

Character input Method and Character Input Apparatus

Field of the Invention

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

Background Art

A small-sized electronic device, such as a mobile phone terminal or a pager, includes a display unit composed of an LCD etc. for displaying various information including numbers, characters, pictures and the like. For example, in the case of a mobile phone terminal, there has been a kind of device with a function of so-called electronic telephone directory, capable of storing hundreds of telephone numbers. Meanwhile, for each of the stored telephone number, a personal name or company name is stored so as to indicate whose telephone number it is, and the stored telephone numbers and names etc. could be displayed. Also, in the case of a mobile phone terminal with the function of character message transmission, character messages input to the mobile phone terminal can be sent to another telephone, or the mobile phone terminal can receive character messages sent from another telephone and display them on the display unit.

Here, when it is considered to display Chinese characters of Chinese language on the display unit of such an electronic apparatus, since there are more than 6000~7000 frequently used Chinese characters, a method for inputting these characters is desirable. For example, in the case of a relatively large electronic apparatus with a keyboard by which letters could be inputted, the keyboard can be used to input the pronunciation of the desired Chinese characters, by typing letters, and candidate characters

having the pronunciation are displayed successively on the display unit, and the desired character can be selected 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 virtue of letter keys, whose number is identical to the number of letters, is not suitable for a small-sized electronic apparatus such as a mobile phone terminal. In the case of a mobile phone terminal, the inputting of letters is realized by assigning three or four letters to each dial key of a terminal, and pressing the dial key for different times.

Furthermore, when characters are inputted, it is often to input long character strings such as names, addresses and messages. If the pronunciations of these characters are inputted character-by-character through the dial keys, the times of pressing keys increases as the number of inputted characters increases, therefore the process of inputting becomes very troublesome. As a result, the inputting of Chinese characters becomes very troublesome in a small-sized electronic apparatus such as a mobile phone terminal.

Here, although above description is made with reference to the problem of inputting Chinese characters in case of a mobile phone terminal, the same problem exists when Chinese characters need to be inputted in various relatively small-sized electronic apparatuses similar to the mobile phone terminal.

Summary of the Invention

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

According to one aspect of the present invention, there is provided a character input method for inputting a character string of a plurality of characters, wherein each of the characters is defined by a plurality of pronunciation elements, the method comprising the steps of: inputting the first character of the character string through a prescribed operation; inputting initial parts of the pronunciation elements of a plurality of characters that follow the first character in the character string, without inputting all the parts of the pronunciation elements; displaying from among a plurality of stored character strings a character string comprising the inputted first character and a plurality of following characters, for which the initial parts of the pronunciation elements match the inputted initial parts of the pronunciation elements, in the same order; and determining the displayed character string as the characters to be inputted.

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

- a memory unit for storing character strings as searching objects;
- an operation unit, at least capable of inputting marks corresponding to pronunciation elements of a plurality of characters in a character string;
- a display unit for displaying inputted marks corresponding to the pronunciation elements and characters specified by the marks; and a control unit for reading out a candidate character string, by matching an inputted first character and marks of only initial parts of the pronunciation elements of the plurality of characters that follow the first character, inputted through the

operation of the operation unit, from the memory unit, and displaying the candidate character string on the display unit for determining as the character string being input.

According to an embodiment, by performing input related to a first character and inputting the marks of the initial parts of the pronunciation elements of the respective characters following the first character by the operation unit, reading out the candidate character strings from the character string stored in the memory unit as searching objects and displaying them on the display unit, the displayed character string can be determined to be the inputted characters.

Brief Description of Drawings

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

Fig. 2 is a perspective diagram of an exemplary profile of a mobile phone

terminal according to an embodiment of the present invention;

Fig.3 is a flowchart of an exemplary character inputting process according to an embodiment of the present invention;

Fig.4 is illustrative diagram of an exemplary display of inputting based on the flowchart of fig.3;

Fig.5 is illustrative diagram of an exemplary display of inputting method different from that in fig.4;

Fig.6 is a flowchart of an exemplary character inputting process according to another embodiment of the present invention; and

Fig.7 is illustrative diagram of an exemplary display of inputting based on the flowchart of fig.6.

Detailed Description of the Preferred Embodiments

The embodiments of the present invention will be described with reference to the attached drawings.

This embodiment is applicable to 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 communication.

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

In the structure of performing wireless communications, a voice signal

picked up by a microphone 11 is subjected to baseband processing by an amplifier 12 etc. The baseband-processed voice signal is converted into digital voice data with a prescribed format by an A/D 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 structure of transmission data. At this time, control data etc. supplied from the CPU 31 is also attached to the transmission data. The transmission data processed by the data processor 14 is supplied to a modulator unit 15 to be modulated. The data signal modulated by the modulator unit 15 is supplied to a transmission HF (high frequency) circuit unit 16 to be subjected to frequency conversion for transmission. The transmission signal after frequency conversion by the HF circuit unit 16 is supplied to an antenna 18 via an antenna switch 17 and is wirelessly transmitted from the antenna 18.

Also, a signal received by the antenna 18 is supplied to a reception HF circuit unit 19 via the antenna switch 17 to be subjected to frequency conversion processing, 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 unit 19 is supplied to a demodulator unit 20 to be demodulated. The signal demodulated by the demodulator 20 is supplied to the data processor unit 14. In the data processor unit 14, voice data and control data are extracted from the received signal. 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 amplifying processing in an amplifier 22 or the like and then is played from a speaker 23. Also, the control data extracted by the data processor 14 is supplied to the CPU 31.

The CPU 31 is connected to a memory 32 which stores in advance the operation program necessary for a wireless phone. Also data set by

users' operation, such as electronic phone directory data or character message information etc. which will be described later, are stored into the memory 32 under the control of the CPU 31. Here, in the case of mobile phone terminal of this example, for the electronic phone directory data or the character message information, in addition to characters such as letters, Chinese characters such as those in Chinese language can also be stored as prescribed codes. Also, information necessary for search process when the Chinese characters are input, which will be described later, are also stored in the memory 32.

In addition, 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 inputting by operation of rotating and pressing.

In the case of this example, 26 letters are assigned to number dial keys 2-9 in the dial keys of operation keypad 33. That is to say, three letters "A, B, C" are assigned to key 2, three letters "D, E, F" are assigned to key 3, three letters "G, H, I" are assigned to key 4, three letters "J, K, L" are assigned to key 5, three letters "M, N, O" are assigned to key 6, four letters "P, Q, R, S" are assigned to key 7, three letters "T, U, V" are assigned to key 8, and four letters "W, X, Y, Z" are assigned to key 9. The rotary operation unit 34 is an apparatus referred to as "jogdial". When the operation keypad 33 and the rotary operation unit 34 are operated, their operation instructions are supplied to the CPU 31.

Also, the mobile phone terminal of this example includes a display unit 40 composed of an LCD, and can display numerals, characters or pictures of preset digits 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 recognized even in a dark place.

An exemplary profile of the mobile phone terminal of this example is shown in figure 2. On the front surface of the casing of the mobile phone terminal 10, a microphone 11 is provided at the lower parts, a speaker 23 is provided on the upper part, and the operation keypad 33 and the display unit 40 are provided therebetween. On the dial keys corresponding to numbers etc. in the operation keypad 33, numbers 1, 2, 3, ..., 9, 0 and the symbols #, *, are printed. Also, three or four letters assigned as described above are printed on the number key 2~9.

Also, the rotary operation unit 34 is provided on the left side where the operation keypad 33 and the display unit are provided. The rotary operation unit 34 is a rotary switch called "jogdial" with a part of a round plate portion protruding outside 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 arrows "c". When each of the operations is performed, the corresponding operation information is supplied to CPU 31. When the mobile phone terminal 10 is held by for example a left hand, the rotary unit 34 can be rotated upward or downward or be pressed only with the thumb of the left hand. In this example, characters can be inputted by using the rotary unit 34.

Also, as shown in figure 2, the display unit 40 provided on the mobile phone terminal of this example is configured to have several display lines, such as the display line 41 and the display line 42, to display numbers and characters. Also, a display line 43 is arranged to display reception level or the residual amount of the batteries with pictures.

In the display line 41, 42 of the display unit 40, for example, when a transmission operation is performed by the terminal, or when the terminal is called, the phone number of the receiver or the phone number of the transmitter is displayed with numbers on the second display line 42, under the control of the CPU 31. Also, when the phone number of the receiver is registered by the function of electronic phone directory, the two display lines 41, 42 are used to display the registered phone number with numbers and the personal name or company name etc. related to the phone number with characters, under the control of CPU 31. Here, in the case of this example, numbers, and characters such as Chinese characters or letters etc. can be used to display 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 phone number is displayed on the display unit 40 by such an operation, the rotary operation unit 34 is pressed, so that the CPU31 performs processing for calling the said phone number.

Likewise, when the phone numbers of a receiver or transmitter is displayed, in the case that the phone number has been registered in advance by the function of the above electronic phone directory, the registered name etc. are also displayed in addition to the phone number thereof.

Also, the mobile phone terminal of this example can transmit or receive a

character message under the control of the CPU31. In the case of receiving a character message, the received character message is stored into the memory 32, and at the same time the stored character message is displayed on the display unit 40. Also, the character 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 character 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 of Chinese language is described as an example of inputting characters to register a name etc. by the above function of electronic phone directory, or to prepare a character message to be transmitted.

First, the codes of the Chinese characters of Chinese language are classified according to the pronunciations of these characters, and stored in the memory 32 of the mobile phone terminal of this example. Here, based on the fact 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 contain the vowel, the classification and storage can be made using the letters indicating the pronunciation elements, shengmus and yunmus.

That is, the shengmus from the pronunciations of Chinese characters, as denoted by the letterized indicators in the shengmu column of the following table 1, basically include 21 different pronunciations. Also, the yunmus, as denoted by the letterized indicators in the yunmu column of the following table 1, include 35 different pronunciations.

Table 1 Contents of Shengmus and Yunmus

Shengmu	basic	b p m f d t n l g k h j q x zh ch sh r z c s
	additiona l	basic shengmu + a o e + w y
yunmu		a o e ai ei ao ou an en ang eng ong i ia ie iao iou ian in iang ing iong u ua uo uai uei uan uen uang ueng ü ü eü an ü n

With the combining of the letterized shengmus and yunmus indicated in the table 1, the pronunciation elements of Chinese characters of Chinese language can be expressed.

Here, in the case of this example, by letterizing the pronunciations of the Chinese characters stored in the memory 32 and storing them, the inputting of these letters can be used to search a Chinese character. Furthermore, in this example, by storing the information of idioms composed of several Chinese characters in the memory 32, these idioms can be easily searched using this information. As for idioms, for example, in the mobile phone terminal of this example, the information of frequently used idioms composed of several Chinese characters (4 Chinese characters in the following illustrated example), are stored in the memory 32.

Thus, using the information of idioms stored in the memory 32, CPU 31 perform the process of inputting of characters of the idioms, according to the process of the flowchart of figure 3. When the characters are inputted, CPU 31 use, for example, the display line 42 of the display unit 40 as the display position of inputting process. The user performs the inputting

operation of characters while watching the display contents of the display line 42.

Next, the process of flowchart of figure 3 will be described with reference to the display example (in which “不见不散” are inputted) of figure 4. First, CPU 31 determines whether the mode of inputting characters is selected (step 101). Here, if the mode of inputting characters is selected, it is determined whether the mode of inputting idioms is selected (step 102). If the mode of inputting idioms is not selected, then the process of inputting each character is performed. The process of inputting each character can be realized by using already known methods, the description of which is omitted here.

Then, in case it is determined in step 102 that the mode of inputting idioms is selected, the inputting of initial character (that is, the first character) of the idiom is performed (step 103). To input the first character, for example, dial keys are operated to specify the letters assigned to the dial keys, thus the pronunciation of the first character is inputted. Figure 4A shows an example that the pronunciation of the first character is inputted and displayed on the display unit 40. Here, it is supposed that “bu” is inputted.

If there are prescribed operations after the inputting of the pronunciation, CPU 31 displays a list of the Chinese characters with the inputted pronunciation on the display unit 40. Then the rotary operation unit 34 is operated to search the desired Chinese character out of the displayed Chinese characters, so the first character is determined. The determined first character is displayed on the display unit 40 (step 104). Figure 4B shows an example of selecting and displaying “不” from the Chinese characters with the pronunciation “bu” .

If the inputting of the first character is concluded, then the dial keys are operated to input the shengmus of remaining characters of the idiom to be inputted (step 105). At this time, only the first letters of the shengmus are inputted in turn. For example, in the case that the four-character idiom to be inputted is “不见不散”, if the “不见不散” is expressed with the letterized pronunciations, it is “bu-jian-bu-san”. The first letter “J” of the pronunciation of the character “见” following the inputted first character “不”, is inputted. Then the first letter “B” of the pronunciation of the character “不” next to “见”, is inputted. Further, The first letter “S” of the pronunciation of the last character “散”, is inputted.

Therefore, after the “不” is inputted, the operation of inputting three letters “JBS” is performed. Figure 4C shows an example of inputting and display “JBS” after inputting of “不”.

After the above inputting, the user of the mobile phone terminal uses the rotary operation unit 34 to perform the operation of specifying (step 106). CPU 31 searches the idiom corresponding to the inputting, from the four-letter idioms stored in the memory 32. That is, in this example, the four-letter idioms are searched, whose first character is “不”, and whose remaining three characters' pronunciation's first letters are “JBS” successively. At this time, it is determined whether there is only one candidate idiom (step 107). If there is only one candidate idiom, the candidate idiom is displayed on the display unit 40 (step 108). Figure 4D shows an example of displaying a candidate four-letter idiom “不见不散” as a result of the inputting.

In the state of displaying the candidate characters, CPU 31 determines

whether the operation of the determination of inputting is performed by the operation of the rotary operation unit 34 (step 109). If the operation of the determination of inputting is performed, it is determined that the displayed four-character idiom is that to be inputted (step 110). Then, if the period during which the operation of the determination of inputting is not performed exceeds a prescribed time, then the present candidate characters become invalid. When the present candidate characters become invalid, the process returns to for example the state of displaying the first character and the letters (after step 105), the process of changing letters is made if necessary (the method of changing is omitted here).

Further, if it is determined in step 107 that there are more than one candidate idiom corresponding to the present inputting, these candidate idioms are successively displayed on the display unit 40 (step 111). For the present display process, the displayed candidate idiom may be switched, for example, every several seconds, or the displayed idiom may be switched successively each time a certain key is operated. Then, when the idiom to be determined as the inputted characters is displayed, CPU 31 determines whether the operation of the determination of inputting is performed by the operation of the rotary operation unit 34 (step 112). If the operation of the determination of inputting is performed, it is determined that the displayed four-character idiom is that to be inputted (step 110). Then, if in the step 112 the period during which the operation of the determination of inputting is not performed exceeds a prescribed time, then all the present candidate characters become invalid. When all the present candidate characters become invalid, the process returns to for example the state of displaying the first character and the letters (after step 105), the process of changing letters is made if necessary.

In case the candidate idiom is not found from the stored data in the

memory 32 in the step 107, for example, the display as shown in figure 4C remains, the displayed letter can be changed if necessary.

Then, the character string determined in step 110 is regarded as the information corresponding to the present operation mode. For example, in the mode of transmitting character message to any opposite parties, the inputted characters are stored as the character message information in the memory 32. When the operation of transmitting the character message is performed, the stored character message information is read out from the memory 32, and transmitted to another party through wireless telephone line. Moreover, when the characters are inputted as the names in the electronic telephone directory registered together with the telephone numbers, the inputted characters are stored in the memory 32 as names.

By performing process of inputting idioms in this manner, compared with searching the characters one-by-one and inputting the idiom formed out of these characters, it is possible to quickly and easily input characters through a very few key operations. That is, for example, in the case of the above example, after the first character “不”, the initial character, is first inputted, it is only required to input the first letters of the pronunciations of the remaining three characters, that is, three letters “JBS”. Compared with inputting four characters one-by-one, it is possible to quickly input four-character idioms.

Here, three examples of four-character idioms, inputted through the process of this example, are shown in the following table 2.

Table 2

Inputting characters	Inputting method
不 见 不 散 bu jian bu san	bu→J→B→S
不 能 实 现 bu neng shi xian	bu→N→S→X
不 败 之 地 bu bai zhi di	bu→B→Z→D

Although in the above description, the searching is based on the so-called inputting of pronunciation, that is, the first character, or initial character, is inputted by virtue of the letterized pronunciation, it is also possible to input the first character in other inputting manners.

For example, the strokes of radicals (部首) of Chinese characters can be assigned to respective dial keys, thus a radical can be specified by specifying the strokes successively according to the order of the strokes. On the basis of the radical, the desired character can be found and inputted. For example, when the radical “王” is to be specified, since it is composed of strokes “一” and “丨”, the stroke “一”, “一”, “丨”, and “一” are successively inputted according to the order of strokes, thus the radical “王” is specified through these operations. Those Chinese characters with the radical “王” are displayed as “王, 汪, 美, …”, and the desired character is found from the displayed Chinese characters, thus the selected character is specified.

It is also possible to input the first character by way of inputting by radicals. Figure 5 shows a display example of inputting the first character by way of inputting by radicals. In this example, the inputting process is also described by example of four-character idiom “不见不散”. First,

as shown in figure 5A, in order to input the first character, the initial character “不”, the radicals of the character “不” are specified and inputted according to the order of strokes, and are respectively displayed on the display unit 40. After the first character “不” is searched and displayed by way of inputting by radicals, as shown in figure 5B, the initial letters of the pronunciations of the remaining three characters are inputted, as shown in figure 5C, thus the first character “不” and letters “JBS” are displayed. Through changing operation, the respective four-character idiom “不见不散” are displayed as shown in figure 5D, thus the inputting of the four-character idiom is determined.

Furthermore, in the above description of the process of inputting idioms, the first character, or the initial character of the desired idiom, is specified in the process of inputting, but for the first character of the desired idiom, it is also possible to only input the first letter of the pronunciation of the first character.

Figure 6 is a flowchart showing an example of inputting process, in which only the first letter of the pronunciation of the first character is inputted. Next, the process will be described with reference to the display example (in which “不见不散” are inputted) of figure 7. First, CPU 31 determines whether the mode of inputting characters is selected (step 201). Here, if the mode of inputting characters is selected, it is determined whether the mode of inputting idioms is selected (step 202). If the mode of inputting idioms is not selected, then the process of inputting every character is performed. The process of inputting every character can be realized by using already known methods, the description of which is omitted here.

Then, if it is determined in step 202 that the mode of inputting idioms is

selected, the first letters of pronunciations of all characters of the idioms are inputted (step 203). For the inputting of these letters, for example, dial keys are operated to successively specify and input the letters assigned to the dial keys. Figure 7A shows the inputting example of the process. Here, if the inputting character string “不见不散” is expressed by the letterized pronunciations, then it is “bu-jian-bu-san”, the first letters “BJBS” of the pronunciations of the respective characters are inputted and displayed on the display unit 40.

After the above inputting, the user of the mobile phone terminal uses the rotary operation unit 34 to perform the operation of specifying (step 204). CPU 31 searches the idiom corresponding to the inputting, from the four-letter idioms stored in the memory 32. That is, in this example, the four-letter idioms are searched, whose first letters of the pronunciations of respective characters are “BJBS”. At this time, it is determined whether there is only one candidate idiom (step 205). If there is only one candidate idiom, the candidate idiom is displayed on the display unit 40 (step 206). Figure 7B shows an example of displaying a candidate four-letter idiom “不见不散” as a result of the inputting.

In the state of displaying the candidate characters, CPU 31 determines whether the operation of the determination of inputting is performed by the operation of the rotary operation unit 34 (step 207). If the operation of the determination of inputting is performed, it is determined that the displayed four-character idiom is that to be inputted (step 208). Then, if the period during which the operation of the determination of inputting is not performed exceeds a prescribed time, then the present candidate characters become invalid. When the present candidate characters become invalid, for example, the process returns to for example the state of displaying the letters (after step 203), the process of changing letters is

made if necessary.

Further, if it is determined in step 205 that there are more than one candidate idiom corresponding to the present inputting, these candidate idioms are successively displayed on the display unit 40 (step 209). For the present display process, the displayed candidate idiom may be switched, for example, every several seconds, or the displayed idiom may be switched successively each time a certain key is operated. Then, when the idiom to be determined as the inputted characters is displayed, CPU 31 determines whether the operation of the determination of inputting is performed by the operation of the rotary operation unit 34 (step 210). If the operation of the determination of inputting is performed, it is determined that the displayed four-character idiom is that to be inputted (step 208). Then, if in the step 210 the period during which the operation of the determination of inputting is not performed exceeds a prescribed time, then all the present candidate characters become invalid. When all the present candidate characters become invalid, the process returns to for example the state of displaying the first character and the letters (after step 203), the process of changing letters is made if necessary.

In case the candidate idiom is not found from the stored data in the memory 32 in the step 205, for example, the display of inputted letters as shown in figure 4A remains, the displayed letter is changed if necessary.

Then, the character string determined in step 208 is regarded as the information corresponding to the present operation mode. For example, in the mode of transmitting character message to any opposite parties, the inputted characters are stored as the character message information in the memory 32. When the operation of transmitting the character message is performed, the stored character message information is read out from the

memory 32, and transmitted to another party through wireless telephone line. Moreover, when the characters are inputted as the names in the electronic telephone directory registered together with the telephone numbers, the inputted characters are stored in the memory 32 as names.

By performing process of inputting idioms in this manner, compared with searching the characters one-by-one and inputting the idiom formed out of these characters, it is possible to quickly and easily input characters by a very few key operations. In particular, in the case of present example, only the first letters of the pronunciations of all characters need to be inputted. For a four-character idiom, only four letters need to be inputted, therefore four-character idioms can be inputted quite quickly.

Here, three display examples of four-character idioms, inputted through the process based on the flowchart of figure 6, are shown in the following table 3.

Table 3

Inputting characters	Inputting method
不 见 不 散 bu jian bu san	B→J→B→S
不 能 实 现 bu neng shi xian	B→N→S→X
不 败 之 地 bu bai zhi di	B→B→Z→D

In the three inputting example of the table 3, the three idioms to be inputted are the same as those shown in the table 2. From them, we can find that the idioms are more easily inputted in the example of table 3. But, in the case of table 3, because the first character is not specified,

perhaps there are several more candidate idioms.

Moreover, although the above descriptions of the processes of inputting are made by example of inputting four-character idioms, the same processes can also be applied to the case of inputting two-character idioms besides four-character idioms. Furthermore, besides inputting the above meaningful idioms, the processes can be also applied to cases of inputting names composed of several characters, such as two characters. When the data of frequently used names are stored in memory 32 in advance, and the names of several characters are to be inputted, the same inputting processes can also be performed.

Moreover, although the structure of above mobile phone terminal is shown by an example, it is also possible to use mobile phone terminals with other structures. For example, although in the above description, a rotary operation unit 34 on the side of a terminal is used to perform operations such as determination, it is also possible to use the operation keypad 33 on the front side of the terminal to perform the same operations. In addition, although in the above example, the dial keys of operation keypad 33 are used to input letters, it is also possible to use the rotary operation unit 34 to input letters.

Moreover, although in the above embodiments, the invention is applied to the cases of inputting Chinese characters of Chinese language in a mobile phone terminal, it is also possible to apply the invention to the cases of inputting Chinese characters in other various electronic apparatuses. For example, the invention can also be applied to audio signal reproduction apparatus that reproduce music and the like from prescribed record media, or the case of inputting names of songs using Chinese characters.

Moreover, although in the above embodiments, the invention is applied to the cases of inputting idioms formed out of Chinese characters of Chinese language, in the cases of inputting several characters strings of other languages, the same inputting processes can also be made according to the pronunciation elements of these characters strings.

Moreover, although in the above embodiments, in order to specify the pronunciation elements of characters, the letters are used to input, it is also possible to input other marks specifying the pronunciation elements of characters.

According to the character input method of the first aspect of the invention, it is possible to very quickly and easily input such characters as Chinese characters of Chinese language, compared with the case of inputting character-by-character, by inputting the first character of the character string, inputting the marks of the initial parts of the pronunciation elements of the respective characters following the first character, and reading out and displaying the candidate character strings from the character string stored as searching objects.

According to the character input method of the second aspect of the invention, in the first aspect of the invention, the elements inputted as the initial parts of the pronunciation elements of the respective characters following the initial characters, are inputted letters that correspond to the initial parts of the pronunciation elements thereof. If the letters can be specified, it is possible to easily input a plurality of character strings.

According to the character input method of the third aspect of the invention, in the first or second aspect of the invention, the prescribed operation of inputting the initial character is the operation of inputting the

initial part of the pronunciation elements of the initial character, thus it is possible to more easily input character strings of a plurality of characters.

According to the character input method of the fourth aspect of the invention, in the first, second or third aspect of the invention, the determined character string inputted through the above operation, is transmitted through a prescribed communication line to an opposite party as the information of a character message, thus it is possible to easily input characters transmitted as a character message.

According to the apparatus of inputting characters of the fifth aspect of the invention, by inputting the marks related to a first character by the operation unit, inputting the marks of the initial parts of the pronunciation elements of the respective characters following the first character, searching the candidate character strings from the character string stored in the memory unit as searching objects and determining the characters to be inputted, it is possible to input characters such as Chinese characters of Chinese language by a very few operations of the operation unit.

According to the apparatus of inputting characters of the sixth aspect of the invention, in the fifth aspect of the invention, the marks corresponding to the pronunciation elements, inputted by the operation unit, are letters, and by using the letters the control unit determines the initial parts of the pronunciation elements of the respective characters, thus it is possible to easily input character strings with only a structure of operation unit capable of inputting letters.

According to the apparatus of inputting characters of the seventh aspect of the invention, in the fifth or sixth aspect of the invention, the determination of the control unit with respect of the inputting of the first

character, is also based on the inputting of marks of the initial parts of the pronunciation elements of the first character, thus it is possible to input character strings of a plurality of characters through more simple operations.

According to the apparatus of inputting characters of the eighth aspect of the invention, in the fifth, sixth or seventh aspect of the invention, the determined character string displayed on the above display unit, is transmitted by the control unit through a prescribed communication line to an opposite party as the information of a character message, thus it is possible to easily input characters transmitted as a character message.

CLAIMS:

1. A character input method for inputting a character string of a plurality of characters, wherein each of said characters is defined by a plurality of pronunciation elements, the method comprising the steps of:

inputting the first character of said character string through a prescribed operation;

inputting initial parts of the pronunciation elements of a plurality of characters that follow the first character in said character string, without inputting all the parts of said pronunciation elements;

displaying from among a plurality of stored character strings a character string comprising the inputted first character and a plurality of following characters, for which the initial parts of the pronunciation elements match the inputted initial parts of the pronunciation elements, in the same order; and

determining the displayed character string as the characters to be inputted.

2. The character input method according to claim 1, wherein:

the elements inputted as the initial parts of the pronunciation elements of the plurality of characters that follow the first character are letters that correspond to the initial parts of the pronunciation elements of the plurality of characters.

3. The character input method according to claim 1 or 2, wherein:

the prescribed operation of inputting the first character is the operation of inputting the initial part of the pronunciation elements of the first character.

4. The character input method according to any one of the claim 1 to 3, wherein:

the determined character string inputted through the above operations is transmitted through a prescribed communication line to an opposite party as the information of a character message.

5. A character input apparatus, comprising:

a memory unit for storing character strings as searching objects;

an operation unit, at least capable of inputting marks corresponding to pronunciation elements of a plurality of characters in a character string,

a display unit for displaying inputted marks corresponding to the pronunciation elements and characters specified by the marks; and

a control unit for reading out a candidate character string, by matching an inputted first character and marks of only initial parts of the pronunciation elements of the plurality of characters that follow the first character, inputted through the operation of the operation unit, from the memory unit, and displaying the candidate character string on the display unit for determining as the character string being input.

6. The character input apparatus according to claim 5, wherein:

the marks corresponding to the pronunciation elements, inputted by the operation unit, are letters, and by using the letters the control unit determines the initial parts of the pronunciation elements of the plurality of characters.

7. The character input apparatus according to claim 5 or 6, wherein

the determination of the control unit with respect to the inputting of the first character is also based on the inputting of mark of only initial part of the pronunciation elements of the first character.

8. The character input apparatus according to any one of claim 5 to 7, wherein:

the determined character string displayed on the display unit is transmitted by the control unit through a prescribed communication line to an opposite party as the information of a character message.