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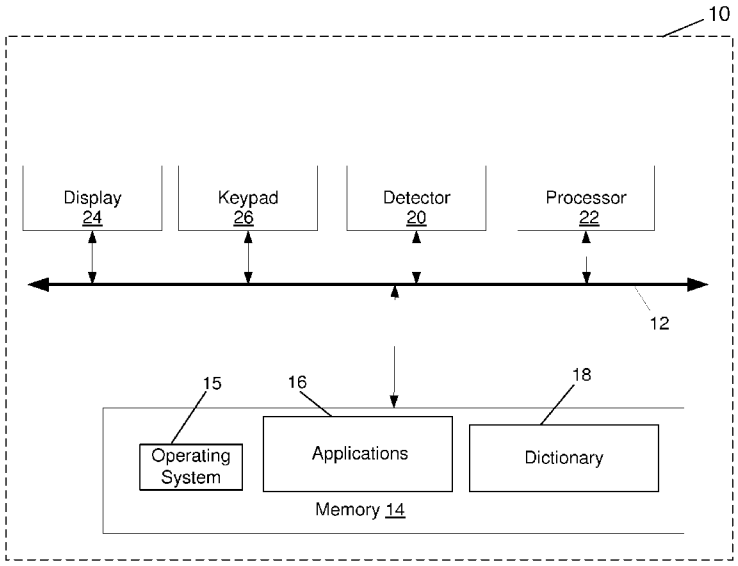

Fig. 1

(57) Abstract: Embodiments of the invention include a method, apparatus, and/or computer readable medium for text entry in a device. The method, according to one embodiment, includes detecting an input from a user, the input including a selection of a key representing a plurality of characters from a keypad of the device. The method further includes determining, based on a type of the input, whether the user has selected explicit text entry or ambiguous text entry of one of the characters on the key, and, based on the result of the determining, activating one of the explicit text entry or the ambiguous text entry for the character.

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TITLE:

MIXED AMBIGUITY TEXT ENTRY

BACKGROUND:

Field:

[0001] Embodiments of the invention relate to an apparatus, method and/or computer readable medium for improving text entry for electronic devices, such as a terminal or wireless communications device, or any other electronic device with multiple characters per key.

Description of the Related Art:

[0002] Electronic communications devices, such as mobile telephones, can include a user interface that facilitates text entry for instant messages or text messages, such as short message service (SMS) or multimedia message service (MMS). The text entry interface may support an explicit input mode (also known as an "unambiguous" input mode) and/or an ambiguous input mode.

[0003] One example of an explicit input mode for a device is multi-tap. Multi-tap is generally used in devices with a keypad, such as a standard E.161 telephone keypad that defines the assignment of the 26 letter English alphabet (a to z) to a 12-key telephone keypad. For example, the keypad may be such that the alphabet is printed under each number key, beginning with "2," in a three or four letter sequence as follows: "ABC" under "2" key,

"DEF" under "3" key, "GHI" under "4" key, "JKL" under "5" key, "MNO" under "6" key, "PQRS" under "7" key, "TUV" under "8" key, and "WXYZ" under "9" key. In a multi-tap text entry system, the user selects the exact letter to be input by repeatedly pressing the same key to cycle through the letters for that key. For example, pressing the "5" key twice would input the letter "k" since that is the second letter listed under "5." Other examples of an explicit input mode include a full "qwerty" keyboard where there is one dedicated key for each character.

[0004] Under an ambiguous input mode, on the other hand, the user's character selection is not explicit. An example of an ambiguous input mode is T9 (Text on 9 keys), provided by Nuance of Burlington Massachusetts. T9 allows text to be entered by a single key press of each character or letter. The device then utilizes an algorithm and accesses a dictionary to look up all words corresponding to the sequence of key presses entered by the user. If there is more than one word that corresponds to the sequence of key presses, then the device may provide the user with a list of those words to select from. The words may be ordered by frequency of use in an effort to accurately predict the intended word. Additionally, the user may be able to add new words to the dictionary.

[0005] While some devices may have the capability to support both an explicit input mode and an ambiguous input mode, current devices cannot support both simultaneously. In other words, the two approaches are always

separated into independent modes. Therefore, the user will have to determine which mode they would like to use and select only one of the modes to use for inputting text. Further, when in ambiguous input mode, the algorithm/dictionary may not always locate the required word. In this case, the user must first manually switch to the explicit input mode, then explicitly enter the required word, and finally manually switch back to the ambiguous input mode.

SUMMARY:

[0006] One embodiment of the invention is a method for text entry in a device. The method includes detecting an input from a user, the input including a selection of a key representing a plurality of characters from a keypad of the device. The method further includes determining whether the user has selected explicit text entry or ambiguous text entry of one of the characters based on a type of the input, and, based on the result of the determining, activating one of the explicit text entry or the ambiguous text entry for the one of the characters.

[0007] Another embodiment of the invention is an apparatus capable of text entry. The apparatus includes at least one processor, and at least one memory including computer program code. The at least one memory and the computer program code are configured, with the at least one processor, to cause the apparatus at least to detect an input from a user. The input may

include a selection of a key representing a plurality of characters from a keypad of a device. The at least one memory and the computer program code are further configured, with the at least one processor, to cause the apparatus to determine whether the user has selected explicit text entry or ambiguous text entry of one of the characters based on the input type, and, based on the result of the determining, activate one of the explicit text entry or the ambiguous text entry for the one of the characters.

[0008] In another embodiment a computer program, embodied on a computer readable storage medium, is provided. The computer program is configured to control a processor to perform a process, which includes detecting an input from a user, the input including a selection of a key representing a plurality of characters from a keypad of a device. The computer program is configured to control the processor to determine whether the user has selected explicit text entry or ambiguous text entry of one of the characters based on a type of the input, and, based on the result of the determining, to activate one of the explicit text entry or the ambiguous text entry for the one of the characters.

[0009] Another embodiment of the invention includes an apparatus configured for text entry. The apparatus includes detecting means for detecting an input from a user, the input including a selection of a key representing a plurality of characters from a keypad of the device. The apparatus further includes determining means for determining whether the

user has selected explicit text entry or ambiguous text entry of one of the characters based on a type of the input, and, based on the result of the determining means, activating means for activating one of the explicit text entry or the ambiguous text entry for the one of the characters.

BRIEF DESCRIPTION OF THE DRAWINGS:

[00010] For proper understanding of the invention, reference should be made to the accompanying drawings, wherein:

[00011] Fig. 1 illustrates a block diagram of an apparatus according to one embodiment;

[00012] Fig. 2 illustrates an exemplary implementation of a keypad according to an embodiment;

[00013] Fig. 3 illustrates an example of a text string inputted in accordance with one embodiment of the invention;

[00014] Fig. 4a illustrates an example of text input according to an embodiment;

[00015] Fig. 4b illustrates an example of text input according to an embodiment;

[00016] Fig. 4c illustrates an example of text input according to an embodiment;

[00017] Fig. 5a illustrates another example of text input according to one

embodiment;

[00018] Fig. 5b illustrates an example of text input according to one embodiment;

[00019] Fig. 5c illustrates an example of text input according to one embodiment;

[00020] Fig. 5d illustrates an example of text input according to one embodiment;

[00021] Fig. 5e illustrates an example of text input according to one embodiment; and

[00022] Fig. 6 illustrates a method in accordance with one embodiment of the invention.

DETAILED DESCRIPTION:

[00023] Conventionally, text input in portable devices is either explicit, such as multi-tap text entry, or ambiguous, as in T9 text entry. Ambiguous text entry tends to provide a faster and easier method of entering text because it does not involve multiple taps or selection from a list. Further, ambiguous text entry utilizes tools like dictionaries, algorithms, and/or known probabilities of certain character combinations (n-grams) in order to provide relatively accurate estimates of what text the user intended to enter. Such an approach may work well when the user is inputting common,

standard words. However, when a user desires to use words or spellings that may not be found within a standard dictionary, ambiguous text input alone will not result in accurate text entry. For instance, a user may want to use a proper noun, non-standard abbreviation, or shorthand in their text messages. In such a situation, the user will need to enter the text using ambiguous mode and then make a laborious correction since the device will not match the correct word, or the user will need to change the text entry mode to an explicit mode and then change it back once he has completed the word. Both of these options prove to be tiresome and time consuming.

[00024] Therefore, embodiments of the invention provide a text input method, apparatus and/or computer program that mixes ambiguous and explicit input methods into a single mode within a device. As a result, the user will not need to toggle between explicit and ambiguous text entry modes. Rather, the user can select explicit or ambiguous text entry as they provide an input to the keypad. In other words, the user can at any point choose to enter a character explicitly or ambiguously without needing to have previously toggled between modes. This provides users of the device with a faster, easier, and more accurate text input method.

[00025] Fig. 1 illustrates a text input apparatus 10 with combined explicit and ambiguous text entry capability, according to one embodiment. In some embodiments, text input apparatus 10 is implemented in an electronic device, such as a terminal or wireless communications device, including a

mobile telephone, portable computer, Personal Digital Assistant (PDA), portable game console, or any other electronic device with multiple characters per key.

[00026] Apparatus 10 may include an interface 12, such as a bus or other communications mechanism, for communicating information between components of apparatus 10. Alternatively, the components of apparatus 10 may communicate directly with each other, without use of interface 12.

[00027] Apparatus 10 also includes a processor 22, coupled to interface 12, for receiving, managing, and/or processing user input or information, and for executing instructions or operations. Processor 22 may be any type of general or specific purpose processor.

[00028] Apparatus 10 further includes a memory 14 for storing information and instructions to be executed by processor 22. Memory 14 can be comprised of any combination of random access memory (RAM), read only memory (ROM), static storage such as a magnetic or optical disk, or any other type of machine or computer readable media. Computer readable media may be any available media that can be accessed by processor 22 and could include volatile or nonvolatile media, removable or non-removable media, and communication media. Communication media may include computer program code or instructions, data structures, program modules or other data, and includes any information delivery media.

[00029] Processor 22 can further be coupled, via interface 12 or directly, to a graphical user interface or display 24, such as a thin film transistor (TFT) liquid crystal display (LCD), for displaying information to a user. In some embodiments, display 24 can be a touchscreen display that allows a user to interact directly with what is presented on display 24 by using their finger, hand, stylus, or another passive object.

[00030] A keypad 26 can further be coupled to interface 12 to enable a user to interface with apparatus 10. In one example, keypad 26 is a touchscreen keypad displayed on display 24 where each of the keys can be activated by touching that portion of display 24. Alternatively, keypad 26 may be a physical keypad. In one example, keypad 26 may be a standard E.161 12-key keypad. In other embodiments, keypad 26 may include a different number of keys – for example less than 12 keys, as will be discussed in further detail below.

[00031] Apparatus 10 can further include a sensor or detector 20 for detecting some action taken, for example, by a user by means of display 24 or keypad 26. Detector 20 can be a separate component of apparatus 10 or, alternatively, detector 20 can be included as a function of processor 22.

[00032] In one embodiment, memory 14 stores software modules or applications that provide functionality when executed by processor 22. The modules may include an operating system 15 that provides operating system functionality for apparatus 10. The memory 14 may also store applications

16, such as text editing or messaging applications, games, web browsers, etc. Apparatus 10 may also store a dictionary 18 to provide a library of words for the text editing or messaging applications.

[00033] Apparatus 10 is configured to provide an improved text inputting and editing method by mixing ambiguous and explicit input methods into a single mode within the device. As a result, according to some embodiments, explicitly chosen characters can be mixed with ambiguously chosen characters in a text input string displayed to the user during text entry. In order to do so, embodiments of the invention provide keys that can be activated in at least two ways. A first type of activation of a key will result in explicit text entry, and another type of activation of the key will result in ambiguous text entry.

[00034] For example, in a standard E.161 12-key layout discussed above, the "2" button is assigned to the characters "2," "A," "B," and "C." According to one embodiment of the invention, a single short press on the key will enter the character as an ambiguous entry of one of "2," "A," "B," or "C." The device can then decide which of the characters the user intended based on an algorithm that may include a dictionary comparison. However, if the user holds down the key for longer than a predetermined period of time, the device will recognize that the user desires explicit text entry and will provide the user with a pop-menu or list of the four options so that the user can unambiguously select their choice of character (for example

using subsequent presses of the same key, or navigating the menu using cursor keys). The same can apply for any of the other character keys in the 12-key keypad.

[00035] Fig. 2 illustrates an exemplary implementation of keypad 26, according to another embodiment of the invention. In this example, a 5-key keypad overlaid with a qwerty layout is used. For example, the first key 200 may include the characters "Q," "W," "A," "S," "Z," and "X" in the format shown. The second key 210 may include the characters "E," "R," "D," "F," "C," and "V" as illustrated. The third key 220 may include the characters "T," "Y," "G," "H," "B," and "N." The fourth key 230 may include the characters "U," "I," "J," "K," "M," and "," as shown. The fifth key 240 may include the characters "O," "P," "L," "'," "." and "-" as illustrated. As a result, when viewed together, the five keys mimic a qwerty keyboard. Keypad 26, as illustrated in Fig. 2, may also include a shift key 250, a space key 260, and a delete key 270.

[00036] According to one embodiment, swiping or stroking the keypad from the center of a key in the direction of one of the characters will result in explicit input of that character. In the example of Fig. 2, swiping key 200 toward the bottom left of the key, as illustrated by the arrow, will result in the explicit selection of letter "Z." Similarly, any key swiping in the direction of any of the characters on that key will result in an explicit selection of that character. In this embodiment, a user may swipe in any of

the six directions corresponding to the six characters on each of the keys

[00037] More specifically, according to one embodiment, detector 20 and/or processor 22 will detect that the user has swiped a key of keypad 26 in the direction of a character and, determine, based on the type of input (in this case a swipe), that the user intended to explicitly select that character. Processor 22 determines the character that the user wants to explicitly select based on the key swiped and the direction of the swipe. Processor 22 may then cause display 24 to display the character explicitly selected by the user, or cause the character to be used in another way (e.g. saved to a location in the memory 14). In one embodiment, the swipe can be started anywhere within the area of the key and the direction of the swipe (rather than position) will be used to determine which character the user intended to explicitly select.

[00038] There are a number of methods by which a user interface of a device can detect that a user has touched, swiped, or stroked the touchscreen of the device. For example, resistive, capacitive, surface acoustic wave, or optical imaging systems may be used to recognize a touch gesture made on the touchscreen. Embodiments of the invention can be applied to any touchscreen implementation, including those not yet developed. Embodiments may also be suitable for implementations that use a touch sensitive device other than touchscreen, for example a fixed keyboard layout that is touch sensitive but does not include a screen.

[00039] Returning to Fig. 2, for ambiguous text entry, the user may simply tap any portion of a key. For instance, tapping key 230, as illustrated by the circle thereon in Fig. 2, will result in ambiguous input of one of the characters displayed on key 230, "U," "I," "J," "K," "M," or ",". Thus, according to this embodiment, detector 20 and/or processor 22 will detect that the user has tapped a key of keypad 26 and, determine, based on the type of input (in this case a tap), that the user intended to ambiguously select a character. The processor 22 can cause apparatus 10 to estimate the character intended by the user based, for example, on any previous characters entered and/or by consulting dictionary 18. Similarly, tapping any of the other keys will result in an ambiguous selection from amongst the characters of that key.

[00040] The configuration described above with mixed explicit and ambiguous text entry capability can allow for a reduction in the number of keys required for the device. Ambiguous text entry normally needs a certain number of keys to work effectively (e.g., 12 keys are used in T9) because when the number of keys is reduced to six, for example, the level of ambiguity becomes too high for an algorithm to reliably find the required word within a dictionary and therefore necessitates frequent corrections to be made by the user. Examples of the invention, on the other hand, can result in a significant reduction in the number of keys required by simultaneously providing both explicit and ambiguous text entry

capabilities. Since the number of keys is reduced, a device can be made significantly smaller and more space efficient. In other words, the size of the device is not increased due to the need for numerous keys.

[00041] While the example of Fig. 2 illustrates five keys, any number of keys may be used without departing from the scope of the invention. Additional keys may be added or removed without affecting the functionality of the keypad 26 or text input method. Additionally, the qwerty keypad configuration is not necessary for operation of the invention; the characters may be configured in any order.

[00042] Fig. 3 illustrates an example of a text string inputted according to one embodiment of the invention. According to this example, the first character "S" and the last character "r" have been entered explicitly in the manner described above. The middle three letters, which are underlined, have been entered ambiguously, and a dictionary based algorithm has defined them as "u," "p," and "e." As such, according to this example, the user has been able to enter a single word, "Super," using both explicit and ambiguous text entry methods.

[00043] Returning to Fig. 1, according to certain embodiments of the invention, processor 22 is configured, along with memory 14 that includes computer program code, to cause the apparatus 10 to detect an input from a user. The input may be a selection of a key representing at least one character from keypad 26 of the device. As outlined above, the input may

take the form of a directional swipe indicating that the user intends to explicitly input a specific letter. The input may also be a tap of a key indicating that the user intends to ambiguously input one of the characters on that key.

[00044] Next, the processor 22 and memory 14 are further configured to cause apparatus 10 to determine whether the user has selected explicit text entry or ambiguous text entry of the at least one character based on the input type. In other words, according to one embodiment, apparatus 10 determines whether the user wants to activate explicit text input or ambiguous text input for that character based, for example, on whether the user has swiped or tapped the key. Then, based on the result of the determination as to whether the user selected explicit or ambiguous text input, the processor 22 and memory 14 are configured to cause apparatus 10 to activate one of the explicit text entry or the ambiguous text entry for that character.

[00045] Figs. 4a-4c illustrate an example of text input using explicit and ambiguous text entry methods within a single character string or word. In Fig. 4a, a user may explicitly select letter "C" for entry by swiping key 210 in the direction of "C" as shown by the circle and directional arrow on key 210. As a result, the letter "C" is displayed in text input area 400. In some embodiments, text input area 400 is a text input area within a text messaging application, text editing application, or any application running on the device

that accepts text as input.

[00046] In the example of Fig. 4b, the user ambiguously enters one of the characters of key 200 by tapping key 200. Apparatus 10 interprets this ambiguous entry as the entry of the letter "a" by consulting an algorithm which may use a dictionary 18 stored in memory 14. As a result, the letter "a" is displayed in text input area 400 after the letter "C."

[00047] In the example of Fig. 4c, the user ambiguously enters one of the characters of key 240 by tapping key 240. Again, apparatus 10 utilizes an algorithm and may also use a dictionary 18 stored in memory 14 to interpret this ambiguous entry as the letter "p." The letter "p" is now displayed in text input area 400 following the letters "C" and "a." Accordingly, the user has now formed the word "Cap" using a combination of explicit text entry and ambiguous text entry. The interpretation of ambiguous entries may be revised in light of subsequent ambiguous and/or explicit entries. For example, suppose that the word "Cap" is further extended by the explicit entry of the letter "l". The algorithm used to interpret ambiguous entries may determine that the word "Capl" does not feature in the dictionary 18 as the beginning or whole of a known word. On this basis, the algorithm may determine that the word "Call" represents a more likely candidate word (the explicitly entered "C" and "l" are present in this candidate). On the basis of the explicit entry of the second "l", the displayed word may be revised to "Call" in the text input area 400.

[00048] Figs. 5a-5e illustrate another example of text input using explicit and ambiguous text entry methods within a single character string or word. In the example shown in Fig. 5a, the user explicitly selects the letter "B" with a swipe of key 220 in the direction of "B" as shown by the circle and directional arrow on key 220. As a result, the letter "B" is displayed in text input area 500.

[00049] Continuing with the example shown in Fig. 5b, the user ambiguously selects one of the characters on key 230 by, for example, tapping key 230. Based on a dictionary comparison, apparatus 10 determines that the letter intended by the user when tapping key 230 could be any of the letters "u," "i," "j," "k," or "m." In one embodiment, apparatus 10 may select on of those letters to at least temporarily display in the text input area 500. In this example, the letter "i" is selected for display following "B" because, for example, dictionary 18 contains more letters that begin with "Bi" than any of the other possibilities. Alternatively, it may be that apparatus 10 has determined that the user has historically used more words that begin with "Bi" than any of the other possibilities. As a result, according to this example, "Bi" is temporarily displayed in text input area 500.

[00050] In the example of Fig. 5c, the user ambiguously selects one of the characters on key 210 by, for example, tapping key 210. Apparatus 10 interprets this ambiguous entry as the entry of the letter "d" by consulting an

algorithm and dictionary 18 stored in memory 14. Thus, as shown in Fig. 5d, apparatus 10 knows that the first letter is "B" based on the user's explicit entry and has determined that the final letter is a "d" based on dictionary matching. However, there are at least two possibilities for the second letter that was entered ambiguously from key 230. According to this example, the second letter might be an "i" to spell the letter "Bid," or might be a "u" to spell the letter "Bud."

[00051] Therefore, in this example, apparatus 10 may prompt the user to confirm which word they intended to enter. In order to do so, apparatus 10 can request that the user clarify only the key letters that will resolve the ambiguity. In the example of Fig. 5d, therefore, apparatus 10 will only need to request that the user clarify the second letter of the word. As illustrated in Fig. 5e, the user may then explicitly identify the letter "i" as the desired input for the second letter by, for example, swiping key 230 in the direction of "i." As a result, the letter "i" is now displayed in text input area 500 to complete the word "Bid," as intended by the user.

[00052] Thus, in one embodiment, when there is ambiguity regarding the desired word, apparatus 10 will prompt the user to clarify only the ambiguously entered characters required to resolve the word. In other words, the user modifies ambiguously inputted characters, making them explicit, until the word can be predicted based on dictionary matching, for example.

[00053] In alternative embodiments, other techniques may be used to select between alternative candidates for a word. For example, the user may be prompted to select between a plurality of candidate words, rather than individual letters. In another example, the best candidate is selected based on usage information – for example, an algorithm may be used to select a most frequently used candidate word, or a candidate word that is used most frequently in a particular context (for example, "bid" may be used more frequently than "bud" in sentences that also include the word "auction").

[00054] Fig. 6 illustrates a flow diagram of a method for receiving text input by a device according to one embodiment of the invention. As illustrated in the example of Fig. 6, the method includes detecting an input from a user at 600. In one embodiment, the input is a selection of a key representing at least one character on the device. Once an input is detected, the method may include determining, at 610, whether the input is for explicit text entry or ambiguous text entry based on the type of input. For example, if the input is a tap of the key, the method may determine that the input type is ambiguous. Whereas, if the input is a directional swipe of the key, the method may determine that the input type is explicit.

[00055] After determining the type of input, the method includes activating, at 620, explicit or ambiguous text entry for the inputted character(s) based on the result of the determining step. In other words, when the method determines, at 610, that the desired input type is explicit,

the method will activate explicit text entry for that input and will display the explicitly chosen character. When the method determines, at 610, that the desired input type is ambiguous, the method will activate ambiguous text entry for that input and display one of the characters from the selected key.

[00056] At 630, the method includes repeating the steps of detecting the input, determining the input type, and activating explicit or ambiguous text entry until the user has completed a character string or word. In an embodiment, the method recognizes that the user has completed entering a character string or word when the user inputs a space or some type of punctuation, such as a period, question mark, etc. Once the user has completed entering a character string, the method includes determining, at 640, whether more than word matches the character string entered by the user meaning that there is ambiguity regarding the character string the user intended to input. If there is such an ambiguity, the method includes prompting, at 650, the user to clarify the character that will resolve the ambiguity. If, however, it is determined that there is no ambiguity, the method ends at 660.

[00057] According to certain embodiments, the method described above can be stored as instructions on a computer readable medium and executed by a processor. The computer-readable medium may be a non-transitory medium that can be encoded with information that, when executed in hardware, performs a process corresponding to the process disclosed in Fig.

6, or any other process discussed herein. Examples of non-transitory mediums include a computer-readable medium, a computer distribution medium, a computer-readable storage medium, and a computer program product.

[00058] The computer readable medium mentioned above may be at least partially embodied by a transmission line, a compact disk, digital-video disk, a magnetic tape, a Bernoulli drive, a magnetic disk, holographic disk or tape, flash memory, magnetoresistive memory, integrated circuits, or any other digital processing apparatus memory device.

[00059] As a result of the improved text input method provided by embodiments of the invention, users are provided with an easier, faster and more accurate text input experience. Because a single mode is provided that combines explicit and ambiguous text entry capabilities, the user does not need to toggle between two different modes and does not need to switch their attention between the text entry keypad and a list of words to select from. Further, according to some embodiments, when a word is not recognized by the dictionary, the user does not need to re-enter the complete word from the beginning in explicit entry mode. Rather, the user can simply modify some of the already entered characters in a manner that yields the desired word.

[00060] Additionally, as a result of certain embodiments of the invention, a keypad with fewer keys than currently available with T-9 text

entry may be provided. Therefore, a device utilizing combined explicit and ambiguous text entry can dedicate less space for a physical keypad or less space for the keypad to be displayed in the touchscreen user interface. Similarly, the device is able to display or otherwise include larger keys, e.g. five large keys rather than twelve small keys, thereby improving the text input experience for visually impaired users or for users utilizing in-motion text input.

[00061] Where embodiments or examples have been described with reference to specific types of input, it is to be understood that they may be implemented using other suitable input types.

[00062] For example, whereas explicit and ambiguous inputs using a physical key may be distinguished based on whether a long or short keypress is used, they may be similarly distinguished based on whether the keypress is hard or soft (e.g. by using a pressure-sensitive key), or any other characteristic of the input.

[00063] Similarly, embodiments that use touchscreens or other touch sensitive input elements have been described as distinguishing between explicit and ambiguous inputs based on whether a tap or a swipe is detected. Other touch gestures are also suitable for making explicit and ambiguous entries and for distinguishing between them – for example an explicit input may require the user to draw a circle around an input letter, whereas any other gesture within a key may be interpreted as an ambiguous gesture. A

pressure-sensitive touch surface may be used to distinguish between a hard gesture for an explicit entry and a soft gesture for an ambiguous entry, or any other suitable characteristic of the input may be used.

[00064] In some embodiments, determinations between input types may be based upon a user input action that is performed simultaneously to the selection of a character key. For example, a device may include a touchscreen or hardware button that can be held down whilst a key is activated in order to indicate that the activation is explicit or ambiguous. Similarly, a tilt sensor or accelerometer may be used to detect a change in orientation of the device as the key is activated, or voice detection used to recognize an audio input made at the time of the key activation (e.g. the user speaks the word "explicit", to indicate that the key is being used explicitly). In this manner, each key activation can be made explicitly or ambiguously at the time of the activation – i.e. without needing to pre-configure the device to an explicit or ambiguous mode of input.

[00065] It should be noted that many of the functional features described in this specification have been presented as modules or applications, in order to more particularly emphasize their implementation independence. For example, a module may be implemented as a hardware circuit comprising custom VLSI circuits or gate arrays, off-the-shelf semiconductors such as logic chips, transistors, or other discrete components. A module may also be implemented in programmable hardware devices such as field

programmable gate arrays, programmable array logic, programmable logic devices or the like.

[00066] Modules may also be partially implemented in software for execution by various types of processors. An identified module of executable code may, for instance, comprise one or more physical or logical blocks of computer instructions which may, for instance, be organized as an object, procedure, or function. Nevertheless, the executables of an identified module need not be physically located together, but may comprise disparate instructions stored in different locations which, when joined logically together, comprise the module and achieve its stated purpose.

[00067] Indeed, a module of executable code could be a single instruction, or many instructions, and may even be distributed over several different code segments, among different programs, and across several memory devices. Similarly, operational data may be identified and illustrated herein within modules, and may be embodied in any suitable form and organized within any suitable type of data structure. The operational data may be collected as a single data set, or may be distributed over different locations including over different storage devices, and may exist, at least partially, merely as electronic signals on a system or network.

[00068] The described features, advantages, and characteristics of the invention may be combined in any suitable manner in one or more embodiments. One skilled in the relevant art will recognize that the

invention can be practiced without one or more of the specific features or advantages of a particular embodiment. In other instances, additional features and advantages may be recognized in certain embodiments that may not be present in all embodiments of the invention.

[00069] Therefore, one having ordinary skill in the art will readily understand that the invention as discussed above may be practiced with steps in a different order, may be practiced with hardware elements in configurations which are different than those which are disclosed, and that embodiments may be combined in any appropriate manner. Accordingly, although the invention has been described based upon these preferred embodiments, it would be apparent to those of skill in the art that certain modifications, variations, and alternative constructions would be apparent, while remaining within the spirit and scope of the invention. In order to determine the metes and bounds of the invention, therefore, reference should be made to the appended claims.

WE CLAIM:

1. A method, comprising:

detecting an input from a user, wherein the input comprises a selection of a key representing a plurality of characters from a keypad of a device;

determining whether the user has selected explicit text entry or ambiguous text entry of one of the characters based on a type of the input; and

based on the result of the determining, activating one of the explicit text entry or the ambiguous text entry for the one of the characters.

2. The method according to claim 1, further comprising repeating the detecting, determining, and activating until it is determined that the user has completed inputting a character string.

3. The method according to claim 2, wherein the repeating is performed until the user inputs one of a space or punctuation.

4. The method according to claim 1, wherein the activating comprises activating the explicit text entry when the input is a directional swipe of the key.

5. The method according to claim 1, wherein the activating comprises activating the ambiguous text entry when the input is a tap of the key.

6. The method according to claim 1, wherein the keypad comprises five keys.

7. The method according to claim 2, further comprising:

when it is determined that the user has completed inputting the character string, determining whether there is ambiguity regarding the character string the user intended to input, and

when it is determined that there is ambiguity regarding the character string, prompting the user to clarify the character that will resolve the ambiguity.

8. The method according to claim 1, wherein the detecting, determining, and activating are performed by a processor communicating with the keypad of the device.

9. An apparatus, comprising:

at least one processor; and

at least one memory including computer program code;

the at least one memory and the computer program code are configured, with the at least one processor, to cause the apparatus at least to

detect an input from a user, wherein the input comprises a selection of a key representing a plurality of characters from a keypad of a device;

determine whether the user has selected explicit text entry or ambiguous text entry of one of the characters based on a type of the input; and

based on the result of the determining, activate one of the explicit text entry or the ambiguous text entry for the one of the characters.

10. The apparatus according to claim 9, wherein the at least one memory and the computer program code are further configured, with the at least one processor, to cause the apparatus to repeat the detecting, determining, and activating until it is determined that the user has completed inputting a character string.

11. The apparatus according to claim 10, wherein the at least one memory and the computer program code are further configured, with the at least one processor, to cause the apparatus to determine that the user has completed inputting the character string when the user inputs one of a space or punctuation.

12. The apparatus according to claim 9, wherein the at least one memory and the computer program code are further configured, with the at least one processor, to cause the apparatus to activate the explicit text entry when the input is a directional swipe of the key.

13. The apparatus according to claim 9, wherein the at least one memory and the computer program code are further configured, with the at least one processor, to cause the apparatus to activate the ambiguous text entry when the

input is a tap of the key.

14. The apparatus according to claim 9, wherein the keypad comprises five keys.

15. The apparatus according to claim 10, further comprising:

when the apparatus determines that the user has completed inputting the character string, the at least one memory and the computer program code are further configured, with the at least one processor, to cause the apparatus to determine whether there is ambiguity regarding the character string the user intended to input, and

when the apparatus determines that there is ambiguity regarding the character string, the at least one memory and the computer program code are further configured, with the at least one processor, to cause the apparatus to prompt the user to clarify the character that will resolve the ambiguity.

16. A computer program embodied on a computer readable storage medium, the computer program configured to control a processor to perform a process, comprising:

detecting an input from a user, wherein the input comprises a selection of a key representing a plurality of characters from a keypad of a device;

determining whether the user has selected explicit text entry or ambiguous text entry of one of the characters based on a type of the input; and

based on the result of the determining, activating one of the explicit text entry or the ambiguous text entry for the one of the characters.

17. The computer program according to claim 16, further comprising repeating the detecting, determining, and activating until it is determined that the user has completed inputting a character string.

18. The computer program according to claim 17, wherein it is determined that the user has completed inputting the character string when the user inputs one of a space or punctuation.

19. The computer program according to claim 16, wherein the activating comprises activating the explicit text entry when the input is a directional swipe of the key.

20. The computer program according to claim 16, wherein the activating comprises activating the ambiguous text entry when the input is a tap of the key.

21. The computer program according to claim 16, wherein the keypad comprises five keys.

22. The computer program according to claim 17, further comprising:

when it is determined that the user has completed inputting the character string, determining whether there is ambiguity regarding the character string the user intended to input, and

when it is determined that there is ambiguity regarding the character string, prompting the user to clarify the character that will resolve the ambiguity.

23. An apparatus, comprising:

detecting means for detecting an input from a user, wherein the input comprises a selection of a key representing a plurality of characters from a keypad of a device;

determining means for determining whether the user has selected explicit text entry or ambiguous text entry of one of the characters based on a type of the input; and

based on the result of the determining means, activating means for activating one of the explicit text entry or the ambiguous text entry for the one of the characters.

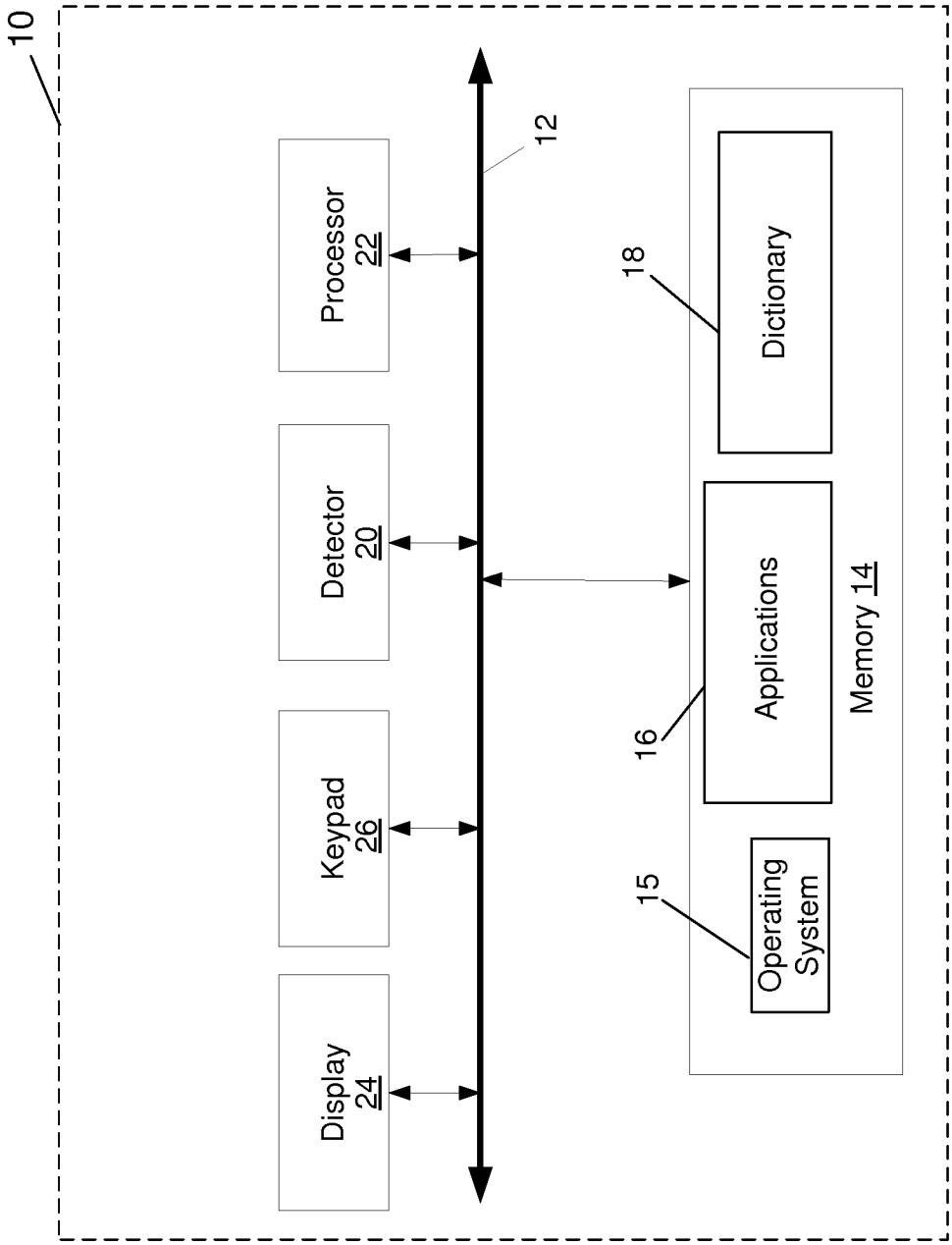

10
12
Processor 22
Detector 20
Keypad 26
Display 24
18
Dictionary
16
Applications
Memory 14
15
Operating System

Fig. 1

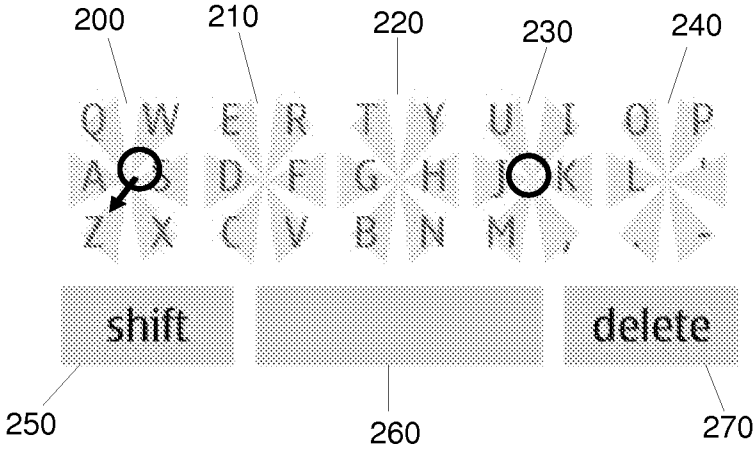

200
210
220
230
240
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
shift
delete
250
260
270

Fig. 2

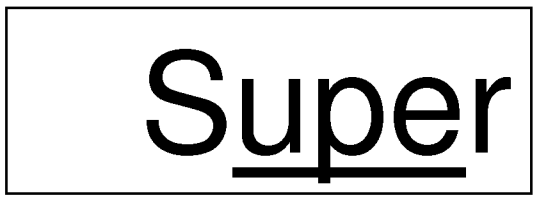


Fig. 3

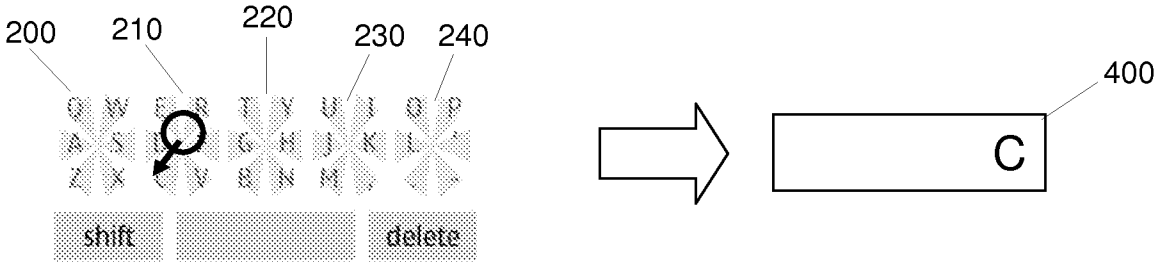


Fig. 4a

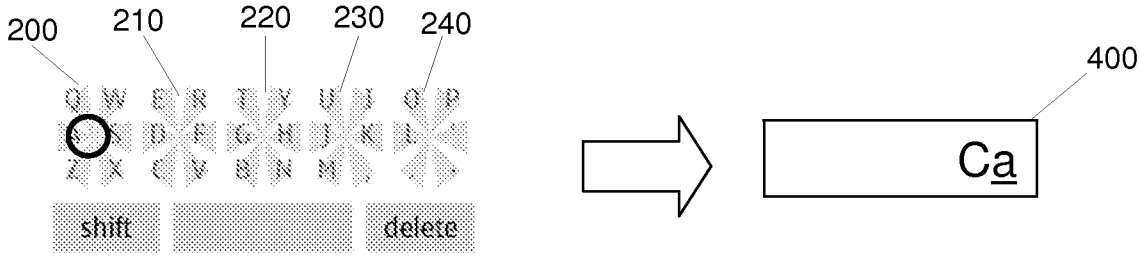


Fig. 4b

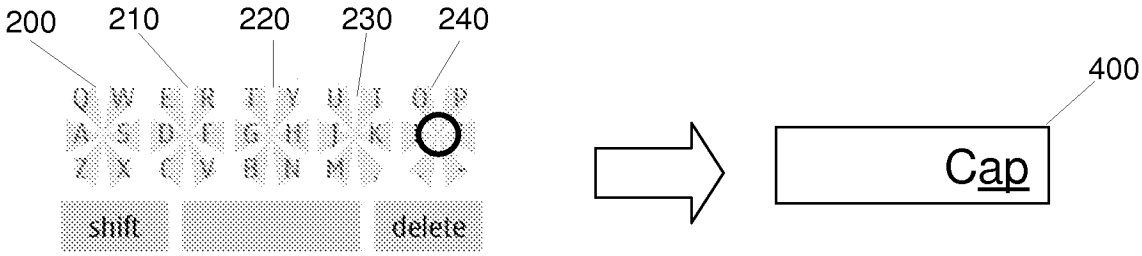


Fig. 4c

Fig. 5a

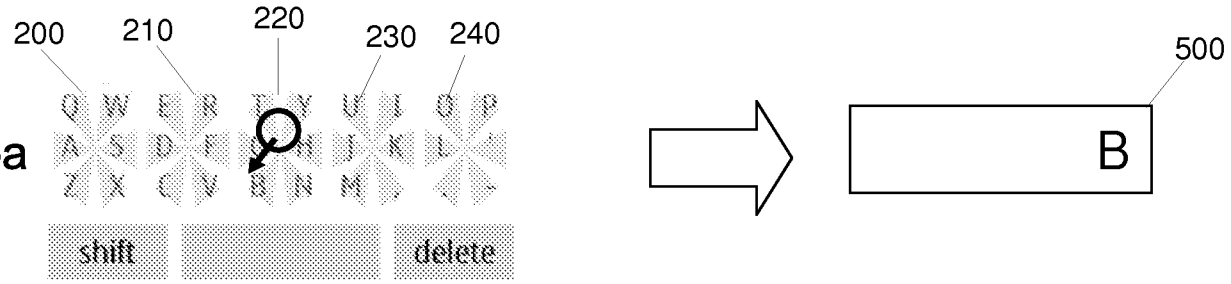


Fig. 5b

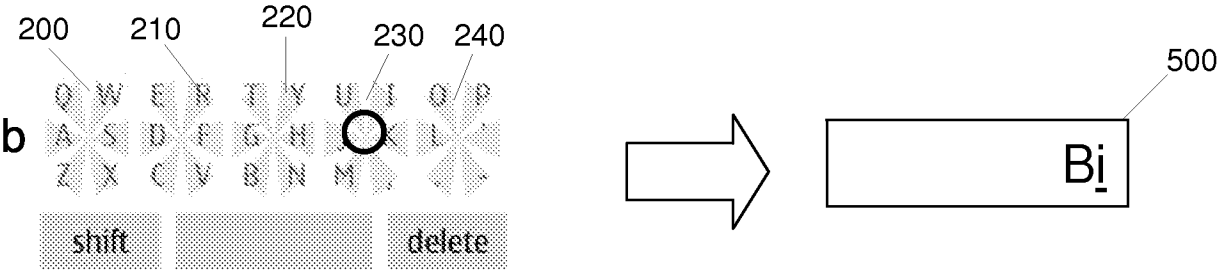


Fig. 5c

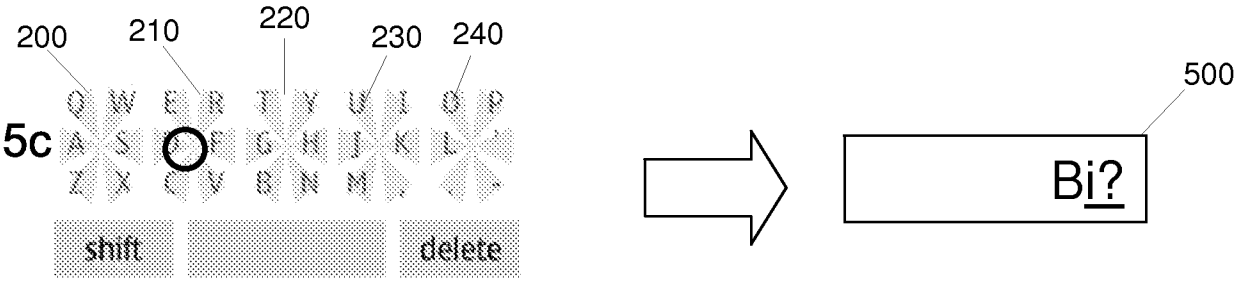


Fig. 5d

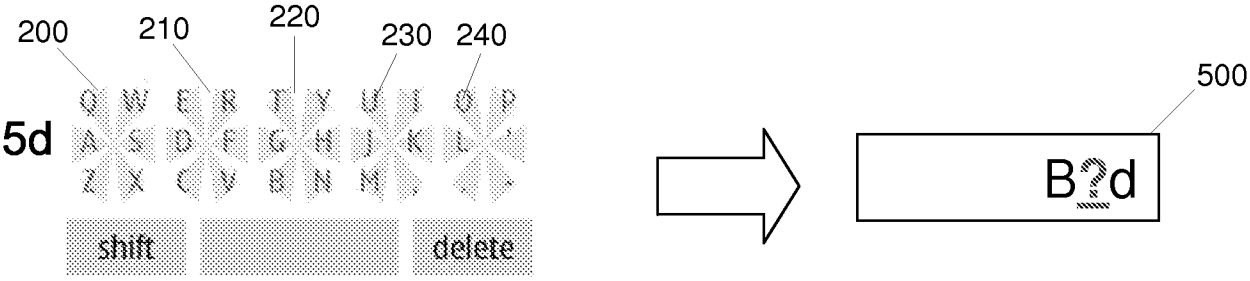
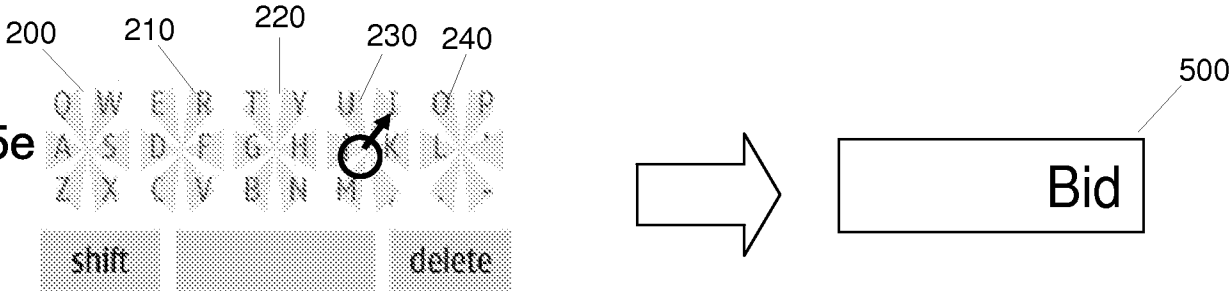


Fig. 5e



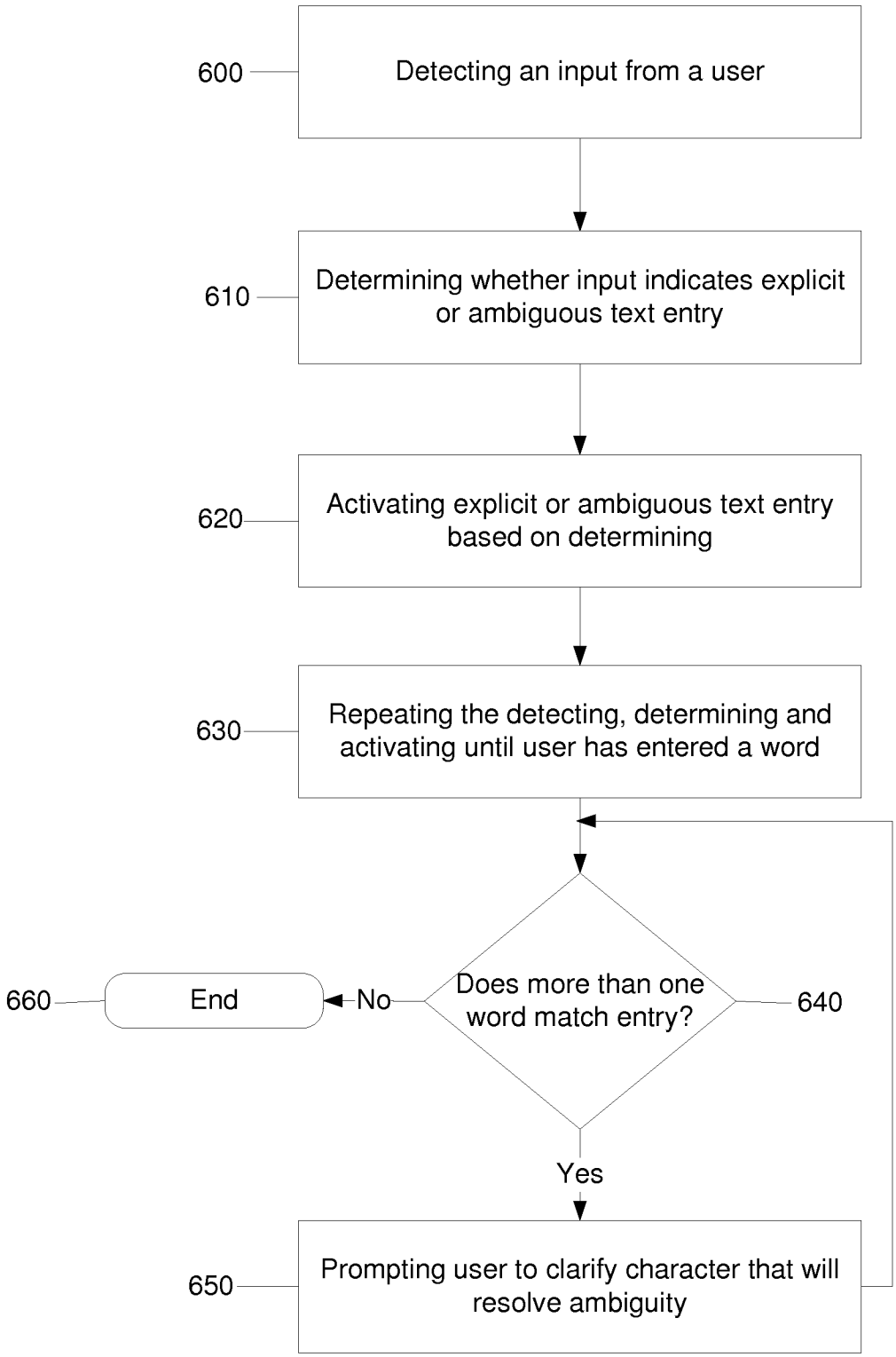

600
Detecting an input from a user
610
Determining whether input indicates explicit or ambiguous text entry
620
Activating explicit or ambiguous text entry based on determining
630
Repeating the detecting, determining and activating until user has entered a word
Does more than one word match entry?
640
No
660
End
Yes
650
Prompting user to clarify character that will resolve ambiguity

Fig. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2010/052705

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ, INSPEC, COMPDX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 20020196163 A1 (BRADFORD, ETHAN ROBERT ET AL), 26 December 2002 (26.12.2002), figures 1, 8, claims 1-6, paragraphs [0046]-[0060]	1-23
X	US 20100088626 A1 (RUBANOVICH, DAN), 8 April 2010 (08.04.2010), figures 1, 3, paragraphs [0018]-[0024], [0027]-[0029]	1-23
X	WO 2008114086 A2 (GHASSABIAN, FIROOZ), 25 Sept 2008 (25.09.2008), claim 1, abstract	1-23

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
31 January 2011	03 -02- 2011
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Frida Jussing / EÖ Telephone No. +46 8 782 25 00

International patent classification (IPC)
G06F 3/048 (2006.01)

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Cited literature, if any, will be enclosed in paper form.

US	20020196163	A1	26/12/2002	NONE		
US	20100088626	A1	08/04/2010	NONE		
WO	2008114086	A2	25/09/2008	AU	2007349606 A	25/09/2008
				CA	2681198 A	25/09/2008
				EP	2038769 A	25/03/2009