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(54) **PIXEL STRUCTURE, DRIVING METHOD THEREOF AND DISPLAY DEVICE**

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(52) **U.S. Cl.**

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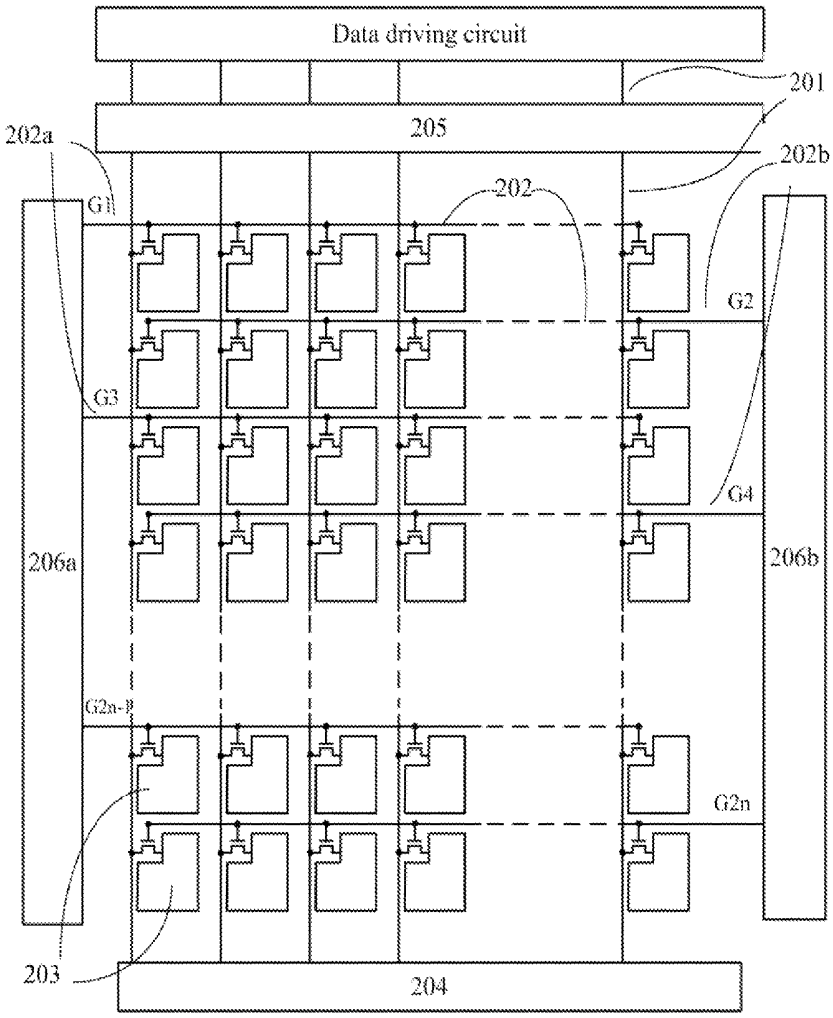
(57) **ABSTRACT**

A pixel structure includes a plurality of data lines, a plurality of scan lines, a plurality of pixels located in an area defined by the data lines crossing the scan lines, a common voltage line connected with the plurality of pixels, a voltage detection unit connected with the data lines and configured to detect voltages on the data lines, and a voltage compensation unit connected with the data lines and configured to compensate voltages on the data lines so that brightness differences between different pixels corresponding to the plurality of scan lines is the lowest, so as to improve or eliminate effectively linear cloudy strips with uniform bright and dark strips and improve the image quality of a displayed image on a liquid crystal display panel.



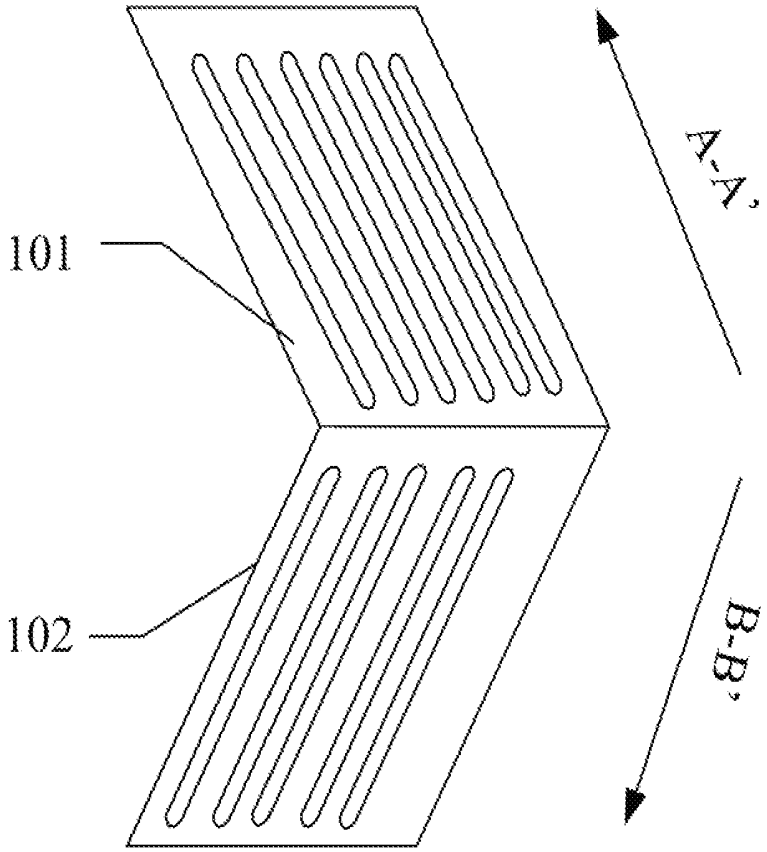


FIG. 1A

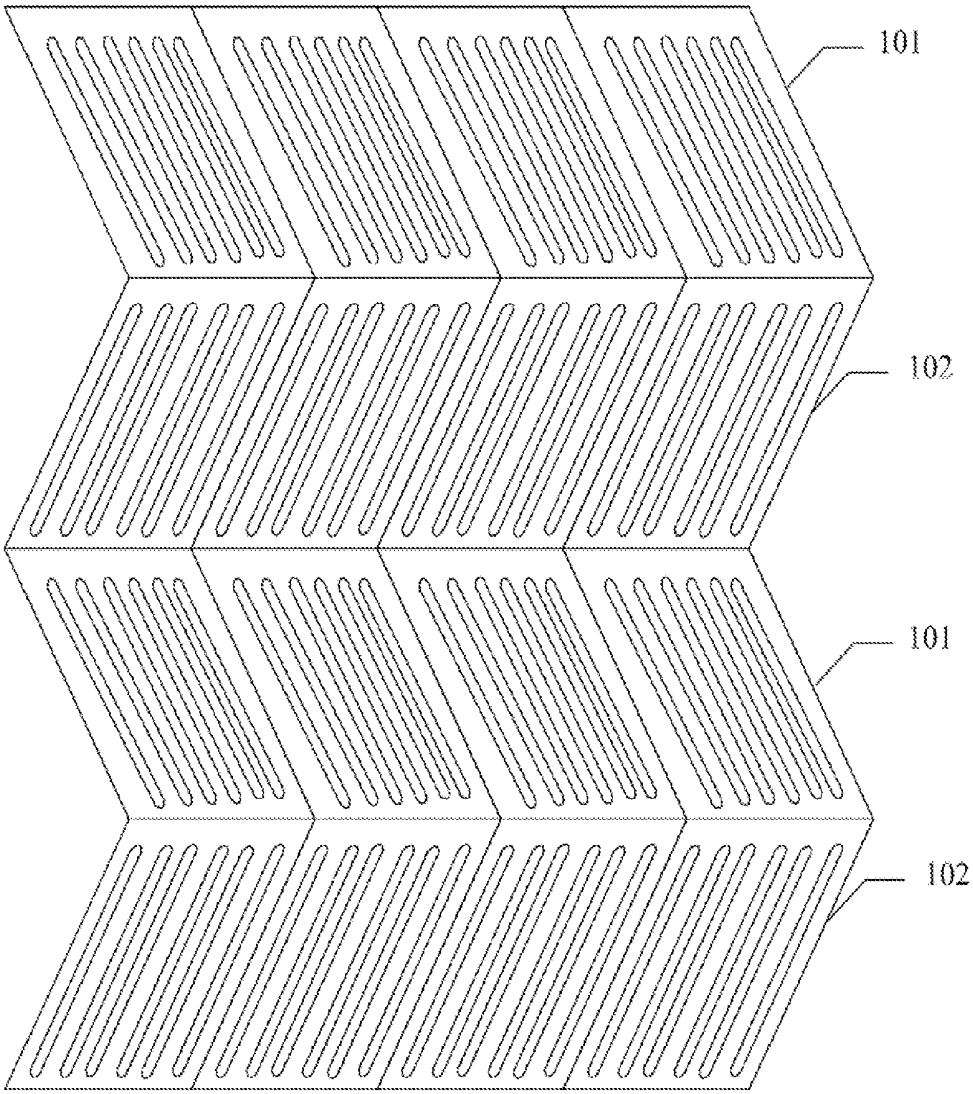


FIG. 1B

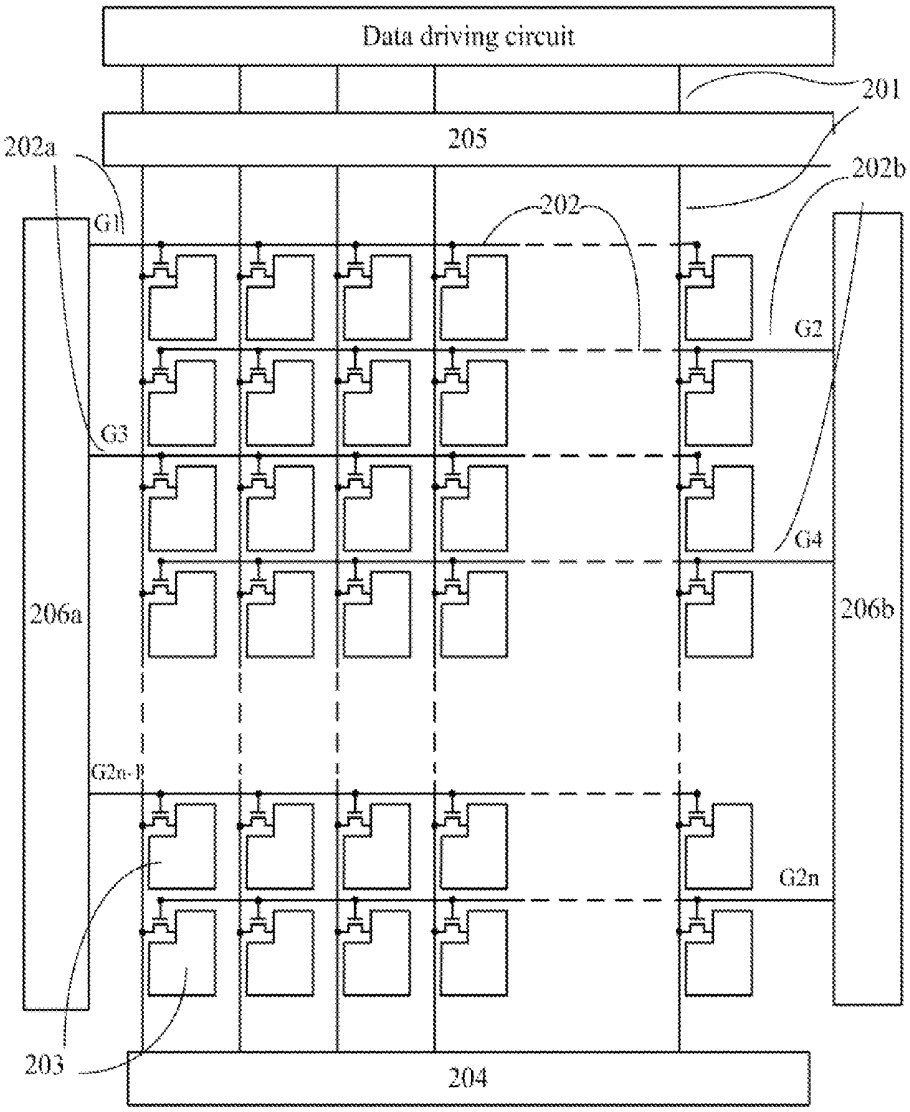

Data driving circuit
201
205
202a
202b
202
G1
G2
G3
G4
206a
206b
G2n-1
G2n
203
204

FIG. 2

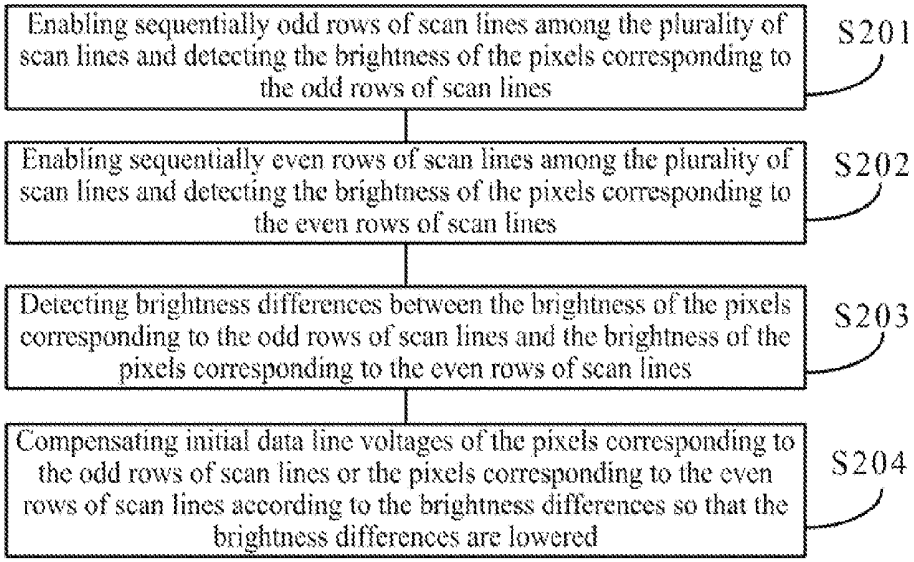

Enabling sequentially odd rows of scan lines among the plurality of scan lines and detecting the brightness of the pixels corresponding to the odd rows of scan lines
S201
Enabling sequentially even rows of scan lines among the plurality of scan lines and detecting the brightness of the pixels corresponding to the even rows of scan lines
S202
Detecting brightness differences between the brightness of the pixels corresponding to the odd rows of scan lines and the brightness of the pixels corresponding to the even rows of scan lines
S203
Compensating initial data line voltages of the pixels corresponding to the odd rows of scan lines or the pixels corresponding to the even rows of scan lines according to the brightness differences so that the brightness differences are lowered
S204

FIG. 3

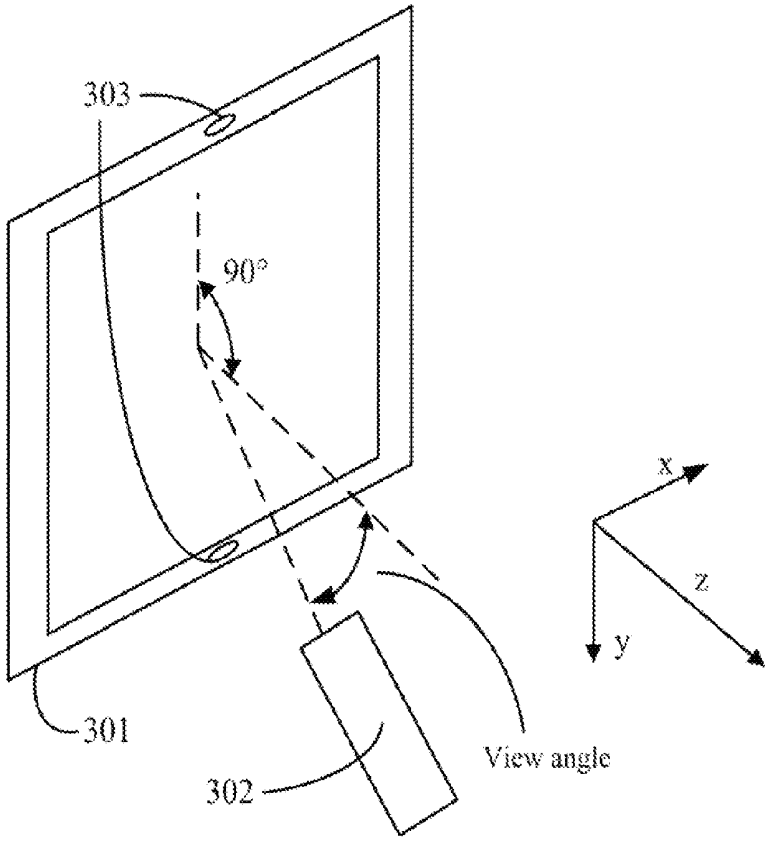

303
90°
x
z
y
301
302
View angle

FIG. 4

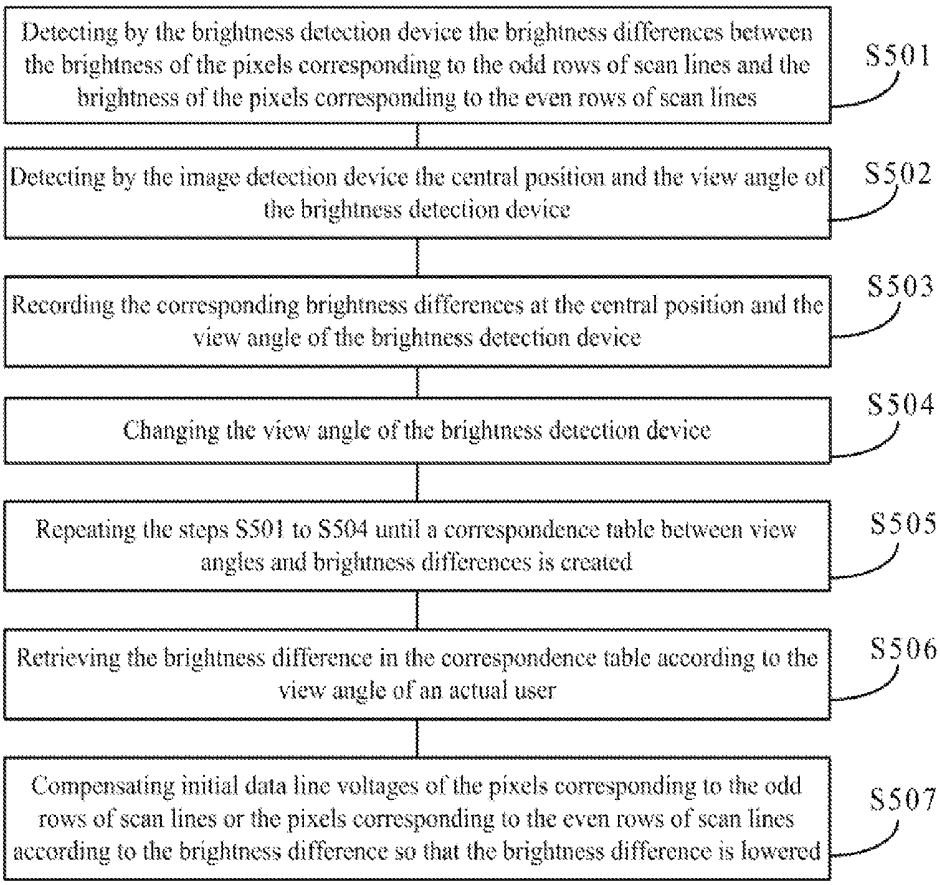

Detecting by the brightness detection device the brightness differences between the brightness of the pixels corresponding to the odd rows of scan lines and the brightness of the pixels corresponding to the even rows of scan lines
S501
Detecting by the image detection device the central position and the view angle of the brightness detection device
S502
Recording the corresponding brightness differences at the central position and the view angle of the brightness detection device
S503
Changing the view angle of the brightness detection device
S504
Repeating the steps S501 to S504 until a correspondence table between view angles and brightness differences is created
S505
Retrieving the brightness difference in the correspondence table according to the view angle of an actual user
S506
Compensating initial data line voltages of the pixels corresponding to the odd rows of scan lines or the pixels corresponding to the even rows of scan lines according to the brightness difference so that the brightness difference is lowered
S507

FIG. 5

PIXEL STRUCTURE, DRIVING METHOD THEREOF AND DISPLAY DEVICE

CROSS-REFERENCES TO RELATED APPLICATIONS

[0001] This application claims priority to Chinese patent application No. 201410379870.4 filed on Aug. 4, 2014 and entitled "PIXEL STRUCTURE, DRIVING METHOD THEREOF AND DISPLAY DEVICE", the content of which is incorporated herein by reference in its entirety.

BACKGROUND OF THE INVENTION

[0002] An existing liquid crystal display includes pixel elements arranged in the form of a matrix and a driving circuit configured to drive these pixel elements, so that liquid crystal molecules are deflected by varying an electric field inside a liquid crystal box to thereby achieve a display effect.

[0003] In order to improve the display effect, the multi-domain display technology has been widely applied, wherein the existing multi-domain display is possible in a multi-domain pixel structure designed in a pixel or possible in a pseudo multi-domain pixel structure with different domain directions being designed in adjacent pixels in order to avoid the problem of a color irregularity arising from multiple domains being designed in a pixel.

[0004] FIG. **1**A illustrates a schematic structural diagram of an existing pixel element, and FIG. **1**B illustrates a schematic structural diagram of an existing pixel array. As illustrated in FIG. **1**A, the pixel element in an existing pseudo dual-domain pixel structure includes a first pixel element **101** and a second pixel element **102**, which are driven by different thin film transistors, wherein the inclined line direction A-A' and the inclined line direction B-B' as illustrated in the FIG. **1**A represent domain inclination directions in the two adjacent pixel elements respectively, and then as can be apparent from FIG. **1**A, the domain inclination directions in the two pixel elements are different, and the domain inclination direction in the same pixel element is uniform. With the structure of the pixel array in FIG. **1**B composed of pixel elements as illustrated in FIG. **1**A, the domain inclination direction in pixel elements in the same row direction is uniform, and domain inclination directions in two adjacent rows of pixel elements are different. For example, in FIG. **1**B, first pixel elements **101** are arranged throughout a first row direction, second pixel elements **102** are arranged throughout a second row direction, first pixel elements **101** are arranged throughout a third row direction, and so on, the domain inclination directions in every two adjacent rows of pixel elements are different, so that the domain inclination directions of pixel elements at the interface between the adjacent rows are opposite, and when a picture is displayed, there are different display states in the adjacent rows, i.e., dark in one row and bright in the other row, which easily results in transversal strips at the interface between the two adjacent rows. Moreover if a polarization sheet is bonded askew, then polarization angles in odd-numbered rows and polarization angles in even-numbered rows are non-uniform and consequently scan lines in odd-numbered rows and even-numbered rows have uneven brightness, thus resulting in transversal strips.

BRIEF SUMMARY OF THE INVENTION

[0005] In view of this, the invention provides a pixel structure and a driving method thereof and a display device.

[0006] A pixel structure including: a plurality of data lines; a plurality of scan lines which cross the data lines; a plurality of pixels, each of which is located in an area formed by the data lines crossing corresponding scan lines; a common voltage line connected with the plurality of pixels; a voltage detection unit, connected with the data lines, and configured to detect voltages on the data lines; and a voltage compensation unit, connected with the data lines, configured to compensate voltages on the data lines.

[0007] Embodiments of the present invention provide a pixel driving method of a display panel, wherein the display panel includes a plurality of data lines, a plurality of scan lines, and a plurality of pixels located in an area formed by the data lines crossing the scan lines. The driving method including the steps of: providing a common voltage to drive each of the plurality of pixels; providing an initial data line voltage to drive each of the plurality of data lines; providing a voltage detection unit, which is connected respectively with the data lines and configured to detect voltages on the data lines; providing a voltage compensation unit to compensate voltages on the data lines; enabling sequentially odd-numbered rows of scan lines among the plurality of scan lines and detecting brightness of the pixels corresponding to the odd-numbered rows of scan lines; enabling sequentially even-numbered rows of scan lines among the plurality of scan lines and detecting brightness of the pixels corresponding to the even-numbered rows of scan lines; detecting brightness differences between the brightness of the pixels corresponding to the odd-numbered rows of scan lines and the brightness of the pixels corresponding to the even-numbered rows of scan lines; and compensating the initial data line voltages of the pixels corresponding to the odd-numbered rows of scan lines or initial data line voltages of the pixels corresponding to the even-numbered rows of scan lines according to the brightness differences so that the brightness differences are reduced.

[0008] Embodiments of the present invention also provide a display device including the pixel structure described above.

[0009] Compared with the prior art, the invention compensates the voltages on the data lines to thereby minimize the brightness differences between the different pixels corresponding to the plurality of scan liens, so as to improve or eliminate effectively linear cloudy strips with uniform bright and dark strips and improve the image quality of a displayed image on the liquid crystal display panel.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. **1**A illustrates a schematic diagram of an existing pixel element structure;

[0011] FIG. **1**B illustrates a schematic structural diagram of an existing pixel array;

[0012] FIG. **2** illustrates a schematic structural diagram of a pixel structure according to an embodiment of the invention;

[0013] FIG. **3** illustrates a flow chart of a pixel driving method according to the embodiment of the invention;

[0014] FIG. **4** illustrates a schematic structural diagram of a pixel structure according to another embodiment of the invention; and

[0015] FIG. **5** illustrates a flow chart of a pixel driving method according to another embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0016] In order to make the objects and features of the invention more apparent, particular embodiments of the invention will be further described below with reference to the drawings, but the invention can be embodied in different forms and shall not be construed as being limited to the embodiments described below.

[0017] In order to better suppress the phenomenon of transversal strips in a picture being displayed in a dual-domain pixel structure, an embodiment of the invention provides a pixel structure. As illustrated in FIG. **2**, a pixel structure according to the invention includes: a plurality of data lines **201**; a plurality of scan lines **202** which cross the data lines **201**; a plurality of pixels **203**, each of which is located in an area formed by the data lines **201** crossing corresponding scan lines **202**; a common voltage line (not illustrated) connected with the plurality of pixels **203**; a voltage detection unit **204**, connected with the data lines **201**, configured to detect voltages on the data lines **201**; and a voltage compensation unit **205**, connected with the data lines **201**, configured to compensate voltages on the data lines **201**. The driving signals applied to respective pixels **203** are distributed in positive and negative symmetry with respect to the voltage of the common voltage line. The pixel structure further includes a first scan driver **206***a* and a second scan driver **206***b*, wherein the first scan driver **206***a* is configured to drive odd-numbered rows of scan lines **202***a*, and the second scan driver **206***b* is configured to drive even-numbered rows of scan lines **202***b*. In order to accommodate demands for different products, the first scan driver **206***a* and the second scan driver **206***b* can be located on a same side of a non-display area of a display panel, or the first scan driver **206***a* and the second scan driver **206***b* can be located on opposite sides of the non-display area of the display panel.

[0018] In the pixel structure in this embodiment, the voltage detection unit **204** measures the voltages of the corresponding pixels **203** to determine whether there is a brightness difference between the pixels **203** corresponding to the different scan lines **202** and further to determine whether there is a phenomenon of transversal strips when an image is being displayed, and then the voltage compensation unit **205** compensates the voltages of the data lines on the corresponding pixels **203** according to a measurement result by the voltage detection unit **204**. If the voltages of the data lines of the pixels **203** corresponding to the different scan lines **202** in the dual-domain structure is uniform, then the phenomenon of transversal strips would not occur when an image is being displayed.

[0019] An embodiment of the invention further provides a display device including the pixel structure described above.

[0020] In order to address the phenomenon of transversal strips occurring in a dual-domain structure in the prior art, as illustrated in FIG. **3**, an embodiment of the invention provides a driving method for driving the pixel structure. The method includes the following sequential steps:

[0021] Step S**201**: sequentially enable odd-numbered rows of scan lines among the plurality of scan lines and detect the brightness of the pixels corresponding to the odd-numbered rows of scan lines.

[0022] Step S**202**: sequentially enable even-numbered rows of scan lines among the plurality of scan lines and detect the brightness of the pixels corresponding to the even-numbered rows of scan lines.

[0023] Wherein the steps S**201** and S**202** can be performed in a reversed order or can be performed simultaneously to shorten a required time for drive.

[0024] Step S**203**: detect the brightness differences between the brightness of the pixels corresponding to the odd-numbered rows of scan lines and the brightness of the pixels corresponding to the even-numbered rows of scan lines.

[0025] The brightness differences are determined from the total brightness of the pixels corresponding to the odd-numbered rows of scan lines and the even-numbered rows of scan lines, and since the brightness difference of pixels corresponds to scan lines at different locations, the corresponding brightness difference can be determined from the location of the scan line.

[0026] Step S**204**: compensate the initial data line voltages of the pixels corresponding to the odd-numbered rows of scan lines or the pixels corresponding to the even-numbered rows of scan lines according to the brightness differences so that the brightness differences are reduced.

[0027] The brightness differences can be lowered by compensating the voltage of the data lines corresponding to the pixels **203** to thereby avoid non-uniform polarization angles in the odd-numbered rows and the even-numbered rows, due to poor bonding of a polarization sheet in the dual-domain structure, without modifying the dual-domain structure. Particularly the voltage compensation unit **205** compensates the desired voltages of the data lines according to the initial data line voltages corresponding to the pixels **203** detected by the voltage detection unit **204**.

[0028] In the present embodiment, a compensation scheme may include but is not limited to:

[0029] A first scheme for maintaining the initial data line voltages of the pixels **203** corresponding to the odd-numbered rows of scan lines **202***a*, and compensating the initial data line voltages of the pixels **203** corresponding to the even-numbered rows of scan lines **202***b* so that the compensated voltages of the data lines of the even-numbered rows of scan lines **202***b* are equal to the initial data line voltages of the pixels **203** corresponding to the odd-numbered rows of scan lines **202***a*. This compensation scheme will not take into account whether the luminescent brightness of the pixels **203** corresponding to the odd-numbered rows of scan lines **202***a* is higher or lower than the luminescent brightness of the pixels **203** corresponding to the even-numbered rows of scan lines **202***b*, but only require that the voltages of the data lines of the pixels **203** corresponding to the even-numbered rows of scan lines **202***b* are compensated to be equal to the initial data line voltages of the pixels **203** corresponding to the odd-numbered rows of scan lines **202***a*.

[0030] A second scheme for maintaining the initial data line voltages of the pixels **203** corresponding to the even-numbered rows of scan lines **202***b*, and compensating the initial data line voltages of the pixels **203** corresponding to the odd-numbered rows of scan lines **202***a* so that the compensated voltages of the data lines of the odd-numbered rows of scan lines **202***a* are equal to the initial data line voltages of the pixels **203** corresponding to the even-numbered rows of scan lines **202***b*.

[0031] A third scheme for simultaneously compensating the initial data line voltages of the pixels **203** corresponding to both the odd-numbered rows of scan lines **202***a* and the even-numbered rows of scan lines **202***b* so that the compensated voltages of the data lines of the pixels **203** corresponding to

the odd-numbered rows of scan lines **202***a* are equal to the compensated voltages of the data lines of the pixels **203** corresponding to the even-numbered rows of scan lines **202***b*.

[0032] In order for the optimum voltages of the data lines, a first one of the plurality of data lines **202** is enabled, and the brightness of a first pixel corresponding to the first scan line is detected; a second scan line adjacent to the first scan line is enabled, and the brightness of a second pixel corresponding to the second scan line is detected; and the voltage of the data line corresponding to the first pixel or the voltage of the data line corresponding to the second pixel is compensated so that the brightness difference between the first pixel and the second pixel is the lowest. Due to the lowest brightness difference between the adjacent first pixel and second pixel, the compensation scheme of the initial data line voltage is optimized to thereby avoid transversal strips from occurring.

[0033] In another embodiment of the invention, in view of the brightness difference of the dual-domain structure as viewed by a user of the liquid crystal panel is varied when the user is at a different location, the technical solution according to the embodiment can compensate the voltages of the data lines dynamically to ensure that the viewer viewing the liquid crystal panel at a different location will not see the phenomenon of transversal strips.

[0034] The present embodiment is different from the embodiment described above in connection with FIG. **2** in that a brightness detection device **302** and an image detection device **303** are further provided. As illustrated in FIG. **4**, the brightness detection device **302** is located directly in front of the display panel **301** including the pixel structure and is configured to view a picture being displayed on the display panel **301**; and the image detection devices **303** is located on one side of a non-display area of the display panel **301** are configured to obtain the central position and the view angle of the brightness detection device **302**, wherein the number of image detection devices **303** is preferably at least two, or the image detection devices **303** are arranged on all four sides of the non-display area of the display panel **301**, and a larger number of image detection devices **303** together with their different distribution of locations can better obtain the central position and the view angle of the brightness detection device **302**.

[0035] The embodiment further provides a driving method of the pixel structure, as illustrated in FIG. **5**, the method includes the following sequential steps:

[0036] Step S**501**: detect, by the brightness detection device, the brightness differences between the brightness of the pixels corresponding to the odd-numbered rows of scan lines and the brightness of the pixels corresponding to the even-numbered rows of scan lines.

[0037] Step S**502**: obtain, by the image detection device, a central position and a view angle of the brightness detection device.

[0038] The view angle is the angle between the brightness detection device aimed at the center of the display panel **301** and the normal at the center of the display panel **301**.

[0039] Step S**503**: record the corresponding brightness differences at the central position and the view angle of the brightness detection device.

[0040] Step S**504**: change the view angle of the brightness detection device.

[0041] Step S**505**: repeat the steps S**501** to S**504** until a correspondence table between view angles and brightness differences is created.

[0042] In the correspondence table between view angles and brightness differences, an one-to-one relationship between the view angles and the brightness differences is stored, and since the brightness difference varies dependent upon the view angle and independent of the detection distance, a different brightness difference can be obtained simply by changing the view angle.

[0043] The view angle is changed at a time preferably by a variation amount of 2.2° to 4.7° to ensure that the detection cost can be lowered as a result of a lower number of changes and also the correspondence table between view angles and brightness differences can be derived precisely. Finally the correspondence table is burned (stored) into a storage device built in the image detection device and the brightness difference can be retrieved automatically in use.

[0044] Step S**506**: retrieve the brightness difference in the correspondence table according to the view angle of an actual user.

[0045] When the actual user of the display panel is watching an image displayed on the display panel **301**, the image detection device **303** locates actively the center of both eyes of the user and obtains the view angle of the user. The view angle is detected by the image detection device **303** focusing the left eye and the right eye of the user respectively and obtaining the focus distances, so that if the focus distance of the left eye and the focus distance of the right eye are equal when the user is being faced to the center of the display panel **301**, then the image detection device **303** determines the view angle of the user to be 0° and retrieves the brightness difference corresponding to 0° in the correspondence table. If the focus distance of the left eye and the focus distance of the right eye are unequal when the user is not being faced to the center of the display panel **301**, then the image detection device **303** can obtain the view angle of the user.

[0046] Step S**507**: compensate the initial data line voltage of the pixels corresponding to the odd-numbered rows of scan lines or the pixels corresponding to the even-numbered rows of scan lines according to the brightness difference so that the brightness difference is reduced.

[0047] Since the actual user may change the view angle, at which the user watches an image displayed on the display panel **301**, at any time, the image detection device **303** can detect the view angle of the user in a period of time, preferably at an interval of time ranging from 16.67 ms to 43.2 ms, to thereby compensate dynamically the voltage of the data lines corresponding to the pixels so as to ensure that the user can experience the optimum view effect.

[0048] The invention has been described by taking the dual-domain structure as an example, and a single-domain or multi-domain pixel structure and a corresponding pixel driving method thereof also fall into the scope of the invention as defined in the claims.

[0049] Evidently those skilled in the art can make various modifications and variations to the invention without departing from the spirit and scope of the invention. Thus the invention is also intended to encompass these modifications and variations thereto so long as the modifications and variations come into the scope of the appended claims and their equivalents.

What is claimed is:

1. A pixel structure, comprising:

a plurality of data lines;

a plurality of scan lines;

a plurality of pixels located in an area defined by the data lines crossing the scan lines;

a common voltage line connected with the plurality of pixels;

a voltage detection unit connected with the data lines and configured to detect voltages on the data lines; and

a voltage compensation unit connected with the data lines and configured to compensate voltages on the data lines.

2. The pixel structure according to claim **1**, further comprising:

a first scan driver configured to drive odd-numbered rows of the scan lines; and

a second scan driver configured to drive even-numbered rows of the scan lines.

3. The pixel structure according to claim **2**, wherein the first scan driver and the second scan driver are located on a same side of a non-display area of a display panel.

4. The pixel structure according to claim **2**, wherein:

the first scan driver is located on a left side of a non-display area of a display panel; and

the second scan driver is located on a right side of the non-display area of the display panel.

5. The pixel structure according to claim **1**, further comprising:

a brightness detection device arranged in front of a display panel and configured to view an image being displayed on the display panel; and

an image detection device arranged in a non-display area of the display panel, and configured to obtain a central position and a view angle of the brightness detection device.

6. The pixel structure according to claim **1**, wherein the pixel structure is a dual-domain structure.

7. A driving method for driving a display panel comprising a plurality of data lines, a plurality of scan lines arranged in odd-numbered and even-numbered rows, and a plurality of pixels located in an area defined by the data lines crossing the scan lines, the driving method comprising the steps of:

providing a common voltage to drive each of the pixels;

providing an initial data line voltage to drive each of the data lines;

providing a voltage detection unit connected with the data lines and configured to detect voltages on the data lines;

providing a voltage compensation unit to compensate the voltages on the data lines;

enabling the odd-numbered rows of scan lines among the plurality of scan lines and detecting brightness of the pixels corresponding to the odd-numbered rows of scan lines;

enabling the even-numbered rows of scan lines among the plurality of scan lines and detecting brightness of the pixels corresponding to the even-numbered rows of scan lines;

detecting brightness differences between the brightness of the pixels corresponding to the odd-numbered rows of scan lines and the brightness of the pixels corresponding to the even-numbered rows of scan lines; and

compensating initial data line voltages of the pixels corresponding to the odd-numbered rows of scan lines or initial data line voltages of the pixels corresponding to the even-numbered rows of scan lines according to the brightness differences.

8. The driving method according to claim **7**, further comprising:

enabling a first data line of the plurality of data lines, and detecting brightness of a first pixel corresponding to a first scan line;

enabling a second scan line adjacent to the first scan line, and detecting brightness of a second pixel corresponding to the second scan line; and

adjusting the voltage of the data line corresponding to the first pixel or the second pixel so that a brightness difference between the first pixel and the second pixel is the lowest.

9. The driving method according to claim **7**, wherein the step of compensating comprises:

maintaining the initial data line voltages of the pixels corresponding to the odd-numbered rows of scan lines, and compensating the initial data line voltages of the pixels corresponding to the even-numbered rows of scan lines.

10. The driving method according to claim **9**, wherein the compensated voltages of the data lines of the pixels corresponding to the even-numbered rows of scan lines are equal to the voltages of the data lines of the pixels corresponding to the odd-numbered rows of scan lines.

11. The drive method according to claim **7**, wherein the step of compensating comprises:

maintaining the initial data line voltages of the pixels corresponding to the even-numbered rows of scan lines, and compensating the initial data line voltages of the pixels corresponding to the odd-numbered rows of scan lines.

12. The driving method according to claim **11**, wherein the compensated voltages of the data lines of the pixels corresponding to the odd-numbered rows of scan lines are equal to the voltages of the data lines of the pixels corresponding to the even-numbered rows of scan lines.

13. The driving method according to claim **7**, further comprising:

(a) detecting, by a brightness detection device, the brightness differences between the brightness of the pixels corresponding to the odd-numbered rows of scan lines and the brightness of the pixels corresponding to the even-numbered rows of scan lines;

(b) obtaining, by an image detection device, a central position and a view angle of the brightness detection device;

(c) recording corresponding brightness differences at the central position and the view angle of the brightness detection device;

(d) changing the view angle of the brightness detection device;

(e) repeating the steps (a) to (d) to create a correspondence table between view angles and brightness differences;

(f) retrieving a brightness difference in the correspondence table in response to a view angle of a user; and

(g) compensating initial data line voltages of the pixels corresponding to the odd-numbered rows of scan lines or the pixels corresponding to the even-numbered rows of scan lines according to the brightness difference so that the brightness difference is reduced.

14. A display device comprising a pixel structure, wherein the pixel structure comprises:

a plurality of data lines;

a plurality of scan lines;

a plurality of pixels located in an area defined by the data lines crossing the scan lines;

a common voltage line connected with the plurality of pixels;

a voltage detection unit connected with the data lines and configured to detect voltages on the data lines; and

a voltage compensation unit connected with the data lines and configured to compensate voltages on the data lines.

15. The display device according to claim **14**, wherein the pixel structure further comprises:

a first scan driver configured to drive odd-numbered rows of the scan lines; and

a second scan driver configured to drive even-numbered rows of the scan lines.

16. The display device according to claim **15**, wherein the first scan driver and the second scan driver are located on a same side of a non-display area of a display panel.

17. The display device according to claim **15**, wherein:

the first scan driver is located on a left side of a non-display area of a display panel; and

the second scan driver is located on a right side of the non-display area of the display panel.

18. The display device according to claim **14**, wherein the pixel structure further comprises:

a brightness detection device arranged in front of a display panel and configured to view a picture being displayed on the display panel; and

an image detection device arranged in a non-display area of the display panel and configured to obtain a central position and a view angle of the brightness detection device.

19. The display device according to claim **14**, wherein the pixel structure is a dual-domain structure.

* * * * *

专利名称(译)	像素结构，其驱动方法和显示装置		
公开(公告)号	US20160035305A1	公开(公告)日	2016-02-04
申请号	US14/529057	申请日	2014-10-30
[标]申请(专利权)人(译)	上海中航光电子有限公司 天马微电子股份有限公司		
申请(专利权)人(译)	上海中航光电科技股份有限公司. 天马微电子股份有限公司.		
当前申请(专利权)人(译)	上海中航光电科技股份有限公司. 天马微电子股份有限公司.		
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摘要(译)

像素结构包括多条数据线，多条扫描线，位于由与扫描线交叉的数据线限定的区域中的多个像素，与多个像素连接的公共电压线，连接的电压检测单元数据线配置为检测数据线上的电压，电压补偿单元与数据线连接，用于补偿数据线上的电压，使得与多条扫描线对应的不同像素之间的亮度差最小，以便有效地改善或消除具有均匀亮暗条带的线性浑浊条带，并改善液晶显示面板上显示图像的图像质量。