

Description

The present invention is directed to an apparatus and a method for generating pattern data for a display and/or a printer.

Character pattern data generating apparatus for producing dot patterns from stored character pattern data is known.

There has been a sharp increase in the number of dots which form a character pattern consistent with enhancement in quality of the printing output of a word processor or the like. This results in the problem that the storage capacity of a character generator for storing the characters in the form of dot pattern data needs to be increased.

To obviate this problem, there has been proposed a method of storing data, so called outline data, representing only an outline of a character pattern and converting such data into dot pattern data for the whole character pattern during a printing or display process.

With this method, character size can be increased and reduced, and character quality enhanced, while reducing as far as possible the data to be stored. There is, however, a drawback with this arrangement when a character pattern of a small size is specified, in which outline regions face each other, in that the proportions of the character pattern between these outline regions may vary, resulting in a decline in character quality.

More specifically, an outline font depicts an outline of a character pattern on a bit map when initially providing outline data for storage, and divides the outline into a plurality of line segments or sub-curves, whose end point co-ordinates are stored as the outline data. Then, the outline data is converted to dot pattern data in order that the area bounded by this outline can be filled in with dots for display or printing.

A description will be made with the example of a Chinese character [Me] (Eye) as shown in Figure 2. An original character pattern is depicted on a bit map having e.g. 256 x 256 bits, each corresponding in size to one dot, and line segments forming an outline of the pattern are defined by the co-ordinates of their initial and terminal points. These co-ordinates are stored as the outline data of the pattern for a standard size.

In the case of converting the original outline data directly into dot pattern data, since the co-ordinate scale accords with dot size, it follows that each line segment S is appropriately located relative to the dot centre positions T (Figure 6 (a)). The original outline data, based on the 256 x 256 bits, may also be scaled down to a size of 40 x 40 dots, viz. 40/256. In this case, as illustrated in Figure 6 (b), each line segment S' does not always correspond to the dot centre positions T but may be expressed as co-ordinates having decimal parts in the course of the arithmetic operation for scaling down the size. In a display like a liquid crystal panel, or in a wire dot printer, an ink jet printer, a thermal printer and a laser printer, the dot conceived as a minimum printing unit has a given finite size. It is, therefore, required that the numerical values indicating dot position co-ordinates be integers, and hence the decimal parts of the outline data are typically subjected to integer processing by rounding processes such as half-adjust, rounding-down and rounding-up so that the decimal parts of the line segment co-ordinates are shifted to immediate dot position co-ordinates.

Such integer processing does not particularly exert an influence on character quality if the character size is large. In the case of a small character size, however, as illustrated in Figure 5(b), the linear width of a pattern section G"-H" may be expanded as compared with the linear widths of regions A"-B", C"-D" and E"-F". As a result, the quality of the character displayed or printed is noticeably degraded.

The present invention is characterised with regard to US-A-4331995 in which it has been proposed to modify outline vector data generated in enlarging an outline, to avoid undue angularity, by deleting outline vectors and substituting two vectors for each deleted vector. WO-A-8704835 discloses a method of using outline data to generate bit map representations of characters at various resolutions and scaling factors in which the bit map representations are modified by comparison with equivalent features of other characters to ensure the characters are uniform and consistent with one another.

It is an object of the present invention to provide a pattern data generating apparatus and method capable of generating dot patterns having a high quality irrespective of size.

According to one aspect of the present invention, there is provided apparatus for generating pattern data comprising data storage means for storing outline data for a pattern, read out means responsive to received selection data for reading out said outline data from said data storage means, outline arithmetic means responsive to received size data for computing outline co-ordinates from said outline data, and dot pattern data generating means for converting said outline co-ordinates into dot pattern data for output, characterised in that said data storage means further stores predetermined correction data said correction data being specific for a particular pattern at a particular pattern size, and in that said outline arithmetic means is arranged to adjust said outline co-ordinates of said pattern according to said correction data.

According to another aspect of the present invention, there is provided a method of generating pattern data comprising storing outline data for a pattern, reading out said outline data in response to received selection

data, computing outline co-ordinates from said outline data in response to received size data, and converting said outline co-ordinates into dot pattern data, characterised by storing predetermined correction data pattern size, said correction data being specific for a particular pattern at a particular size, and by adjusting said outline co-ordinates on the basis of said correction data.

5 The preferred embodiment of the present invention described below is arranged to store outline data in the form of point co-ordinates and to multiply such co-ordinates by an appropriate scale factor for producing the outline co-ordinates. The decimal parts of the resulting co-ordinates are first rounded up or down and then adjusted to an immediately adjacent co-ordinate value above or below on the basis of the correction data, in order to avoid a variation in the linear width of the character pattern due to conforming the pattern to a dot scale.

10 The present invention will be described further, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 is a block diagram of character pattern data generating apparatus embodying the present invention;

15 Figure 2 is an explanatory diagram showing the relation between a character pattern and point co-ordinates for the pattern;

Figure 3 is a schematic diagram illustrating the arrangement of data in an outline data storage circuit of the character pattern data generating apparatus of Figure 1;

20 Figure 4 is a flow chart representing the operation of the character pattern data generating apparatus of Figure 1;

Figure 5 is an explanatory diagram showing the effect of employing the character pattern data generating apparatus of Figure 1; and

Figure 6 is an explanatory diagram showing the effect of scaling down a character in character pattern data generating apparatus according to the prior art.

25 An embodiment of the present invention is shown in Figure 1, and comprises an outline data storage circuit 1, which serves to store character pattern outline data obtained as follows.

As illustrated in Figure 2, an outline of a character pattern is first divided into line segments A to R, or sub-curves, and the respective line segments are converted into initial point co-ordinates 1a and terminal point co-ordinates 1b. The point co-ordinates 1a and 1b are stored in the outline data storage circuit 1, as shown in Figure 3, together with data correction pairs 1c for correcting those point co-ordinates which would cause inconsistencies when converting the co-ordinates into dot patterns, viz. in situations in which a linear width of the pattern or a spatial width between sections of the pattern are not proportional to a dot scale.

30 A read out circuit 2 reads out outline data for a selected character in response to character data in a signal input from a host unit (not shown), the outline data including the initial point co-ordinates 1a, the terminal point co-ordinates 1b and the correction data 1c attached thereto. An outline arithmetic circuit 3 computes new co-ordinates for the line segments on the basis of character size data included in the signal from the host unit and effects modifications to move the computed co-ordinates in X-axis and Y-axis directions on the basis of the correction data.

35 A dot pattern generating circuit 4 receives the revised outline data from the circuit 3 and generates dot pattern data for filling in the interior of the closed region bounded by the outline.

Next, the operation of the above apparatus will be explained with reference to the flow chart of Figure 4.

Upon receipt of a signal from the host unit (not shown), the read out circuit 2 accesses and reads out initial and terminal point co-ordinates for the outline of the selected character from the outline data storage circuit 1, and supplies these co-ordinates to the outline arithmetic circuit 3.

45 [Standard Mode]

Where a standard size is specified by the character size data input with the character data, the outline arithmetic circuit 3 determines the outline on the basis of the received initial and terminal point co-ordinates and outputs the arithmetic results to the dot pattern generating circuit 4.

50 The dot pattern generating circuit 4 generates pattern data for filling in with dots the interior of the closed region bounded by the outline and then the process is repeated for the next character until the dot pattern data for all of the characters corresponding to the input character data has been generated, whereupon the circuit 4 supplies such dot pattern data as output.

55 [Enlargement Mode]

The outline arithmetic circuit 3 computes new initial and terminal point co-ordinates corresponding to a

selected multiplication factor on the basis of the character size data included in the signal from the host unit, and supplies outline data according to the multiplication factor to the dot pattern generating circuit 4. The dot pattern generating circuit 4 in turn converts the outline data into dot pattern data, and then outputs the converted data.

[Scale-down Mode]

The outline arithmetic circuit 3 computes new initial and terminal point co-ordinates, for example as shown in Table 1 below, for a scaled down character, on the basis of character size data included in the signal from the host unit, and then performs integer processing to convert these co-ordinates to values shown in Table 2 corresponding to dot positions on a bit map. The integer processing, as explained earlier, does not ensure a uniform reduction in the linear width of the character pattern according to the scale down factor. In this example, there is created a variation, in that the linear width is two dots between line segments A" and B", C" and D", and E" and F" but is three dots between line segments G" and H" representing the lowest cross bar (Figure 5 (b)).

Table

TABLE					
	I		II		
Line segment	Integer non-processing		Integer processing		Linear width
	Initial point coordinates	Terminal point coordinates	Initial point coordinates	Terminal point coordinates	
A"	1.5, 0.6	35.9, 0.6	2, 1	36, 1	
B"	4.0, 2.9	33.4, 2.9	4, 3	33, 3	2
C"	4.0, 12.8	33.4, 12.8	4, 13	33, 13	10
D"	4.0, 15.1	33.4, 15.1	4, 15	33, 15	2
E"	4.0, 25.0	33.4, 25.0	4, 25	33, 25	10
F"	4.0, 27.3	33.4, 27.3	4, 27	33, 27	2
G"	4.0, 37.1	33.4, 37.1	4, 37	33, 37	10
H"	1.5, 39.5	35.9, 39.5	2, 40	36, 40	⊙ 3

Therefore, immediately when the integer processing with respect to the point co-ordinates of one line segment is finished, a judgement is made as to whether the correction data applies to this line segment or not. If not (line segments A" to G" in this example), the arithmetic results are output as they are.

On the other hand, if the correction data does apply, the line segment (the line segment H" in this example) is adjusted upwards (or downwards) by changing the co-ordinate values for the Y-co-ordinates by an amount specified by the correction data 1c, i.e. by one dot in this example. Thus, in this instance, the initial point co-ordinates (2, 40) and the terminal point co-ordinates (36, 40) for the line segment H" as calculated are modified to co-ordinates (2, 39) and co-ordinates (36, 39), respectively, whereby to produce a modified line segment H' whose spacing from the adjacent line segment G' is now two dots.

The spacing between the line segments A' and B', C' and D', E' and F', and G' and H' is thus equalised, resulting in a scaled down pattern similar to the original pattern (Figure 5 (a)).

Consequently, when printing a scaled down character by the use of a laser printer or the like, the character can be printed to match the original design. It is, therefore, possible to print well balanced logos and characters

for all character sizes.

The embodiment described above deals with one scale of reduction. However, if the amount of correction differs depending on the reduction factor even for the same character, then as a matter of course the correction data is created and stored for every reduction factor.

In the described embodiment, the lateral lines alone are adjusted in the direction of the Y-axis by way of correction, for simplifying the explanation. It is feasible also to store data for adjusting the longitudinal lines to the left or right and data for effecting correction of oblique or curved lines by bi-directional compounding.

As described also, the correction is effected only in the scale down mode. However, in an enlargement mode too, the linear width of an enlarged character may be modified by providing the correction data corresponding to an enlargement factor and making an adjustment upwards or downwards to an immediately adjacent position on the basis of the correction data, whereby the enlarged character may be printed with a still higher quality.

The embodiment given above deals with Chinese characters. Of course, the invention may also be applied in the case of other alphabets, numerals, Korean characters and so on, by way of example.

In addition to characters, the invention may be applied to the production of graphs (including shapes such as a circle, triangle, rectangle, etc), patterns, symbols and marks.

The present character/graphic pattern generating apparatus may be incorporated into a display unit or attached thereto, the read out circuit 2 (Figure 1) then being operated in accordance with an (outline) display command. Outline display can be effected on the display unit, such as a CRT and a liquid crystal panel. Thus, it is feasible to construct a variety of display units for large sized computers, personal computers, work stations and electronic calculators.

The character/graphic pattern generating apparatus may also be incorporated into a printer or attached thereto, the read out circuit 2 then being operated in accordance with an (outline) print command. With this arrangement, printing operations can be performed by a wire dot printer, an ink jet printer, a thermal printer and a laser printer. It is thus possible to provide a variety of printers for use with large sized computers, personal computers, work stations and electronic calculators.

The character pattern data generating device described above comprises: the outline data storage means 1 for storing outline data representing a character pattern of a standard size and correction data for modifying the outline data when the character pattern is to be scaled up or down with respect to the standard size; the read out means 2 for reading out the outline data from the outline data storage means 1 in response to character data transmitted from outside; the outline arithmetic means 3 for computing character outline co-ordinates on the basis of the outline data, character size data transmitted from outside and the correction data; and the dot pattern data generating means 4 for outputting dot pattern data in accordance with the character outline co-ordinates.

In particular, co-ordinate numerical values produced when varying said outline data by an appropriate scale factor are adjusted to an immediately adjacent value above or below on the basis of the correction data, thereby avoiding an error in linear width, which is caused by allocation of the character pattern to a 1-bit map or dot scale.

With such an arrangement, it is possible to generate a scaled down or enlarged character pattern, and particularly a scaled down pattern, having fidelity to an original pattern, by correcting an inter-line distance so as to be in proportion to the original pattern irrespective of the process of distribution of the pattern to the bit map.

Claims

1. Apparatus for generating pattern data comprising data storage means (1) for storing outline data for a pattern, read out means (2) responsive to received selection data for reading out said outline data from said data storage means, outline arithmetic means (3) responsive to received size data for computing outline co-ordinates from said outline data, and dot pattern data generating means (4) for converting said outline co-ordinates into dot pattern data for output, characterised in that said data storage means further stores predetermined correction data, said correction data being specific for a particular pattern at a particular pattern size, and in that said outline arithmetic means is arranged to adjust said outline co-ordinates of said pattern according to said correction data.
2. Apparatus according to claim 1 characterised in that said data storage means stores said outline data representing a pattern of a standard size and said correction data representing adjustments to be made when altering said standard size in order to maintain pattern proportions.



for all character sizes.

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In the described embodiment, the lateral lines alone are adjusted in the direction of the Y-axis by way of correction, for simplifying the explanation. It is feasible also to store data for adjusting the longitudinal lines to the left or right and data for effecting correction of oblique or curved lines by bi-directional compounding.

As described also, the correction is effected only in the scale down mode. However, in an enlargement mode too, the linear width of an enlarged character may be modified by providing the correction data corresponding to an enlargement factor and making an adjustment upwards or downwards to an immediately adjacent position on the basis of the correction data, whereby the enlarged character may be printed with a still higher quality.

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In addition to characters, the invention may be applied to the production of graphs (including shapes such as a circle, triangle, rectangle, etc), patterns, symbols and marks.

The present character/graphic pattern generating apparatus may be incorporated into a display unit or attached thereto, the read out circuit 2 (Figure 1) then being operated in accordance with an (outline) display command. Outline display can be effected on the display unit, such as a CRT and a liquid crystal panel. Thus, it is feasible to construct a variety of display units for large sized computers, personal computers, work stations and electronic calculators.

The character/graphic pattern generating apparatus may also be incorporated into a printer or attached thereto, the read out circuit 2 then being operated in accordance with an (outline) print command. With this arrangement, printing operations can be performed by a wire dot printer, an ink jet printer, a thermal printer and a laser printer. It is thus possible to provide a variety of printers for use with large sized computers, personal computers, work stations and electronic calculators.

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In particular, co-ordinate numerical values produced when varying said outline data by an appropriate scale factor are adjusted to an immediately adjacent value above or below on the basis of the correction data, thereby avoiding an error in linear width, which is caused by allocation of the character pattern to a 1-bit map or dot scale.

With such an arrangement, it is possible to generate a scaled down or enlarged character pattern, and particularly a scaled down pattern, having fidelity to an original pattern, by correcting an inter-line distance so as to be in proportion to the original pattern irrespective of the process of distribution of the pattern to the bit map.

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1. Apparatus for generating pattern data comprising data storage means (1) for storing outline data for a pattern, read out means (2) responsive to received selection data for reading out said outline data from said data storage means, outline arithmetic means (3) responsive to received size data for computing outline co-ordinates from said outline data, and dot pattern data generating means (4) for converting said outline co-ordinates into dot pattern data for output, characterised in that said data storage means further stores predetermined correction data, said correction data being specific for a particular pattern at a particular pattern size, and in that said outline arithmetic means is arranged to adjust said outline co-ordinates of said pattern according to said correction data.
2. Apparatus according to claim 1 characterised in that said data storage means stores said outline data representing a pattern of a standard size and said correction data representing adjustments to be made when altering said standard size in order to maintain pattern proportions.



3. Apparatus according to claims 1 or 2 characterised in that said outline arithmetic means are arranged to compute initial outline co-ordinates from said outline data in response to said received size data and to adjust said initial outline co-ordinates selectively by an integer value according to said correction data to produce said outline co-ordinates for supply to said dot pattern data generating means.
4. Apparatus according to claims 1, 2 or 3 characterised in that said pattern is a character.
5. A method of generating pattern data comprising storing outline data for a pattern, reading out said outline data in response to received selection data, computing outline co-ordinates from said outline data in response to received size data, and converting said outline co-ordinates into dot pattern data, characterised by storing predetermined correction data, said correction data being specific for a particular pattern at a particular size, and by adjusting said outline co-ordinates on the basis of said correction data.
6. A method according to claim 5 characterised by storing outline data representing a pattern of a standard size and correction data representing adjustments to be made in order to maintain pattern proportions when the scale of the pattern is altered.
7. A method according to claim 5 or 6 characterised by computing initial outline co-ordinates from said outline data in response to said received size data, and by adjusting said initial outline co-ordinates selectively by an integer value in order to produce said outline co-ordinates for conversion into said dot pattern data.
8. A method according to claim 5, 6 or 7 characterised in that said pattern is a character.
9. Apparatus for generating character pattern data from standard size outline data, comprising: outline data storage means (1) for storing outline data of a character pattern serving as a standard size; read out means (2) for reading out said outline data from said outline data storage means in response to a character data signal transmitted from outside; and outline arithmetic means (3) for computing character outline co-ordinates on the basis of said outline data, and on the basis of character size data given from outside; and dot pattern data generating means (4) for outputting dot pattern data in accordance with said character outline co-ordinates; characterised in that the outline data storage means (1) stores predetermined correction data associated with a specific character at a specific multiplying factor and in that the outline arithmetic means (3) uses the correction data to correct the computed character outline co-ordinates as necessary.
10. Apparatus for generating and using character pattern data, comprising means for storing outline data co-ordinates for each character; converting means for converting said outline data co-ordinates by an appropriate multiplying factor when said character size is to be enlarged or reduced; means for integer processing said converted outline data to round said co-ordinates to integer values, characterised in that the co-ordinate numerical integer values produced when modifying said outline data by said converting means and integer processing means, remain the same, are increased or are decreased to an immediately adjacent integer value on the basis of prestored predetermined correction data predetermined for each character at a specific multiplying factor, thereby preventing distortion of linear width of the characters due to the enlargement or reduction of the character.

Patentansprüche

1. Vorrichtung zum Generieren von Musterdaten, umfassend: ein Datenspeichermittel (1) zum Speichern von Umrißdaten für ein Muster, ein auf empfangene Auswahlkosten ansprechendes Auslesemittel (2) zum Auslesen der Umrißdaten aus dem Datenspeichermittel, ein auf empfangene Größendaten ansprechendes Umrißarithmetikmittel (3) zum Berechnen von Umrißkoordinaten aus den Umrißdaten, und ein Punktmusterdatengeneriermittel (4) zum Umwandeln der Umrißkoordinaten in Punktmusterdaten zur Ausgabe, dadurch gekennzeichnet, daß das Datenspeichermittel ferner vorbestimmte Korrekturdaten speichert, wobei die Korrekturdaten für ein spezielles Muster bei einer speziellen Mustergröße spezifisch sind, und daß das Umrißarithmetikmittel dazu eingerichtet ist, die Umrißkoordinaten des Musters gemäß den Korrekturdaten anzupassen.
2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das Datenspeichermittel einem Muster mit Standardgröße entsprechende Umrißdaten speichert und daß die Korrekturdaten Anpassungen entspre-



chen, die bei Änderung der Standardgröße durchzuführen sind, um die Musterproportionen beizubehalten.

- 5 3. Vorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß das Umrißarithmetikmittel dazu eingerichtet ist, in Antwort zu den empfangenen Größendaten Anfangs-Umrißkoordinaten aus den Umrißdaten zu berechnen, und die Anfangs-Umrißkoordinaten selektiv gemäß den Korrekturdaten auf einen Ganzzahlwert anzupassen, um die Umrißkoordinaten zur Zufuhr zu dem Punktmusterdatengeneriermittel zu erzeugen.
- 10 4. Vorrichtung nach Anspruch 1, 2 oder 3, dadurch gekennzeichnet, daß das Muster ein Buchstabe ist.
- 15 5. Verfahren zum Generieren von Musterdaten, umfassend: Speichern von Umrißdaten für ein Muster, Auslesen der Umrißdaten in Antwort auf empfangene Auswahlkosten, Berechnen von Umrißkoordinaten aus den Umrißdaten in Antwort auf empfangene Größendaten, und Umwandeln der Umrißkoordinaten in Punktmusterdaten, gekennzeichnet durch: Speichern vorbestimmter Korrekturdaten, wobei die Korrekturdaten für ein spezielles Muster bei einer speziellen Größe spezifisch sind, und durch Anpassen der Umrißkoordinaten auf der Basis der Korrekturdaten.
- 20 6. Verfahren nach Anspruch 5, gekennzeichnet durch: Speichern von einem Muster mit Standardgröße entsprechenden Umrißdaten und von Korrekturdaten, die Anpassungen entsprechen, die zur Beibehaltung der Musterproportionen durchzuführen sind, wenn der Maßstab des Musters geändert wird.
- 25 7. Verfahren nach Anspruch 5 oder 6, gekennzeichnet durch: Berechnen von Anfangs-Umrißkoordinaten aus den Umrißdaten in Antwort auf die empfangenen Größendaten, und durch selektives Anpassen der Anfangs-Umrißkoordinaten auf einen Ganzzahlwert, um die Umrißkoordinaten zu erzeugen zur Umwandlung in die Punktmusterdaten.
- 30 8. Verfahren nach Anspruch 5, 6 oder 7, dadurch gekennzeichnet, daß das Muster ein Buchstabe ist.
- 35 9. Vorrichtung zum Generieren von Buchstabenmusterdaten aus Standardgrößen-Umrißdaten, umfassend: ein Umrißdatenspeichermittel (1) zum Speichern von Umrißdaten eines als eine Standardgröße dienenden Buchstabenmusters; ein Auslesemittel (2) zum Auslesen der Umrißdaten aus dem Umrißdatenspeichermittel in Antwort auf ein von außen übertragenes Buchstabendatensignal; und ein Umrißarithmetikmittel (3) zum Berechnen von Buchstabenumrißkoordinaten auf der Basis der Umrißdaten und auf der Basis von außen gegebenen Buchstabengrößendaten; und ein Punktmusterdatengeneriermittel (4) zur Ausgabe von Punktmusterdaten in Übereinstimmung mit den Buchstabenumrißkoordinaten; dadurch gekennzeichnet, daß das Umrißdatenspeichermittel (1) vorbestimmte Korrekturdaten speichert, die einem spezifischen Buchstaben bei einem spezifischen Multiplikationsfaktor zugeordnet sind, und daß das Umrißarithmetikmittel (3) die Korrekturdaten verwendet zum Korrigieren der berechneten Buchstabenumrißkoordinaten wie erforderlich.
- 40 10. Vorrichtung zum Generieren und Verwenden von Buchstabenmusterdaten, umfassend: ein Mittel zum Speichern von Umrißdatenkoordinaten für jeden Buchstaben; ein Umwandlungsmittel zum Umwandeln der Umrißdatenkoordinaten durch einen angemessenen Multiplikationsfaktor, wenn die Buchstabengröße zu vergrößern oder zu verkleinern ist; ein Mittel zum Ganzzahlprozessieren der umgewandelten Umrißdaten um die Koordinaten auf Ganzzahlwerte zu runden, dadurch gekennzeichnet, daß die beim Modifizieren der Umrißdaten durch das Umwandlungsmittel und das Ganzzahlprozessiermittel erzeugten numerischen Koordinatenganzzahlwerte gleichbleiben, auf einen unmittelbar benachbarten Ganzzahlwert erhöht oder vermindert werden auf der Basis von vorher gespeicherten vorbestimmten Korrekturdaten, die für jeden Buchstaben bei einem spezifischen Multiplikationsfaktor vorbestimmt sind, wodurch eine Verzerrung einer Linearausdehnung des Buchstabens aufgrund einer Vergrößerung oder Verkleinerung des Buchstabens verhindert wird.
- 45 50

55 Revendications

1. Appareil de génération de données de motifs comprenant un moyen de stockage de données (1) destiné à stocker les données de contour d'un motif, un moyen de lecture en sortie de mémoire (2) réagissant



- 5 aux données de sélection reçues et destiné à lire lesdites données de contour en sortie dudit moyen de stockage de données, un moyen de calcul arithmétique de contour (3) réagissant aux données de dimensions reçues et destiné à calculer les coordonnées de contour à partir desdites données de contour, et un moyen de génération des données de motifs par points (4) destiné à convertir lesdites coordonnées de contour en données de motifs par points en sortie, caractérisé en ce que ledit moyen de stockage de données stocke en outre des données de correction prédéterminées, lesdites données de correction étant spécifiques d'un motif particulier pour une taille de motif particulière, et en ce que ledit moyen de calcul arithmétique de contour est disposé de façon à ajuster lesdites coordonnées de contour dudit motif en fonction desdites données de correction.
- 10 2. Appareil selon la revendication 1, caractérisé en ce que ledit moyen de stockage des données stocke lesdites données de contour représentant un motif de taille standard et lesdites données de correction représentant les ajustements à effectuer quand on modifie ladite taille standard de façon à conserver les proportions du motif.
- 15 3. Appareil selon la revendication 1 ou 2, caractérisé en ce que ledit moyen de calcul arithmétique de contour est disposé de façon à calculer les coordonnées de contour de départ à partir desdites données de contour en réponse auxdites données de taille reçues et à ajuster sélectivement lesdites coordonnées de contour de départ au moyen d'une valeur entière en fonction desdites données de correction de façon à produire lesdites coordonnées de contour pour les fournir audit moyen de génération de données de motif par points.
- 20 4. Appareil selon les revendications 1, 2 ou 3, caractérisé en ce que ledit motif est un caractère.
- 25 5. Procédé de génération de données de motifs consistant à stocker les données de contour d'un motif, à lire en sortie de mémoire lesdites données de contour en fonction des données de sélection reçues, à calculer les coordonnées de contour à partir desdites données de contour en fonction des données de taille reçues, et à convertir lesdites coordonnées de contour en données de motifs par points, caractérisé en ce que l'on stocke des données de correction prédéterminées, lesdites données de correction étant spécifiques d'un motif particulier pour une taille de motif particulière, et en ce que l'on ajuste lesdites coordonnées de contour en se basant sur lesdites données de correction.
- 30 6. Procédé selon la revendication 5, caractérisé par le stockage des données de contour représentant un motif de taille standard et des données de correction représentant les ajustements à effectuer de façon à conserver les proportions du motif quand l'échelle du motif est modifiée.
- 35 7. Procédé selon la revendication 5 ou 6, caractérisé en ce que l'on calcule des coordonnées de contour de départ à partir desdites données de contour en réponse à ladite donnée de taille reçue, et en ce que l'on ajuste de façon sélective des coordonnées de contour de départ au moyen d'une valeur entière de façon à produire lesdites coordonnées de contour pour les convertir en lesdites données de motif par points.
- 40 8. Appareil selon les revendications 5, 6 ou 7, caractérisé en ce que ledit motif est un caractère.
- 45 9. Appareil de génération de données de motif de caractère à partir des données de contour de taille standard, comprenant : un moyen de stockage de données de contour (1) destiné à stocker les données de contour d'un motif de caractère utilisé comme référence de taille standard ; un moyen de lecture en sortie de mémoire (2) destiné à lire lesdites données de contour en sortie dudit moyen de stockage des données de contour en réponse à un signal de données de caractère provenant de l'extérieur ; et un moyen de calcul arithmétique de contour (3) destiné à calculer les coordonnées de contour de caractère en se basant sur lesdites données de contour et en se basant sur les données de taille de caractère provenant de l'extérieur ; et un moyen de génération de motifs par points (4) destiné à émettre les données de motifs par points en fonction desdites coordonnées de contour de caractère ; caractérisé en ce que le moyen de stockage de données de contour (1) stocke les données de correction prédéterminées qui sont associées à un caractère spécifique pour un facteur multiplicatif spécifique et en ce que le moyen de calcul arithmétique de contour (3) utilise les données de correction pour corriger les coordonnées de contour de caractère calculées si nécessaire.
- 50 10. Appareil de génération et d'utilisation de données de motifs de caractères, comprenant un moyen pour stocker les données des coordonnées de contour de chaque caractère ; un moyen de conversion pour
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convertir lesdites données de contour au moyen d'un facteur multiplicatif approprié lorsque ladite taille de caractère doit être agrandie ou réduite ; un moyen de traitement en nombres entiers appliqué aux données de contour converties de façon à arrondir lesdites coordonnées en des valeurs entières, caractérisé en ce que les valeurs numériques entières des coordonnées produites lorsqu'on modifie lesdites données de contour par ledit moyen de conversion et par ledit moyen de traitement en nombres entiers restent les mêmes, sont augmentées ou sont diminuées en une valeur entière immédiatement adjacente en se basant sur les données de correction prédéterminées qui sont préenregistrées pour chaque caractère pour un facteur multiplicatif spécifique, ce qui permet d'éviter une distorsion de la largeur linéaire des caractères à cause de l'agrandissement ou de la réduction du caractère.

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