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(54) Title: INPUTTING CHINESE CHARACTERS IN PINYIN MODE

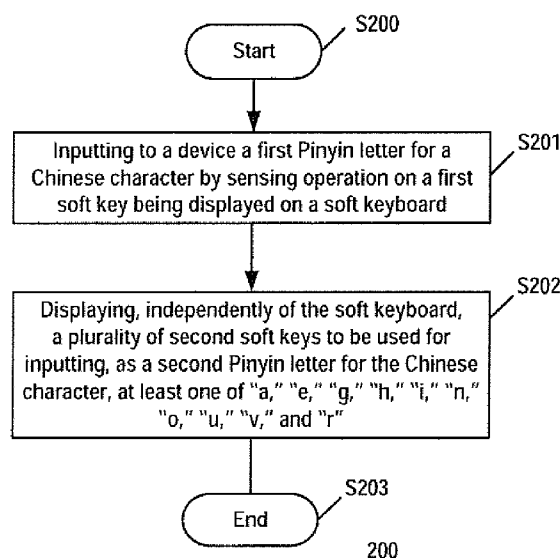


Fig. 2

(57) Abstract: Provided are a method, an apparatus and a computer program product for providing a user interface for inputting Chinese characters. The method comprises: inputting to a device a first Pinyin letter for a Chinese character by sensing operation on a first soft key being displayed on a soft keyboard; and displaying, independently of the soft keyboard, a plurality of second soft keys to be used for inputting, as a second Pinyin letter for the Chinese character, at least one of "a," "e," "g," "h," "i," "n," "o," "u," "v," and "r." With the present invention, a user may efficiently input Chinese characters in a Pinyin input mode without significantly moving his or her finger across a soft keyboard. Therefore, the accuracy and speed of inputting Chinese characters will be improved.



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INPUTTING CHINESE CHARACTERS IN PINYIN MODE

FIELD OF THE INVENTION

[0001] Embodiments of the present invention generally relate to methods and apparatus for inputting Chinese characters by using a soft keyboard. More particularly, embodiments of the present invention relate to a method and apparatus for providing a user interface for inputting Chinese characters and a computer program product for providing user interface for inputting Chinese characters.

BACKGROUND OF THE INVENTION

[0002] Nowadays, various soft keyboards, which include but are not limited to QWERTY soft keyboards, mini-qwerty keyboards and ITU-T keyboards, have been used widely as human-machine interfaces for many electronic devices, including, for example, personal computers (PC), personal digital assistants (PDA), mobile phones, electronic dictionaries, electronic readers. In order to input a Chinese character, most soft keyboards have been preinstalled with a Pinyin input function. However, in some respects, such soft keyboards are still inconvenient for inputting Chinese characters.

[0003] For example, the key layout of a QWERTY soft keyboard is still not optimized or customized for the Pinyin input. For a better understanding of this problem, reference is made to Fig. 1. Fig. 1 illustrates a user interface that may be used in connection with a QWERTY soft keyboard for the Pinyin input. As illustrated in Fig. 1, after a user inputs English letters “n” and “i” as the Pinyin letters, a row of Chinese candidate characters 101, for example, “你 尼 呢 泥 拟 . . . ” are displayed for the user to select, and the first Chinese character “你” has been presented in an input window. Meanwhile, legal letters “e,” “u,” “a,” and “n,” which may follow the letter “i” according to a Pinyin coding rule, have been predicted and protruded from the soft keyboard for user’s possible further selection. The remaining keys on the QWERTY soft keyboard, which are illegal letters according to the Pinyin coding rule, are all rendered dimmed and cannot be selected by the user. Although such a user interface for the soft keyboard may provide a good way for quickly inputting Chinese characters,

the user still has to constantly move his or her finger or stylus across the whole soft keyboard to select appropriate soft keys.

[0004] In addition, capacitive touch screens have been widely used in mobile phones. However, because of constraints on sizes of soft keyboards, users are very likely to touch undesired keys. Accordingly, it would lower efficiency and cause bad user experience.

SUMMARY OF THE INVENTION

[0005] Therefore, a need exists in the art to provide a soft keyboard with an improved user interface so that a user of the soft keyboard may efficiently input Chinese characters under a Pinyin input mode without significantly moving fingers across the whole soft keyboard.

[0006] In one embodiment of the present invention, a method is provided. The method comprises inputting to a device a first Pinyin letter for a Chinese character by sensing operation on a first soft key being displayed on a soft keyboard. The method also comprises displaying, independently of the soft keyboard, a plurality of second soft keys to be used for inputting, as a second Pinyin letter for the Chinese character, at least one of "a," "e," "g," "h," "i," "n," "o," "u," "v," and "r."

[0007] In one embodiment, the plurality of second soft keys substantially surround the first soft key. In another embodiment, the plurality of second soft keys include eight soft keys, one of which is to be used for inputting "g" or "h", and another of which is to be used for inputting "v" or "r."

[0008] In a further embodiment, soft keys being illegal for the second Pinyin letter or an additional Pinyin letter for the Chinese character are displayed in an unnoticeable manner.

[0009] In an additional embodiment, the soft keyboard initially comprises twenty three soft keys to be used for inputting the first Pinyin letter. In one embodiment, the twenty three soft keys are arranged in three rows, including an upper row of eight soft keys for "e," "q," "w," "r," "t," "y," "p," and "o," a middle row of eight soft keys for "a," "s," "d," "f," "g," "h," "j," and "l," and a lower row of seven soft keys for "z," "x," "c," "b," "n," "m," and "k."

[0010] In another embodiment, the method further comprises: inputting to the device the second Pinyin letter for the Chinese character by sensing operation on one of the plurality of second soft keys; and for any two consecutive subsequent Pinyin letters for the Chinese character, inputting to the device a first letter of the two consecutive subsequent Pinyin letters by sensing operation on a corresponding soft key being displayed on the soft keyboard; and displaying, independently of the soft keyboard, a plurality of second soft keys to be used for inputting, as a second letter of the two consecutive subsequent Pinyin letters, at least one of “a,” “e,” “g,” “h,” “i,” “n,” “o,” “u,” “v,” and “r.”

[0011] In a further embodiment, the method further comprises inputting to the device the second or more Pinyin letters for the Chinese character by sensing operation on one or more of the plurality of second soft keys.

[0012] In one embodiment, for any soft key that has been used for inputting to the device the second Pinyin letter or an additional Pinyin letter for the Chinese character, a plurality of predicted soft keys are displayed, substantially surrounding the soft key that has been used, for inputting to the device additional Pinyin letters for the Chinese character.

[0013] In one embodiment, the operation comprises a click, touch, swap, press, or other actions by a user. In another embodiment, the first soft key is separate and away from the plurality of second soft keys. In a further embodiment, the plurality of second soft keys are displayed on the soft keyboard, but on a half of the soft keyboard different from the first soft key, replacing certain original soft keys. In an additional embodiment, a layout of the plurality of second soft keys is one of a pie, a rectangle, a square, an eclipse, or a similar shape.

[0014] In another embodiment of the present invention, an apparatus is provided. The apparatus comprises means for inputting to a device a first Pinyin letter for a Chinese character by sensing operation on a first soft key being displayed on a soft keyboard. The apparatus also comprises means for displaying, independently of the soft keyboard, a plurality of second soft keys to be used for inputting, as a second Pinyin letter for the Chinese character, at least one of “a,” “e,” “g,” “h,” “i,” “n,” “o,” “u,” “v,” and “r.”

[0015] In a further embodiment of the present invention, an apparatus is

provided. The apparatus comprises at least one processor and at least one memory including computer program code. The memory and the computer program code are configured to cause the at least one processor to input to a device a first Pinyin letter for a Chinese character by sensing operation on a first soft key being displayed on a soft keyboard. The memory and the computer program code are also configured to cause the at least one processor to display, independently of the soft keyboard, a plurality of second soft keys to be used for inputting, as a second Pinyin letter for the Chinese character, at least one of "a," "e," "g," "h," "i," "n," "o," "u," "v," and "r."

[0016] In another embodiment of the present invention, a computer program product is provided. The computer program product comprises at least one computer readable storage medium having a computer readable program code portion stored thereon. The computer readable program code portion comprises program code instructions for inputting to a device a first Pinyin letter for a Chinese character by sensing operation on a first soft key being displayed on a soft keyboard. The computer readable program code portion comprises program code instructions for displaying, independently of the soft keyboard, a plurality of second soft keys to be used for inputting, as a second Pinyin letter for the Chinese character, at least one of "a," "e," "g," "h," "i," "n," "o," "u," "v," and "r."

[0017] According to certain embodiments of the present invention, a user may easily select soft keys for inputting Chinese characters because a reduced number of second soft keys are displayed for inputting a second Pinyin letter for the Chinese character. Further, because a first soft key is substantially surrounded by the second soft keys only, which are legal for the second Pinyin letter or an additional Pinyin letter for a Chinese character, a user only needs to move a finger or stylus across a very short distance to input the Chinese character.

[0018] In addition, when the users are accustomed to or familiar with the arrangement of the plurality of the second soft keys, their speed of inputting Chinese characters would be greatly improved. This is very helpful or convenient in some applications, such as, chatting, short messaging, or text editing on a portable device.

[0019] Other features and advantages of the embodiments of the present invention would also be understood from the following description of specific embodiments when read in conjunction with the accompanying drawings, which

illustrate, by way of example, the principles of embodiments of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The embodiments of the invention that are presented in the sense of examples and their advantages are explained in greater detail below with reference to the accompanying drawings, in which:

[0021] Fig. 1 illustrates a user interface that is used in connection with a QWERTY soft keyboard for the Pinyin input;

[0022] Fig. 2 is a simplified flow chart of a method for providing a user interface to a soft keyboard according to one embodiment of the present invention;

[0023] Figs. 3-6 are schematic diagrams illustrating a plurality of user interfaces for inputting Pinyin letters according to certain embodiments of the present invention;

[0024] Fig. 7 is a schematic diagram illustrating an arrangement of a soft keyboard which is suitable for being used with the user interfaces as illustrated in Figs. 3-6; and

[0025] Fig. 8 is a schematic diagram of an apparatus according to another embodiment of the present invention, which is equipped with, or implements, the method or user interfaces as illustrated in Figs. 2-7.

DETAILED DESCRIPTION OF EMBODIMENTS

[0026] Embodiments of the present invention will be described in detail as below.

[0027] In one embodiment of the present invention, by sensing operation (e.g., touching, pressing, or swapping by a user) on a first soft key on a soft keyboard being displayed on a touch screen, the first Pinyin letter is inputted to a device. Then, a plurality of second soft keys to be used for inputting a second Pinyin letter are displayed independently of the soft keyboard. In one embodiment, the plurality of second soft keys are displayed so that they substantially surround the first soft key. For example, the plurality of second soft keys may form a pie, a rectangle, a square, an

eclipse, or other shapes and pop up after the operation has been sensed on the first soft key. Herein, the operation comprises a click, swap, touch, press or other actions by a user. In another embodiment, the first soft key and the plurality of second soft keys are displayed separately. In a further embodiment, the plurality of second soft keys are displayed within the same soft keyboard as the first soft key but are located on another part (e.g., half) of the soft keyboard, replacing certain of original soft keys on the soft keyboard.

[0028] Fig. 1 illustrates a user interface that is used in connection with a QWERTY soft keyboard for the Pinyin input and has been discussed previously.

[0029] Fig. 2 is a flow chart of a method 200 for providing a user interface to a soft keyboard according to one embodiment of the present invention. The method 200 starts at step S200 and proceeds to step S201. At step S201, the method 200 inputs to a device a first Pinyin letter for a Chinese character by sensing operation on a first soft key being displayed on a soft keyboard. Then, the method 200 proceeds to step S202. At step S202, the method 200 displays, independently of the soft keyboard, a plurality of second soft keys to be used for inputting, as a second Pinyin letter for the Chinese character, at least one of "a," "e," "g," "h," "i," "n," "o," "u," "v," and "r." Finally, the method 200 ends at step S203.

[0030] In the method 200, the reason why the plurality of second soft keys are only used for inputting at least one of "a," "e," "g," "h," "i," "n," "o," "u," "v," and "r" is based upon inventors' finding related to the Chinese Pinyin coding rule, as discussed below. According to the Chinese Pinyin coding rule, only twenty three English letters, except "i," "u," and "v," may be used as a first Pinyin letter. However, only ten English letters, e.g., "a," "e," "g," "h," "i," "n," "o," "u," "v," and "r," may be used as a second Pinyin letter or an additional Pinyin letter for a Chinese character. In other words, only the ten English letters are legal for inputting a second Pinyin letter or an additional Pinyin letter. For example, Pinyin letters for a Chinese character "中," are "zhong." The first Pinyin letter is the English letter "z" and each of the remaining Pinyin letters "hong" is one the above ten English letters "a," "e," "g," "h," "i," "n," "o," "u," "v," and "r." Based upon inventors' such important finding related to Chinese Pinyin coding rule, the method 200 only needs to display a plurality of second soft keys for inputting at least one of the above ten English letters as a second Pinyin

letter or an additional Pinyin letter. How to display the plurality of second soft keys through a user interface is illustrated in Figs. 3-6. Hereinafter, discussion regarding certain embodiments of the present invention will be made with reference to each of Figs. 3-6.

[0031] Figs. 3-6 are schematic diagrams illustrating a plurality of user interfaces for inputting Chinese characters according to certain embodiments of the present invention.

[0032] As illustrated in Fig. 3, a user interface for inputting Chinese characters is formed as a pie 301 independently of the soft keyboard. At the center of the pie 301, located is a first soft key “p” which has been clicked as the first Pinyin letter by a user. Surrounding the first soft key “p” are eight second soft keys, one of which is to be used for inputting “g” or “h”, and another of which is to be used for inputting “v” or “r.” The remaining second soft keys are assigned to the letters “a,” “e,” “i,” “n,” “o,” “u,” respectively. Making letters “g” and “h” to share one soft key 302 is because the letter “g” only follows the letter “n” and the letter “h” only follows the letters “c,” “s,” and “z” according to the Chinese Pinyin coding rule. That is, they do not follow the same letter and thus may be distinguished from each other. Similarly, making letters “v” and “r” to share one soft key 303 is because the letter “v” only follows the letters “j” and “n” and the letter “r” only follows the letter “e.” Such sharing of one soft key may advantageously decrease the number of the second soft keys on the pie and thus each second soft key has a relatively large area, which is much easier for user’s touch or click. Although not reflected in Fig. 3, the size of the pie 301 may be preset according to a user’s preference.

[0033] The foregoing has described in general the user interface formed as the pie according to one embodiment of the present invention. The following will describe how to input a Chinese character through this user interface. Suppose that a user desires to input a Chinese character “平” whose Pinyin letters are “ping.” First, he or she clicks the soft key (i.e., the first soft key as noted above) indicative of the letter “p” on the QWERTY soft keyboard. Upon sensing that the soft key “p” has been clicked, the pie 301 as illustrated in Fig. 3 would be automatically popped up and wait for user’s further selection. In different embodiments of the present invention, at least three manners may be provided to proceed with for inputting the remaining Pinyin

letters.

[0034] In a first manner, the user may click, touch, swap, or press the soft key indicative of “i” to input the Chinese Pinyin letter “i.” Herein, swap means that the user continues to select the second soft keys without lifting up his or her finger or stylus away from the touch screen. For example, after clicking the first soft key “p,” the finger or stylus slides along the surface of the touch screen directly to the second soft key indicative of the letter “i.” Once the Pinyin letter “i” has been input, the pie 301 that popped up previously would disappear automatically. Although not illustrated in Fig.3, a list of candidate Chinese characters would be presented in a candidate window for user’s selection, similarly to the plurality of Chinese characters in a text window as illustrated in Fig. 7 (to be discussed later). For example, Chinese characters “皮,” “批,” “劈,” and “屁,” which have the same Pinyin letters, would be presented. Because the Pinyin letters “ping” for the Chinese character “平” has not yet been completely inputted, the user may click on the original soft keyboard the soft key indicative of the Pinyin letter “n,” (i.e., the first soft key), another pie, which is the same as the pie 301 but at a different location, e.g., surrounding the letter “n,” pops up. Likewise, the use may select the soft key indicative of the Pinyin letter “g” (i.e., the second soft key) by a click, touch, swap, press, or other actions. Once the Pinyin letter “g” is inputted, the input of Pinyin letters for the Chinese character “平” has been completed. Similarly, there may be a list of candidate Chinese characters for user’s final selection. For example, Chinese characters “凭,” “瓶,” “评,” “平,” and “屏” would be presented for further selection. The user may select the Chinese character “平” to successfully complete the input this time.

[0035] It can be seen from the first manner that the second Pinyin letter for the Chinese character may be inputted to the device by sensing operation on one of the plurality of second soft keys. For any two consecutive subsequent Pinyin letters for the Chinese character (e.g., “n,” and “g” in this example), a first letter of the two consecutive subsequent Pinyin letters may be inputted to the device by sensing operation on a corresponding soft key being displayed on the soft keyboard; and, independently of the soft keyboard, a plurality of second soft keys are displayed, which will be used for inputting at least one of “a,” “e,” “g,” “h,” “i,” “n,” “o,” “u,” “v,” and “r,” as a second letter of the two consecutive subsequent Pinyin letters.

[0036] In a second manner, after the user clicked the second soft key on the pie, i.e., inputting the Pinyin letter “i,” the pie 301 does not disappear, which is different from the first manner. Then, the user may successively input two second soft keys indicative of the Pinyin letters “n” and “g” via the pie 301. During the process of inputting, accompanying each input of the Pinyin letters, the list of candidate Chinese characters is updated accordingly. Additionally, during the process of inputting, if the user wants to dismiss the pie, he or she may touch an empty area in a text editor or other soft keys on the soft keyboard. Then, the pie 301 may disappear and the user may simply use the soft keyboard to input the Pinyin letters.

[0037] It can be seen from the second manner that the second or more Pinyin letters for the Chinese character may be inputted to the device by sensing operation on one or more of the plurality of second soft keys.

[0038] In a third manner, after the user inputted the Pinyin letter “i,” through the pie, the pie would disappear and a new pie would pop up substantially around the previous second soft key “i.” Then the user may select from this new pie, by a click, touch, swap, press, or other actions, the second soft key to input the Pinyin letter “n.” Again, a new pie would pop up substantially around the previous second soft key “n” and the user may select and input the last Pinyin letter “g.” Because a new pie is formed substantially around the immediately previous second soft key, the number of the second soft keys on the new pie may decrease and thus the size of the pie or the area of each second soft key may change each time one Pinyin letter is input. Preferably, accompanying each input of the Pinyin letters, some other predicted soft keys may also be displayed on the pie.

[0039] It can be seen from the third manner that for any soft key that has been used for inputting to the device the second Pinyin letter or an additional Pinyin letter for the Chinese character, a plurality of predicted soft keys are displayed, substantially surrounding the soft key that has been used, for inputting to the device additional Pinyin letters for the Chinese character. Because the size of the pie may dynamically change during the process of the input based upon the number of the remaining Pinyin letters, the user may have fun inputting the Pinyin letters.

[0040] The above has illustratively described three manners that may be used with the user interface as illustrated in Fig. 3. However, the embodiments of the

present invention are not limited thereto. A person skilled in the art may make any suitable change or adaptation without departing from the spirit and scope of the present invention. For example, although not illustrated in Fig. 3, in the subsequent input of the Pinyin letters, the illegal letters, that is, letters that cannot follow the previous second soft key according to the Pinyin coding rule, may be rendered dimmed to avoid incorrect input. In other words, soft keys being illegal for the second Pinyin letter or an additional Pinyin letter for the Chinese character are displayed in an unnoticeable manner.

[0041] In addition, the arrangement of the plurality of second soft keys on the pie, as illustrated in Fig. 3, is illustrative only; there may be other suitable arrangements for efficient inputs. Besides the pie, other suitable geometries may also be used for presenting a layout of the plurality of second soft keys, e.g., a rectangle 401 as illustrated in Fig. 4.

[0042] Another benefit of flexibly using the above three manners is that Chinese characters or phrases having the same Pinyin letters can be easily distinguished and inputted. For example, when inputting the Chinese character “先” and the Chinese phrase “西安,” which have the same Pinyin letters “xian” (or “Xi An”), the Chinese phrase “西安” may be inputted using the first manner and the Chinese character “先” may be inputted using the second or third manner.

[0043] Furthermore, regarding a situation in which the soft key (e.g., “p” and “q”) for inputting the first Pinyin letter has reach or will exceed the edges of the soft keyboard, as illustrated in Figs. 3 and 4, respectively, the areas of the pie, rectangle, square, eclipse, or other shapes may outreach the edges of the touch screen. In this case, some soft keys being illegal for the second Pinyin letter or an additional Pinyin letter may be arranged on the pie, rectangle, square, eclipse, or other shapes at a side that is closer to the edge of the touch screen, e.g., the second soft keys for inputting the Pinyin letters “n,” “vr,” and “gh” in Fig. 3. Such an arrangement would guarantee that the second soft keys legal for the second Pinyin letter or an additional Pinyin letter are presented within the screen for user's selection. Fig. 7 schematically illustrates an arrangement of a soft keyboard which may address the above situation as well, whose details will be discussed later.

[0044] As above discussed, Fig. 4 illustrate another user interface 401 for

inputting the Pinyin letters according to one embodiment of the present invention. Except a different shape from the user interface 301 as illustrated in Fig. 3, both user interfaces 301 and 401 are the same or similar in term of the use and operation. Thus, for purpose of simplifying the description, the discussion about the user interface as illustrated in Fig. 4 is omitted herein.

[0045] Fig. 5 schematically illustrates a user interface for inputting the Pinyin letters according to another embodiment of the present invention. As illustrated in Fig. 5, the upper portion 501 of the Fig. 5 shows a simplified QWERTY soft keyboard. The middle portion 502 of the Fig. 5 shows that when a first soft key “S” at the left side is clicked or pressed, as illustrated by a cross symbol “×,” the plurality of second soft keys are displayed at the right portion 503 of the soft keyboard 501. Likewise, the lower portion 504 of the Fig. 5 shows that when a first soft key “J” at the right side is clicked, the plurality of second soft keys are displayed at the left portion 505 of the soft keyboard 501. That is, the plurality of second soft keys are displayed on the soft keyboard, but on a half of the soft keyboard different from the first soft key, replacing certain original soft keys. Such user interfaces may be advantageously applied to a multi-touch enabled portable device.

[0046] Fig. 6 schematically illustrates additional user interfaces for inputting the Pinyin letters according to one embodiment of the present invention. Different from the user interfaces as illustrated in Fig. 5, the second soft keys for input Pinyin letters are separate from the first soft keys and form an extra keyboard. In particular, the upper portion 601, middle portion 603 and lower portion 605 of Fig. 6 particularly illustrate three main soft keyboards, two of which are QWERTY soft keyboards and one of which is an ITU-T soft keyboard. The upper portion 602, middle portion 604 and the lower portion 606 of Fig. 6 are three extra keyboards including the plurality of second soft keys. When the user clicks the first soft key displayed on the main soft keyboard, the extra keyboard would pop up for a further Pinyin input and disappear when the input is completed. It should be noted that the former two user interfaces are suitable for a multi-touch enabled device with a big touch screen and the third user interface is suitable for a single-touch enabled device.

[0047] Fig. 7 is a schematic diagram illustrating an arrangement of a soft keyboard which is suitable for using with the user interfaces as illustrated in Figs. 3-6.

The arrangement of the soft keyboard is intended to address a possible problem that the second soft keys being displayed, e.g., by a pie, rectangle, square, eclipse, or other shapes as illustrated in Figs. 3 and 4, would outreach the edges of the touch screen. To avoid such a situation, it may be necessary to reduce the number of soft keys to be arranged on the soft keyboard. In one embodiment, only twenty three soft keys are used for inputting the first Pinyin letter. These twenty three soft keys are arranged in three rows, including an upper row 701 of eight soft keys for “e,” “q,” “w,” “r,” “t,” “y,” “p,” and “o,” a middle row 702 of eight soft keys for “a,” “s,” “d,” “f,” “g,” “h,” “j,” and “l,” and a lower row 703 of seven soft keys for “z,” “x,” “c,” “b,” “n,” “m,” and “k,” as illustrated in Fig. 7. By initially arranging a soft keyboard in such a manner, all the second soft keys may be displayed within the touch screen even when the first soft key is close to an edge of the soft keyboard.

[0048] Fig. 8 is a schematic diagram of an apparatus in another embodiment of the present application, which is equipped with, or implements, the method or user interfaces as illustrated in Figs. 2-7. The apparatus 80 as illustrated in Fig. 8 is only an example of the electronic devices in which the embodiments of the present invention implemented. In certain embodiments, the apparatus 80 as illustrated in Fig. 8 may be a personal digital assistant (PDA), a mobile phone, an electronic dictionary or electronic reader, a receipt printer, etc. As illustrated in Fig. 8, the apparatus 80 comprises at least one processor 800, a soft keyboard 801 (e.g., implemented in an area of a touch screen), a codec circuitry 802, a microphone 803, an ear-piece 804, a radio interface circuitry 805, an antenna 806, at least one memory 807 storing computer program code, an infrared port 808, a display 809 (e.g., including the above touch screen), a smart card 810, and a card reader 811. Individual circuits and elements are all of a type well known in the art and some of them are omitted herein so as not to obscuring embodiments of the present invention unnecessarily.

[0049] As illustrated in Fig. 8, the memory 807 and the computer program code as stored therein are configured to cause the processor 800 to input to the apparatus 80 a first Pinyin letter for a Chinese character by sensing operation on a first soft key being displayed on the soft keyboard 801; and display, independently of the soft keyboard 801, a plurality of second soft keys to be used for inputting, as a second Pinyin letter for the Chinese character, at least one of “a,” “e,” “g,” “h,” “i,” “n,” “o,”

“u,” “v,” and “r.”

[0050] Exemplary embodiments of the present invention have been described above with reference to block diagrams and flowchart illustrations of methods and apparatuses (i.e., systems). It will be understood that each block of the block diagrams and flowchart illustrations, and combinations of blocks in the block diagrams and flowchart illustrations, respectively, can be implemented by various means including computer program instructions. These computer program instructions may be loaded onto a general purpose computer, special purpose computer, or other programmable data processing apparatus to produce a machine, such that the instructions which execute on the computer or other programmable data processing apparatus create means for implementing the functions specified in the flowchart block or blocks.

[0051] The foregoing computer program instructions can be, for example, sub-routines and/or functions. A computer program product in one embodiment of the invention comprises at least one computer readable storage medium, on which the foregoing computer program instructions are stored. The computer readable storage medium can be, for example, an optical compact disk or an electronic memory device like a RAM (random access memory) or a ROM (read only memory).

[0052] Many modifications and other embodiments of the inventions set forth herein will come to mind to one skilled in the art to which these embodiments of the invention pertain having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the embodiments of the invention are not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

CLAIMS

1. A method, comprising:
inputting to a device a first Pinyin letter for a Chinese character by sensing operation on a first soft key being displayed on a soft keyboard; and
displaying, independently of the soft keyboard, a plurality of second soft keys to be used for inputting, as a second Pinyin letter for the Chinese character, at least one of "a," "e," "g," "h," "i," "n," "o," "u," "v," and "r."
2. A method as recited in Claim 1, wherein the plurality of second soft keys substantially surround the first soft key.
3. A method as recited in Claim 1, wherein the plurality of second soft keys include eight soft keys, one of which is to be used for inputting "g" or "h", and another of which is to be used for inputting "v" or "r."
4. A method as recited in Claim 1, wherein soft keys being illegal for the second Pinyin letter or an additional Pinyin letter for the Chinese character are displayed in an unnoticeable manner.
5. A method as recited in Claim 1, wherein the soft keyboard initially comprises twenty three soft keys to be used for inputting the first Pinyin letter.
6. A method as recited in Claim 5, wherein the twenty three soft keys are arranged in three rows, including an upper row of eight soft keys for "e," "q," "w," "r," "t," "y," "p," and "o," a middle row of eight soft keys for "a," "s," "d," "f," "g," "h," "j," and "l," and a lower row of seven soft keys for "z," "x," "c," "b," "n," "m," and "k."
7. A method as recited in Claim 1, further comprising:
inputting to the device the second Pinyin letter for the Chinese character by sensing operation on one of the plurality of second soft keys; and
for any two consecutive subsequent Pinyin letters for the Chinese character,
inputting to the device a first letter of the two consecutive subsequent Pinyin letters by sensing operation on a corresponding soft key being displayed on the soft keyboard; and
displaying, independently of the soft keyboard, a plurality of second soft keys to be used for inputting, as a second letter of the two consecutive subsequent Pinyin letters, at least one of "a," "e," "g," "h," "i," "n," "o," "u," "v," and "r."

8. A method as recited in Claim 1, further comprising:
inputting to the device the second or more Pinyin letters for the Chinese character by sensing operation on one or more of the plurality of second soft keys.
9. A method as recited in Claim 2, wherein for any soft key that has been used for inputting to the device the second Pinyin letter or an additional Pinyin letter for the Chinese character, a plurality of predicted soft keys are displayed, substantially surrounding the soft key that has been used, for inputting to the device additional Pinyin letters for the Chinese character.
10. A method as recited in Claim 1, wherein the operation comprises a click or swap by a user.
11. A method as recited in Claim 1, wherein the first soft key is separate and away from the plurality of second soft keys.
12. A method as recited in Claim 11, wherein the plurality of second soft keys are displayed on the soft keyboard, but on a half of the soft keyboard different from the first soft key, replacing certain original soft keys.
13. A method as recited in any one of Claims 1-12, wherein a layout of the plurality of second soft keys is one of a pie, a rectangle, a square, an eclipse, or a similar shape.
14. An apparatus, comprising:
means for inputting to a device a first Pinyin letter for a Chinese character by sensing operation on a first soft key being displayed on a soft keyboard; and
means for displaying, independently of the soft keyboard, a plurality of second soft keys to be used for inputting, as a second Pinyin letter for the Chinese character, at least one of "a," "e," "g," "h," "i," "n," "o," "u," "v," and "r."
15. An apparatus as recited in Claim 14, wherein the plurality of second soft keys substantially surround the first soft key.
16. An apparatus as recited in Claim 14, wherein the plurality of second soft keys include eight soft keys, one of which is to be used for inputting "g" or "h", and another of which is to be used for inputting "v" or "r."
17. An apparatus as recited in Claim 14, wherein soft keys being illegal for the second Pinyin letter or an additional Pinyin letter for the Chinese character are displayed in an unnoticeable manner.

18. An apparatus as recited in Claim 14, wherein the soft keyboard initially comprises twenty three soft keys to be used for inputting the first Pinyin letter.

19. An apparatus as recited in Claim 18, wherein the twenty three soft keys are arranged in three rows, including an upper row of eight soft keys for "e," "q," "w," "r," "t," "y," "p," and "o," a middle row of eight soft keys for "a," "s," "d," "f," "g," "h," "j," and "l," and a lower row of seven soft keys for "z," "x," "c," "b," "n," "m," and "k."

20. An apparatus as recited in Claim 14, further comprising:

means for inputting to the device the second Pinyin letter for the Chinese character by sensing operation on one of the plurality of second soft keys; and

for any two consecutive subsequent Pinyin letters for the Chinese character,

means for inputting to the device a first letter of the two consecutive subsequent Pinyin letters by sensing operation on a corresponding soft key being displayed on the soft keyboard; and

means for displaying, independently of the soft keyboard, a plurality of second soft keys to be used for inputting, as a second letter of the two consecutive subsequent Pinyin letters, at least one of "a," "e," "g," "h," "i," "n," "o," "u," "v," and "r."

21. An apparatus as recited in Claim 14, further comprising:

means for inputting to the device the second or more Pinyin letters for the Chinese character by sensing operation on one or more of the plurality of second soft keys.

22. An apparatus as recited in Claim 15, wherein for any soft key that has been used for inputting to the device the second Pinyin letter or an additional Pinyin letter for the Chinese character, the apparatus further comprises means for displaying a plurality of predicted soft keys, substantially surrounding the soft key that has been used, for inputting to the device additional Pinyin letters for the Chinese character.

23. An apparatus as recited in Claim 14, wherein the operation comprises a click or swap by a user.

24. An apparatus as recited in Claim 14, wherein the first soft key is separate and away from the plurality of second soft keys.

25. An apparatus as recited in Claim 24, wherein the plurality of second soft keys are displayed on the soft keyboard, but on a half of the soft keyboard different

from the first soft key, replacing certain original soft keys.

26. An apparatus as recited in any one of Claims 14-25, wherein a layout of the plurality of second soft keys is one of a pie, a rectangle, a square, an eclipse, or a similar shape.

27. An apparatus, comprising:

at least one processor and at least one memory including computer program code,

the memory and the computer program code configured to cause the at least one processor to perform:

inputting to a device a first Pinyin letter for a Chinese character by sensing operation on a first soft key being displayed on a soft keyboard; and

displaying, independently of the soft keyboard, a plurality of second soft keys to be used for inputting, as a second Pinyin letter for the Chinese character, at least one of "a," "e," "g," "h," "i," "n," "o," "u," "v," and "r."

28. A computer program product, comprising at least one computer readable storage medium having a computer readable program code portion stored thereon, the computer readable program code portion comprising:

program code instructions for inputting to a device a first Pinyin letter for a Chinese character by sensing operation on a first soft key being displayed on a soft keyboard; and

program code instructions for displaying, independently of the soft keyboard, a plurality of second soft keys to be used for inputting, as a second Pinyin letter for the Chinese character, at least one of "a," "e," "g," "h," "i," "n," "o," "u," "v," and "r."

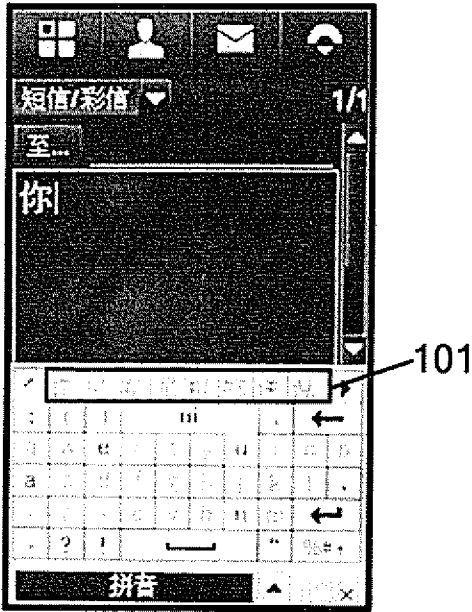


Fig. 1

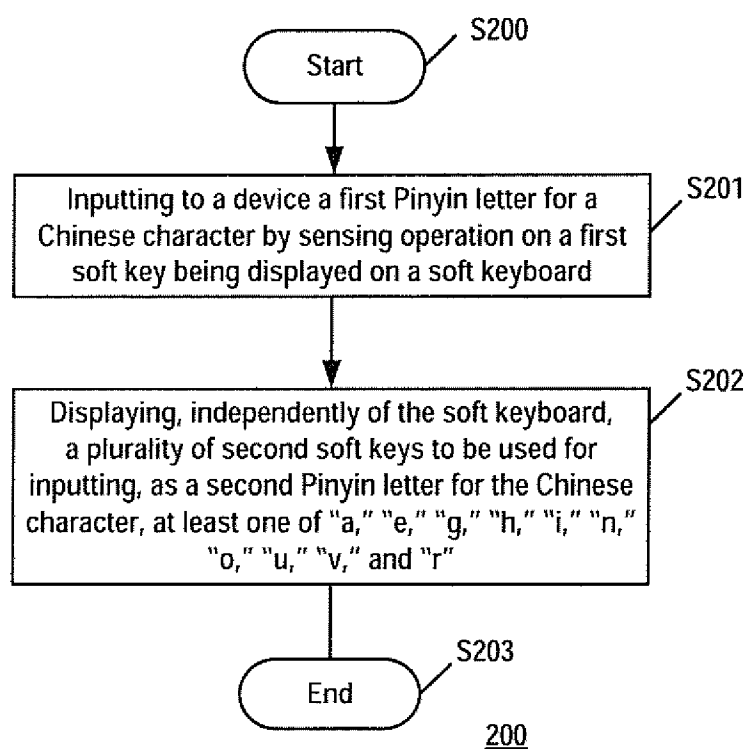


Fig. 2

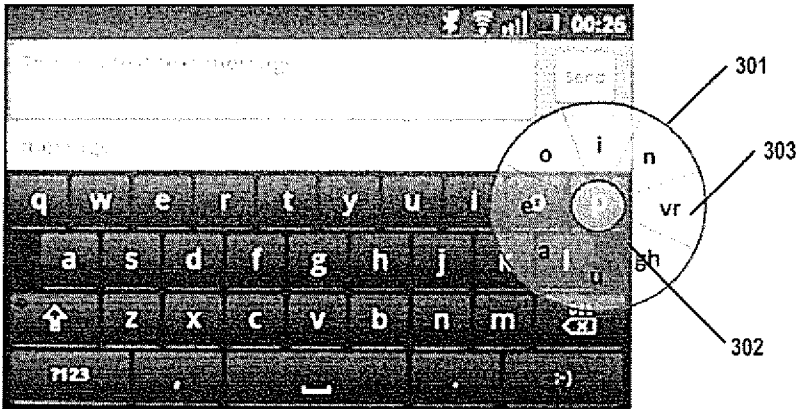


Fig. 3

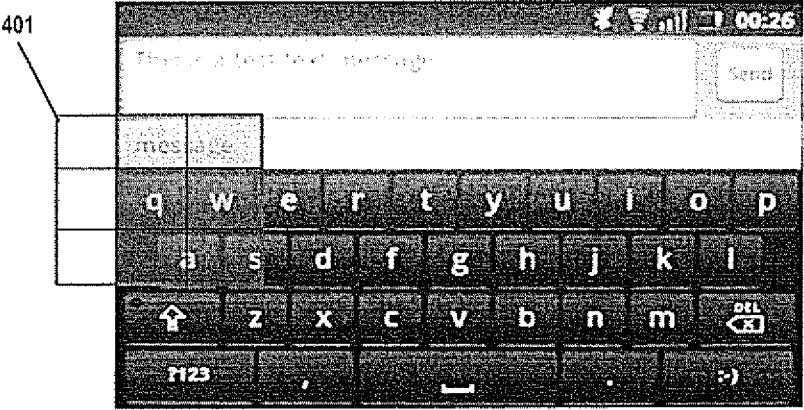


Fig. 4

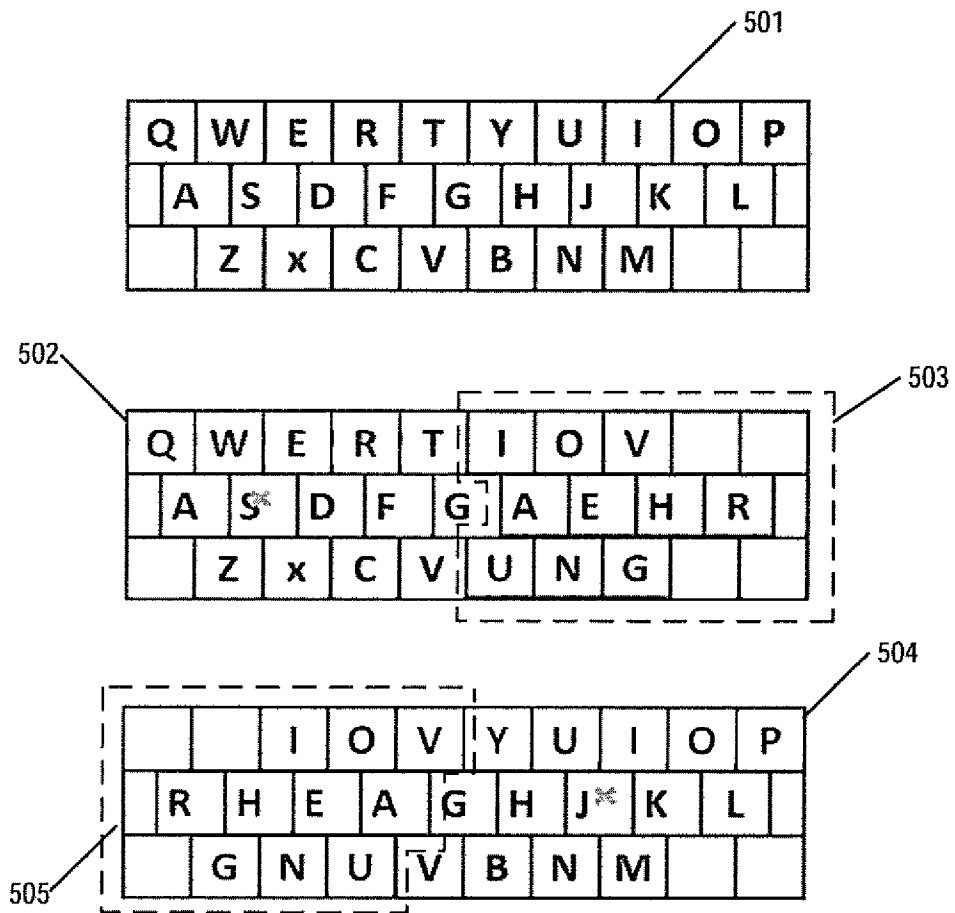


Fig. 5

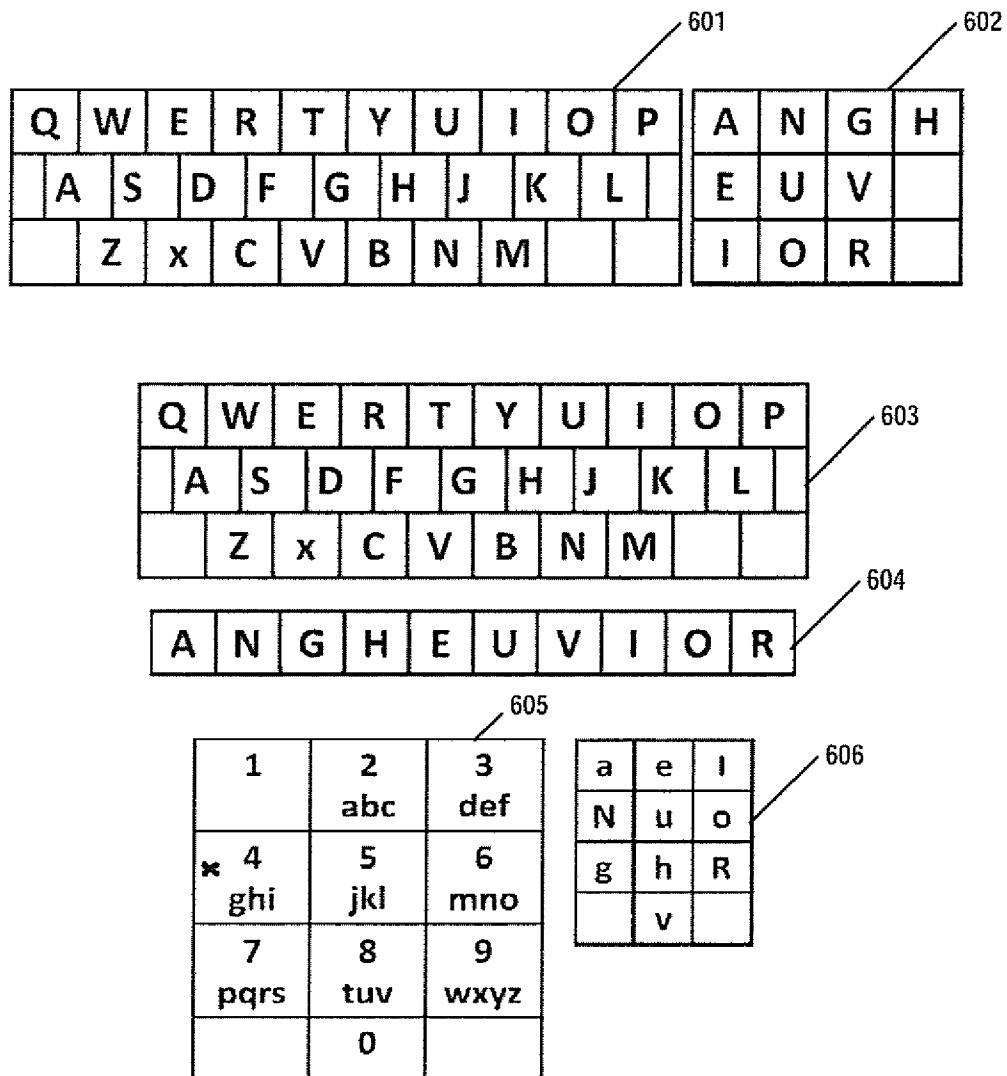


Fig. 6

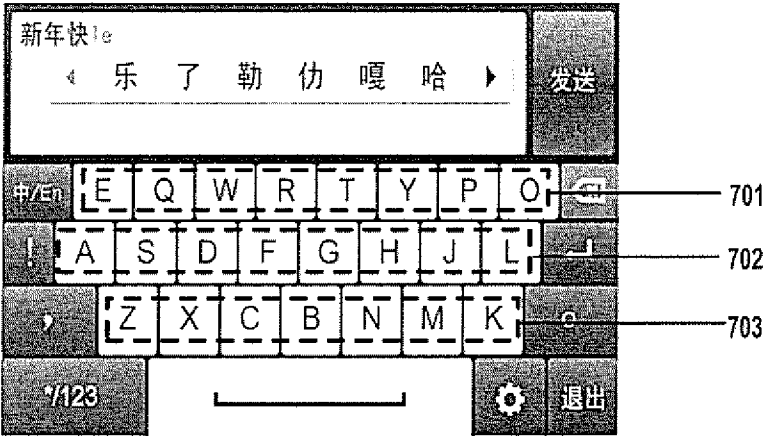


Fig. 7

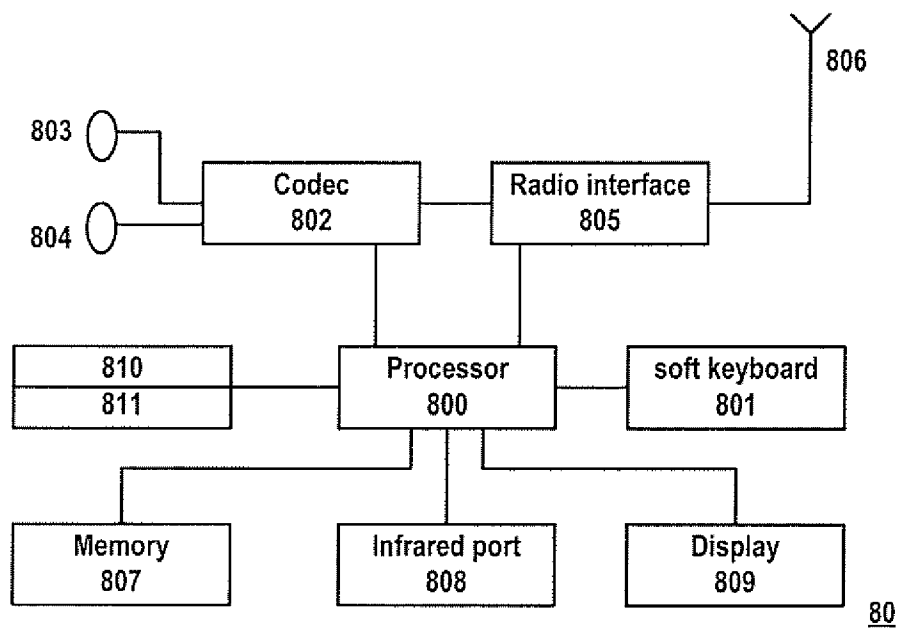


Fig. 8

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2011/071487

A. CLASSIFICATION OF SUBJECT MATTER

G06F3/048(2006.01) i

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;H04L;H04Q;H04M;H04B;H04W

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

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

WPI;EPODOC;CNKI;IEEE;CNPAT: touch 1w screen, soft w keyboard, virtual w screen, character, pinyin, letter?, key?, keyboard, display

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN101290555A (SAMSUNG ELECTRONICS CO., LTD.) 22 October 2008 (22.10.2008) figures 2-9, page 3, line 9-page 8, line 15, description	1-4, 8-17,21-28
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Y	CN1215858A (LI, Zhigang) 05 May 1999 (05.05.1999) page 2, lines 20-26, description	5-6,18-19
A	CN1766817A (NOKIA CORP.) 03 May 2006 (03.05.2006) see the whole document	1-28
A	US2008/0297480A1 (LEE, Byung-Hwan) 04 Dec. 2008 (04.12.2008) see the whole document	1-28

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 22 March 2011 (22.03.2011)	Date of mailing of the international search report 27 Oct. 2011 (27.10.2011)
Name and mailing address of the ISA/CN The State Intellectual Property Office, the P.R.China 6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088 Facsimile No. 86-10-62019451	Authorized officer LI,Tianxing Telephone No. (86-10)62414494

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2011/071487

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