Character Input Method and Character Input Apparatus

The present invention relates to a character input method and a 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 the 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.

One of the conventional Chinese character input processes proposed for a mobile phone terminal for example assigns strokes (笔划) composing radicals (部首) of Chinese characters to dial keys, and strokes are specified successively according to the fixed order observed in calligraphy (笔顺) so as to specify a radical by which the desired character is found and input. For example, when the radical "王" is specified, since the radical is composed of the strokes "—" and "|", "—", "—", "|" and "—" are input successively in the fixed order observed in calligraphy, and by these operations the radical "王" is specified. Chinese characters containing the radical "王" are successively displayed as "王, 汪, 美...", and the desired character is found from the displayed characters and then is specified.

However, the input-by-radical processes require that the fixed order observed in calligraphy of each Chinese character be remembered correctly from the first stroke to the last stroke. Even if the order of one stroke is wrongly remembered, the desired Chinese character cannot be found. Meanwhile, in the case of radicals with many strokes, the times of key operations are so many that the desired character cannot be quickly found and input. Especially, when character input is performed, it is very rare to input only one character. If a plurality of characters composing a name or a message are to be input one by one by the above operations, very long time will be cost to complete a series of input operations.

Here, the description is made with regard to the case that Chinese characters are input in a mobile phone terminal, but the same problems exist in the case that Chinese characters are input in various relatively small-sized electronic apparatuses similar to the mobile phone terminal.

The purpose of the present invention is for conveniently inputting characters such as Chinese characters in an electronic apparatus with limited space to arrange the operation keys etc.

According to a first aspect of the invention, there is provided a character input method, having:

a first inputting step for inputting a first character by prescribed operations;

a first displaying step for displaying in a described order characters capable of following the character input in said first inputting step;

a condition specifying step identifying an element of a character capable of following the first character for specifying a prescribed condition for the candidate characters displayed in said first displaying step;

a second displaying step for displaying in a prescribed order only characters satisfying the condition specified in said condition specifying step, from among the candidate characters displayed in said first displaying step; and

a second inputting step for selecting a second character from among the characters displayed in said first or second displaying step and inputting the selected character.

According to a second aspect of the invention, there is provided a character input apparatus comprising:

a memory means for storing information on characters capable of being input and storing information on possible combinations of the stored characters;

an operation means for specifying specific characters among the characters stored in the memory means by prescribed operations;

a display means for displaying the characters specified by the operation means; and

a control means for judging candidate characters capable of combining with a specific first character and display them on the display means when the first character has been specified by operations of the operation means, and displaying candidate characters satisfying a specific condition specifying an element of a character capable of following the first character on the display means when the condition has been specified by operations of the operations means in the state of the displaying.

According to the present Invention, it is possible to display a string of candidate characters capable of combining with a first character after the first character has been input, and select a second character to follow the first character from among the string of candidate characters. At this time, a specific condition is specified by operations of an operation means so as to reduce the string of candidate characters to characters satisfying the condition, and the second character can be selected from a string of a few candidate characters.

Brief description of the figures:

Fig.1 is a structure diagram of an exemplary mobile phone terminal according to one embodiment of the present invention;

Fig.2 is a perspective diagram of an exemplary mobile phone terminal according to one embodiment of the present invention;

Fig.3 is a flow chart of an exemplary character input process according to one embodiment of the present invention;

Fig.4A~4E are illustrative diagrams of exemplary displays according to one embodiment of the present invention; and

Fig. 5 is a flowchart of an exemplary character input process according to another embodiment of the present invention.

Next, an embodiment of the present invention will be described with reference to the accompanying figures.

This embodiment is suitable for the case of inputting characters in 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 HF processing, thus the signal with a prescribed frequency 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 the Chinese characters are input, which will be described later, 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.

An exemplar appearance of the mobile phone terminal of this example is shown in Fig. 2. On the front 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 10 is held 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, characters are input by using the rotary operation unit 34.

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 transmission operations are performed 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.

In the mode of displaying the registered phone numbers on the display unit 40, the displayed phone numbers and names are changed successively in the prescribed order or its reverse order, under the control of the CPU 31 based on the upward or downward rotation operation of the above rotary operation unit 34. When the desired addressee phone number is displayed on the display unit 40 by such an operation, the CPU 31 calls to the phone number when the rotary operation unit 34 is pressed.

And when the phone numbers of the addressee and the addresser are displayed at the receiving side, in the case that the phone number has been registered in advance by the function of the above electronic phone directory, in addition to the phone number, the registered name etc. is also displayed.

Also, the mobile phone terminal of this example can transmit or receive a text message under the control of the CPU 31. In the case of receiving a text message, the received text message is stored into the memory 32 with the stored text message being displayed on the display unit 40. Also, the text message input by user operation and displayed on the display unit 40 can be transmitted to a party with any phone number, under the control of the CPU 31. Similar to the above case of electronic phone directory, the text message can also be displayed with characters such as Chinese characters or letters etc.

Next, the process of inputting characters by using the mobile phone terminal of this example will be described. Here, the case of inputting Chinese characters is described as an example of inputting characters for registering a name etc. by the above function of electronic phone directory, or for preparing a text message to be transmitted.

First, the codes of the Chinese characters of Chinese are classified according to specific elements, and stored in the memory 32 of the mobile phone terminal of this example. For example, each character is classified and stored according to its pronunciation. As the classification according to the pronunciation, for example, it is noticed that the pronunciation of each Chinese character is composed of a pronunciation

element called *shengmu* (声母) which is the initial consonant, and a pronunciation element called *yunmu* (韵母) which contains the vowel, and classification and storage can be made according to the pronunciation elements of *shengmu*s and *yunmu*s.

Also, in this example, for a character stored in the memory 32, information on possible combinations of the character is also stored in the memory 32. In particular, for a word composed of a plurality of characters (personal names, place names etc.), characters stored in the memory 32 and capable of combining with the initial first character when the first character is specified can be known from the information.

By using the information thus classified and stored in the memory 32, the CPU 31 performs the character input process according to the flowchart shown in Fig. 3. When the character input process are performed, the CPU 31 uses the second display line 42 of the display unit 40 as a display position for the input process. The user performs the input operation by inputting characters while looking at the display on the display line 42. Also, the first display line 41 of the display unit 40 is used as a display position for inputting a determined character string. In the following process, the input characters are displayed one by one on the display line 41, forming a name or a text message etc. Fig. 4A~E show examples of how the display changes on the display lines 41, 42.

Next, the process of the flowchart in Fig. 3 will be described. First, the CPU 31 judges whether it is in the mode of inputting characters (Step 101). Here, in the mode of inputting characters, prescribed key operations or operations of the rotary operation unit 34 are performed to input the first character of the desired word (Step 102). The character selected by these operations is displayed at the left end of the first display line 41 of the display unit 40 (Step 103). Fig. 4A shows an example of the first character selected and displayed. Here, "不" is selected and displayed at the left end of the first display line 41 of the display unit 40.

Any input method may be used to select the first character. For example, a *shengmu* and a *yunmu* are specified by key operations, and candidate characters with the pronunciation of their combination are

displayed on the display line 42, and when a character is selected therefrom to be input as the first character, it is displayed at the left end of the display line 41. Alternatively, strokes of the desired character may be specified according to the fixed order observed in calligraphy so as to specify the character.

In this example, when the process of Step 103 is performed and the first character is displayed, the CPU 31 reads out the information on characters capable of combining with the first character from the memory 32, and displays the characters on the display line 42 of the display unit 40 as a string of candidate characters (Step 104). Displayed on the display line 42 of Fig. 4A is an example of characters very likely to follow "不". Here, there are at least tens of characters very likely to follow "不", among which several characters are displayed on the display line 42. All the characters prepared as candidates can be displayed for example by rotating the rotary operation unit 34 to change their display positions. Also, among the candidate characters displayed on the display line 42, the character selected when the determination operation is performed is underlined. In the example of Fig. 4A, the character at the left end is underlined.

In this state, in the case that the character to be input as the second character is found, the character is selected from among the candidate characters by a prescribed determination operation (for example, pressing the rotary operation unit 34) (Step 109) in the state that the character is underlined. Under the control of the CPU 31, the selected character is displayed at the end (the right side) of the character string displayed on the display line 41 (Step 110).

When candidate characters are displayed in Step 104, the case that candidate characters are too many to search is considered. At this time, in the case of this example, a condition on which the character is input is specified. Here, the user is asked to press the key corresponding to the letter of the initial pronunciation of the character to be input as the second character so as to specify the initial pronunciation. In the case of a mobile phone terminal, about three letters are assigned to each of the nine keys of

"1"~"9". By pressing a key only once, a plurality of pronunciations assigned to the key may be specified.

If the CPU 31 detects the key operation in Step 104 (Step 105), only characters with the plurality of pronunciations specified by the key pressed at this time as the initials among the candidate characters prepared in Step 104 are regarded as candidate characters, and the reduced candidate characters are displayed on the display line 42 of the display unit 40 (Step 106). The display example of Fig. 4B shows the following example: in the state that "不" is displayed on the display line 41 as the character determined to be input, when the key to which the letters "J", "K", "L" are assigned (for example, the key of the number "5") is pressed, candidate characters with the letters "J", "K", "L" as the initial pronunciations are displayed on the display line 42. At this time, all the characters prepared as candidates can also be displayed for example by rotating the rotary operation unit 34 to change their display positions successively.

In this state, in the case that the character to be input as the second character is found, the character is selected from among the candidate characters by a prescribed determination operation in the state that the character is underlined (Step 109). Under the control of the CPU 31, the selected character is displayed at the end (the right side) of the character string displayed on the display line 41 (Step 110).

When candidate characters are displayed in Step 106, the case that candidate characters are too many to search is also considered. At this time, in the case of this example, a condition on which the character is input is specified again. Here, when the CPU 31 judged that a certain letter among the letters "J", "K", "L" is determined by key operations (or rotation of the rotary operation unit 34), only characters with the determined pronunciation as the initial are regarded as candidate characters, and the reduced candidate characters are displayed on the display line 42 of the display unit 40 (Step 108).

In this state, in the case that the character to be input as the second character is found, the character is selected from among the candidate

characters by a prescribed determination operation in the state that the character is underlined (Step 109). Under the control of the CPU 31, the selected character is displayed at the end (the right side) of the character string displayed on the display line 41 (Step 110).

Thus, the state in which the second character has been input is shown in Fig. 4C. This example shows the state in which "见" has been selected as the second character.

If the second character is displayed on the display line 41 in Step 110, the process returns to Step 104. That is to say, here, candidate characters very likely to follow the combination of the first character and the second character are displayed on the display line 41 successively. In the example of Fig. 4C, candidate characters very likely to follow "不见" are displayed under the control of the CPU 31. In this case, by performing the key operations of Step 105, the candidates are reduced to characters with the pronunciations assigned to a specific key as the initials. In the example of Fig. 4D, the display example shows that the key to which the letters "A", "B", "C" are assigned (for example, the key of the number "2") is pressed. In this example, the candidates are reduced to three characters.

Further, in the state shown in Fig. 4D, by performing key operations to determine the letter "B", candidates are reduced to characters with the letter "B" as the initial pronunciation. Fig. 4E shows an example of candidate characters with the letter "B" as the initial pronunciation, with the candidates being reduced to two characters. By selecting "不"from between the two characters, three characters "不见不" can be selected. By further selecting the following character using similar operations, for example a word "不见不散" can be input.

An example of reducing candidate characters by these input operations is shown in Table 1.

[Table 1]

Example		Association Words		
Phrase	Word	Index with *Shengmu*		count
开诚布公	开		办标采场车诚城除船创春刀导动端发方放封.....	80
		ABC	办标采场车诚城除船创春	11
		C	采场车诚城除船创春	9
	诚		布恳然实心意挚	7
		ABC	布	1
		B	布	1
	布		告公局朗满鞋依置	8
		GHI	告公	2
		G	公	1
	公			
不见不散	不		安败比必便变畅成错大单但当得等定懂断对.....	133
		JKL	及计佳见讲解仅尽禁久觉堪靠可肯快愧理力.....	23
		J	及计佳见讲解仅尽禁久觉	11
	见		报不长解面识闻习效证状	11
		ABC	报不长	3
		B	报不	2
	不		安败比必便变畅成错大单但当得等定懂断对.....	133
		PQRS	怕配平巧清屈然忍容如散善少深慎胜失时是.....	22
		S	散善少深慎胜失时是适熟算	12
	散			

The example in the lower part of Table 1 shows the case that "不见不散" is input. For example, when "不" is input as the first character, there are 133 candidate characters for the second character. Here, by pressing the key specifying the letters "J", "K", "L", the candidate characters for the second character are reduced to 23. Then by specifying the letter "J" among them, the candidate characters are further reduced from 23 to 11.

By selecting "见" from the 11 candidate characters, there are for the third character 11 candidates capable of combining with "不见". Here, by pressing the key specifying the letters "A", "B", "C", candidates for the

third character are reduced to three. Then by specifying the letter "B" among them, the candidate characters are further reduced to 2.

Thus, "不见不散" can be input by a few key operations.

The example in the upper part of Table 1 shows the case that "开诚布公" is input. It is obvious that candidate characters can be reduced by performing similar operations successively.

By performing the character input of this example in this manner, for characters after the first character in a word, a string of candidate characters are displayed automatically. Selection is made therefrom, thus input can be simply performed. In the case of many candidate characters, by operating the key specifying the initial pronunciation, candidate characters can be reduced so that selection can be made from among a few candidate characters. Therefore, a word composed of a plurality of characters can be input by a very few key operations, which greatly enhances the efficiency of character input in an apparatus with limited keys such as a mobile phone terminal.

In the example described above, the process of specifying elements to reduce the candidate characters for the second or following character is to specify the initial pronunciation, but other elements may be specified as well. For example, it is also possible to specify strokes according the fixed order observed in calligraphy to reduce the candidate characters for the second or following character.

That is to say, Chinese characters stored in the memory 32 are here classified according to which of the five strokes "—", "丨", "丿", "丶", "㇕" is the first stroke when a Chinese character is written. Further, information on the second stroke, the third stroke ... is also stored when necessary. Then, the five strokes "—", "丨", "丿", "丶", "㇕" are assigned to five of the number keys.

Then, characters are input according to the flowchart of Fig. 5. That is to say, first, the CPU 31 judges whether it is in the mode of inputting characters (Step 201). Here, in the mode of inputting characters, prescribed key operations or operations of the rotary operation unit 34 are performed to input the desired first character (Step 202). The character

selected by these operations is displayed at the left end of the first display line 41 of the display unit 40 (Step 203). Any input method may be used to select the first character. Then, when the process of Step 203 is performed and the first character is displayed, the CPU 31 reads out the information on characters capable of combining with the first character from the memory 32, and displays the characters on the display line 42 of the display unit 40 as a string of candidate characters (Step 204).

In this state, in the case that the character to be input as the second character is found, the character is selected from among the candidate characters by a prescribed determination operation (for example, pressing the rotary operation unit 34) in the state that the character is underlined (Step 209). Under the control of the CPU 31, the selected character is displayed at the end (the right side) of the character string displayed on the display line 41 (Step 210).

When candidate characters are displayed in Step 204, a condition on which the character is input is specified when candidate characters are too many to search. Here, the user is asked to press the key corresponding to the first stroke of the character to be input as the second character so as to specify the stroke. If the CPU 31 detects the key operation (Step 205), it regards only characters with the stroke specified by the key pressed at this time as the first stroke as candidate characters from among the candidate characters prepared in Step 204, and displays the reduced candidate characters on the display line 42 of the display unit 40 (Step 206).

In this state, in the case that the character to be input as the second character is found, the process shifts to the selection operations and display operations of Step 209 and Step 210.

Further, when candidate characters displayed in Step 206 are still too many to search, the user is asked to press the key corresponding to the second stroke so as to specify the stroke. If the CPU 31 detects the key operation (Step 207), it regards only characters with the stroke specified by the key pressed at this time as the second stroke as candidate characters from among the candidate characters prepared in Step 206, and displays the reduced candidate characters on the display line 42 of the

display unit 40 (Step 208).

In this state, in the case that the character to be input as the second character is found, the process shifts to the selection operations and display operations of Step 209 and Step 210.

Further, when candidate characters are too many to search, the process can also shifts to operations for specifying the third stroke.

Thus, by specifying the strokes according the fixed order observed in calligraphy, a word composed of a plurality of characters can be simply input, similarly to the case of specifying the pronunciations as described above.

An example of reducing candidate characters by these operations for specifying the strokes is shown Table 2.

[Table 2]

Example				
Phrase	Word	Index with First Stroke		count
开诚布公	开		办辟标采场车诚城除船创春刀导动端发方放.....	80
		丶	诚端方放关户火课阔朗门启窍赛设市庭通头	23
	诚		不恳然实心意挚	7
		一	布挚	2
	布		告公局朗满鞋依置	8
		丿	告公依	3
	公			
不见不散	不		安败比必便变畅成错大单但当得等定懂断对.....	133
		丨	败畅见肯明时是同畏易止只足	13
	见		报不长解面识闻习效证状	11
		一	报不面	3
	不		安败比必便变畅成错大单但当得等定懂断对.....	133
		一	成大顾过禁堪可理配平巧散无想幸朽需严要.....	25
	散			

In the case of Table 2, the example in the lower part also shows the case that "不见不散" is input, and the example in the upper part also shows the case that "开诚布公" is input. In this example, as an example for specifying the first stroke, it is obvious that candidate characters are

reduced by specifying the first stroke.

When Chinese characters are input as described above, if the character combination at that time is a combination with high priority, the CPU 31 can also register it into the memory 32. By registering in this manner, in the case that next time the same characters are input and candidate characters are displayed, character input can be more quickly performed by displaying the candidate characters successively on the display unit 40 starting from the character with high priority. For example, when "不见不散" is input, by registering the character combination as a combination with high priority, when "不" is initially input as the first character, "见" is displayed first (at the left end) as a candidate for the second character, and "不" is displayed first as a candidate for the third character, and "散" is displayed first as a candidate for the fourth character, thus "不见不散" can be input by a very few operations. Thus, the mobile phone terminal will become more convenient for the user to use if it is repeatedly used by the user to input characters.

Also, the order to display candidate Chinese characters can be changed according to the operation mode of the terminal when Chinese characters are input. For example, in the mode of inputting Chinese characters to be registered as electronic phone directory, Chinese characters frequently used as names are displayed with priority on the display unit, while in the mode of inputting Chinese characters to be transmitted as text message, common words are displayed with priority on the display unit.

Also, in the above example as shown in Fig. 4, as the display on the display unit when Chinese characters are input, the character to be selected is underlined. But, other ways of display may be employed to indicate the part to be selected. For example, blinking may be applied to the part of the character to be selected, to indicate that the part is to be selected, or the display color can be reversed to indicate that the part is to be selected.

Although the above embodiments are applied to the mobile phone terminal for inputting Chinese characters of Chinese, it 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.

Further, in the above embodiment, in the case that Chinese characters are input, pronunciations or strokes are specified to reduce a plurality of candidate characters capable of character combination. But other character elements may be specified to reduce the candidate characters. Also, in the case that a plurality of characters other than Chinese characters of Chinese are input, it is also possible to specify specific elements to reduce candidate characters.

According to the character input method of the 1st aspect of the present invention, it is possible to display a string of candidate characters capable of combining with a first character after the first character has been input, and select a second character to follow the first character from among the string of candidate characters. At this time, a specific condition is specified by operations of an operation means so as to reduce the string of candidate characters to characters satisfying the condition, and the second character can be selected from a string of a few candidate characters. Therefore, for input operations of the second or following character when characters are input, selection can be made from among a string of a few candidate characters, and the desired character to be input can be easily found and selected.

According to the character input method of the 2nd aspect of the present invention, the 1st aspect of the invention has a third displaying step for displaying in a prescribed order characters capable of following the first character and the second character when the second character has been input in the second inputting step. Thus, for the input operations of the third or following character, it is possible to reduce the string of candidate characters to a few characters, similarly to the second character.

According to the character input method of the 3rd aspect of the present invention, in the 1st aspect of the present invention, the condition specifying step specifies an initial pronunciation element for the

candidate characters. Thus, it is possible to use pronunciation elements to reduce candidate characters, and reduce candidate characters by simple operations.

According to the character input method of the 4th aspect of the present invention, in the 1st aspect of the present invention, the condition specifying step specifies a first stroke element for the candidate characters. Thus, it is possible to use first stroke elements to reduce candidate characters, and reduce candidate characters excellently.

According to the character input method of the 5th aspect of the present invention, the 1st aspect of the invention has a priority setting step for registering the character input in the second inputting step, as character with high priority among the candidate characters capable of following the character input in the first inputting step. Thus whenever a character is input, character strings frequently input are given high priority, and it is possible to set the display order according to the priority, and quickly input character strings frequently input by a few operations.

According to the character input method of the 6th aspect of the present invention, the 1st aspect of the invention has a registering step for registering the character string input in the first and second inputting steps, as phone directory information which is name information corresponding to a phone number. Thus, names to be registered as phone directory can be simply input.

According to the character input method of the 7th aspect of the present invention, the 1st aspect of the invention has a transmitting step for transmitting the character string input in the first and second inputting steps, to an opposite party via a prescribed communication line, as text message information. Thus, characters to be transmitted as text message can be simply input.

According to the character input apparatus of the 8th aspect of the present invention, it is possible to display a string of candidate characters capable of combining with a first character after the first character has been input, and select a second character to follow the first character from among the string of candidate characters. At this time, a specific

condition is specified by operations of an operation means so as to reduce the string of candidate characters to characters satisfying the condition, and the second character can be selected from a string of a few candidate characters. Therefore, a character input apparatus can be obtained wherein for input operations of the second or following character when characters are input, selection can be made from among a string of a few candidate characters, and the desired character to be input can be easily found and selected.

According to the character input apparatus of the 9th aspect of the present invention, in the 8th aspect of the present invention, when a second character has been selected from among the candidate characters, the control means further displays candidate characters capable of combining with the two characters of the first character and the second character. Thus, a character input apparatus can be obtained wherein for the input operations of the third or following character, it is possible to reduce the string of candidate characters to a few characters, similarly to the second character.

According to the character input apparatus of the 10th aspect of the present invention, in the 8th aspect of the present invention, the specifying of a specific condition by operations of the operation means is to specify an initial pronunciation element for the candidate characters. Thus, a character input apparatus can be obtained to use pronunciation elements to reduce candidate characters, and reduce candidate characters by simple operations.

According to the character input apparatus of the 11th aspect of the present invention, in the 8th aspect of the present invention, the specifying of a specific condition by operations of the operation means is to specify for the candidate characters that a first stroke is a specific element. Thus, a character input apparatus can be obtained to use first stroke elements to reduce candidate characters, and reduce candidate characters by simple operations.

According to the character input apparatus of the 12th aspect of the present invention, in the 8th aspect of the present invention, when a

second character has been selected, the control means regards the selected character as a character with high priority among candidate characters capable of following the first character, and store it into the memory means. Thus, a character input apparatus can be obtained wherein whenever a character is input, character strings frequently input are stored with high priority, and it is possible to set the display order according to the priority, and quickly input character strings frequently input by a few operations.

According to the character input apparatus of the 13th aspect of the present invention, in the 8th aspect of the present invention, the control means registers the input character string as phone directory information which is name information corresponding to a phone number. Thus, a character input apparatus can be obtained to simply input names to be registered as phone directory.

According to the character input apparatus of the 14th aspect of the present invention, in the 8th aspect of the present invention, the control means transmits the input character string to an opposite party via a prescribed communication line as text message information. Thus, a character input apparatus can be obtained to simply input characters to be transmitted as text message.

CLAIMS

1. a character input method, having:

a first inputting step for inputting a first character by prescribed operations;

a first displaying step for displaying in a described order characters capable of following the character input in said first inputting step;

a condition specifying step identifying an element of a character capable of following the first character for specifying a prescribed condition for the candidate characters displayed in said first displaying step;

a second displaying step for displaying in a prescribed order only characters satisfying the condition specified in said condition specifying step, from among the candidate characters displayed in said first displaying step; and

a second inputting step for selecting a second character from among the characters displayed in said first or second displaying step and inputting the selected character.

2. The character input method according to Claim 1, having a third displaying step for displaying in a prescribed order characters capable of following said first character and said second character when said second character has been input in said second inputting step.

3. The character input method according to Claim 1 or 2, wherein said condition specifying step specifies an initial pronunciation element for the candidate characters.

4. The character input method according to Claim 1 or 2, wherein said condition specifying step specifies a first stroke element for the candidate characters.

5. The character input method according to any one of the preceding claims, having a priority setting step for registering the character input in said second inputting step, as character with high priority among the candidate characters capable of following the character input in said first inputting step.

6. The character input method according to any one of the preceding claims, having a transmitting step for transmitting the character string input in said first and second inputting steps, as phone directory information which is name information corresponding to a phone number.

7. The character input method according to any one of the preceding claims, having a transmitting step for transmitting the character string input in said first and second inputting steps, to an opposite party via a prescribed communication line, as text message information.

8. A character input apparatus, comprising:

memory means for storing information on characters capable of being input and storing information on possible combinations of the stored characters;

an operation means for specifying specific characters among the characters stored in said memory means by prescribed operations;

a display means for displaying the characters specified by said operation means; and

a control means for judging candidate characters capable of combining with a specific first character and display them on said display means when the first character has been specified by operations of said operation means, and displaying candidate characters satisfying a specific condition specifying an element of a character capable of following the first character on said display means when the condition has been specified by operations of said operation means in the state of said displaying.

9. The character input apparatus according to Claim 8, wherein when a second character has been selected from among said candidate characters, said control means further displays candidate characters capable of combining with the two characters of said first character and said second character.

10. The character input apparatus according to Claim 8 or 9, wherein said specifying of a specific condition by operations of said operation means is to specify an initial pronunciation element for the candidate characters.

11. The character input apparatus according to Claim 8 or 9, wherein said specifying of a specific condition by operations of said operation means is to specify for the candidate characters that a first stroke is a specific element.

12. The character input apparatus according to any one of Claims 8 to 11, wherein when a second character has been selected, said control means regards the selected character as a character with high priority among

candidate characters capable of following said first character, and store into said memory means.

13. The character input apparatus according to any one of Claims 8 to 12, wherein said control means registers the input character string as phone directory information which is name information corresponding to a phone number.

14. The character input apparatus according to any one of Claims 8 to 13, wherein said control means transmits the input character string to an opposite party via a prescribed communication line a text message information.

15. Apparatus according to any one of Claims 8 to 14, operable according to the method of any one of Claims 1 to 7.

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Character Input Method and Character Input Apparatus

Abstract

A character input method and a character input apparatus can display a string of candidate characters capable of combining with a first character after the first character has been input, and select a second character to follow the first character from among the string of candidate characters. At this time, a specific condition is specified by operations of an operation means so as to reduce the string of candidate characters to characters satisfying the condition, and the second character can be selected from a string of a few candidate characters. Therefore, for input operations of the second or following character when characters are input, selection can be made from among a string of a few candidate characters, and the desired character to be input can be easily found and selected.

Figure 1