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(54) **DRIVING AND SCANNING CIRCUIT,
DISPLAY SCREEN AND MOBILE
TERMINAL**

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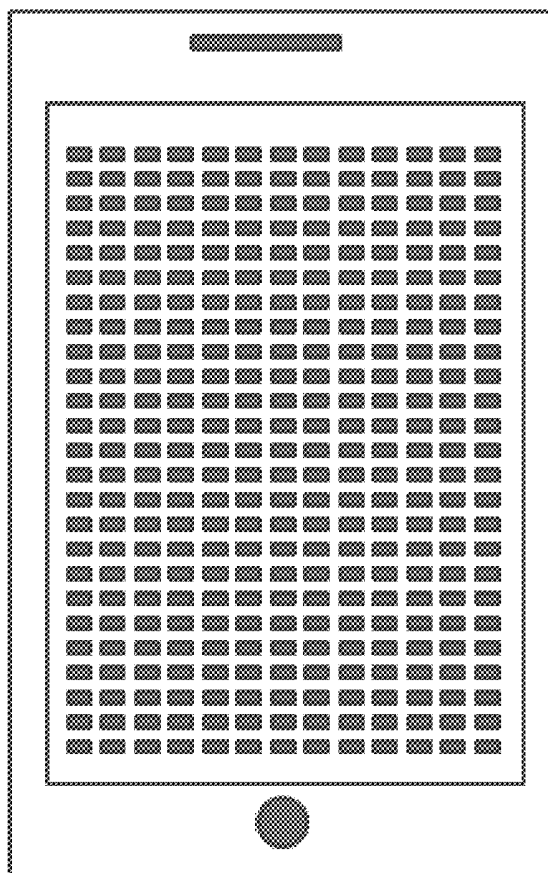
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(57) **ABSTRACT**

A driving and scanning circuit, a display screen and a mobile terminal, comprise driving and scanning units which are distributed in an array, each comprising an AMOLED driving unit for driving an OLED to emit light and a fingerprint scanning unit for forming pixel capacitances, wherein the AMOLED driving unit comprises a first thin film transistor, a second thin film transistor, a third thin film transistor and an OLED, the first thin film transistor is connected with a driving voltage and a first switching voltage, the second thin film transistor and the third thin film transistor are respectively connected with an anode terminal and a cathode terminal, and the OLED is positioned between the cathode terminal and the second thin film transistor; the cathode terminal also comprises a fourth thin film transistor connected with a second driving voltage and a second switching voltage.



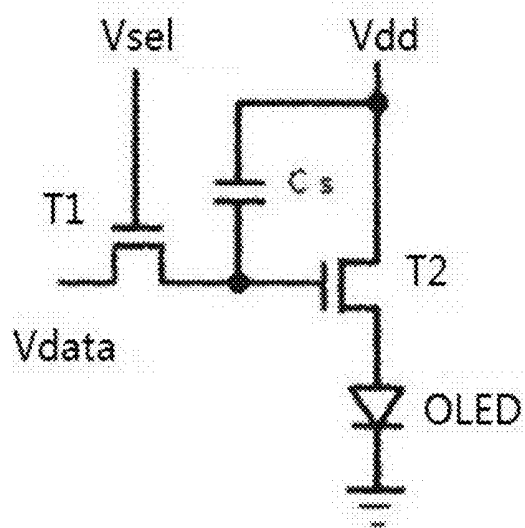


Fig. 1

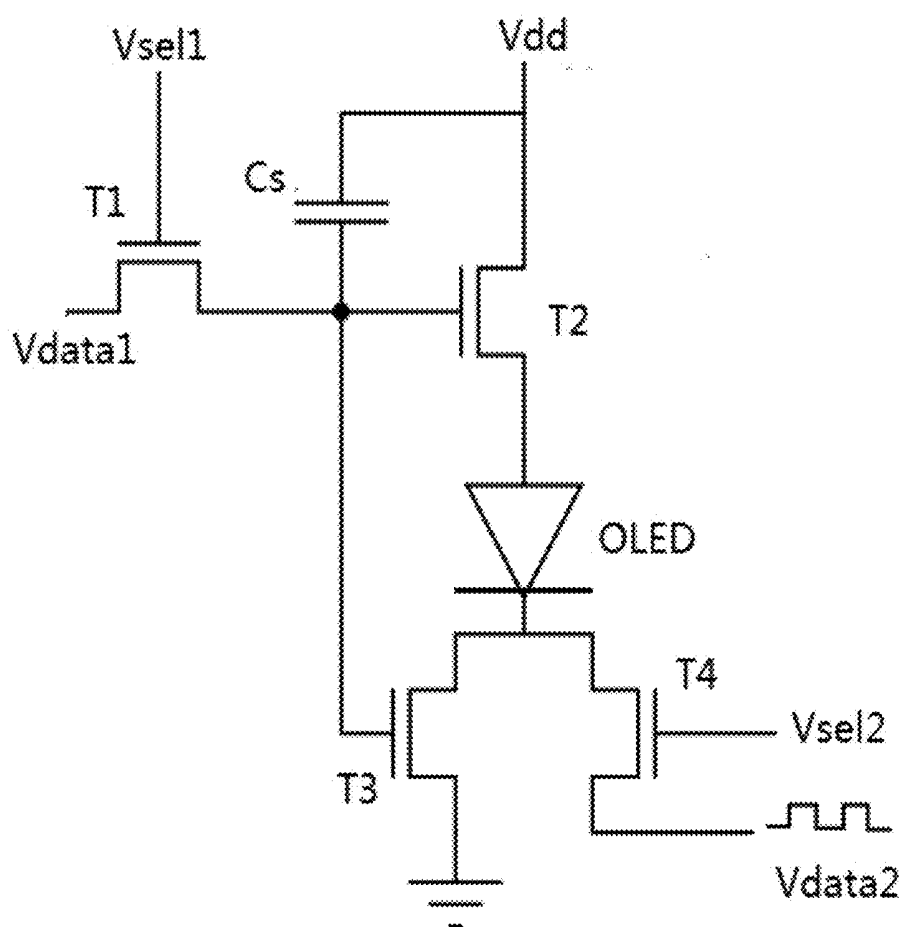


Fig. 2

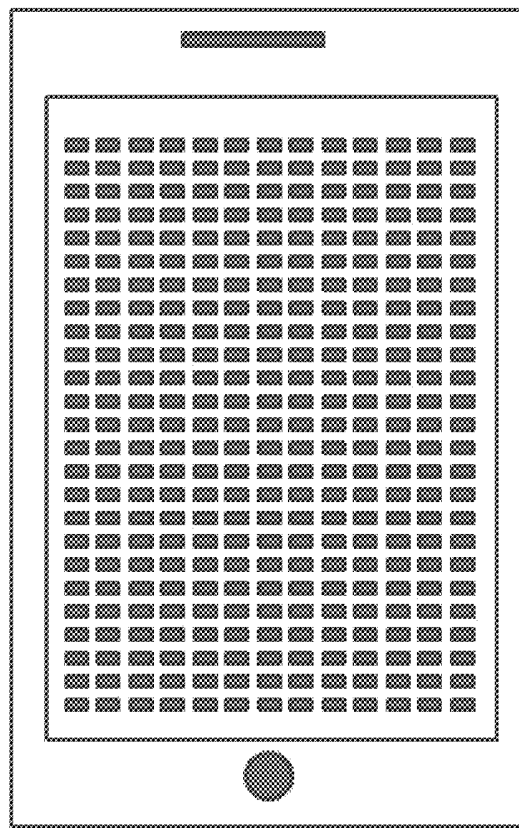


Fig. 3

DRIVING AND SCANNING CIRCUIT, DISPLAY SCREEN AND MOBILE TERMINAL

TECHNICAL FIELD

[0001] The present invention relates to general image data processing and in particular to a method and system for zooming-in a picture on a mobile terminal.

BACKGROUND OF THE PRESENT INVENTION

[0002] At present, as the resolution of a camera for a mobile terminal becomes higher, pictures photographed by the camera may become larger and larger in size. However, considering portability, the screen of the mobile terminal may generally be not more than 6 inches, so some details may not be viewed clearly when these large pictures are displayed on the screen. Consequently, these pictures may need to be zoomed-in for viewing. In the prior art, zooming-in a picture on a mobile terminal may generally be realized by sliding two fingers on the touch screen in opposite directions, but this zoom-in method may be difficult to use to ensure zoom-in precision. Moreover, as the slide operations of two fingers may not be consistent every time, it may often be difficult to achieve a purpose of zooming-in a same region for two times.

[0003] Therefore, further improvements and developments are needed in the prior art.

SUMMARY OF THE PRESENT INVENTION

[0004] In view of the deficiencies in the prior art, in order to solve the defects and deficiencies in the prior art, the present invention provides a method and system for zooming-in a picture, which can achieve the purpose of zooming-in a large picture by a fuzzy operation, and can also increase the zoom-in precision and achieve the purpose of zooming-in a same region by multiple times of operation, so that it is convenient for a user to zoom-in or zoom-out a picture for use.

[0005] To solve the technical problem, the present invention employs the following technical solutions.

[0006] A method for zooming-in a picture on a mobile terminal is provided, including the following steps of:

[0007] partitioning a picture into an array formed by $M \times N$ rectangles, and assigning a serial number to each of the rectangles in the array according to a row position and a column position of this respective rectangle in the array, wherein the serial numbers are set by an array storage structure;

[0008] acquiring rectangles in which two touch points are located when detecting that there are two touch points on the picture; and

[0009] zooming-in a rectangular array between rows and columns of the acquired rectangles in which the two touch points are located.

[0010] As a further improved solution, the acquiring rectangles of two touch points when detecting that there are two touch points on the picture specifically includes the following steps of:

[0011] acquiring coordinates (x,y) of the two touch points on a touch screen of the mobile terminal; and

[0012] determining a rectangular range of the x-coordinate value x and the y-coordinate value y of the coordinates (x,y)

of each of the two touch points in the array, to determine rectangles in which the two touch points are located.

[0013] As a further improved solution, zooming-in a rectangular array between rows and columns of the rectangles of the two touch points specifically includes the following steps of:

[0014] searching row and column positions of the rectangles in which the two touch points are located according to the serial numbers of the rectangles; and

[0015] determining and zooming-in a rectangular array between rows and columns of the rectangles in which the two touch points are located.

[0016] In an embodiment, rectangles in the array are numbered as $[a][b]$, where a and b satisfy the following conditions: $1 \leq a \leq M$ and $1 \leq b \leq N$; when a rectangular range of the x-coordinate value x and y-coordinate value y of the coordinates (x,y) of a touch point in the array is determined, and if $x[a_1][b_1] \leq x < x[a_1][b_1]'$ and $y[a_1][b_1] \leq y < y[a_1][b_1]'$, the coordinates (x,y) of the touch point are located with a rectangle numbered as $[a_1][b_1]$, where $x[a_1][b_1]$ is an x-coordinate of a bottom left corner of the rectangle numbered as $[a_1][b_1]$, $y[a_1][b_1]$ is a y-coordinate of the bottom left corner of the rectangle numbered as $[a_1][b_1]$, $x[a_1][b_1]'$ is an x-coordinate of a top right corner of the rectangle numbered as $[a_1][b_1]$, and $y[a_1][b_1]'$ is a y-coordinate of the top right corner of the rectangle numbered as $[a_1][b_1]$.

[0017] A method for zooming-in a picture on a mobile terminal is provided, including the following steps of:

[0018] partitioning a picture into an array formed by $M \times N$ rectangles;

[0019] acquiring rectangles in which two touch points are located when detecting that there are two touch points on the picture; and

[0020] zooming-in a rectangular array between rows and columns of the rectangles of the two touch points.

[0021] In an embodiment, after the step of partitioning a picture into an array formed by $M \times N$ rectangles, the method further includes: assigning a serial number to each of the rectangles according to a row position and a column position of this rectangle in the array.

[0022] In an embodiment, the acquiring rectangles of two touch points when detecting that there are two touch points on the picture includes the following steps of:

[0023] acquiring coordinates (x,y) of the two touch points on a touch screen of the mobile terminal; and

[0024] determining a rectangular range of the x-coordinate value x and the y-coordinate value y of the coordinates (x,y) of each of the two touch points in the array, to determine rectangles in which the two touch points are located.

[0025] In an embodiment, zooming-in a rectangular array between rows and columns of the rectangles of the two touch points includes the following steps of:

[0026] searching row and column positions of the rectangles in which the two touch points are located according to the serial numbers of the rectangles; and

[0027] determining and zooming-in a rectangular array between rows and columns of the rectangles in which the two touch points are located.

[0028] In an embodiment, rectangles in the array are numbered as $[a][b]$, where a and b satisfy the following conditions: $1 \leq a \leq M$ and $1 \leq b \leq N$; when a rectangular range of the x-coordinate value x and y-coordinate value y of the coordinates (x,y) of a touch point in the array is determined, and if $x[a_1][b_1] \leq x < x[a_1][b_1]'$ and $y[a_1][b_1] \leq y < y[a_1][b_1]'$, the

coordinates (x,y) of the touch point are located with a rectangle numbered as $[a_1][b_1]$, where $x[a_1][b_1]$ is an x-coordinate of a bottom left corner of the rectangle numbered as $[a_1][b_1]$, $y[a_1][b_1]$ is a y-coordinate of the bottom left corner of the rectangle numbered as $[a_1][b_1]$, $x[a_1][b_1]'$ is an x-coordinate of a top right corner of the rectangle numbered as $[a_1][b_1]$, and $y[a_1][b_1]'$ is a y-coordinate of the top right corner of the rectangle numbered as $[a_1][b_1]$.

[0029] In an embodiment, a system for zooming-in a picture on a mobile terminal may include the mobile terminal including a touch screen, wherein the system includes a picture partitioning module, a touch detection module and a display and zoom-in module;

[0030] the picture partitioning module may be configured to partition a picture into an array formed by $M \times N$ rectangles;

[0031] the touch detection module may be configured to detect whether the touch screen is touched, and acquire rectangles in which two touch points are located when detecting that there are two touch points on the picture; and

[0032] the display and zoom-in module may be configured to zoom-in a rectangular array between rows and columns of the rectangles of the two touch points.

[0033] In an embodiment, after partitioning a picture into an array formed by $M \times N$ rectangles, the picture partitioning module may further assign a serial number to each of the rectangles according to a row position and a column position of this rectangle in the array.

[0034] In an embodiment, the touch detection module may be configured to acquire coordinates (x,y) of the two touch points on a touch screen of the mobile terminal; and determine a rectangular range of the x-coordinate value x and the y-coordinate value y of the coordinates (x,y) of each of the two touch points in the array, to determine rectangles in which the two touch points are located.

[0035] In an embodiment, the display and zoom-in module is may be configured to search row and column positions of the rectangles in which the two touch points are located according to the serial numbers of the rectangles; and determine and zoom-in a rectangular array between rows and columns of the rectangles in which the two touch points are located.

[0036] In an embodiment, the picture partitioning module can number a rectangle in the array as $[a][b]$, where a and b satisfy the following conditions: $1 \leq a \leq M$ and $1 \leq b \leq N$; when the touch detection module determines a rectangular range of the x-coordinate value x and y-coordinate value y of the coordinates (x,y) of a touch point in the array, and if $x[a_1][b_1] \leq x < x[a_1][b_1]'$ and $y[a_1][b_1] \leq y < y[a_1][b_1]'$, the coordinates (x,y) of the touch point are located within a rectangle numbered as $[a_1][b_1]$, wherein $x[a_1][b_1]$ is an x-coordinate of a bottom left corner of the rectangle numbered as $[a_1][b_1]$, $y[a_1][b_1]$ is a y-coordinate of the bottom left corner of the rectangle numbered as $[a_1][b_1]$, $x[a_1][b_1]'$ is an x-coordinate of a top right corner of the rectangle numbered as $[a_1][b_1]$, and $y[a_1][b_1]'$ is a y-coordinate of the top right corner of the rectangle numbered as $[a_1][b_1]$.

[0037] In contrast to the prior art, the present invention, by performing rectangle partitioning and assigning numbers on a picture, and zooming-in a rectangular array between rows and columns of two touch points when the touch screen detects that there are two touch points, does not require performing slide operations in opposite directions by two fingers so that the operation difficulty of inconsistent slide

operations of two fingers can be avoided. Thus, the operation of zooming-in the picture can be more convenient, and the purpose of zooming-in the picture by a fuzzy operation can be achieved. The content of the picture can be zoomed-in within the range of rows and columns of two touch points as long as there are two touch points on the touch screen, so that the operation precision is can be improved.

BRIEF DESCRIPTION OF THE DRAWINGS

[0038] FIG. 1 is a flowchart of an embodiment of a method for zooming-in a picture on a mobile terminal according to the present invention;

[0039] FIG. 2 is a schematic diagram of partitioning a picture into rectangular arrays in an embodiment of the method for zooming-in a picture on a mobile terminal according to the present invention; and

[0040] FIG. 3 is a principle structure diagram of an embodiment of a system for zooming-in a picture on a mobile terminal according to the present invention.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

[0041] To make the objectives, technical solutions and advantages of the present invention understood more clear, the present invention will be further described below in detail by embodiments with reference to the accompanying drawings. It should be understood that the specific embodiments described herein are merely for explaining the present invention and not intended to limit the present invention.

[0042] The present invention provides a method for zooming-in a picture on a mobile terminal, which zooms-in a picture by means of a fuzzy operation. This method is applied to the operation to a picture on a mobile terminal with a touch screen. A preferred implementation flow of the method is as shown in FIG. 1.

[0043] **S100:** A picture is partitioned into an array formed by $M \times N$ rectangles as shown in FIG. 2. In FIG. 2, picture 90 is partitioned into $M \times N$ arrays. Each of the rectangles in the array is numbered according to a row position and a column position of this rectangle in the array. The serial numbers are expressed as follows by an array storage structure: $[1][1], \dots [1][N], \dots [M][1], \dots [M][N]$. In other words, the serial number of a certain rectangle in the array is set as $[a][b]$, where a and b satisfy the following conditions: $1 \leq a \leq M$ and $1 \leq b \leq N$.

[0044] **S200:** Rectangles of two touch points are acquired when it is detected that there are two touch points on the picture. The specific steps may be as follows:

[0045] First, coordinates (x,y) of the two touch points on the touch screen of the mobile terminal are acquired. For a mobile terminal with a touch screen, when a picture operation is performed, it is required to detect touch points on the touch screen. In an embodiment of this method, during an operation of zooming-in the picture by touch points, the operation of zooming-in the picture can be confirmed only when two touch points are locked. Otherwise, the detection operation may be aborted and it may be required to perform detection again. When the locked touch points need to be touched on the touch screen, the system of the mobile terminal may acquire coordinates of the touch points, and determine that the coordinates of the detected touch point have been locked only when the coordinates of each touch point remains unchanged within a predetermined time. At this

time, a position of a picture rectangle of the coordinates of the touch point in the array can be further determined.

[0046] Then, a rectangular range of the x-coordinate value x and the y-coordinate value y of the coordinates (x,y) of each of the two touch points in the array is determined, to determine rectangles in which the two touch points are located. During determining the rectangles in which the touch points are located, it may be required to calculate coordinates (x,y) of the two touch points. As the calculation process of the coordinates of the two touch points may be the same, the description will be illustrated by taking the coordinates (x,y) of one touch point as an example. If it is determined that $x[a_1][b_1] \leq x < x[a_1][b_1]'$, and $y[a_1][b_1] \leq y < y[a_1][b_1]'$, the coordinates (x,y) of the touch point are located within a rectangle numbered as $[a_1][b_1]$, where $x[a_1][b_1]$ is an x-coordinate of a bottom left corner of the rectangle numbered as $[a_1][b_1]$, $y[a_1][b_1]$ is a y-coordinate of the bottom left corner of the rectangle numbered as $[a_1][b_1]$, $x[a_1][b_1]'$ is an x-coordinate of a top right corner of the rectangle numbered as $[a_1][b_1]$, and $y[a_1][b_1]'$ is a y-coordinate of the top right corner of the rectangle numbered as $[a_1][b_1]$.

[0047] **S300:** A rectangular array between rows and columns of the rectangles of the two touch points is shown as zoomed-in. The zooming-in operation is performed in accordance with the serial numbers of the rectangles of the two touch points obtained in **S200**. Row and column positions of the rectangles of the two touch points are searched according to the serial numbers of the rectangles, and the rectangular array between the rows and columns of the rectangles in which the two touch points are located is determined and then zoomed-in for displaying. In the example of searching the serial numbers of rectangles according to the coordinates (x,y) of the touch points in step **S200**, after the serial numbers $[a][b]$ of the rectangles of the two touch points are determined, the system can zoom-in and display a region formed by the rectangular array between rows and columns of the two touch points according to the serial numbers of the rectangles of the two touch points. If the two touch points are $[a_1][b_1]$ and $[a_2][b_2]$, respectively, the rectangles to be zoomed-in include all rectangles numbered as $[a_z][b_z]$, where $a_1 \leq a_z \leq a_2$, and $b_1 \leq b_z \leq b_2$.

[0048] The present invention further provides a system for zooming-in a picture on a mobile terminal. The mobile terminal may include a touch screen. As shown in FIG. 3, the system **60** of the mobile terminal includes a picture partitioning module **10**, a touch detection module **20** and a display and zoom-in module **30**.

[0049] The picture partitioning module **10** may be configured to partition a picture into an array formed by $M \times N$ rectangles; the touch detection module **20** may be configured to detect whether the touch screen is touched, and acquire rectangles of two touch points when detecting that there are two touch points on the picture; and the display and zoom-in module **30** may be configured to zoom-in a rectangular array between rows and columns of the rectangles in which the two touch points are located.

[0050] After partitioning a picture into an array formed by $M \times N$ rectangles, the picture partitioning module **10** further numbers each of the rectangles according to a row position and a column position of this rectangle in the array. The picture partitioning module **10** numbers the rectangles in the array as $[a][b]$, wherein a and b satisfy the following conditions: $1 \leq a \leq M$, and $1 \leq b \leq N$.

[0051] The touch detection module **20** is configured to acquire coordinates (x,y) of the two touch points on the touch screen of the mobile terminal; and determine a rectangular range of the x-coordinate value x and the y-coordinate value y of the coordinates (x,y) of each of the two touch points in the array, to determine rectangles in which the two touch points are located. In the process of acquiring the coordinates (x,y) of the two touch points on the touch screen of the mobile terminal, when a picture operation is performed, it may be required to detect touch points on the touch screen. During an operation of zooming-in the picture by touch points, the operation of zooming-in the picture can be confirmed only when two touch points are locked. Otherwise, the detection operation may be aborted and it may be required to perform detection again. When the locked touch points need to be touched on the touch screen, the system of the mobile terminal may acquire coordinates of the touch points, and determine that the coordinates of the detected touch point have been locked only when the coordinates of each touch point remains unchanged within a predetermined time. At this time, a position of a picture rectangle of the coordinates of the touch point in the array can be further determined. Then, the touch detection module **20** further needs to determine a rectangular range of the x-coordinate value x and the y-coordinate value y of the coordinates (x,y) of each of the two touch points in the array. During implementation, it may be required to calculate coordinates (x,y) of the two touch points. As the calculation process of the coordinates of the two touch points is the same, the description will be illustrated by taking the coordinates (x,y) of one touch point as an example. If it is determined that $x[a_1][b_1] \leq x < x[a_1][b_1]'$ and $y[a_1][b_1] \leq y < y[a_1][b_1]'$, the coordinates (x,y) of the touch point may be located within a rectangle numbered as $[a_1][b_1]$, where $x[a_1][b_1]$ is an x-coordinate of a bottom left corner of the rectangle numbered as $[a_1][b_1]$, $y[a_1][b_1]$ is a y-coordinate of the bottom left corner of the rectangle numbered as $[a_1][b_1]$, $x[a_1][b_1]'$ is an x-coordinate of a top right corner of the rectangle numbered as $[a_1][b_1]$, and $y[a_1][b_1]'$ is a y-coordinate of the top right corner of the rectangle numbered as $[a_1][b_1]$.

[0052] The display and zoom-in module **30** is configured to search row and column positions of the rectangles of the two touch points according to the serial numbers of the rectangles; and the display and zoom-in module **30** may determine and zoom-in a rectangular array between rows and columns of the rectangles of the two touch points. The zoom-in operation can be performed in accordance with the serial numbers of the rectangles of the two touch points detected by the touch detection module **20**. Row and column positions of the rectangles of the two touch points can be searched according to the serial numbers of the rectangles, and the rectangular array between the rows and columns of the rectangles of the two touch points is can be determined and then zoomed-in for displaying. After the serial numbers $[a][b]$ of the rectangles of the two touch points are determined, the system can zoom-in and display a region formed by the rectangular array between rows and columns of the two touch points according to the serial numbers of the rectangles of the two touch points. If the two touch points are $[a_1][b_1]$ and $[a_2][b_2]$, respectively, the rectangles to be zoomed-in may include all rectangles numbered as $[a_z][b_z]$, where $a_1 \leq a_z \leq a_2$, and $b_1 \leq b_z \leq b_2$.

[0053] In an embodiment, a picture is partitioned into an array formed by $M \times N$ rectangles, and each of the rectangles in the array is numbered; when it is detected that the touch screen is touched, the number of touch points is acquired after coordinates of the detected touch points are locked, and serial numbers of rectangles of the touch points in the array are determined if the number is 2; and a region in the picture to be zoomed-in is determined according to the serial numbers of the two rectangles, and then zoomed-in for displaying. In the present invention, the purpose of zooming-in and displaying a picture by a fuzzy operation is achieved, the zoom-in precision is increased, the purpose of zooming-in a same region by multiple operations, and it is convenient for a user to use.

[0054] It should be understood that the foregoing description merely shows an embodiment of the present invention and is not intended to limit the technical solutions of the present invention. A person of ordinary skill in the art can make additions/deletions, replacements, transformations or improvements to the foregoing description within the spirit and principle of the present invention, and all the added/deleted, replaced, transformed or improved technical solutions fall into the protection scope defined by the appended claims of the present invention.

1. A driving and scanning circuit, comprising:

a plurality of driving and scanning units which are distributed in an array, wherein each driving and scanning unit comprises an AMOLED driving unit for driving an OLED to emit light and a fingerprint scanning unit for forming pixel capacitances, wherein

the AMOLED driving unit comprises a first thin film transistor, a second thin film transistor, a third thin film transistor and an OLED, the first thin film transistor is connected with a first driving voltage and a first switching voltage, the second thin film transistor and the third thin film transistor are respectively connected with an anode terminal and a cathode terminal, and the OLED is positioned between the cathode terminal and the second thin film transistor;

the cathode terminal comprises a fourth thin film transistor, and the fourth thin film transistor is connected with a second driving voltage and a second switching voltage;

one and only one of the AMOLED driving unit and the fingerprint scanning unit is in a conducting state;

in the fingerprint scanning unit: a gate of the fourth thin film transistor is connected with the second switching voltage, and a source and a drain are respectively connected with the OLED and the second driving voltage; the first switching voltage and the first driving voltage are respectively connected with a first scanning line and a first signal line, and the second switching voltage and the second driving voltage are respectively connected with a second scanning line and a second signal line.

2. The driving and scanning circuit as set forth in claim 1, wherein the driving and scanning circuit includes:

a first state, the first driving voltage and the first switching voltage controlling the first thin film transistor, the second thin film transistor and the third thin film transistor to be turned on, the second driving voltage and the second switching voltage controlling the fourth

thin film transistor to be cut off, and the AMOLED driving unit driving the OLED to be turned on to emit light; and

a second state, the first driving voltage and the first switching voltage controlling the first thin film transistor, the second thin film transistor and the third thin film transistor to be cut off, the second driving voltage and the second switching voltage controlling the fourth thin film transistor to be turned on, and the fourth thin film transistor forming pixel capacitances for fingerprint recognition.

3. The driving and scanning circuit as set forth in claim 1, wherein in the AMOLED driving unit:

a gate of the first thin film transistor is connected with the first switching voltage, and the source and the drain are respectively connected with the first driving voltage and the second thin film transistor;

a gate of the second thin film transistor is connected with the first thin film transistor, and the source and the drain are respectively connected with a high level of an anode and the OLED;

a gate of the third thin film transistor is connected with the gate of the second thin film transistor, and the source and the drain are respectively connected with the OLED and a low level of a cathode.

4. The driving and scanning circuit as set forth in claim 3, wherein the low level of the cathode is a grounding zero level.

5. The driving and scanning circuit as set forth in claim 3, wherein a capacitor for driving the second thin film transistor is arranged between the gate of the second thin film transistor and the high level of the anode.

6. A display screen,

wherein the display screen comprises a cathode layer, an anode layer, an organic light-emitting layer, and a driving and scanning circuit,

wherein the driving and scanning circuit comprises a plurality of driving and scanning units which are distributed in an array,

wherein each driving and scanning unit comprises an AMOLED driving unit for driving an OLED to emit light and a fingerprint scanning unit for forming pixel capacitances;

the AMOLED driving unit comprises a first thin film transistor, a second thin film transistor, a third thin film transistor and an OLED,

wherein the first thin film transistor is connected with a first driving voltage and a first switching voltage, the second thin film transistor and the third thin film transistor are respectively connected with an anode terminal and a cathode terminal, and the OLED is positioned between the cathode terminal and the second thin film transistor; the cathode terminal comprises a fourth thin film transistor, and the fourth thin film transistor is connected with a second driving voltage and a second switching voltage; and one and only one of the AMOLED driving unit and the fingerprint scanning unit is in a conducting state.

7. The display screen as set forth in claim 6, wherein the driving and scanning circuit includes:

a first state, the first driving voltage and the first switching voltage controlling the first thin film transistor, the second thin film transistor and the third thin film transistor to be turned on, the second driving voltage

and the second switching voltage controlling the fourth thin film transistor to be cut off, and the AMOLED driving unit driving the OLED to be turned on to emit light; and

- a second state, the first driving voltage and the first switching voltage controlling the first thin film transistor, the second thin film transistor and the third thin film transistor to be cut off, the second driving voltage and the second switching voltage controlling the fourth thin film transistor to be turned on, and the fourth thin film transistor forming pixel capacitances for fingerprint recognition.

8. The display screen as set forth in claim 6, wherein in the AMOLED driving unit:

- a gate of the first thin film transistor is connected with the first switching voltage, and a source and a drain are respectively connected with the first driving voltage and the second thin film transistor;
- a gate of the second thin film transistor is connected with the first thin film transistor, and the source and the drain are respectively connected with a high level of an anode and the OLED;
- a gate of the third thin film transistor is connected with the gate of the second thin film transistor, and the source and the drain are respectively connected with the OLED and a low level of a cathode.

9. The display screen as set forth in claim 8, wherein a capacitor for driving the second thin film transistor is arranged between the gate of the second thin film transistor and the high level of the anode.

10. The display screen as set forth in claim 6, wherein the first switching voltage and the first driving voltage are respectively connected with a first scanning line and a first signal line, and the second switching voltage and the second driving voltage are respectively connected with a second scanning line and a second signal line; in the fingerprint scanning unit: a gate of the fourth thin film transistor is connected with the second switching voltage, and the source and the drain are respectively connected with the OLED and the second driving voltage.

11. A mobile terminal,

wherein the mobile terminal comprises a driving and scanning circuit, and the driving and scanning circuit comprises a plurality of driving and scanning units which are distributed in an array, wherein each driving and scanning unit comprises an AMOLED driving unit for driving an OLED to emit light and a fingerprint scanning unit for forming pixel capacitances;

the AMOLED driving unit comprises a first thin film transistor, a second thin film transistor, a third thin film transistor and an OLED, the first thin film transistor is connected with a first driving voltage and a first switching voltage, the second thin film transistor and the third thin film transistor are respectively connected with an anode terminal and a cathode terminal, and the OLED is positioned between the cathode terminal and the second thin film transistor; the cathode terminal also comprises a fourth thin film transistor, and the fourth thin film transistor is connected with a second driving voltage and a second switching voltage; and one and only one of the AMOLED driving unit and the fingerprint scanning unit is in a conducting state.

12. The mobile terminal as set forth in claim 11, wherein the driving and scanning circuit includes:

a first state, the first driving voltage and the first switching voltage controlling the first thin film transistor, the second thin film transistor and the third thin film transistor to be turned on, the second driving voltage and the second switching voltage controlling the fourth thin film transistor to be cut off, and the AMOLED driving unit driving the OLED to be turned on to emit light; and

- a second state, the first driving voltage and the first switching voltage controlling the first thin film transistor, the second thin film transistor and the third thin film transistor to be cut off, the second driving voltage and the second switching voltage controlling the fourth thin film transistor to be turned on, and the fourth thin film transistor forming pixel capacitances for fingerprint recognition.

13. The mobile terminal as set forth in claim 11, wherein in the AMOLED driving unit:

- a gate of the first thin film transistor is connected with the first switching voltage, and a source and a drain are respectively connected with the first driving voltage and the second thin film transistor;
- a gate of the second thin film transistor is connected with the first thin film transistor, and the source and the drain are respectively connected with a high level of an anode and the OLED;
- a gate of the third thin film transistor is connected with the gate of the second thin film transistor, and the source and the drain are respectively connected with the OLED and a low level of a cathode.

14. The mobile terminal as set forth in claim 13, wherein a capacitor for driving the second thin film transistor is arranged between the gate of the second thin film transistor and the high level of the anode; in the fingerprint scanning unit: the gate of the fourth thin film transistor is connected with the second switching voltage, and the source and the drain are respectively connected with the OLED and the second driving voltage.

15. The mobile terminal as set forth in claim 11, wherein the mobile terminal includes a driving display state and a fingerprint scanning state, wherein:

when the mobile terminal is in the driving display state, the AMOLED driving unit in the driving and scanning circuit is used to drive the OLED to emit light to realize the display function of the mobile terminal;

when the mobile terminal is in the fingerprint scanning state, the fingerprint scanning unit in the driving and scanning circuit forms a capacitance matrix of pixels per unit needed by the fingerprint scanning unit,

and a fingerprint is acquired by using a capacitance algorithm to realize fingerprint recognition and related effective action in any display area of the mobile terminal.

16. The driving and scanning circuit of claim 1, wherein the fingerprint scanning unit is positioned at a cathode terminal of the AMOLED driving unit.

17. The driving and scanning circuit of claim 2, wherein the fingerprint recognition is operational at every point on a display screen.

18. The display screen of claim 6, wherein the fingerprint scanning unit is positioned at a cathode terminal of the AMOLED driving unit.

19. The display screen of claim 7, wherein the fingerprint recognition is operational at every point on the display screen.

20. The mobile terminal of claim **11**, wherein the fingerprint scanning unit is positioned at a cathode terminal of the AMOLED driving unit.

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摘要(译)

驱动和扫描电路，显示屏和移动终端包括分布在阵列中的驱动和扫描单元，每个驱动和扫描单元包括用于驱动OLED发光的AMOLED驱动单元和用于形成像素电容的指纹扫描单元，其中AMOLED驱动单元包括第一薄膜晶体管，第二薄膜晶体管，第三薄膜晶体管和OLED，第一薄膜晶体管连接有驱动电压和第一开关电压，第二薄膜晶体管和第三薄膜晶体管分别与阳极端子和阴极端子连接，OLED位于阴极端子和第二薄膜晶体管之间；阴极端子还包括与第二驱动电压和第二开关电压连接的第四薄膜晶体管。

