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Chinese Character Input Method and Chinese Character Input Apparatus

The present invention relates to a Chinese character input method and a Chinese character input apparatus, especially suitable for a relatively small-sized electronic apparatus such as a mobile phone terminal.

A small-sized electronic apparatus, such as a mobile phone terminal or a pager, includes a display unit composed of an LCD etc. for displaying various information such as numbers, characters, or pictures. For example, in the case of a mobile phone terminal, there has been a type which has the function of so-called electronic phone directory and can store about several hundred phone numbers. Meanwhile, for each of the stored phone numbers, a personal name or company name is stored so as to indicate whose phone number it is, and the stored phone numbers and names etc. can be displayed. Also, in the case of a mobile phone terminal having the function of text message transmission, character information input to the mobile phone terminal can be sent to another phone, or the mobile phone can receive character information sent from another phone and display it on the display unit.

Here, in the case of displaying Chinese characters of Chinese on the display unit of such an electronic apparatus, since there are 6000~7000 frequently used Chinese characters, a method for inputting the characters is desirable. That is to say, in the case of a relatively large electronic apparatus having a keyboard by which letters can be input, the keyboard can be used to input the pronunciation of a desired Chinese character by letters, and candidate characters having the pronunciation are displayed successively on the display unit and the desired character is found from among them.

However, in a relatively small-sized electronic apparatus such as a mobile phone terminal, the number of keys which can be provided on the terminal is limited. Usually, only dial keys corresponding to the numbers 1, 2, 3 ... 9, 0 and several function keys are provided. Therefore, the process of inputting Chinese characters by letters is not suitable for a

small-sized electronic apparatus such as a mobile phone terminal. Some types assign about three letters to each dial key of a mobile phone terminal, and the letters can be input by different numbers of key presses. However, it is very troublesome to input Chinese characters by such letters.

The conventional simple input processes of Chinese characters for a mobile phone terminal are roughly divided as input-by-*pinyin* (拼音) methods and input-by-stroke(笔划) methods. The input-by-*pinyin* methods refer to the methods for selecting Chinese characters by pronunciation symbols (consonants, vowels), while the input-by-stroke methods refer to the methods for dividing a Chinese character as elements of stroke symbols and arranging them in the fixed order observed in calligraphy (笔顺).

For example, in the input-by-stroke methods, when the character "王" is specified, since the character is composed of the strokes "一" and "丨", the strokes "一", "一", "丨", and "一" are input successively in its fixed order. The character "王" is thus specified by the above operations (this is an example of the fixed order used in China).

The input-by-stroke methods are determined by "how many" and "what shapes" are the elements of the basic stroke symbols, and their performances are evaluated in the operating conditions (such as in a mobile telephone terminal etc.).

Conventionally, five stroke symbols "一", "丨", "丿", "丶" and "乛" are used as the minimum basic stroke symbols in China. The less the basic stroke symbols, the easier they can be memorized, but the more the symbols unable to be represented by the basic stroke symbols, which are difficult to use without a reference table and are troublesome to specify, thus mistakes are likely made.

On the other hand, if there are too many basic stroke symbols, their distinctions are difficult to memorize, and they cannot be represented by the input keys of a mobile phone etc.

Here, the description is made with regard to the case of inputting Chinese characters in a mobile phone terminal, but the same problem

exists in the case of inputting Chinese characters in various relatively small-sized electronic apparatuses similar to the mobile phone terminal.

Embodiments of the present invention provides apparatus and method for conveniently inputting Chinese characters in an electronic apparatus with limited space to arrange the input keys.

In accordance with a first aspect of the invention, there is provided a Chinese character input method comprising the steps of:

inputting a stroke from among the nine strokes symbols "一", "丨", "丿", "丶", "乚", "㇕", "㇀", "㇈", "丶" wherein the nine stroke symbols form the basis elements of Chinese characters comprising images of symmetrical shapes observed in Chinese calligraphy (笔顺) ;

obtaining a desired character corresponding to the input stroke symbol of a Chinese character with images of symmetrical shapes according to the fixed order of strokes observed in Chinese calligraphy (笔顺) .

According to the embodiments of the present invention, the nine stroke symbols "一", "丨", "丿", "丶", "乚", "㇕", "㇀", "㇈", "丶" with images of symmetrical shapes take advantage of the five basic stroke symbols in China, with other stroke symbols being added by symmetrical images. Therefore they are easy to memorize, thus the selection process is fast, and the processing time is short. Therefore, Chinese characters can be easily input by simple operations.

In accordance with a second aspect of the invention, there is provided a Chinese character input apparatus comprising:

a key arrangement comprising 3x3 input keys, wherein the nine basic strokes of Chinese characters "—", "丨", "丿", "㇏", "乚", "㇕", "㇀", "㇈", "㇔" are assigned to an input key whereby the stroke symbol "㇔" being assigned to the central dial key and other strokes being symmetrically assigned.

According to the embodiments of the present invention, the nine stroke symbols "—", "丨", "丿", "㇏", "乚", "㇕", "㇀", "㇈", "㇔" with images of symmetrical shapes take advantage of the five basic stroke symbols in China. Among the 3x3 input keys such as in a mobile telephone terminal, the stroke symbol "㇔" is assigned to the central input key and other strokes are symmetrically assigned. Therefore, the relation between the nine stroke symbols and the nine dial keys is easy to memorize. Also, the basic stroke symbols increase to nine, which reduces the indistinction of symbols, thus the selection process is fast, and the processing time is short. Therefore, Chinese characters can be easily input by simple operations.

Brief description of the figures:

Fig. 1 is a structure diagram of an example of mobile phone terminal;

Fig. 2 is a perspective diagram of an example of Chinese character input apparatus according to an embodiment of the present invention; and

Fig. 3 is a chart for explaining the present invention.

Next, the Chinese character input method and the Chinese character input apparatus according to an embodiment of the present invention will be described with reference to the accompanying figures. The figures show an example of applying the present invention to a mobile phone terminal capable of performing wireless communication with a base station for wireless phones through prescribed wireless phone lines and performing calls through voice data transmission, and various data communications.

First, the structure of the mobile phone terminal will be described. Fig. 1 shows the internal structure of the mobile phone terminal of this example. The mobile phone terminal has a CPU (central processing unit) 31 composed of a microprocessor and performs communications as a wireless phone and various functions of the terminal under the control of the CPU 31.

As the structure for performing wireless communications, a voice signal picked up by a microphone 11 is subjected to baseband processing by an amplifier 12 etc. The voice signal after baseband processing is converted into digital voice data in a prescribed format by an A/D (analog/digital) converter 13. The digital voice data converted by the A/D converter 13 is supplied to a data processor 14 and is converted into a transmission data structure.

At this time, control data etc. supplied from the CPU 31 is also appended to the transmission data. The transmission data processed by the data processor 14 is supplied to a modulator 15 to be modulated for transmission. The data modulated by the modulator 15 is supplied to a transmission HF (high frequency) circuit 16 to be subjected to frequency conversion for transmission. The transmission signal after frequency

conversion by the HF circuit 16 is supplied to an antenna 18 via an antenna switch 17 and is wirelessly transmitted from the antenna 18.

On the other hand, a signal received by the antenna 18 is supplied to a reception HF circuit 19 via the antenna switch 17 to be subjected to frequency conversion, thus the received HF signal is converted into an IF (intermediate frequency) signal (or a baseband signal). The IF signal converted by the HF circuit 19 is supplied to a demodulator 20 to be demodulated for reception. The signal demodulated by the demodulator 20 is supplied to the data processor 14.

In the data processor 14, voice data and control data are extracted from the supplied received data. The extracted voice data is converted into an analog voice signal by a D/A (digital/analog) converter 21. The voice signal converted by the D/A converter 21 is subjected to baseband processing by an amplifier 22 etc. and then is played from a speaker 23. Also, the control data extracted by the data processor 14 is supplied to the CPU 31.

To the CPU 31 is connected a memory 32 which stores in advance the operation program necessary for a wireless phone. Also, under the control of the CPU 31, data set by user operation, such as electronic phone directory data or text message information etc. which will be described later are stored into the memory 32.

Here, in the case of the mobile phone terminal of this example, as the electronic phone directory data or the text message information, in addition to characters such as letters, Chinese characters such as those in Chinese can also be stored as prescribed codes. Also, information necessary for search process when inputting the Chinese characters is also stored in the memory 32.

Also, the mobile phone terminal includes an operation keypad 33 provided with dial keys corresponding to the numbers 1, 2, 3 ... 9, 0 and the symbols #, *, and several function keys such as a TRANSMISSION key and an END key, and includes a rotary operation unit 34 capable of input operation by rotation operation and press operation. The rotary operation unit 34 is a device called "jogdial". When the operation keypad

33 and the rotary operation unit 34 are operated, their operation commands are supplied to the CPU 31.

Also, the mobile phone terminal of this example includes a display unit 40 composed of an LCD, and numerals, characters or pictures of prescribed digits can be displayed in several lines (for example about 4 lines) on the display unit 40, under the control of the CPU 31. Backlight is provided on the display unit 40, thus the display can be confirmed even in a dark place.

The appearance of the mobile phone terminal of this example is shown in Fig. 2. On the surface of the casing composing the mobile phone terminal 10, a microphone 11 is provided at the lower part, and a speaker 23 is provided on the upper part, and the operation keypad 33 and the display unit 40 are provided on between. Also, the rotary operation unit 34 is provided on the left side where the operation keypad 33 and the display unit 40 are provided.

The rotary operation unit 34 is a rotary switch called "jogdial" with only part of a round plate portion protruding from the body of the terminal. The portion can be rotated in the upward direction as indicated by the arrow "a", be rotated in the downward direction as indicated by the arrow "b", or be pressed to the body side as indicated by the arrow "c". When each operation is performed, the corresponding operation information is supplied to the CPU 31. When the mobile phone terminal is hold by for example the left hand, the rotary operation unit 34 can be rotated upward or downward or be pressed only by the thumb of the left hand.

In this example, in the case that Chinese characters are input, 3x3=9 dial keys 33a, 33b ... 33i on the mobile telephone terminal are used as input keys. In this case, in this example, when a Chinese character is to be input, nine stroke symbols "—", "丨", "丿", "丶", "乚", "㇕", "㇀", "㇁", "㇏" with images of symmetrical shapes are used as basic elements. And when they are arranged in the fixed order observed in the calligraphy, the desired Chinese character is obtained.

In this example, the nine stroke symbols "—", "丨", "丿", "丶",

"㇄", "㇆", "㇂", "㇃", "㇔" with images of symmetrical shapes are assigned to the 3x3=9 dial keys 33a, 33b ... 33i on the mobile telephone terminal, with the stroke symbol "㇔" being assigned to the central dial key 33e and others being symmetrically assigned.

In a concrete example, as shown in Fig. 2 and Fig. 3, the stroke symbol "㇂" is assigned to the dial key 33a for inputting the number "1". The symbol "㇏" is similar to the stroke symbol "㇂". Examples of Chinese characters with the stroke symbol "㇂" are "以, 比, 项, 民, 我 ...".

Also, as shown in Fig. 2 and Fig. 3, the stroke symbol "—" is assigned to the dial key 33b for inputting the number "2". The symbol "/" is similar to the stroke symbol "—". Strokes written from left to right belong to this group of the stroke symbol "—". Examples of Chinese characters with the stroke symbol "—" are "王, 十, 凉, 纸, 刁...".

As shown in Fig. 2 and Fig. 3, the stroke symbol "㇆" is assigned to the dial key 33c for inputting the number "3". As shown in Fig. 3, the symbols "㇀", "㇁", "㇇", "㇈", "㇉", "㇊", "㇋", "㇌", "㇍", "㇎" are similar to the stroke symbol "㇆". Strokes written from left to right horizontally then forwarding down belong to this group of the stroke symbol "㇆".

As shown in Fig. 3, examples of Chinese characters with the stroke symbol "㇆" are "口, 写, 包, 又, 及, 耶, 乃, 风, 凸, 凹, 记...".

Also, as shown in Fig. 2 and Fig. 3, the stroke symbol "㇒" is assigned to the dial key 33d for inputting the number "4". The symbols "㇓", "㇕" are similar to the stroke symbol "㇒".

Strokes written from the right to the lower left belong to this group of the stroke symbol "㇒". Examples of Chinese characters with the stroke symbol "㇒" are "八, 你, 所, 月, 乐, 质...".

As shown in Fig. 3, the stroke symbol "㇔" is assigned to the central one of the 3x3 input keys, i.e. the dial key 33e for inputting the number "5". Examples of Chinese characters with the stroke symbol "㇔" are "欢, 黑, 刘...".

Also, as shown in Fig. 2 and Fig. 3, the stroke symbol "㇏" is

assigned to the dial key 33f for inputting the number "6". The symbol "㇀" is similar to the stroke symbol "㇏". Examples of Chinese characters with the stroke symbol "㇏" are "人, 火, 延, 迈...".

As shown in Fig. 2 and Fig. 3, the stroke symbol "㇄" is assigned to the dial key 33g for inputting the number "7". The symbols "㇀", "㇂", "㇆", "㇉", "㇈", "㇊" are similar to the stroke symbol "㇄". Strokes written from up to down then forwarding horizontally or obliquely to right belong to this group of the stroke symbol "㇄".

Examples of Chinese characters with the stroke symbol "㇄" are "屯, 丢, 女, 西, 巴, 转, 与, 鼎...".

Also, as shown in Fig. 2 and Fig. 3, the stroke symbol "丨" is assigned to the dial key 33h for inputting the number "8". Examples of Chinese characters with the stroke symbol "丨" are "中, 申....".

As shown in Fig. 2 and Fig. 3, the stroke symbol "㇁" is assigned to the dial key 33i for inputting the number "9". The symbol "㇂"is similar to the stroke symbol "㇁". Examples of Chinese characters with the stroke symbol "㇄" are "利, 刘, 猪, 豕....".

In the example of Fig. 2 and Fig. 3, with the stroke "丶" on the central input key 33e of the 3x3 input keys as the center, the stroke symbols with images of symmetrical shapes are arranged symmetrically, thus are easy to memorize.

In the example of Fig. 2 and Fig. 3, it is also possible to assign the stroke symbol "㇄" to the dial key 33a for inputting the number "1", and assign the stroke symbol "㇃" to the dial key 33g for inputting the number "7". In this case, the symmetrical stroke symbols are arranged at left and right side respectively.

Also, as shown in Fig. 2, the display unit 40 provided on the mobile phone terminal of this example prepares at least a first display line 41 and a second display line 42, as display lines for displaying numerals or characters. Also, a display line 43 is also prepared for displaying the reception level or the remaining energy of the batteries by pictures etc.

In the first, second display lines 41, 42 of the display unit 40, for example when performing transmission operations by the terminal, or

when the terminal is called, phone number of the addressee or phone number of the addresser is displayed with numerals on the second display line 42, under the control of the CPU 31. Also, when the phone number of the addressee is registered by the function of electronic phone directory, the two display lines 41, 42 are used to display the registered phone number with numerals, and to display the personal name or company name etc. related to the phone number with characters, under the control of the CPU 31. Here, in the case of this example, characters such as Chinese characters or letters etc. can be used as the name related to the phone number.

Thus, according to this example, the nine stroke symbols "一", "丨", "丿", "丶", "乚", "㇕", "㇀", "㇈", "丶" with images of symmetrical shapes take advantage of the five basic stroke symbols in China. Among the nine dial keys 33a, 33b ... 33i on the mobile telephone terminal which arranges the input keys as 3x3, the stroke symbol "丶" is assigned to the central dial key 33e and other strokes are symmetrically assigned. Therefore, the relation between the nine stroke symbols and the nine dial keys 33a, 33b ... 33i is easy to memorize.

Also, according to this example, since the number of basic stroke symbols increases to nine, the indistinction of symbols is reduced, thus the selection process is fast, and the processing time is short.

Therefore, according to this example, Chinese characters can be easily input by simple operations of the input keys.

Although the above example is described as applied to the case that the mobile phone terminal is used for inputting Chinese characters of Chinese, the present invention can also be used in other various electronic apparatus to input Chinese characters. For example, it can be applied to a reproduction apparatus for reproducing audio signal such as music from a prescribed medium when the title of the music is input with Chinese characters.

Also, the above example is described by an example of inputting Chinese characters by the nine basic stroke symbols assigned to the dial keys 33a, 33b ... 33i. But similarly, the jogdial (rotary operation unit 34)

can also be used to input Chinese characters. It will be readily understood that the same functions and effects as the above can also be achieved.

Also, the present invention is not limited to the above example. Other various structures may be employed without departing from the spirit of the present invention.

According to the present invention, the nine stroke symbols "—", "丨", "丿", "㇏", "㇄", "㇕", "㇀", "㇃", "丶" with images of symmetrical shapes take advantage of the five basic stroke symbols in China. Among the nine input keys arranged as 3x3 on the mobile telephone terminal, the stroke symbol "丶" is assigned to the central input key and other strokes are symmetrically assigned. Therefore, the relation between the nine stroke symbols and the nine input keys is easy to memorize.

Also, according to the present invention, since the number of basic stroke symbols increases to nine, the indistinction of symbols is reduced, thus the selection process is fast, and the processing time is short.

Therefore, according to the present invention, Chinese characters can be easily input by simple operations of the input keys.

CLAIMS

1. A Chinese character input method comprising the steps of:

inputting a stroke from among the nine stroke symbols "一", "丨", "丿", "丶", "乚", "㇕", "乀", "乙" wherein the nine stroke symbols form the basis elements of Chinese characters comprising images of symmetrical shapes observed in Chinese calligraphy (笔顺);

obtaining a desired character corresponding to the input stroke symbol of a Chinese character with images of symmetrical shapes according to the fixed order of strokes observed in Chinese calligraphy (笔顺).

2. A Chinese character input apparatus comprising:

a key arrangement comprising 3x3 input keys, wherein the nine basic strokes of Chinese characters "一", "丨", "丿", "丶", "乚", "㇕", "乀", "乙" are assigned to an input key whereby the stroke symbol "丶" being assigned to the central dial key and other strokes being symmetrically assigned.

3. The Chinese character input apparatus according to claim 2, characterized in that among said nine basic stroke symbols assigned to said key arrangement comprising 3x3 key input keys, "乀", "一", "㇕" are assigned to the input keys of the first row, and "丿", "丶", "丶"are assigned to the input keys of the second row, and "乚", "丨", "乙" are assigned to the input keys of the third row.