

IMPROVEMENTS TO SELECTING TELEPHONE NUMBERS

FIELD OF THE INVENTION

5 This invention relates to selecting telephone numbers stored in a
phone book of an electronic device. The invention is particularly useful
for, but not necessarily limited to, selecting telephone numbers in a
phone book comprising both ideographic represented names (such as
names represented by Chinese characters) and alphanumeric
10 represented names (such as names in the English language and pinyin
representations of Chinese characters).

BACKGROUND ART

15 Cellular telephones having display screens and land line
telephones with display screens are becoming more popular. Also,
telecommunications service providers typically offer services that try to
provide customers with information that enables them to determine
whether or not to accept or return a call. This service is generally
20 termed caller identification ("Caller ID") and provides an indication of
who has called or is calling (or sending text, by Short Messaging System
protocols or otherwise). The caller's identification (name of the caller) is
identified by using a phone book of stored names and associated
numbers that are stored in a database in the telephone's memory.
25 Furthermore, if the phone book stores a large number of names and
associated numbers, then searching the phone book to identify the
name of the calling party may take an unacceptable amount of time.
Also, if the phone book stores ideographic represented names and
alphanumeric represented names then difficulties may arise in

inputting the required representation and searching for a required name.

Further to the above, today the majority of cellular telephones use a standard telephone reduced keypad having ten number keys, an asterisk or star (*) key, and a hash or pound (#) key. For English and many other alphabet languages, number keys TWO (2) to NINE (9) on the numeric keypad of the device are overlaid with an alphabet keypad where three or more letters of the alphabet are associated with each number key. For example, the number five (5) key is associated with the letters j-k-l. In some reduced keypad electronic devices, upon entering an alphabet entry mode, a user employs multiple key presses to enter letters to make words and names for use by features such short messaging and address book name selection.

Currently, one common way to search, select and dial telephones numbers using a conventional reduced keypad is through the multi-tap method. The multi-tap method is a way of using the conventional keypad of a telephone to input the name of a person who a user wishes to call. The multi-tap method typically requires the user to press the TWO through NINE keys for inputting letters of the person's name. For any of the alphabet letters, the user is required to press the TWO through NINE keys to scroll through the letters and number choices associated with that key. For example, when the TWO key is pressed once, the character "a" is displayed. The second press of the same key (the TWO key) displays the character "b", the third press of the same key displays the character "c" and finally the fourth press of the TWO key displays the number "2". This can therefore be tedious and time

consuming if the user wishes to quickly look up and a telephone number and make a telephone call.

5 In this specification, including the claims, the terms 'comprises',
'comprising' or similar terms are intended to mean a non-exclusive
inclusion, such that a method or apparatus that comprises a list of
elements does not include those elements solely, but may well include
other elements not listed. Also, throughout this specification the term
10 "key" has the broad meaning of any key, button or actuator having a
dedicated, variable or programmable function that is actuatable by a
user. Furthermore the word character has the broad meaning that
includes symbols and in this specification the words symbol and
character may be interchangeable as will be apparent to a person skilled
in the art.

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SUMMARY OF THE INVENTION

20 According to one aspect of the invention there is provided a
method for identifying a telephone number associated with a name
stored in a phone book located in a memory of a telephone, the method
including:

25 Receiving a data sequence input by actuation of keys on a
keypad of the telephone, each of the keys providing for selecting a
plurality of characters such that the data sequence corresponds to a
plurality of possible character strings;

Searching the phone book to identify at least one phone book
character string that matches any of the possible character strings; and

Identifying the telephone number associated with the name stored in the phone book that includes said phone book character string.

- 5 Suitably, the identifying includes displaying the name stored in the phone book on a display screen of the telephone.

Preferably, the method includes the further steps of:
selecting the name; and

- 10 calling a telephone number stored in the phone book, the number being associated with the name.

- Suitably, the identifying is characterized by the character string appearing anywhere in the name. The identifying can be suitably
15 characterized by the character string appearing at the beginning of the name. However, the identifying can be suitably characterized by the character string appearing at the beginning of any word forming the name. The position of the character sting in the name may be suitably selected by a user.

- 20 Preferably, the searching the phone book to identify at least one phone book character string that matches any of the possible character strings includes searching at least one pinyin character string representing a Chinese character.

- 25 The keys may be suitably on a reduced keypad with each of the actuated keys allowing for the input at least 3 letters of the alphabet and a number.

The keys may be suitably on a reduced keypad with the data sequence input may include at least one wildcard key, the wildcard key being a key without any associated letters of the alphabet thereon.

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Suitably, the data sequence is a sequence of numbers, wherein each one of the numbers corresponds to a number displayed on one of the keys.

10 Preferably each of the numbers is associated with a group of characters, the association thereof being displayed by on the keys.

15 Preferably, the searching is characterized by searching number strings representative of said phone book character string, wherein each number in the number strings is obtained by associating the number with group of characters, the association thereof being displayed on the keys.

20 Preferably, the number string representative of said phone book character string is stored in the phone book. The number strings representative of said phone book character string may be suitably generated automatically when the character string is stored in the phone book.

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According to another aspect of the invention there is provided a telephone comprising:

A processor;

5 A display coupled to the processor;

A keypad comprising a plurality of keys coupled to the processor, the keypad in use providing a data sequence of possible character strings ; and

10 A memory coupled to the processor, the memory storing a phone book of names and corresponding telephone numbers, wherein the processor provides for searching the phone book to identify at least one phone book character string that matches any of the possible character strings and thereafter provides for identifying the at least one name stored in the phone book that includes said phone book character
15 string.

Suitably, the telephone a display coupled to the processor the display providing for includes the name stored in the phone book on a display screen of the telephone.

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BRIEF DESCRIPTION OF THE DRAWINGS

In order that the invention may be readily understood and put into practical effect, reference will now be made to a preferred
25 embodiment as illustrated with reference to the accompanying drawings in which:

FIG. 1 is a block diagram illustrating an embodiment of a telephone in accordance with the invention; and

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FIG. 2 illustrates a method performed on the telephone of Fig. 1, the method providing for identifying at least one name stored in a phone book of the telephone of FIG. 1.

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DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE INVENTION

In the drawings, like numerals on different Figs are used to indicate like elements throughout. With reference to Fig. 1, there is illustrated a telephone 100 in the form of a handheld wireless communications device comprising a radio frequency communications unit 102 coupled to be in communication with a processor 103. The telephone 100 also has a keypad 106, auxiliary keys 130 and a display screen 105 coupled to be in communication with the processor 103.

The keypad 106 is a conventional reduced keypad typically having ten number keys 0 to 9, an asterisk or star (*) key, and a hash or pound (#) key. For English and many other alphabet languages, number keys Two (2) to NINE (9) of the keypad 106 have at least 3 associated letters of the alphabet. More specifically: the number two (2) key has letters a-b-c associated therewith and printed thereon; the number three (3) key has letters d-e-f associated therewith and printed thereon; the number four (4) key has letters g-h-i associated therewith and printed thereon; the number five (5) key has letters j-k-l associated therewith and printed thereon; the number six (6) key has letters m-n-o associated therewith and printed thereon; the number seven (7) key has letters p-q-r-s associated therewith and printed thereon; the number eight (8) key has letters t-u-v associated therewith and printed thereon;

and the number nine (9) key has letters w-x-y-z associated therewith and printed thereon.

5 The processor 103 includes an encoder/decoder 111 with an associated Code Read Only Memory (ROM) 112 storing data for encoding and decoding voice or other signals that may be transmitted or received by the radio-telephone 100. The processor 103 also includes a micro-processor 113 coupled, by a common data and address bus 117, to the encoder/decoder 111, a character Read Only Memory (ROM) 10
10 114, a Random Access Memory (RAM) 104, static programmable memory 116 and a Subscriber Identity Module (SIM) interface 118. The static programmable memory 116 and a SIM (often called a SIM card) operatively coupled to the SIM interface 118 each can store, amongst other things, selected incoming text messages and a Telephone Number
15 Database TND (phone book) comprising a number field for telephone numbers and name field for identifiers associated with one the numbers in the name field. For instance, one entry in the Telephone Number Database TND may be 91999111111 (entered in the number field) with an associated identifier "Steven C at work" in the name
20 field. The SIM card and static memory 116 may also store passwords for allowing accessibility to password protected functions on the handheld wireless communications device 100.

25 The micro-processor 113 has ports for coupling to the keypad 106, auxiliary keys 130, screen 105 and an alert module 115 that typically contains an alert speaker, vibrator motor and associated drivers. Also, micro-processor 113 has ports for coupling to a microphone 135 and communications speaker 140. The character Read only memory 114 stores code for decoding or encoding text messages that may be received by the communication unit 102. In this

embodiment the character Read Only Memory 114 also stores operating code (OC) for micro-processor 113 and code for performing functions associated with the handheld wireless communications device 100.

5 The radio frequency communications unit 102 is a combined receiver and transmitter having a common antenna 107. The communications unit 102 has a transceiver 108 coupled to antenna 107 via a radio frequency amplifier 109. The transceiver 108 is also coupled to a combined modulator/demodulator 110 that couples the
10 communications unit 102 to the processor 103.

Referring to Fig. 2 there is illustrated a method 200 identifying a telephone number associated with a name stored in a phone book or Telephone Number Database TND located in a memory of a telephone
15 100. This memory could, for instance, be the static programmable memory 116 or a removable SIM as will be apparent to a person skilled in the art. The name is one of the names associated with a corresponding telephone number stored in the phone book located and the method 200 is effected by the telephone 100. After a start step 210
20 the method 200 performs a step of receiving 220 for receiving a data sequence input by actuation of keys on a keypad 106 of the telephone 100, wherein each of the keys providing for selecting a plurality of characters CHARS such that the data sequence corresponds to a plurality of possible character strings PCSTR.

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After the receiving step 220 a searching step 230 provides for searching the phone book to identify at least one phone book character string PBCSTR that matches any of the possible character strings PCSTR. Thereafter a step of identifying 240 provides for identifying the

telephone number associated with the name stored in the phone book (or Telephone Number Database TND) that includes said phone book character string PBCSTR.

5 By way of example, consider the phone book comprising the entries of Table 1 below. If a user requires to dial a telephone number associated with the name "Steven John" that is stored in the phone book then the user actuates keys on the keypad 106. At the step of receiving 220, the user can enter the data sequence (key sequence) by
10 actuating key number 7 then key number 8 and then key number 3. As will be apparent to a person skilled in the art, this data sequence forms a number string of "783" that corresponds to both the phone book character string PBCSTR "ste" and phone book character string PBCSTR "sue". Hence, the searching 230 identifies both "ste" and
15 "sue" and the step of identifying 240 identifies and displays both the names "Steven John" and "Sue Smith" (that are stored in the phone book) on a display screen 105 of the telephone 100. The user can then continue to actuate the keys on the keypad 106 to enter more data that is appended to the data sequence or confirm that entering is completed
20 as determined at a completed entering test step 250. If more data is to be appended to the data sequence then the steps 220 to 250 are repeated. For example, the user can actuate key number 8 and thus the data sequence forms a number string of "7838" that corresponds only to the phone book character string PBCSTR "stev" and thus "steven
25 john" is the only name identified and displayed at the step of identifying 240.

After entering is completed a selecting step 260 then allows for the user to select the name "Steven John" by appropriate use of the

auxiliary keys 130 of the telephone 100 and thereafter the step of calling
 270 provides for calling a telephone number stored in the phone book,
 the number being associated with the name which in this example is
 phone number 91731009 associated with the name "steven john". The
 5 method then terminates at an end step 280.

Name	Phone number	Key Sequence (number string)	Word Position
Ben Hu	42457819	23648	{0,3}
丁伟 Qiang	55432786	346493474264	{0,4,7}
Steven John	91731009	7838365646	{0,6}
Sue Smith	81876559	78376484	{0,3}
Rebecca Zhang	65234678	732322294264	{0,7}
Hu Helen	99765432	4843536	{0,2}
Peter Goodman	97435679	738374663626	{0,5}
Alex Jay Smith	45671288	253952976484	{0,4,7}
刘 Ming	54896511	5486464	{0, 3}
steven,john@office	64184312	783836,5646@699489	{0,7,12}
Rebecca 王	576552332	73232229264	{0,7}

Table 1. Part of a phone book

It should be noted that the step of identifying 240 is
 10 characterized by the character string appearing anywhere in the name.
 For instance, consider the character string "be" this string, amongst
 others, corresponds to the names "Rebecca Zhang" and "Ben hu" so
 both of these names would be identified and displayed at the step of

identifying 240. However, by suitable menu selection by actuation of the auxiliary keys 130 the step of identifying 240 can be guided such that character string must appear at the beginning of the name for the string to be selected. Hence, "Ben Hu" would be the only name selected as 'be' does not appear at the beginning of then name "Rebecca Zhang". However, as will be apparent to a person skilled in the art, the identifying can be suitably characterized by the character string appearing at the beginning of any word forming the name whereby the position of the character sting in the name may be suitably selected by appropriate selective actuation of the auxiliary keys 130.

The searching step 230 also provides for searching the phone book to identify at least one phone book character string that matches any of the possible character strings includes searching at pinyin character strings representing a Chinese character. For example the Chinese characters "丁伟" for the name "丁伟 Quiang" have a key sequence (number string) created from its pinyin representation "ding wei", similarly the Chinese character "刘" for the name "刘 Ming" has a key sequence (number string) created from its pinyin representation.

One useful feature of the present invention is that the steps 220 to 240 also provides for wildcard keys by appropriate use of the "*" and "#" keys, these keys being keys without any associated letters of the alphabet thereon. The "*" key is used to match either: (a) no symbols/characters (a null character); or (b) any single character/symbol including a space. In contrast the "#" is used to match any number of symbols/characters including null characters and spaces. Thus, if a user enters the data sequence (key sequence) 43*5 then Hu Helen is identified at the step of identifying 240 (as the "*" key

in the data sequence is redundant and selects a null character). Also, if a user enters the data sequence (key sequence) 78* then Sue Smith, Steven John and steven, john@office are identified at the step of identifying 240. As another example, if a user enters the data sequence (key sequence) 7#6 then Steven John, steven, john@office , Sue Smith, Rebecca Zhang, Alex Jay Smith, Rebecca 王 are identified at the step of identifying 240. As a final example, if a user enters the data sequence (key sequence) 7*3#8 then Steven John, steven, john@office, Sue Smith and Peter Goodman are identified at the step of identifying 240.

Advantageously, the present invention provides for allowing a user to quickly look up and a telephone number and make a telephone call by use of a conventional reduced keypad. In this regard, by using the reduced keypad, the data sequence is a sequence of numbers, wherein each one of the numbers corresponds to a number displayed on one of the keys. Each of the numbers is associated with a group of characters and this association is displayed by on the keys. Also, the searching is characterized by searching number strings representative of the phone book character string and each number in the number strings is obtained by associating the number with group of characters, As described in the exemplary embodiment, the number string representative of said phone book character string is stored in the phone book and the character string is generated automatically when the character string is stored in the phone book. This therefore reduces processing time during performance of the method 200.

The detailed description provides a preferred exemplary embodiment only, and is not intended to limit the scope, applicability, or configuration of the invention. Rather, the detailed description of

the preferred exemplary embodiment provides those skilled in the art with an enabling description for implementing a preferred exemplary embodiment of the invention. It should be understood that various changes may be made in the function and arrangement of elements without departing from the spirit and scope of the invention as set forth in the appended claims.

WE CLAIM:

1. A method for identifying a telephone number associated with a name stored in a phone book located in a memory of a telephone, the method including:

Receiving a data sequence input by actuation of keys on a keypad of the telephone, each of the keys providing for selecting a plurality of characters such that the data sequence corresponds to a plurality of possible character strings;

Searching the phone book to identify at least one phone book character string that matches any of the possible character strings; and

Identifying the telephone number associated with the name stored in the phone book that includes said phone book character string.

2. A method as claimed in claim 1, wherein the identifying includes displaying the name stored in the phone book on a display screen of the telephone.

3. A method as claimed in claim 1, including the further steps of:
selecting the name; and

calling a telephone number stored in the phone book, the number being associated with the name.

4. A method as claimed in claim 1, wherein the identifying is
5 characterized by the character string appearing anywhere in the name.

5. A method as claimed in claim 1, wherein the identifying is
characterized by the character string appearing at the beginning of the
name.

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6. A method as claimed in claim 1, wherein the identifying is
characterized by the character string appearing at the beginning of any
word forming the name.

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7. A method as claimed in claim 1, wherein the position of
the character sting in the name may be suitably selected by a user.

8. A method as claimed in claim 1, wherein the searching the
phone book to identify at least one phone book character string that
20 matches any of the possible character strings includes searching at least
one pinyin character string representing a Chinese character.

9. A method as claimed in claim 1, wherein keys are on a
reduced keypad with each of the actuated keys allowing for the input at
25 least 3 letters of the alphabet and a number.

10. A method as claimed in claim 1, wherein the keys are on a
reduced keypad with the data sequence including at least one wildcard

key, the wildcard key being a key without any associated letters of the alphabet thereon.

11. A method as claimed in claim 1, wherein the data sequence
5 is a sequence of numbers and wherein each one of the numbers
corresponds to a number displayed on one of the keys.

12. A method as claimed in claim 11, wherein each of the
numbers is associated with a group of characters, the association
10 thereof being displayed by on the keys.

13. A method as claimed in claim 1, wherein the searching is
characterized by searching number strings representative of said phone
book character string, and wherein each number in the number strings
15 is obtained by associating the number with group of characters, the
association thereof being displayed on the keys.

14. A method as claimed in claim 13, wherein the number
string representative of said phone book character string is stored in the
20 phone book.

15. A method as claimed in claim 14, wherein the number
strings representative of said phone book character string is generated
automatically when the character string is stored in the phone book.

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16. A telephone comprising:
A processor;
A display coupled to the processor;

A keypad comprising a plurality of keys coupled to the processor, the keypad in use providing a data sequence of possible character strings ; and

5 A memory coupled to the processor, the memory storing a phone book of names and corresponding telephone numbers, wherein the processor provides for searching the phone book to identify at least one phone book character string that matches any of the possible character strings and thereafter provides for identifying the at least one name stored in the phone book that includes said phone book character
10 string.

17. A telephone as claimed in claim 16, wherein there is a the telephone a display coupled to the processor the display providing for includes the name stored in the phone book on a display screen of the
15 telephone.