub light-emitting pixels in a corresponding one of the cross areas.

13. The display panel according to claim 10, wherein each of the plurality of control switches comprises a gate electrode, a source electrode, and a drain electrode; the gate electrode is electrically connected with one of the scanning lines, the source electrode is electrically connected with one of the data lines, and the drain electrode is electrically connected with one of the sub light-emitting pixels.

14. The display panel according to claim 13, wherein the gate electrode is arranged on a same layer as the plurality of scanning lines.

15. The display panel according to claim 13, wherein the source electrode and the drain electrode are arranged on a same layer as the plurality of data lines.

16. The display panel according to claim 10, wherein each of the plurality of control switches comprises a gate electrode, a source electrode, and a drain electrode; the gate electrode is

electrically connected with one of the scanning lines, the drain electrode is electrically connected with one of the data lines, and the source electrode is electrically connected with one of the sub light-emitting pixels.

17. The display panel according to claim 1, wherein in each of the light-emitting components, each of the sub light-emitting pixels is electrically with one of the scanning lines electrically connected with the corresponding one of the light-emitting components and electrically with one of the three data lines, and a number of the sub light-emitting pixels connected with a same one of the scanning lines and a same one of the three data lines is one.

18. A display panel, comprising: a substrate provided with a plurality of scanning lines and a plurality of data lines, wherein the plurality of scanning lines extend along a first direction and are arranged in parallel along a second direction, the plurality of data lines extend along the second direction and are arranged in parallel along the first direction, and the first direction is at an included angle with the second direction; and a plurality of light-emitting components arranged on the substrate in parallel along the first direction, wherein each of the plurality of light-emitting components comprises three data lines of the plurality of data lines and two light-emitting units arranged in parallel along the first direction, each of the two light-emitting units comprises a plurality of light-emitting pixels arranged in parallel along the second direction, each of the plurality of light-emitting pixels comprises a plurality of sub light-emitting pixels arranged in parallel along the second direction, and each of the plurality of sub light-emitting pixels is electrically connected with one of the three data lines in a same one of the light-emitting components; and wherein a number of the scanning lines electrically connected with each of the light-emitting units is less than a number of the sub light-emitting pixels in a corresponding one of the light-emitting units; a product of the number of the scanning lines electrically connected with each of the light-emitting components and a number of the data lines in a corresponding one of the light-emitting components is greater than or equal to a number of the sub light-emitting pixels in the corresponding one of the light-emitting components; and the three data lines in each of the plurality of light-emitting components are located between the two light-emitting units of the corresponding one of the light-emitting components.

19. The display panel according to claim 18, wherein in each of the light-emitting components, each of the sub light-emitting pixels is electrically with one of the scanning lines electrically connected with the corresponding one of the light-emitting components and electrically with one of the three data lines, and a number of the sub light-emitting pixels connected with a same one of the scanning lines and a same one of the three data lines is one.