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(54) **DISPLAY DRIVING METHOD USING OVERLAPPING SCAN MODE WITH REDUCED COUPLING EFFECT**

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(57) **ABSTRACT**

The embodiment of the present invention provides a display driving method relating to the field of display, which can reduce the coupling effect due to the rapid changes of the voltage on the gate line and improve stability of display. The display driving method uses overlapping scan mode, wherein in the display panel two gate lines are arranged between two rows of pixel units for driving the two rows of pixel units respectively, the display driving method comprising: providing a switching voltage signal to the odd gate lines in the gate line group sequentially; providing a switch-
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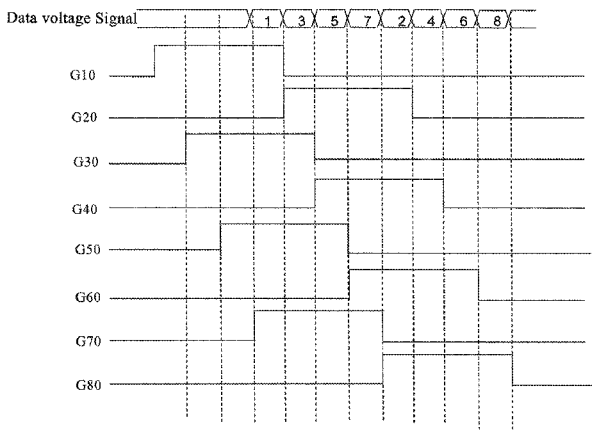

ing voltage signal to the even gate lines in the gate line group sequentially; and wherein for every two adjacent gate lines, when the switching voltage signal on an odd gate line has a falling edge, the switching voltage signal on an adjacent even gate line has a rising edge.

2 Claims, 5 Drawing Sheets

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See application file for complete search history.

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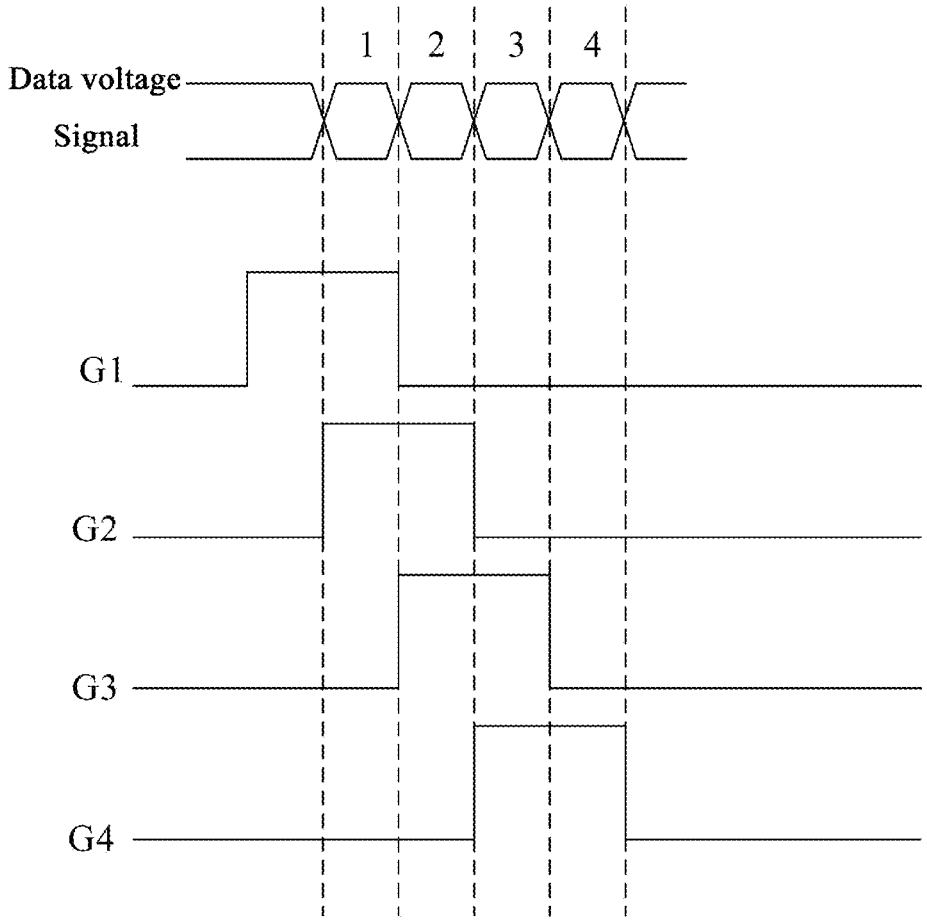

Fig. 1 (Prior Art)

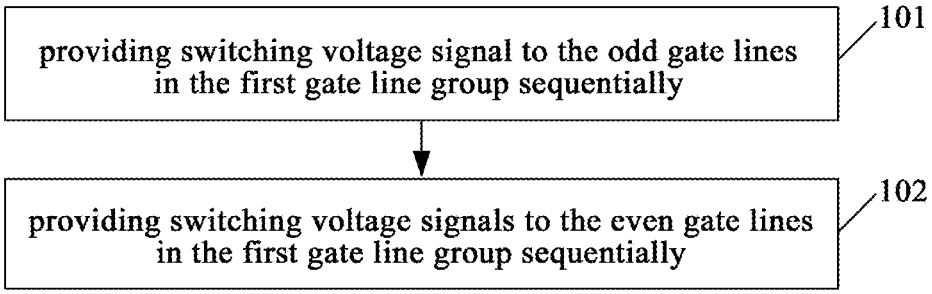

Fig. 2

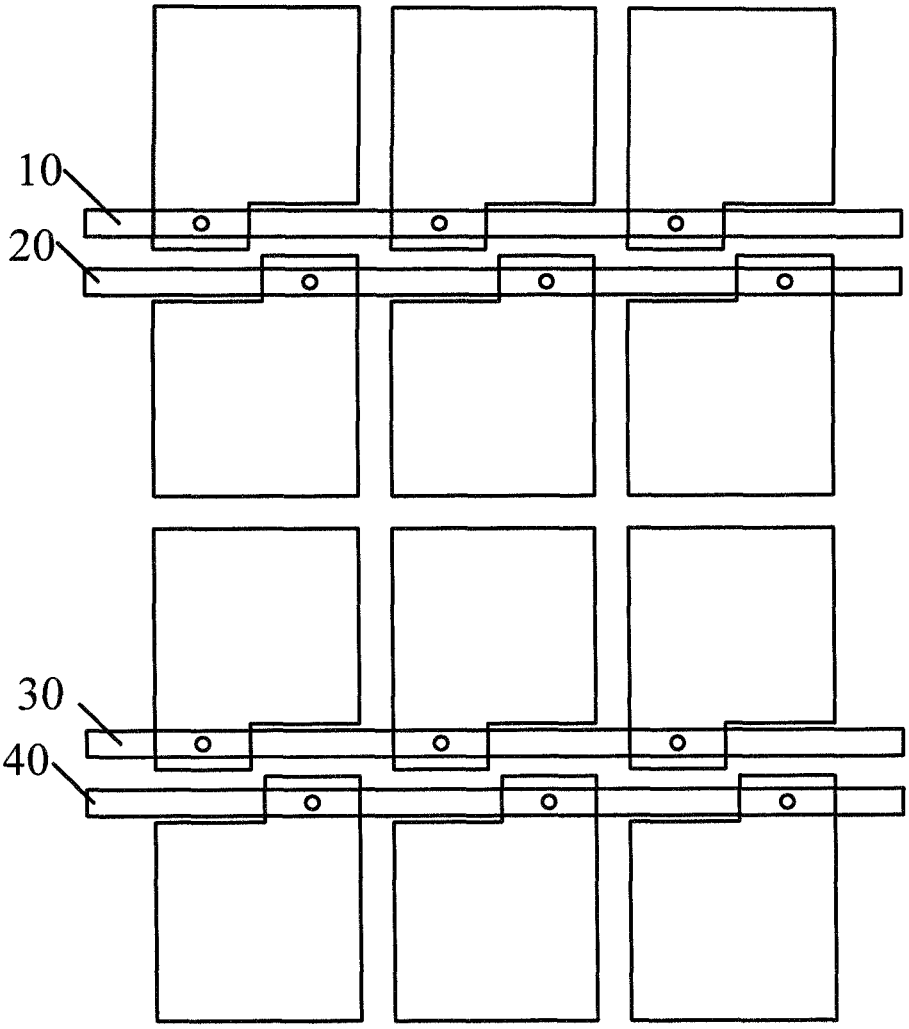

Fig. 3

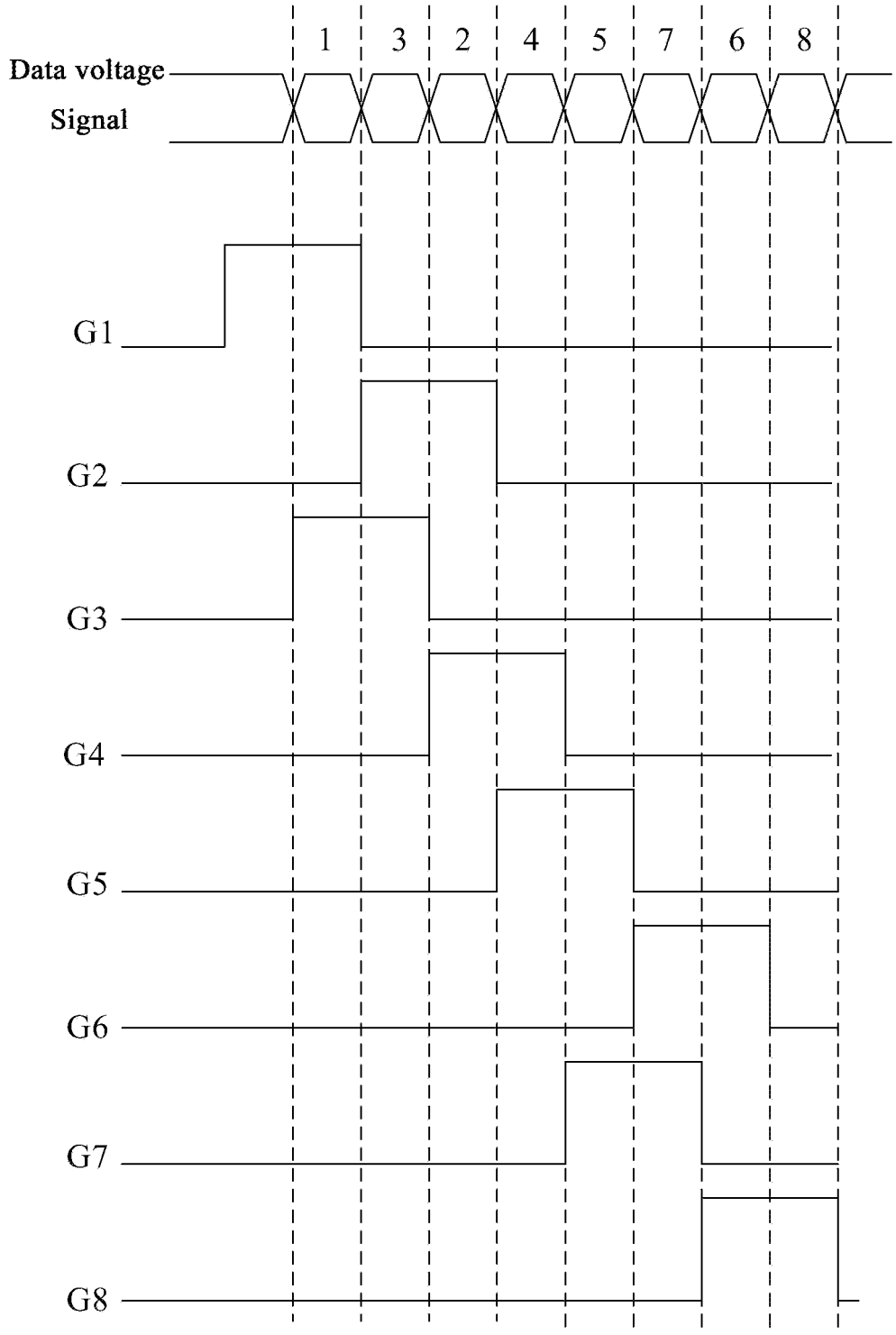

Fig. 4

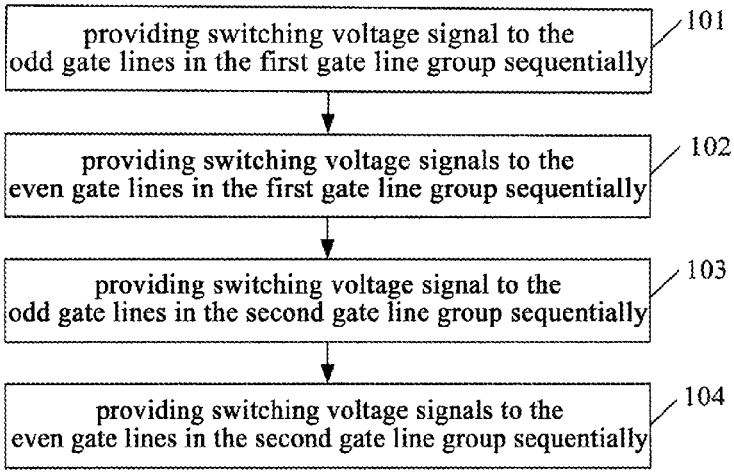
providing switching voltage signal to the odd gate lines in the first gate line group sequentially
101
providing switching voltage signals to the even gate lines in the first gate line group sequentially
102
providing switching voltage signal to the odd gate lines in the second gate line group sequentially
103
providing switching voltage signals to the even gate lines in the second gate line group sequentially
104

Fig. 5

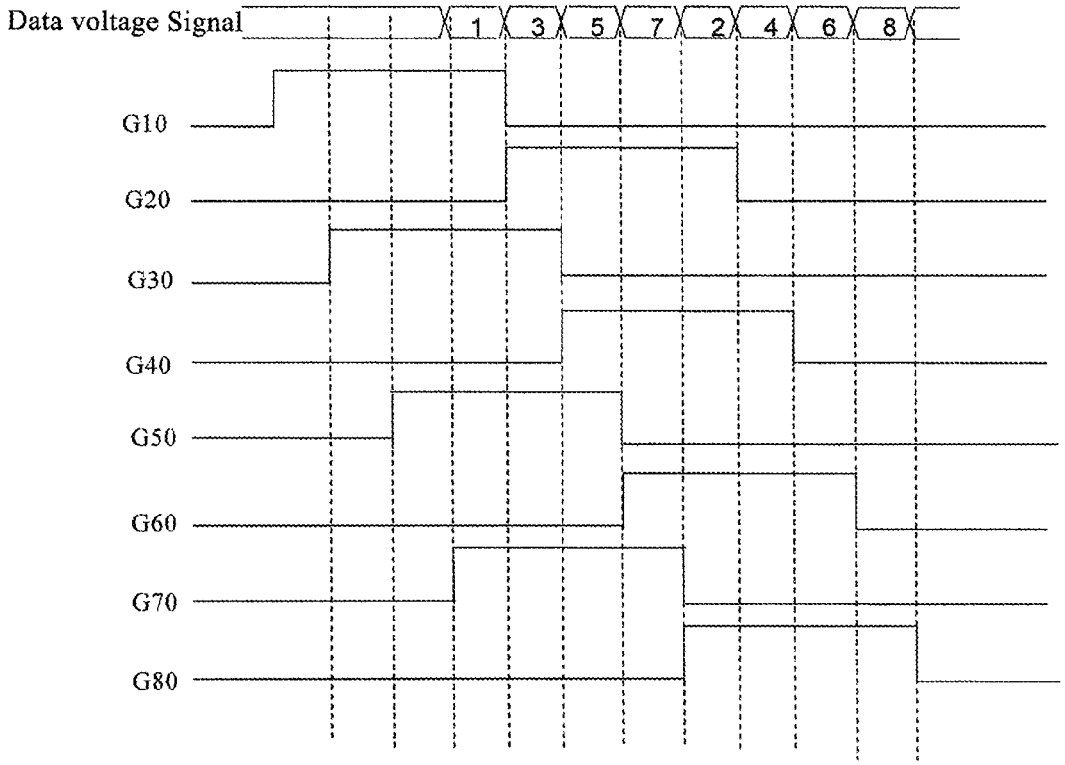
Data voltage Signal
1
3
5
7
2
4
6
8
G10
G20
G30
G40
G50
G60
G70
G80

Fig. 6

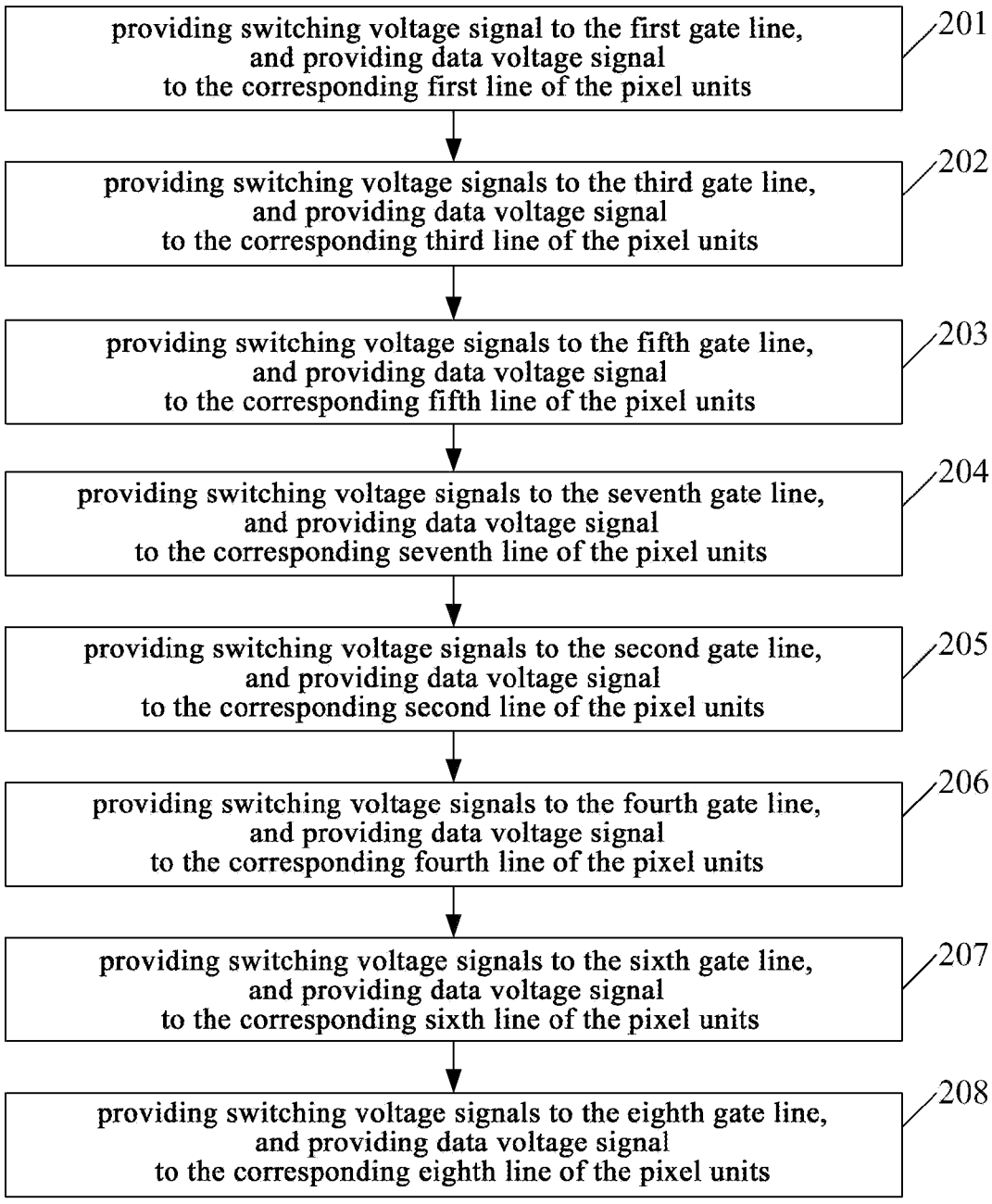
providing switching voltage signal to the first gate line, and providing data voltage signal to the corresponding first line of the pixel units
201
providing switching voltage signals to the third gate line, and providing data voltage signal to the corresponding third line of the pixel units
202
providing switching voltage signals to the fifth gate line, and providing data voltage signal to the corresponding fifth line of the pixel units
203
providing switching voltage signals to the seventh gate line, and providing data voltage signal to the corresponding seventh line of the pixel units
204
providing switching voltage signals to the second gate line, and providing data voltage signal to the corresponding second line of the pixel units
205
providing switching voltage signals to the fourth gate line, and providing data voltage signal to the corresponding fourth line of the pixel units
206
providing switching voltage signals to the sixth gate line, and providing data voltage signal to the corresponding sixth line of the pixel units
207
providing switching voltage signals to the eighth gate line, and providing data voltage signal to the corresponding eighth line of the pixel units
208

Fig. 7

DISPLAY DRIVING METHOD USING OVERLAPPING SCAN MODE WITH REDUCED COUPLING EFFECT

CROSS-REFERENCE TO RELATED APPLICATIONS

This patent application is a continuation of U.S. patent application Ser. No. 14/137,947, filed Dec. 20, 2013, entitled DISPLAY DRIVING METHOD USING OVERLAPPING SCAN MODE TO REDUCE COUPLING EFFECT, which claims priority to Chinese Patent Application No. CN 201210564612.4, filed Dec. 21, 2012.

FIELD OF THE INVENTION

The present invention relates to the field of display, particularly to a display driving method.

BACKGROUND OF THE INVENTION

With the continuous development of electronic technology, LCD displays have been widely used in various fields. A thin film transistor (TFT) array substrate is an important part of a liquid crystal display. Most TFT array substrate includes a base, common electrode lines, gate lines and data lines and other structures, wherein the gate lines are disposed between the two lines of sub-pixel, the data lines are disposed between the two columns of sub-pixels, the crossing regions of the gate lines and the data lines form the pixel units; the common electrode lines are also disposed between two lines of sub-pixel.

A driving method shown in FIG. **1** uses the overlapping scan driving modes, that is the gate pulse signal are overlapped therebetween. FIG. **1** shows the data voltage signal on the data lines and the switching voltage signals on four gate lines G**1**, G**2**, G**3**, and G**4**, wherein the switching voltage signal may be a pulse signal. As for the switching voltage signal on the gate line G**2**, in the first half of the switching voltage signal, the data voltage signal corresponding to the last gate line is written, in the second half of the switching voltage signal, the data voltage signal corresponding to the current gate line is written. During actual driving, firstly the thin-film transistor is turned on and the data voltage signal is provided to the pixel unit, if the switching voltage signals on the four gate lines G**1**, G**2**, G**3** and G**4** control the thin film transistors to be turned on in order. During changing of the gate voltages, there are certain periods wherein the switching voltage signals on two adjacent gate lines are both in high level (i.e., TFT is turned on), thus the magnetic field generated by the changing voltage on two gates lines are superimposed, leading to a strong coupling effect. In addition, due to the rapid changes of the voltage on the gate line, while the voltage on the common electrode line parallel to the gate line is usually constant, the enhanced coupling effect will further lead to instability of the common electrode voltage VCOM, affecting the display quality of the screen.

SUMMARY OF THE INVENTION

The embodiment of the present invention provides a display driving method, which can reduce the coupling effect due to the rapid changes of the voltage on the gate line and improve stability of display.

The present application provides a display driving method using overlapping scan mode, each two lines of pixel units have two gate lines to control the two lines respectively, the two gate lines drive the pixel units connected thereto respectively, each gate line group including N pairs of adjacent two gate lines, N being a natural number, said driving method comprising:

providing switching voltage signals to the odd gate lines in the gate line group sequentially;

providing switching voltage signals to the even gate lines in the gate line group sequentially;

wherein when the switching voltage signal on the odd gate lines is in the falling edge, the switching voltage signal on the even gate lines is in the rising edge.

Further, when N=1, each of the gate line group including four gate lines.

The gate line group comprises a first gate line, a second gate line, a third gate line and the fourth gate line, the driving method comprising:

providing switching voltage signals to the first gate line, and providing a first data voltage signal to the corresponding first line of the pixel units;

providing switching voltage signals to the third gate line, and providing a third data voltage signal to the corresponding third line of the pixel units;

providing switching voltage signals to the fifth gate line, and providing a fifth data voltage signal to the corresponding fifth line of the pixel units;

providing switching voltage signals to the seventh gate line, and providing a seventh data voltage signal to the corresponding seventh line of the pixel units;

providing switching voltage signals to the second gate line, and providing a second data voltage signal to the corresponding second line of the pixel units;

providing switching voltage signals to the fourth gate line, and providing a fourth data voltage signal to the corresponding fourth line of the pixel units;

providing switching voltage signals to the sixth gate line, and providing a sixth data voltage signal to the corresponding sixth line of the pixel units;

providing switching voltage signals to the eighth gate line, and providing a eighth data voltage signal to the corresponding eighth line of the pixel units.

Further, providing a data voltage signal to the corresponding first line of the pixel units comprising: providing a first data voltage signal to the corresponding first line of the pixel units in the second half of the switching voltage signal;

providing a data voltage signal to the corresponding third line of the pixel units comprising: write the first data voltage signal of the first line of the pixel units to the corresponding third line of the pixel units in the first half of the switching voltage signal, and write the third data voltage signal to the third line of the pixel units in the second half of the switching voltage signal;

providing a data voltage signal to the second line of the pixel units comprising: write the third data voltage signal of the third line of the pixel units to the corresponding second line of the pixel units in the first half of the switching voltage signal, and write the second data voltage signal to the second line of the pixel units in the second half of the switching voltage signal;

providing a data voltage signal to the fourth line of the pixel units comprising: write the second data voltage signal of the first line of the pixel units to the corresponding fourth line of the pixel units in the first half of the switching voltage signal, and write the fourth data voltage signal to the fourth line of the pixel units in the second half of the switching voltage signal.

Further, when N=2, each of the gate line group including eight gate lines.

Further, the gate line group comprises a first gate line, a second gate line, a third gate line, a fourth gate line, a fifth gate line, a sixth gate line, a seventh gate line and a eighth gate line, the driving method comprising:

providing switching voltage signals to the first gate line, and providing a data voltage signal to the corresponding first line of the pixel units;

providing switching voltage signals to the third gate line, and providing a data voltage signal to the corresponding third line of the pixel units;

providing switching voltage signals to the fifth gate line, and providing a data voltage signal to the corresponding fifth line of the pixel units;

providing switching voltage signals to the seventh gate line, and providing a data voltage signal to the corresponding seventh line of the pixel units;

providing switching voltage signals to the second gate line, and providing a data voltage signal to the corresponding second line of the pixel units;

providing switching voltage signals to the fourth gate line, and providing a data voltage signal to the corresponding fourth line of the pixel units;

providing switching voltage signals to the sixth gate line, and providing a data voltage signal to the corresponding sixth line of the pixel units;

providing switching voltage signals to the eighth gate line, and providing a data voltage signal to the corresponding eighth line of the pixel units.

Further, providing a data voltage signal to the corresponding first line of the pixel units comprising providing a first data voltage signal to the corresponding first line of the pixel units in the last quarter of the switching voltage signal;

providing a data voltage signal to the corresponding third line of the pixel units comprising: providing the first data voltage signal to a corresponding third line of the pixel units in the third quarter of the switching voltage signal, and providing the third data voltage signal to the corresponding third line of the pixel units in the last quarter of the switching voltage signal;

providing a data voltage signal to the corresponding fifth line of the pixel units comprising: providing the first data voltage signal to a corresponding fifth line of the pixel units in the second quarter of the switching voltage signal, providing the third data voltage signal to the corresponding fifth line of the pixel units in the third quarter of the switching voltage signal, and providing the fifth data voltage signal to the corresponding fifth line of the pixel units in the last quarter of the switching voltage signal;

providing a data voltage signal to the corresponding seventh line of the pixel units comprising: providing the first data voltage signal to a corresponding seventh line of the pixel units in the first quarter of the switching voltage signal, providing the third data voltage signal to the corresponding seventh line of the pixel units in the second quarter of the switching voltage signal, providing the fifth data voltage signal to the corresponding seventh line of the pixel units in the third quarter of the switching voltage signal, and providing the seventh data voltage signal to the corresponding seventh line of the pixel units in the last quarter of the switching voltage signal;

providing a data voltage signal to the corresponding second line of the pixel units comprising: providing the third data voltage signal to a corresponding second line of the pixel units in the first quarter of the switching voltage signal, providing the fifth data voltage signal to the corresponding second line of the pixel units in the second quarter of the switching voltage signal, providing the seventh data voltage signal to the corresponding second line of the pixel units in the third quarter of the switching voltage signal, and providing the second data voltage signal to the corresponding second line of the pixel units in the last quarter of the switching voltage signal;

providing a data voltage signal to the corresponding fourth line of the pixel units comprising: providing the fifth data voltage signal to a corresponding fourth line of the pixel units in the first quarter of the switching voltage signal, providing the seventh data voltage signal to the corresponding fourth line of the pixel units in the second quarter of the switching voltage signal, providing the second data voltage signal to the corresponding fourth line of the pixel units in the third quarter of the switching voltage signal, and providing the fourth data voltage signal to the corresponding fourth line of the pixel units in the last quarter of the switching voltage signal;

providing a data voltage signal to the corresponding sixth line of the pixel units comprising: providing the seventh data voltage signal to a corresponding sixth line of the pixel units in the first quarter of the switching voltage signal, providing the second data voltage signal to the corresponding sixth line of the pixel units in the second quarter of the switching voltage signal, providing the fourth data voltage signal to the corresponding sixth line of the pixel units in the third quarter of the switching voltage signal, and providing the sixth data voltage signal to the corresponding sixth line of the pixel units in the last quarter of the switching voltage signal;

providing a data voltage signal to the corresponding eighth line of the pixel units comprising: providing the second data voltage signal to a corresponding eighth line of the pixel units in the first quarter of the switching voltage signal, providing the fourth data voltage signal to the corresponding eighth line of the pixel units in the second quarter of the switching voltage signal, providing the sixth data voltage signal to the corresponding eighth line of the pixel units in the third quarter of the switching voltage signal, and providing the eighth data voltage signal to the corresponding eighth line of the pixel units in the last quarter of the switching voltage signal.

Furthermore, while providing switching voltage signals sequentially to the odd gate lines in the gate line group, the method further comprising:

storing the switching voltage signal of the even gate lines in the random access memory of the timing controller;

and before providing the switching voltage signals sequentially to the even gate lines in the gate line group, the method further comprising:

reading from the random access memory of the timing controller the switching voltage signals of the even gate lines.

According to the display driving method of an embodiment of the present invention, all the gate lines are divided into several groups, when scanning the display, firstly the odd gate lines in the first gate line group are provided with switching voltage signals sequentially, then the even gate lines in the first gate line group are provided with switching voltage signals sequentially. In this way, the switching voltage signals on the adjacent two gate lines are set in a manner that one is in rising edge while the other is in falling edge, the magnetic field generated by voltage changes in the two adjacent gate lines are canceled by each other, which improves the stability of display.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to illustrate the embodiments of the present invention or the prior art more clearly, the drawings to be

referenced in describing the embodiments will be described in brief. Obviously, the drawings to be described hereinafter is merely some embodiments of the present invention; for persons of ordinary skill in the art, without the premise of creative effort, other drawings can be obtained according to these figures.

FIG. **1** is a timing diagram of the driving method in the prior art;

FIG. **2** is a schematic flow chart of the display driving method according to an embodiment of the present invention;

FIG. **3** is a schematic structural view of the array substrate according to an embodiment of the present invention;

FIG. **4** is a timing chart of the driving method according to an embodiment of the present invention;

FIG. **5** is another schematic flow chart of the display driving method according to an embodiment of the present invention;

FIG. **6** is another timing chart of the driving method according to an embodiment of the present invention;

FIG. **7** is still another schematic flow chart of the display driving method according to an embodiment of the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

Embodiments of the present invention provide a display driving method which can reduce the coupling phenomenon due to rapid changes in voltage on the gate lines, improving the stability of display.

In the following description, for illustration rather than limitation, specific details such as system structures, interfaces, techniques are proposed for a thorough understanding of the present invention. However, other embodiments of the present invention without these specific details are apparent to those skilled in the art. In other instances, detailed description to the well-known devices, circuits, and methods is omitted in order to avoid unnecessary detail description from dimming the present invention.

The display driving method according to the present invention can be used for driving a display device, wherein the display device may include: a liquid crystal display or an organic light emitting diode (OLED) panel. Various embodiments of the present invention are described using LCD as example.

The present embodiment provides a display driving method using overlapping scan mode (i.e. the switching voltage signals are overlapped therebetween), each two adjacent lines of pixel units of the LCD have two gate lines, the two gate lines drive the pixel units connected thereto respectively, each gate line group includes N pairs of adjacent two gate lines, N being a natural number. In the present embodiment, two gate line groups comprising a first gate line group and a second gate line group are exemplified. As shown in FIG. **2**, the method comprising:

Step **101**, providing a switching voltage signal to the odd gate lines in the first gate line group sequentially.

In the LCD according to the present embodiment, each two lines of pixel units have two gate lines to control the two lines respectively, the two gate lines drive the pixel units connected thereto respectively, each gate line group including N pairs of adjacent two gate lines, N being a natural number. Specifically, the structure of the array substrate of the present embodiment is shown in FIG. **3**, the $2i-1^{th}$ and the $2i^{th}$ gate lines are located between two adjacent lines of pixel units, wherein i is a natural number, and two adjacent gate lines (one odd gate line and one even gate line) are located in the gaps between the two lines of pixel units; that is, the first gate line **10** and the second gate line **20** are both located between the first line of pixel units and the second line of pixel units; the third gate line **30** and the fourth gate line **40** are located between the third and the fourth lines of pixel units. In the present embodiment, the overlapped region of the switching voltage signals of two adjacent gate lines (one odd gate line and one even gate line) occupy a half of the switching voltage signal. For the switching voltage signals of the $2i-1^{th}$ and the $2i^{th}$ gate lines, when the switching voltage signal of one gate line is in rising edge, the switching voltage signal of the other gate line is in falling edge; that is, the switching voltage signal of one gate line of two adjacent gate lines in the same gap is in rising edge while the switching voltage signal of the other gate line is in falling edge. Due to the close proximity of the two gate lines, the magnetic field generated by the changing voltage on the two gate lines is canceled significantly.

In the present embodiment, all the gate lines are divided into several groups, each of the groups has at least four gate lines and the numbers of gate lines in each group are same. During display of the LCD, firstly the odd gate lines in the first gate line group are provided with switching voltage signals sequentially. Hereinafter, the driving method of the present step will be described in detail with for example, four gate lines in each gate line group.

As shown in FIG. **4**, the first gate line group comprises a first gate line G**1**, a second gate line G**2**, a third gate line G**3** and a fourth gate line G**4**, each of the gate lines are provided with switching voltage signal.

Firstly, providing a switching voltage signal to the first gate line G**1**, and providing a data voltage signal to the corresponding first line of the pixel units. Specifically, providing a first data voltage signal **1** to a corresponding first line of the pixel units in the second half of the switching voltage signal.

Then, providing a switching voltage signal to the third gate line G**3**, and providing a data voltage signal to the corresponding third line of the pixel units. Specifically, since the third gate line G**3** is turned on when the data signal driving unit provides the first data voltage signal **1** to the first line of the pixel units, thus the first data voltage signal **1** of the first line of the pixel units is written to the corresponding third line of the pixel units in the first half of the switching voltage signal, and the third data voltage signal **3** is written to the third line of the pixel units in the second half of the switching voltage signal.

Besides, then the gate lines are grouped, six or eight gate lines can be divided into one group, other even number can be used as desired. The present invention is not limited hereto.

Step **102**, providing switching voltage signals to the even gate lines in the first gate line group sequentially.

After providing switching voltage signals to the odd gate lines in the first gate line group sequentially is completed, the even gate lines in the first gate line group are provided with switching voltage signals sequentially.

Firstly, providing switching voltage signal to the second gate line G**2**, and providing a data voltage signal to the second line of the pixel units. Specifically, since the second gate line G**2** is turned on when the data signal driving unit provides the third data voltage signal **3** to the third line of the pixel units, thus the third data voltage signal **3** of the third line of the pixel units is written to the corresponding second line of the pixel units in the first half of the switching voltage

signal, and the second data voltage signal **2** is written to the third line of the pixel units in the second half of the switching voltage signal.

Then, providing a switching voltage signal to the fourth gate line G**4**, and providing a data voltage signal to the corresponding fourth line of the pixel units. Specifically, since the fourth gate line G**4** is turned on when the data signal driving unit provides the second data voltage signal **2** to the second line of the pixel units, thus the second data voltage signal **2** of the second line of the pixel units is written to the corresponding fourth line of the pixel units in the first half of the switching voltage signal, and the fourth data voltage signal **4** is written to the fourth line of the pixel units in the second half of the switching voltage signal.

As shown in FIG. **4**, the switching voltage signals on the adjacent two gate lines in a same gap are set in a manner that the switching voltage signal of the first gate line G**1** is in falling edge while that of the second gate line G**2** is in rising edge, thus the magnetic field generated by voltage changes in the two gate lines are canceled by each other, the coupling effect is reduced, and the change of the voltage on the gate lines do not affect other metal lines such as common electrode line and data lines.

Further, as shown in FIG. **5**, after driving of the first gate line group is completed, the second, third . . . gate line groups will be driven sequentially, until the gate lines of the whole screen are scanned. Specifically, after providing switching voltage signals to the even gate lines in the first gate line group sequentially, the method further comprises:

Step **103**, providing a switching voltage signal to the odd gate lines in the second gate line group sequentially; and

Step **104**, providing switching voltage signals to the even gate lines in the second gate line group sequentially.

The second gate line group comprises a fifth gate line G**5**, a sixth gate line G**6**, a seventh gate line G**7** and a eighth gate line G**8**, each of the gate lines are provided with switching voltage signal. The above mentioned steps specifically comprise:

Providing a switching voltage signal to the fifth gate line G**5**, and providing a data voltage signal to the fifth line of the pixel units; specifically, the fourth data voltage signal **4** of G**4** is written to the corresponding fifth line of the pixel units in the first half of the switching voltage signal, and the fifth data voltage signal **5** is written to the fifth line of the pixel units in the second half of the switching voltage signal;

Providing a switching voltage signal to the seventh gate line G**7**, and providing a data voltage signal to the seventh line of the pixel units; specifically, the fifth data voltage signal **5** of G**5** is written to the corresponding seventh line of the pixel units in the first half of the switching voltage signal, and the seventh data voltage signal **7** is written to the seventh line of the pixel units in the second half of the switching voltage signal;

Providing a switching voltage signal to the sixth gate line G**6**, and providing a data voltage signal to the sixth line of the pixel units; specifically, the seventh data voltage signal **7** of G**7** is written to the corresponding sixth line of the pixel units in the first half of the switching voltage signal, and the sixth data voltage signal **6** is written to the sixth line of the pixel units in the second half of the switching voltage signal;

Providing a switching voltage signal to the eighth gate line G**8**, and providing a data voltage signal to the eighth line of the pixel units; specifically, the sixth data voltage signal **6** of G**6** is written to the corresponding eighth line of the pixel units in the first half of the switching voltage signal, and the eighth data voltage signal **8** is written to the eighth line of the pixel units in the second half of the switching voltage signal.

Moreover, while providing a switching voltage signal to the odd gate lines in the gate line group sequentially, the method further comprises:

storing the switching voltage signal of the even gate lines in the RAM (random access memory) of the timing controller;

and before providing the switching voltage signals sequentially to the even gate lines in the gate line group, the method further comprising:

reading from the RAM of the timing controller the switching voltage signals of the even gate lines.

In the present embodiment, after providing the switching voltage signal to the first gate line, the third gate line rather than the second gate line is provided with switching voltage signal, therefore the switching voltage signal of the second gate line shall be stored temporarily. Specifically, according to the present embodiment, the switching voltage signals of the even gate lines are stored in the RAM of the timing controller, and when the switching voltage signals shall be provided to the even gate lines, the switching voltage signals of the even gate lines can be read from the RAM of the timing controller.

As shown in FIGS. **6** and **7**, when N=2 as a further embodiment of the present invention, each of the gate line group includes eight gate lines, i.e, a first gate line G**10**, a second gate line G**20**, a third gate line G**30**, a fourth gate line G**40**, a fifth gate line G**50**, a sixth gate line G**60**, a seventh gate line G**70** and a eighth gate line G**80**. The differences from the above embodiment are that, according to the present embodiment, the overlapped region of the switching voltage signals of two adjacent odd gate lines in each gate line group occupies three quarter of the switching voltage signal, which means the number of gate lines in each gate line group is at least 8. It should be noted that, the sequence of the following steps are not precisely the practical sequence. As shown in FIG. **7**, the driving method of the present invention comprises:

Step **201**, providing a switching voltage signal to the first gate line, and providing a data voltage signal to the corresponding first line of the pixel units;

specifically, firstly providing switching voltage signals to the first gate line G**10**, and then providing a first data voltage signal **1** to a corresponding first line of the pixel units in the last quarter of the switching voltage signal.

Step **202**, providing switching voltage signals to the third gate line, and providing a data voltage signal to the corresponding third line of the pixel units;

specifically, after providing switching voltage signals to the third gate line G**30**, the data signal driving unit is providing the first data voltage signal **1** in the third quarter of the switching voltage signal and the TFT is turned on in this period, therefore the data signal driving unit provides the first data voltage signal to a corresponding third line of the pixel units in the third quarter of the switching voltage signal, and provides the third data voltage signal **3** in the last quarter of the switching voltage signal, thus providing the third data voltage signal **3** to the corresponding third line of the pixel units in the last quarter of the switching voltage signal.

Step **203**, providing switching voltage signals to the fifth gate line, and providing a data voltage signal to the corresponding fifth line of the pixel units;

specifically, providing the first data voltage signal **1** to a corresponding fifth line of the pixel units through the fifth

gate line G**50** in the second quarter of the switching voltage signal, providing the third data voltage signal **3** to the corresponding fifth line of the pixel units in the third quarter of the switching voltage signal, and providing the fifth data voltage signal **5** to the corresponding fifth line of the pixel units in the last quarter of the switching voltage signal.

Step **204**, providing switching voltage signals to the seventh gate line, and providing a data voltage signal to the corresponding seventh line of the pixel units;

specifically, providing the first data voltage signal **1** to a corresponding seventh line of the pixel units through the seventh gate line G**70** in the first quarter of the switching voltage signal, providing the third data voltage signal **3** to the corresponding seventh line of the pixel units in the second quarter of the switching voltage signal, providing the fifth data voltage signal **5** to the corresponding seventh line of the pixel units in the third quarter of the switching voltage signal, and providing the seventh data voltage signal **7** to the corresponding seventh line of the pixel units in the last quarter of the switching voltage signal.

Step **205**, providing switching voltage signals to the second gate line, and providing a data voltage signal to the corresponding second line of the pixel units;

specifically, providing the third data voltage signal **3** to a corresponding second line of the pixel units through the second gate line G**20** in the first quarter of the switching voltage signal, providing the fifth data voltage signal **5** to the corresponding second line of the pixel units in the second quarter of the switching voltage signal, providing the seventh data voltage signal **7** to the corresponding second line of the pixel units in the third quarter of the switching voltage signal, and providing the second data voltage signal **2** to the corresponding second line of the pixel units in the last quarter of the switching voltage signal.

Step **206**, providing switching voltage signals to the fourth gate line, and providing a data voltage signal to the corresponding fourth line of the pixel units;

specifically, providing the fifth data voltage signal **5** to a corresponding fourth line of the pixel units through the fourth gate line G**40** in the first quarter of the switching voltage signal, providing the seventh data voltage signal **7** to the corresponding fourth line of the pixel units in the second quarter of the switching voltage signal, providing the second data voltage signal **2** to the corresponding fourth line of the pixel units in the third quarter of the switching voltage signal, and providing the fourth data voltage signal **4** to a corresponding fourth line of the pixel units in the last quarter of the switching voltage signal.

Step **207**, providing switching voltage signals to the sixth gate line, and providing a data voltage signal to the corresponding sixth line of the pixel units;

specifically, providing the seventh data voltage signal **7** to a corresponding sixth line of the pixel units through the sixth gate line G**60** in the first quarter of the switching voltage signal, providing the second data voltage signal **2** to a corresponding sixth line of the pixel units in the second quarter of the switching voltage signal, providing the fourth data voltage signal **4** to a corresponding sixth line of the pixel units in the third quarter of the switching voltage signal, and providing the sixth data voltage signal **6** to a corresponding sixth line of the pixel units in the last quarter of the switching voltage signal.

Step **208**, providing switching voltage signals to the eighth gate line, and providing a data voltage signal to the corresponding eighth line of the pixel units;

specifically, providing the second data voltage signal **2** to a corresponding eighth line of the pixel units through the eighth gate line G**80** in the first quarter of the switching voltage signal, providing the fourth data voltage signal **4** to a corresponding eighth line of the pixel units in the second quarter of the switching voltage signal, providing the sixth data voltage signal **6** to a corresponding eighth line of the pixel units in the third quarter of the switching voltage signal, and providing the eighth data voltage signal **8** to a corresponding eighth line of the pixel units in the last quarter of the switching voltage signal.

According to the display driving method of an embodiment of the present invention, all the gate lines are divided into several groups, when scanning the display, firstly the odd gate lines in the first gate line group are provided with switching voltage signals sequentially, then the even gate lines in the first gate line group are provided with switching voltage signals sequentially. In this way, the switching voltage signals on the adjacent two gate lines are set in a manner that one is in rising edge while the other is in falling edge, the magnetic field generated by voltage changes in the two adjacent gate lines are canceled by each other, such that the coupling effect is significantly reduce and the stability of display is improved.

The above are specific embodiments of the present invention, but the scope of the present invention is not limited thereto, variations or replacement in the technical scope of the present invention are apparent to any person skilled in the art, and should fall within the protective scope of the present invention. Accordingly, the protective scope of the invention should be defined by the appended claims.

What is claimed is:

1. A display driving method for driving a display panel in an overlapping scan mode, wherein in the display panel two adjacent gate lines are arranged between two rows of pixel units for driving the two rows of pixel units respectively, each of the two adjacent gate lines exclusively drives one of the two rows of pixel units, respectively, wherein every 4 pairs of adjacent gate lines consists of a gate line group, and each gate line group includes eight gate lines,

the display driving method comprising: applying an active high switching voltage signal in sequence to all odd gate lines in the gate line group; and then, applying the active high switching voltage signal in sequence to all even gate lines in the gate line group;

wherein the gate line group comprises a first gate line, a second gate line, a third gate line, a fourth gate line, a fifth gate line, a sixth gate line, a seventh gate line and an eighth gate line; and

providing a switching voltage signal to the first gate line, and providing a first data voltage signal to the corresponding first row of the pixel units in a last quarter of the switching voltage signal;

then providing a switching voltage signal to the third gate line, and providing a data voltage signal to the corresponding third row of the pixel units that comprises

providing the first data voltage signal to a corresponding third row of the pixel units in a third quarter of the switching voltage signal, and providing a third data voltage signal to the corresponding third row of the pixel units in the last quarter of the switching voltage signal;

then providing a switching voltage signal to the fifth gate line, and providing a data voltage signal to the corresponding fifth row of the pixel units that comprises

providing the first data voltage signal to a corresponding fifth row of the pixel units in a second quarter of the switching voltage signal, providing the third data voltage signal to the corresponding fifth row of the

pixel units in the third quarter of the switching voltage signal, and providing a fifth data voltage signal to the corresponding fifth row of the pixel units in the last quarter of the switching voltage signal;

then providing a switching voltage signal to the seventh gate line, and providing a data voltage signal to the corresponding seventh row of the pixel units that comprises

providing the first data voltage signal to a corresponding seventh row of the pixel units in a first quarter of the switching voltage signal, providing the third data voltage signal to the corresponding seventh row of the pixel units in the second quarter of the switching voltage signal, providing the fifth data voltage signal to the corresponding seventh row of the pixel units in the third quarter of the switching voltage signal, and providing a seventh data voltage signal to the corresponding seventh row of the pixel units in the last quarter of the switching voltage signal;

then providing a switching voltage signal to the second gate line, and providing a data voltage signal to the corresponding second row of the pixel units that comprises

providing the third data voltage signal to a corresponding second row of the pixel units in the first quarter of the switching voltage signal, providing the fifth data voltage signal to the corresponding second row of the pixel units in the second quarter of the switching voltage signal, providing the seventh data voltage signal to the corresponding second row of the pixel units in the third quarter of the switching voltage signal, and providing a second data voltage signal to the corresponding second row of the pixel units in the last quarter of the switching voltage signal;

then providing a switching voltage signal to the fourth gate line, and providing a data voltage signal to the corresponding fourth row of the pixel units that comprises

providing the fifth data voltage signal to a corresponding fourth row of the pixel units in the first quarter of the switching voltage signal, providing the seventh data voltage signal to the corresponding fourth row of the pixel units in the second quarter of the switching voltage signal, providing the second data voltage signal to the corresponding fourth row of the pixel units in the third quarter of the switching voltage signal, and providing a fourth data voltage signal to the corresponding fourth row of the pixel units in the last quarter of the switching voltage signal;

then providing a switching voltage signal to the sixth gate line, and providing a data voltage signal to the corresponding sixth row of the pixel units that comprises

providing the seventh data voltage signal to a corresponding sixth row of the pixel units in the first quarter of the switching voltage signal, providing the second data voltage signal to the corresponding sixth row of the pixel units in the second quarter of the switching voltage signal, providing the fourth data voltage signal to the corresponding sixth row of the pixel units in the third quarter of the switching voltage signal, and providing a sixth data voltage signal to the corresponding sixth row of the pixel units in the last quarter of the switching voltage signal;

then providing a switching voltage signal to the eighth gate line, and providing a data voltage signal to the corresponding eighth row of the pixel units that comprises

providing the second data voltage signal to a corresponding eighth row of the pixel units in the first quarter of the switching voltage signal, providing the fourth data voltage signal to the corresponding eighth row of the pixel units in the second quarter of the switching voltage signal, providing the sixth data voltage signal to the corresponding eighth row of the pixel units in the third quarter of the switching voltage signal, and providing an eighth data voltage signal to the corresponding eighth row of the pixel units in the last quarter of the switching voltage signal; and

wherein for every two adjacent gate lines, when the switching voltage signal on an odd gate line has a falling edge, the switching voltage signal on an adjacent even gate line has a rising edge.

2. The display driving method of claim **1**, wherein, when providing a switching voltage signal to the odd gate lines in the gate line group sequentially, the display driving method further comprises storing the switching voltage signal of the even gate lines into a random access memory of a timing controller; and wherein, before providing a switching voltage signal to the even gate lines in the gate line group sequentially, the display driving method further comprises reading from the random access memory of the timing controller the switching voltage signal of the even gate lines.

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