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(54) QUICK POSITIONING METHOD FOR FORMING TWO-DIMENSIONAL CODE POSITIONING POINT DOT MATRIX, AND QUICK POSITIONING METHOD FOR CAPTURING TWO-DIMENSIONAL CODE POSITIONING POINT DOT MATRIX

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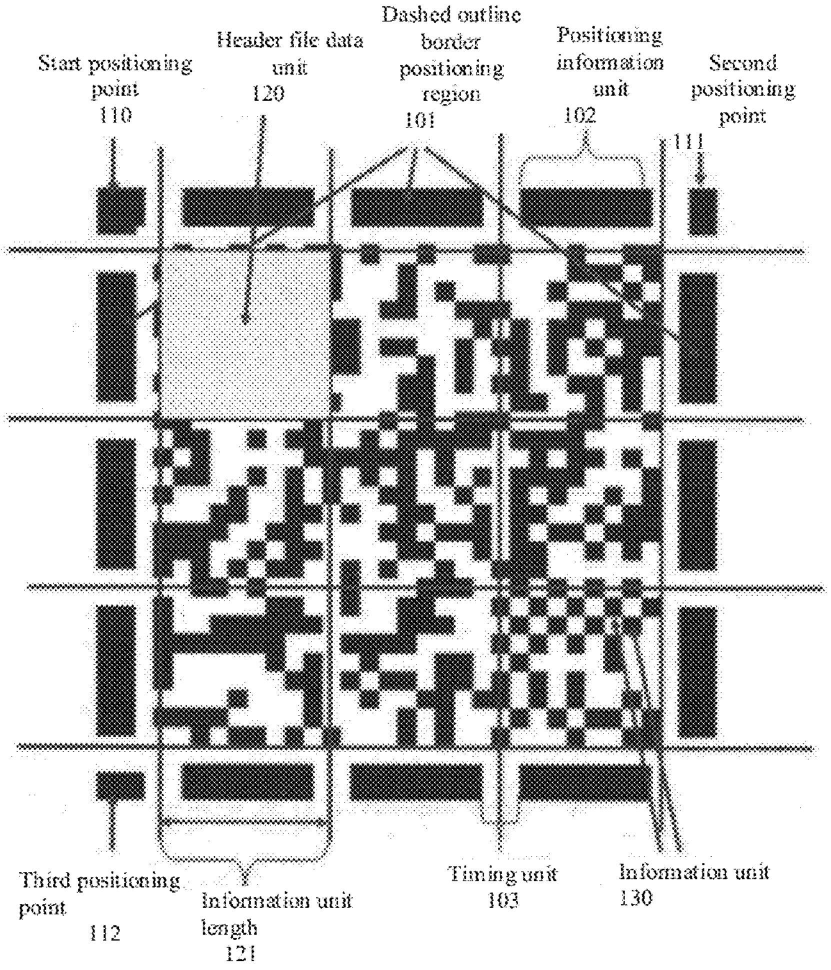
(57) ABSTRACT

The invention relates to the field of data identification, in particular to a technique for forming and capturing a two-dimensional code. The invention provides a method for forming and capturing a two-dimensional code positioning dot matrix for rapid positioning. The method for forming the two-dimensional code positioning point lattice comprises the following steps: Setting or reading the positioning point data lattice; drawing four central symmetric primary positioning point lattice on the setting background; and adding the positioning interval area to the periphery of the primary positioning point lattice. The invention solves the technical problems of long locating time and high locating error rate in 2d code recognition, strengthens the reliability of two-dimensional code locating, improves the identifying efficiency, and reduces the pollution of locating points and data.


Start positioning point 110
Header file data unit 120
Dashed outline border positioning region 101
Positioning information unit 102
Second positioning point 111
Third positioning point 112
Information unit length 121
Timing unit 103
Information unit 130

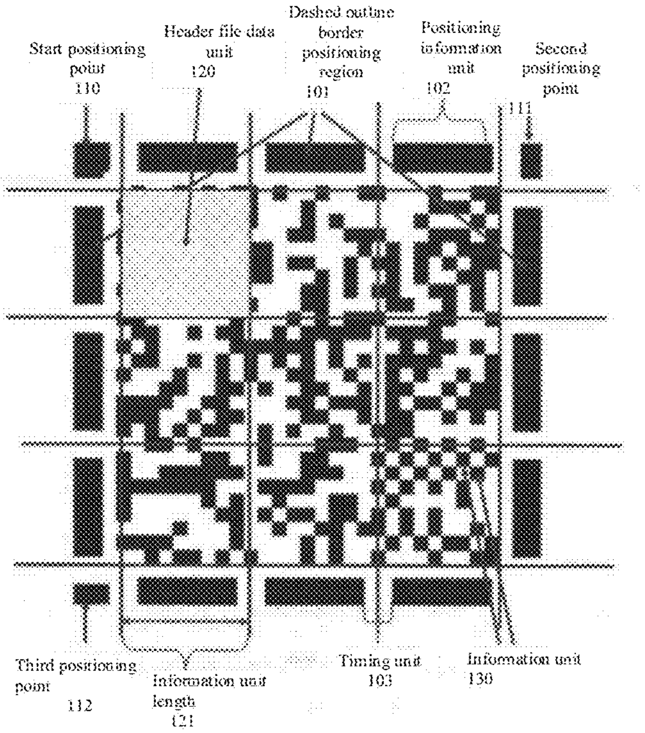

Start positioning point 110
Header file data unit 120
Dashed outline border positioning region 101
Positioning information unit 102
Second positioning point 111
Third positioning point 112
Information unit length 121
Timing unit 103
Information unit 130

Fig. 1

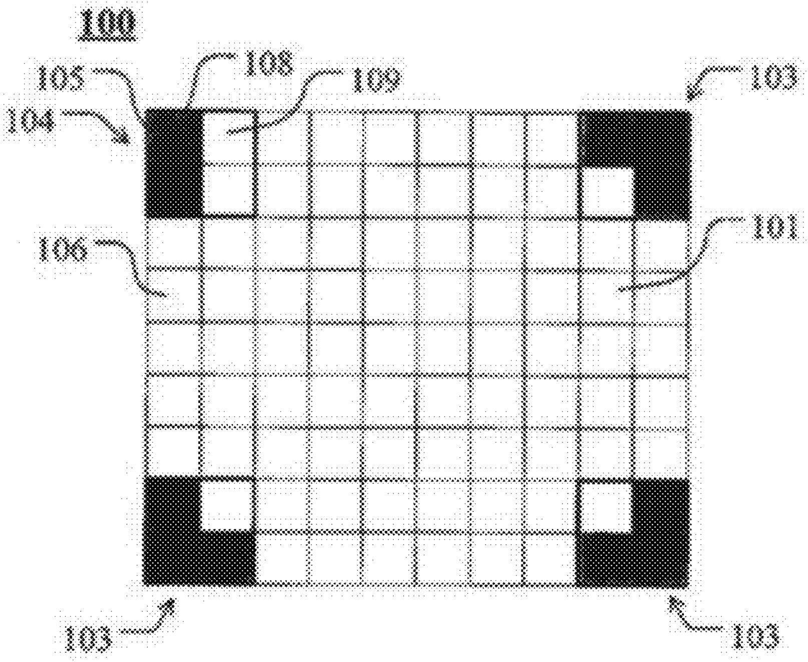
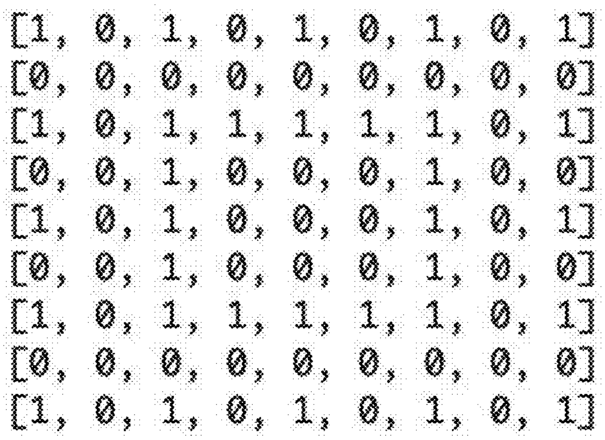

100
105
108
109
103
104
101
106
103
103

Fig. 2



```
[1, 0, 1, 0, 1, 0, 1, 0, 1]
[0, 0, 0, 0, 0, 0, 0, 0, 0]
[1, 0, 1, 1, 1, 1, 1, 0, 1]
[0, 0, 1, 0, 0, 0, 1, 0, 0]
[1, 0, 1, 0, 0, 0, 1, 0, 1]
[0, 0, 1, 0, 0, 0, 1, 0, 0]
[1, 0, 1, 1, 1, 1, 1, 0, 1]
[0, 0, 0, 0, 0, 0, 0, 0, 0]
[1, 0, 1, 0, 1, 0, 1, 0, 1]
```

Fig. 3

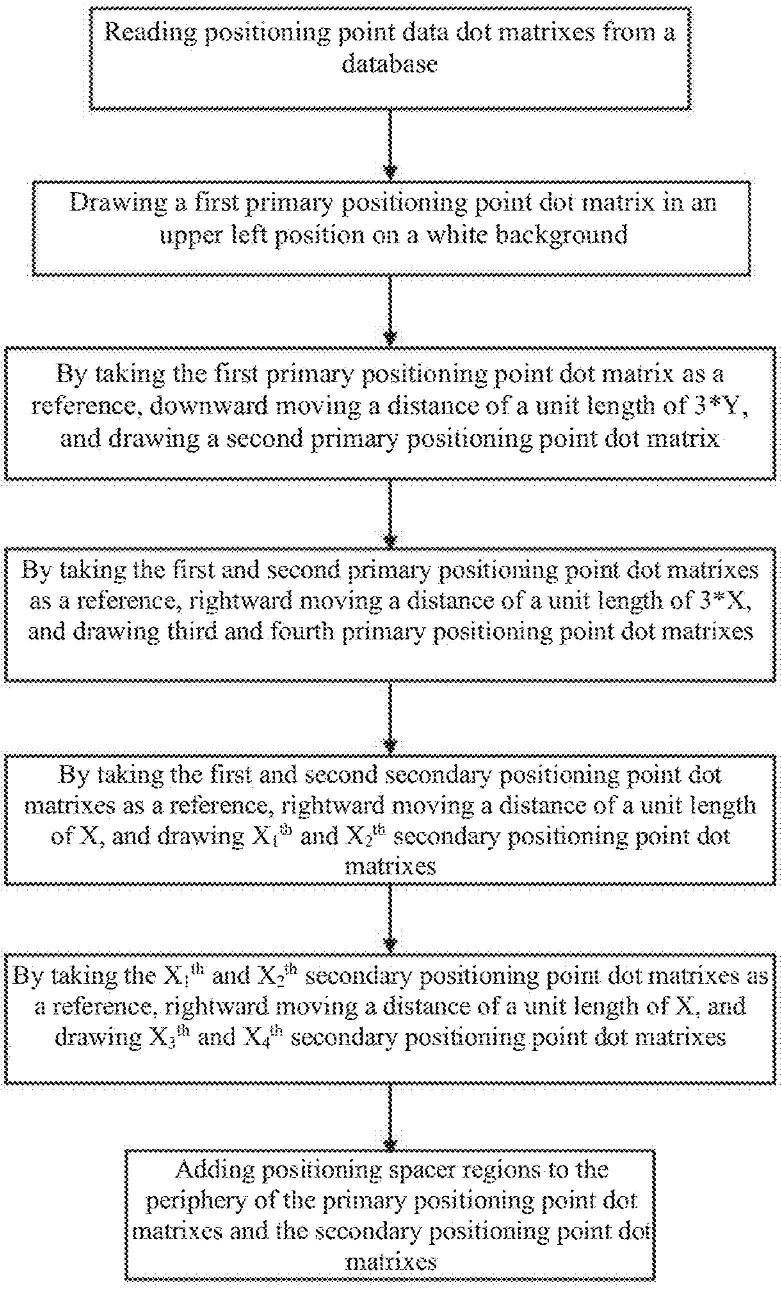

Reading positioning point data dot matrixes from a database
Drawing a first primary positioning point dot matrix in an upper left position on a white background
By taking the first primary positioning point dot matrix as a reference, downward moving a distance of a unit length of 3*Y, and drawing a second primary positioning point dot matrix
By taking the first and second primary positioning point dot matrixes as a reference, rightward moving a distance of a unit length of 3*X, and drawing third and fourth primary positioning point dot matrixes
By taking the first and second secondary positioning point dot matrixes as a reference, rightward moving a distance of a unit length of X, and drawing X_1^{th} and X_2^{th} secondary positioning point dot matrixes
By taking the X_1^{th} and X_2^{th} secondary positioning point dot matrixes as a reference, rightward moving a distance of a unit length of X, and drawing X_3^{th} and X_4^{th} secondary positioning point dot matrixes
Adding positioning spacer regions to the periphery of the primary positioning point dot matrixes and the secondary positioning point dot matrixes

Fig. 4

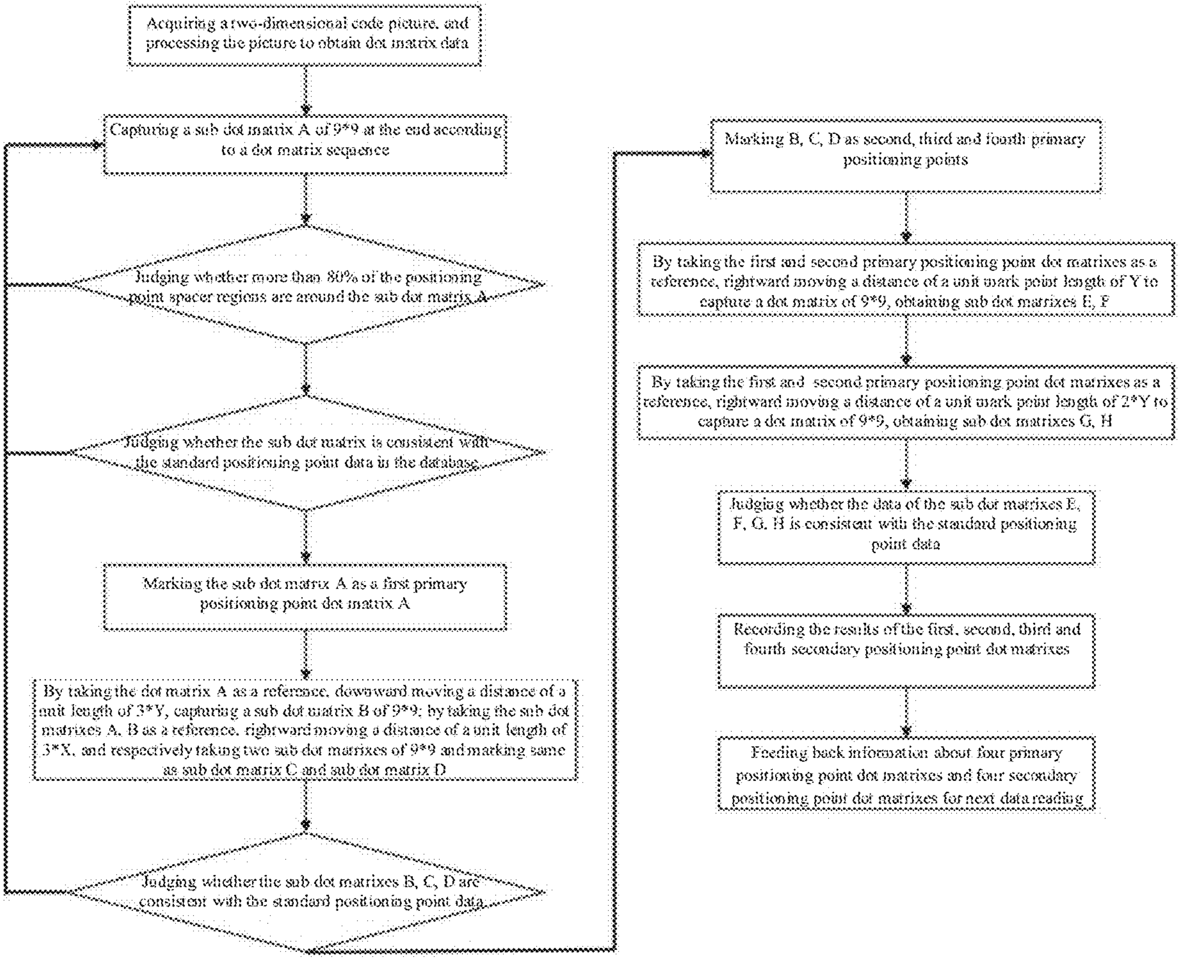

Acquiring a two-dimensional code picture, and processing the picture to obtain dot matrix data
Capturing a sub dot matrix A of 9*9 at the end according to a dot matrix sequence
Judging whether more than 80% of the positioning point spacer regions are around the sub dot matrix A
Judging whether the sub dot matrix is consistent with the standard positioning point data in the database
Marking the sub dot matrix A as a first primary positioning point dot matrix A
By taking the dot matrix A as a reference, downward moving a distance of a unit length of 3*Y, capturing a sub dot matrix B of 9*9; by taking the sub dot matrixes A, B as a reference, rightward moving a distance of a unit length of 3*X, and respectively taking two sub dot matrixes of 9*9 and marking same as sub dot matrix C and sub dot matrix D
Judging whether the sub dot matrixes B, C, D are consistent with the standard positioning point data
Marking B, C, D as second, third and fourth primary positioning points
By taking the first and second primary positioning point dot matrixes as a reference, rightward moving a distance of a unit mark point length of Y to capture a dot matrix of 9*9, obtaining sub dot matrixes E, F
By taking the first and second primary positioning point dot matrixes as a reference, rightward moving a distance of a unit mark point length of 2*Y to capture a dot matrix of 9*9, obtaining sub dot matrixes G, H
Judging whether the data of the sub dot matrixes E, F, G, H is consistent with the standard positioning point data
Recording the results of the first, second, third and fourth secondary positioning point dot matrixes
Feeding back information about four primary positioning point dot matrixes and four secondary positioning point dot matrixes for next data reading

Fig. 5

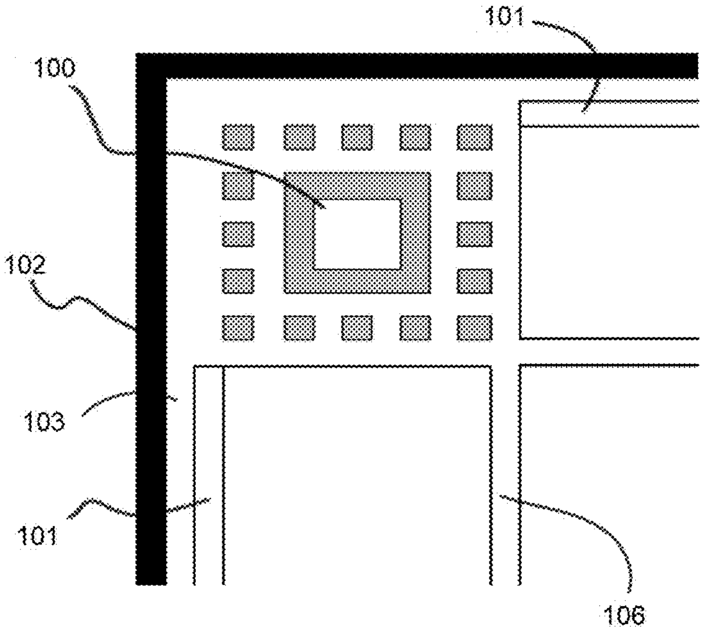


Fig. 6

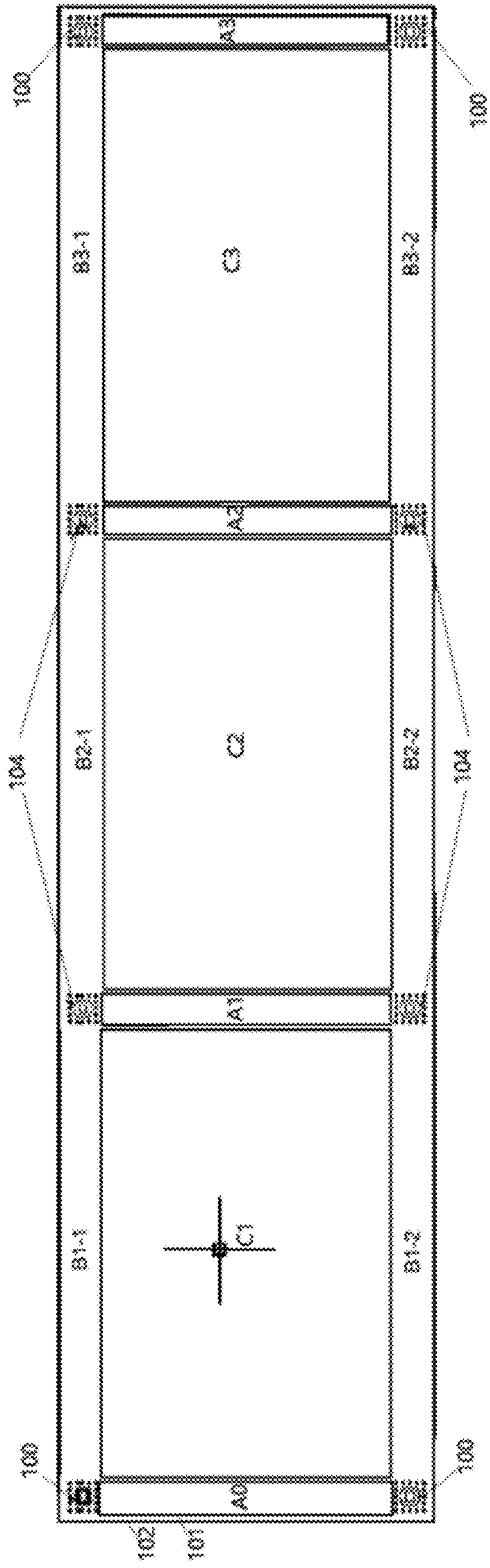

100
100
A3
B3-1
C3
B3-2
A2
104
104
B2-1
C2
B2-2
A1
B1-1
C1
B1-2
100
100
A0
102
101

Fig.7

QUICK POSITIONING METHOD FOR FORMING TWO-DIMENSIONAL CODE POSITIONING POINT DOT MATRIX, AND QUICK POSITIONING METHOD FOR CAPTURING TWO-DIMENSIONAL CODE POSITIONING POINT DOT MATRIX

TECHNICAL FIELD

[0001] The disclosure herein relates to the field of data recognition, and in particular to a technology for forming and capturing a two-dimensional code.

BACKGROUND

[0002] A two-dimensional code is usually in the form of a matrix array, encoding and decoding start from a designated starting point of the matrix array, and accurate and quick reading of the designated starting point is the key to guarantee the success of decoding.

[0003] Prior art 1 is a Chinese patent application with the patent publication No. CN102034127A, the technical solution thereof is shown in FIG. **1**. The invention discloses a system for a high-capacity two-dimensional barcode and an encoding method therefor. In the invention, the positioning points are not sufficiently obvious in shape feature, and are easy to confuse with other contents, so that it takes a long time in the process of recognition and positioning of the positioning points; there is no secondary positioning point, the calculation error probability is high, so that the correctness of information cannot be guaranteed, and the speed of reading cannot be increased; the positioning points are three in number and are different in shape, and have no consistency and symmetry in design, thereby having extremely poor visual effect. In the invention, the positioning process is to find three positioning points through four dashed outline borders, the image range involved is large, which increases the difficulty in the positioning process; and there is no image border, which leads to edge data pollution and is not beneficial to pattern recognition.

[0004] Prior art 2 is a Chinese patent application with the patent publication No. CN102243704A, the technical solution thereof is shown in FIG. **2**. The invention discloses a positioning system for a two-dimensional code and a recognition method for a two-dimensional code. In the invention, positioning points are set at the four endpoints of the two-dimensional code. However, the positioning points are not sufficiently obvious in shape feature, and are easy to confuse with other contents, so that it takes a long time in the process of recognition and positioning of the positioning points; no spacer region is set, which affects the efficiency of positioning and data reading; patterns obtained through optical characteristics are different, are harsh to external optical conditions and are not practical; information partitioning management is not involved, which is not beneficial to the security of data, and affects the reading of data; and there is no image border, which leads to edge data pollution and is not beneficial to pattern recognition.

SUMMARY

[0005] In order to solve the technical problems of long time consumed in two-dimensional code positioning and high positioning error rate existing in the prior art, the present invention proposes a method for forming and capturing a positioning point dot matrix of a two-dimensional code quickly positioned which has the advantages of beautiful appearance, enhancement of positioning reliability, improvement of recognition efficiency, and reduction of positioning points and data pollution.

[0006] To achieve the above purpose, the present application provides **1** a method for forming a positioning point dot matrix of a two-dimensional code quickly positioned, comprising the following steps:

[0007] step **1**: setting or reading positioning point data dot matrixes;

[0008] step **2**: drawing four centrosymmetric primary positioning point dot matrixes on a setting background; and

[0009] step **3**: adding positioning spacer regions to the periphery of the primary positioning point dot matrixes.

[0010] Preferably, step **1** comprises: reading the positioning point data dot matrixes from a database, alternatively, the positioning point data dot matrixes are positioning point dot matrixes of a fixed type.

[0011] Preferably step **2** comprises:

[0012] Step **2.1**: drawing a first primary positioning point dot matrix on a setting coding region background.

[0013] Step **2.2**: by taking the first primary positioning point dot matrix as a reference, moving a distance of a unit length of L_1, and drawing a second primary positioning point dot matrix.

[0014] Step **2.3**: by taking the first and second primary positioning point dot matrixes as a reference, moving a distance of a unit length of L_2, and drawing third and fourth primary positioning point dot matrixes.

[0015] Step **2.4**: drawing secondary positioning point dot matrixes in the X-axis direction.

[0016] Step **2.5**: drawing secondary positioning point dot matrixes in the Y-axis direction.

[0017] Preferably, step **2.4** comprises:

[0018] Step **2.4.1**: by taking the first and second primary positioning point dot matrixes as a reference, moving a distance of a unit length of L_2/n to the third and fourth primary positioning point dot matrixes respectively, drawing V_1^{th} and V_2^{th} secondary positioning point dot matrixes, where n is an integer not less than 1, when n=1, there is no secondary positioning point dot matrix in the X-axis direction, skipping to step **6**.

[0019] Step **2.4.2**: by taking the X_1^{th} and X_2^{th} secondary positioning point dot matrixes as a reference, moving a distance of a unit length of L_2/n to the third and fourth primary positioning point dot matrixes respectively, and drawing X_3^{th} and X_4^{th} secondary positioning point dot matrixes.

[0020] Step **2.4.3**: repeating step **5.2** (n−2) times, and drawing to $X_{(2n-3)}^{th}$ and $X_{(2n-2)}^{th}$ secondary positioning point dot matrixes.

[0021] Preferably, step **2.5** comprises:

[0022] Step **2.5.1**: by taking the first and third primary positioning point dot matrixes as a reference, moving a distance of a unit length of Wm to the second and fourth primary positioning point dot matrixes respectively, drawing Y_1^{th} and Y_3^{th} secondary positioning point dot matrixes, where m is an integer not less than 1, when m=1, there is no secondary positioning point dot matrix in the Y-axis direction, skipping to step **7**.

[0023] Step **2.5.2**: by taking the V_1^{th} and V_2^{th} secondary positioning point dot matrixes as a reference, moving a distance of a unit length of L_1/m to the second and fourth primary positioning point dot matrixes respectively, and drawing Y_m^{th} and Y_4^{th} secondary positioning point dot matrixes.

[0024] Step **2.5.3**: repeating step **6.2** (m−2) times, and drawing to $Y_{(2m-3)}^{th}$ and $Y_{(2m-2)}^{th}$ secondary positioning point dot matrixes.

[0025] Preferably, step **3** comprises: adding positioning spacer regions to the periphery of the secondary positioning point dot matrixes.

[0026] Preferably, the two-dimensional code is used for authentication of information in an off-line state or off-network state.

[0027] A method for catching a positioning point dot matrix of a two-dimensional code quickly positioned, comprising the following steps:

[0028] Step **1**: acquiring a two-dimensional code picture, and processing the picture to obtain dot matrix data.

[0029] Step **2**: capturing a sub dot matrix A of a*b (a>=3, b>=3) at the end according to a dot matrix sequence.

[0030] Step **3**: judging whether positioning point spacer regions are around the sub dot matrix A, and judging whether the sub dot matrix A is consistent with the standard positioning point data in the database, if not, returning to step **2**.

[0031] Step **4**: by taking the sub dot matrix A as the reference, moving a distance of a unit length of L**1**, and capturing a sub dot matrix B of a*b (a>=3, b>=3); by taking the sub dot matrixes A and B as a reference, moving a distance of a unit length of L**2**, and capturing two sub dot matrixes C and D of a*b respectively.

[0032] Step **5**: judging whether the sub dot matrixes B, C and D are consistent with the standard positioning point data, if not, returning to step **2**.

[0033] Preferably, the method further comprises:

[0034] Step **6**: capturing secondary positioning point dot matrixes in the X-axis direction.

[0035] Step **7**: capturing secondary positioning point dot matrixes in the Y-axis direction.

[0036] Step **8**: judging whether secondary positioning point dot matrix data is consistent with the standard positioning point data.

[0037] Step **9**: feeding back information about four primary positioning point dot matrixes and 2(n+m−2) secondary positioning point dot matrixes for next data reading.

[0038] Preferably, the matrix of a*b is a matrix of 9*9.

[0039] Preferably, step **6** comprises:

[0040] step **6.1**: by taking the first and second primary positioning point dot matrixes as a reference, moving a distance of a unit length of L_2/n to the third and fourth primary positioning point dot matrixes to capture a sub dot matrix of a*a, obtaining X_1^{th} and X_2^{th} secondary positioning point dot matrixes, where n is an integer not less than 1, when n=1, not capturing the secondary positioning point dot matrixes in the X-axis direction, skipping to step **8**;

[0041] step **6.2**: by taking the first and second primary positioning point dot matrixes as a reference, moving a distance of a unit length of $2*L_2/n$ to the third and fourth primary positioning point dot matrixes to capture a sub dot matrix of a*a, obtaining X_3^{th} and X_4^{th} secondary positioning point dot matrixes; and

[0042] step **6**.(n−1): repeating step **6.2** (n−2) times in total, and capturing to $X_{(2n-3)}^{th}$ and $X_{(2n-2)}^{th}$ secondary positioning point dot matrixes.

[0043] Preferably, step **7** comprises:

[0044] step **7.1**: by taking the first and third primary positioning point dot matrixes as a reference, moving a distance of a unit length of L_1/m to the second and fourth primary positioning point dot matrixes to capture a sub dot matrix of a*a, obtaining Y_1^{th} and y_2^{th} secondary positioning point dot matrixes, where m is an integer not less than 1, when m=1, not capturing the secondary positioning point dot matrixes in the Y-axis direction, skipping to step **9**;

[0045] step **7.2**: by taking the first and third primary positioning point dot matrixes as a reference, moving a distance of a unit length of $2*L_1/m$ to the second and fourth primary positioning point dot matrixes to capture a dot matrix of a*a, obtaining Y_3^{th} and Y_4^{th} secondary positioning point dot matrixes; and

[0046] step **7**.(m−1): repeating step **7.2** (m−2) times in total, and capturing to Y(2m−3)th and $Y_{(2m-2)}^{th}$ secondary positioning point dot matrixes.

[0047] Preferably, the two-dimensional code is used for authentication of information in an off-line state or off-network state.

[0048] Preferably, the two-dimensional code is used for recognition of credentials including licenses, business cards and nameplates.

[0049] Preferably, the two-dimensional code is used for recognition of financial documents including insurance policies, counterfoils, traffic tickets and financial statements.

[0050] Preferably, the two-dimensional code is used for recognition of announcements including legal documents, certificates, specifications, product packaging, advertisements and printed matter.

[0051] A kind of two-dimensional code quickly positioned, comprises: coding region,

[0052] The coding region comprises four centrosymmetric major fixing sites at four vertices of the coding region, and the main positioning point and the interval area outside the coding area; The coding area also includes a plurality of auxiliary positioning points located on the side line of the coding area.

[0053] Preferably, the snowflake graph dot matrix comprises 2^{2^n} rectangular color blocks that form a ring and a circle color area or a solid rectangular color area or a solid square color area inside the rectangular color block, n is an integer greater than 1.

[0054] Preferably, a positioning interval region is arranged around the positioning point, and the two-dimensional code also includes a border contour region for reducing data contamination, and a main interval region between the border contour region and the coding region.

[0055] Preferably, the two-dimensional code coding area includes a plurality of data areas and a camouflage isolation area spaced differently, and the plurality of data areas and the camouflage isolation area are masked for processing.

[0056] Preferably, the two-dimensional code is used for authentication of information in an off-line state or off-network state.

BRIEF DESCRIPTION OF FIGURES

[0057] FIG. **1** is an example diagram of a two-dimensional code in prior art **1**;

[0058] FIG. **2** is an example diagram of a two-dimensional code in prior art **2**;

[0059] FIG. **3** is a diagram showing a unit positioning point dot matrix provided in embodiment 1 of the present invention;

[0060] FIG. **4** is a diagram showing a method for forming a positioning point dot matrix of a two-dimensional code provided in embodiment 2 of the present invention;

[0061] FIG. **5** is a diagram showing a method for catching a positioning point dot matrix of a two-dimensional code provided in embodiment 3 of the present invention;

[0062] FIG. **6** is an example diagram of a two-dimensional code provided in embodiment 4;

[0063] FIG. **7** is an example diagram of a two-dimensional code provided in embodiment 4.

DETAILED DESCRIPTION

[0064] The technical solution in the embodiments of the present invention will be clearly and fully described below in combination with the drawings in the embodiments of the present invention. Apparently, the described embodiments are merely part of the embodiments of the present invention, not all of the embodiments. Based on the embodiments in the present invention, all other embodiments obtained by those ordinary skilled in the art without contributing creative labor will belong to the protection scope of the present invention.

[0065] In view of the fact that the existing methods cannot realize efficient and high-precision positioning and recognition of two-dimensional codes, embodiments of the present invention provide a method for forming and capturing a positioning point dot matrix of a two-dimensional code. The present invention will be described in detail below in combination with the drawings.

[0066] Embodiment 1

[0067] This embodiment provides a method for forming a single positioning point, as shown in FIG. **3**.

[0068] An image model of the present invention exists in the form of 0-1 digital dot matrix in software, so the process of generating a single positioning point is the process of constructing a 0-1 digital dot matrix. The size of the digital dot matrix is specified as 9×9, so the positioning point is a unit matrix of 9×9. The digit in the matrix is 0 or 1, or a combination of other any two different digits. The unit dot matrix is stored in a software generating database for generating the positioning point.

[0069] An image model of the present invention exists in the form of 0-1 digital dot matrix in software, so the process of generating a single positioning point is the process of constructing a 0-1 digital dot matrix. The size of the digital dot matrix is specified as 9×9, so the positioning point is a unit matrix of 9×9. The digit in the matrix is 0 or 1, or a combination of other any two different digits. The unit dot matrix is stored in a software generating database for generating the positioning point.

[0070] The Unit Orientation Dot Matrix is shown in FIG. **3**. Because the DOT Matrix has a symmetrical center, the contrast speed of the Dot Matrix is four times as fast as that of the asymmetric graph, the invention can realize the comparison of four symmetrical parts at the same time. If the unit lattice is asymmetric, the process of comparing the lattice one by one is relatively time-consuming. The positioning point of the invention comprises light-colored dark lines in four directions and light-colored dark alternating lines in eight directions. The above lines form the middle of the whole blank part, blank part of the outer dark solid frame and light solid frame, as well as the most peripheral depth of the law of alternating the outer border, constitute a snowflake-like figure. This obvious feature can guarantee the success rate of locating point recognition, and directly affect the accuracy of the following data analysis of the two-dimensional Code. Therefore, the invention provides a reliable positioning point graph which can improve the identification efficiency of data analysis.

[0071] Embodiment 2

[0072] This embodiment provides a method for forming a positioning point dot matrix of a two-dimensional code, comprising the following steps as shown in FIG. **4**:

[0073] step **1**: reading positioning point data dot matrixes from a database;

[0074] step **2**: drawing a first positioning point dot matrix in an upper left position on a setting coding region background;

[0075] step **3**: by taking the first primary positioning point dot matrix as a reference, downward moving a distance of a unit length of 3*Y , and drawing a second primary positioning point dot matrix;

[0076] step **4**: by taking the first and second primary positioning point dot matrixes as a reference, rightward moving a distance of a unit length of 3*X, and drawing third and fourth primary positioning point dot matrixes;

[0077] step **5.1**: by taking the first and second primary positioning point dot matrixes as a reference, rightward moving a distance of a unit length of X respectively, and drawing X_1^{th} and X_2^{th} secondary positioning point dot matrixes;

[0078] step **5.2**: by taking the X_1^{th} and X_2^{th} secondary positioning point dot matrixes as a reference, rightward moving a distance of a unit length of X respectively, and drawing X_3^{th} and X_4^{th} secondary positioning point dot matrixes;

[0079] step **6**: adding positioning spacer regions to the periphery of the primary positioning point dot matrixes and the secondary positioning point dot matrixes.

[0080] The formation process of positioning points is as follows: the positions of other positioning points are calculated mainly according to the position and correlation of a single primary positioning point, and the positions of all positioning points are finally locked. Auxiliary positioning is used to improve the parsing speed of the core data content of the two-dimensional code. Through auxiliary positioning, the errors caused by the conversion of a pattern into a dot matrix can be corrected, thus improving the success rate of data parsing and then achieving the effect of increasing the parsing speed.

[0081] In step **6** of the process, a light-colored spacer region is added near each positioning point to reduce the probability that the positioning points cannot be recognized due to errors in the picture processing process. The spacer region helps prevent pollution of critical data. After all the positioning points are generated, an axisymmetric pattern composed of eight centrosymmetric positioning points can be obtained, and the correlation calculation can be guaranteed. The pattern has the advantages of appropriate proportion, nattiness and beautiful appearance.

[0082] Embodiment 3

[0083] This embodiment provides a method for capturing a positioning point dot matrix of a two-dimensional code, comprising the following steps as shown in FIG. **5**:

[0084] step **1**: acquiring a two-dimensional code picture, and processing the picture to obtain dot matrix data;

[0085] step **2**: capturing a sub dot matrix A of 9*9 at the end according to a dot matrix sequence;

[0086] step **3**: judging whether more than 80% of the positioning point spacer regions are around the sub dot matrix A, if not, returning to step **2**;

[0087] step **4**: judging whether the sub dot matrix A is consistent with the standard positioning point data in the database, if not, returning to step **2**;

[0088] step **5**: marking the sub dot matrix A as a first primary positioning point dot matrix A;

[0089] step **6**: by taking the dot matrix A as a reference, downward moving a distance of a unit length of 3*Y, and capturing a sub dot matrix B of 9*9; by taking the sub dot matrixes A and B as a reference, rightward moving a distance of a unit length of 3*X, and respectively taking two sub dot matrixes of 9*9 and marking same as sub dot matrix C and sub dot matrix D;

[0090] step **7**: judging whether the sub dot matrixes B, C and D are consistent with the standard positioning point data, if not, returning to step **2**, and if so, marking B, C, D as second, third and fourth primary positioning point dot matrixes;

[0091] step **8.1**: by taking the first and second primary positioning point dot matrixes as a reference, rightward moving a distance of a unit mark point length of Y to capture a sub dot matrix of 9*9, obtaining sub dot matrixes E, F;

[0092] step **8.2**: by taking the first and second primary positioning point dot matrixes as a reference, rightward moving a distance of a unit mark point length of 2*Y to capture a dot matrix of 9*9, obtaining sub dot matrixes G, H;

[0093] step **9**: judging whether the data of the sub dot matrixes E, F, G, H is consistent with the standard positioning point data;

[0094] step **10**: recording the results of the first, second, third and fourth secondary positioning point dot matrixes (E, F, G, H);

[0095] step **11**: feeding back information about four primary positioning point dot matrixes and four secondary positioning point dot matrixes for next data reading.

[0096] In the parsing process, the positioning point matrix of the present invention has the characteristics of axial symmetry and central symmetry, so that positioning points are captured quickly during capturing and the parsing speed is increased. As long as one of the four primary positioning points is positioned, the remaining positioning points can be found.

[0097] In the present invention, secondary positioning points may not be required. In the capturing process of the secondary positioning points, only the results of corresponding secondary positioning points need to be returned, and there is no need to re-capture the primary positioning points to confirm the secondary positioning points, saving time and unnecessary processes. If there is no secondary positioning point, in the present invention, the positions of the secondary positioning points are predicted through the primary positioning points, and data is further parsed. Of course, this process may cause an increase in the time required for parsing.

[0098] Embodiment 4

[0099] The embodiment provides a two-dimensional code, as shown in FIGS. **6** and **7**, comprising a border contour area **102** for reducing data contamination, a coding area, and a main gap area **103** between the border contour area **102** and the coding area; The coding region comprises four main positioning points **100** located at four vertices of the coding region, a plurality of data regions **101** and a camouflage isolation region **106** with different data regions. The data area **101** is composed of A**0**, A**1**, A**2**, A**3**, B**1-1**, B**2-1**, B**3-1**, B**1-2**, B **2-2**, B**3-2**, CA, C**2**, C**3**. The two-dimensional code also includes four auxiliary locating points **104** on the side line of the coding area. Both primary and secondary positioning points were snowflake-shaped centre-symmetry. The main positioning point of the embodiment achieves enhanced recognition effect through its obvious features on one hand, and aesthetic effect through symmetry on the other hand. Furthermore, the auxiliary positioning point of the embodiment is the same as the main positioning point, which improves the recognition efficiency while reducing the graphic error. Light colored spacers significantly reduce the likelihood of location and data contamination.

[0100] To sum up, the method for forming and capturing a positioning point dot matrix of a two-dimensional code provided in embodiments of the present invention has the following advantageous effects:

[0101] (1) In the positioning mode of an encryption pattern of the present invention, an alabastrine centrosymmetric positioning pattern is adopted, the reliability of positioning is enhanced, and the parsing recognition rate is improved;

[0102] (2) The primary and secondary positioning points in the encryption pattern of the present invention are designed into axisymmetric images, which reduces the error of image processing and increases the data parsing speed;

[0103] (3) The light-colored spacer region in the encryption pattern of the present invention can avoid data pollution, protect the integrity of data of the positioning points, and improve the success rate of data parsing.

[0104] The present invention can be used for positioning of all two-dimensional codes, and can also be used for positioning of images and pictures.

[0105] The objects, technical solutions and advantageous effects of the present invention are further described in detail through the specific embodiments. It is to be understood that the above only describes specific embodiments of the present invention and is not intended to limit the protection scope of the present invention. Any modification, equivalent replacement, improvement, etc. made within the spirit and the principle of the present invention shall be contained within the protection scope of the present invention.

1. A method for forming a positioning point dot matrix of a two-dimensional code quickly positioned, wherein, comprising:

step **1**: setting or reading positioning point data dot matrixes;

step **2**: drawing four centrosymmetric primary positioning point dot matrixes on a setting background;

step **3**: adding positioning spacer regions to the periphery of the primary positioning point dot matrixes;

2. The method for forming a positioning point dot matrix of a two-dimensional code quickly positioned of claim **1**, wherein: step **1** comprises: reading the positioning point data dot matrixes from a database, alternatively, the positioning point data dot matrixes are positioning point dot matrixes of a fixed type.

3. The method for forming a positioning point dot matrix of a two-dimensional code quickly positioned of claim **1**, wherein: step **2** comprises:

step **2.1**: drawing a first primary positioning point dot matrix on a setting coding region background;

step **2.2**: by taking the first primary positioning point dot matrix as a reference, moving a distance of a unit length of L**1**, and drawing a second primary positioning point dot matrix;

step **2.3**: by taking the first and second primary positioning point dot matrixes as a reference, moving a distance of a unit length of L**2**, and drawing third and fourth primary positioning point dot matrixes; step **2.4**: drawing secondary positioning point dot matrixes in the X-axis direction;

step **2.5**: drawing secondary positioning point dot matrixes in the Y-axis direction.

4. The method for forming a positioning point dot matrix of a two-dimensional code quickly positioned of claim **3**, wherein: step **2.4** comprises:

step **2.4.1**: by taking the first and second primary positioning point dot matrixes as a reference, moving a distance of a unit length of L**2**/n to the third and fourth primary positioning point dot matrixes respectively, drawing X_1^{th} and X_2^{th} secondary positioning point dot matrixes, where n is an integer not less than 1, when n=1, there is no secondary positioning point dot matrix in the X-axis direction, skipping to step **6**;

step **2.4.2**: by taking the X_1^{th} and X_2^{th} secondary positioning point dot matrixes as a reference, moving a distance of a unit length of L**2**/n to the third and fourth primary positioning point dot matrixes respectively, and drawing X**3**th and X**4**th secondary positioning point dot matrixes;

step **2.4.3**: repeating step **5.2** (n−2) times, and drawing to $X(2n-3)^{th}$ and $X(2n-2)^{th}$ secondary positioning point dot matrixes.

5. The method for forming a positioning point dot matrix of a two-dimensional code quickly positioned of claim **3**, wherein: step **2.5** comprises:

step **2.5.1**: by taking the first and third primary positioning point dot matrixes as a reference, moving a distance of a unit length of L**1**/m to the second and fourth primary positioning point dot matrixes respectively, drawing $Y1^{th}$ and $Y3^{th}$ secondary positioning point dot matrixes, where m is an integer not less than 1, when m=1, there is no secondary positioning point dot matrix in the Y-axis direction, skipping to step **7**; step **2.5.2**: by taking the $Y1^{th}$ and $Y2^{th}$ secondary positioning point dot matrixes as a reference, moving a distance of a unit length of L**1**/m to the second and fourth primary positioning point dot matrixes respectively, and drawing $Y3^{th}$ and $Y4^{th}$ secondary positioning point dot matrixes; and step **2.5.3**: repeating step **6.2** (m−2) times, and drawing to $Y(2m-3)^{th}$ and $Y(2m-2)^{th}$ secondary positioning point dot matrixes.

6. The method for forming a positioning point dot matrix of a two-dimensional code quickly positioned of claim **1**, wherein: step **3** comprises: adding positioning spacer regions to the periphery of the secondary positioning point dot matrixes.

7. The method for forming a positioning point dot matrix of a two-dimensional code quickly positioned of claim **1**, wherein: the two-dimensional code is used for authentication of information in an off-line state or off-network state.

8. A method for capturing a positioning point dot matrix of a two-dimensional code quickly positioned, comprising the following steps:

step **1**: acquiring a two-dimensional code picture, processing the picture to obtain dot matrix data;

step **2**: capturing a sub dot matrix A of a*b (a>=3, b>=3) at the end according to a dot matrix sequence;

step **3**: judging whether positioning point spacer regions are around the sub dot matrix A, and judging whether the sub dot matrix A is consistent with the standard positioning point data in the database, if not, returning to step **2**;

step **4**: by taking the sub dot matrix A as a reference, moving a distance of a unit length of L_1, and capturing a sub dot matrix B of a*b (a>=3, b>=3); by taking the sub dot matrixes A and B as a reference, moving a distance of a unit length of L_2, and capturing two sub dot matrixes C and D of a*b respectively;

step **5**: judging whether the sub dot matrixes B, C and D are consistent with the standard positioning point data, if not, returning to step **2**.

9. The method for capturing a positioning point dot matrix of a two-dimensional code quickly positioned of claim **8**, wherein: also comprising:

step **6**: capturing secondary positioning point dot matrixes in the X-axis direction;

step **7**: capturing secondary positioning point dot matrixes in the Y-axis direction;

step **8**: judging whether secondary positioning point dot matrix data is consistent with the standard positioning point data;

step **9**: feeding back information about four primary positioning point dot matrixes and 2(n+m−2) secondary positioning point dot matrixes for next data reading.

10. The method for forming a positioning point dot matrix of a two-dimensional code quickly positioned of claim **9**, wherein: step **6** comprises:

step **6.1**: by taking the first and second primary positioning point dot matrixes as a reference, moving a distance of a unit length of L_2/n to the third and fourth primary positioning point dot matrixes to capture a sub dot matrix of a*a, obtaining X_1^{th} and X_2^{th} secondary positioning point dot matrixes, where n is an integer not less than 1, when n=1, not capturing secondary positioning point dot matrixes in the X-axis direction, skipping to step **8**;

step **6.2**: by taking the first and second primary positioning point dot matrixes as a reference, moving a distance of a unit length of 2*L**2**/n to the third and fourth primary positioning point dot matrixes to capture a sub dot matrix of a*a, obtaining $X3^{th}$ and $X4^{th}$ secondary positioning point dot matrixes;

step **6**.(n−1): repeating step **6.2** (n−2) times in total, and capturing to $X(2n-3)^{th}$ and $X(2n-2)^{th}$ secondary positioning point dot matrixes;

11. The method for forming a positioning point dot matrix of a two-dimensional code quickly positioned of claim **9**, wherein: step **7** comprises:

step **7.1**: by taking the first and third primary positioning point dot matrixes as a reference, moving a distance of a unit length of L**1**/m to the second and fourth primary positioning point dot matrixes to capture a sub dot matrix of a*a, obtaining $Y1^{th}$ and $Y2^{th}$ secondary positioning point dot matrixes, where m is an integer not less than 1, when m=1, not capturing secondary positioning point dot matrixes in the Y-axis direction, skipping to step **9**;

step **7.2**: by taking the first and third primary positioning point dot matrixes as a reference, moving a distance of a unit length of 2*L**1**/m to the second and fourth primary positioning point dot matrixes to capture a dot matrix of a*a, obtaining Y**3**th and Y**4**th secondary positioning point dot matrixes;

step **7**.(m−1): repeating step **7.2** (m−2) times in total, and capturing to Y(2m−3)th and Y(2m−2)th secondary positioning point dot matrixes.

12. The method for capturing a positioning point dot matrix of a two-dimensional code quickly positioned of claim **8**, wherein: the two-dimensional code is used for authentication of information in an off-line state or off-network state.

13. (canceled)

14. (canceled)

15. (canceled)

16. A method for a two-dimensional code quickly positioned, wherein:

comprising:

coding region,

the coding region comprises four centrosymmetric major fixing sites at four vertices of the coding region, and the main positioning point and the interval area outside the coding area;

The coding area also includes a plurality of auxiliary positioning points located on the side line of the coding area.

17. The method for a two-dimensional code quickly positioned of claim **16**, wherein: the snowflake graph dot matrix comprises 2^{2n} rectangular color blocks that form a ring and a circle color area or a solid rectangular color area or a solid square color area inside the rectangular color block, n is an integer greater than 1.

18. The method for a two-dimensional code quickly positioned of claim **16**, wherein: a positioning interval region is arranged around the positioning point, and the two-dimensional code also includes a border contour region for reducing data contamination, and a main interval region between the border contour region and the coding region.

19. The method for a two-dimensional code quickly positioned of claim **16**, wherein: the two-dimensional code coding area includes a plurality of data areas and a camouflage isolation area spaced differently, and the plurality of data areas and the camouflage isolation area are masked for processing.

20. The method for a two-dimensional code quickly positioned of claim **16**, wherein: the two-dimensional code is used for authentication of information in an off-line state or off-network state.

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