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61/772,066	03/04/2013		125	2104-052-c4-USP		

CONFIRMATION NO. 2799

32964

DEKEL PATENT LTD., DAVID KLEIN
BEIT HAROF'IM
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REHOVOT, 76209
ISRAEL

FILING RECEIPT



OC000000060759497

Date Mailed: 04/29/2013

Receipt is acknowledged of this provisional patent application. It will not be examined for patentability and will become abandoned not later than twelve months after its filing date. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

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Power of Attorney:

David Klein--41118

If Required, Foreign Filing License Granted: 04/26/2013

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 61/772,066**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

DATA ENTRY SYSTEMS

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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page 1 of 3

application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

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Title 37, Code of Federal Regulations, 5.11 & 5.15

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Provisional Application for Patent Cover Sheet					
This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c)					
Inventor(s)					
Inventor 1					Remove
Given Name	Middle Name	Family Name	City	State	Country i
Benjamin	Firooz	Ghassabian	Jerusalem		IL
All Inventors Must Be Listed – Additional Inventor Information blocks may be generated within this form by selecting the Add button.					Add
Title of Invention		IMPROVED DATA ENTRY SYSTEMS			
Attorney Docket Number (if applicable)		2104-052-c4-USP			
Correspondence Address					
Direct all correspondence to (select one):					
☒ The address corresponding to Customer Number			☐ Firm or Individual Name		
Customer Number			32964		

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.	
☒ No.	
☐ Yes, the name of the U.S. Government agency and the Government contract number are:	

Entity Status

Applicant claims small entity status under 37 CFR 1.27

☒ Yes, applicant qualifies for small entity status under 37 CFR 1.27☐ No**Warning**

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Signature

Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/David Klein/			Date (YYYY-MM-DD)	2013-03-04
First Name	David	Last Name	Klein	Registration Number (If appropriate)	41118

This collection of information is required by 37 CFR 1.51. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **This form can only be used when in conjunction with EFS-Web. If this form is mailed to the USPTO, it may cause delays in handling the provisional application.**

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Electronic Patent Application Fee Transmittal				
Application Number:				
Filing Date:				
Title of Invention:		IMPROVED DATA ENTRY SYSTEMS		
First Named Inventor/Applicant Name:		Benjamin Firooz Ghassabian		
Filer:		David L. Klein		
Attorney Docket Number:		2104-052-C4-USP		
Filed as Small Entity				
Provisional Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Provisional Application Filing Fee	2005	1	125	125
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				125

Electronic Acknowledgement Receipt	
EFS ID:	15104810
Application Number:	61772066
International Application Number:	
Confirmation Number:	2799
Title of Invention:	IMPROVED DATA ENTRY SYSTEMS
First Named Inventor/Applicant Name:	Benjamin Firooz Ghassabian
Customer Number:	32964
Filer:	David L. Klein
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Attorney Docket Number:	2104-052-C4-USP
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Time Stamp:	13:15:38
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Deposit Account	
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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Specification	2104-052-c4-desc-clean.pdf	177004 115f515a10b7b78c3b84af38e4b5dcf5b9fac0f3	no	33
Warnings:					
Information:					
2	Drawings-only black and white line drawings	2104-052-figs340A-B.pdf	33307 3b85d5e458ee66e6a3bc29044c5490c98b0489d9	no	1
Warnings:					
Information:					
3	Transmittal of New Application	2104-052-C4-transmit.pdf	524299 5b70cdca03474f098af2c6b74336b8021119aa71	no	3
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	29637 a06486bc10d8f29351dcca0a2ee2ed34835a3570	no	2
Warnings:					
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Total Files Size (in bytes):			764247		
This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503. <u>New Applications Under 35 U.S.C. 111</u> If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application. <u>National Stage of an International Application under 35 U.S.C. 371</u> If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course. <u>New International Application Filed with the USPTO as a Receiving Office</u> If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.					

Date: 04/March/2013

US Provisional Patent Application

Our ref: 052-c4

Title: IMPROVED DATA ENTRY SYSTEMS

Inventor: BENJAMIN FIROOZ GHASSABIAN

This application is part of the previous US Provisional Patent Applications:
The present application claims priority from US patent applications:

- application number 61599000 filed on February-15th, 2012
- application number 61601143 filed on February-21st, 2012;
- application number 61603390 filed on February-26th, 2012;
- application number 61608181 filed on March-8th, 2012;
- application number 61612509 filed on March-19th, 2012;
- application number 61613580 filed on March-21th, 2012;
- application number 61617224 filed on March-29th, 2012;
- application number 61620525 filed on April-5th, 2012 ;
- application number 61637384 filed on April-24th, 2012;
- application number 61641378 filed on May 2nd, 2012;
- application number 61647611 filed on May 16th, 2012;
- application number 61649322 filed on May 20th, 2012;
- application number 61651089 filed on May 24th, 2012;
- application number 61652950 filed on May 30th, 2012;
- application number 61656091 filed on June 06th, 2012;
- application number 61659536 filed on June 14th, 2012;
- application number 61660755 filed on June 17th, 2012;
- application number 61661390 filed on June 19th, 2012;
- application number 61663582 filed on June 24th, 2012;
- application number 61669152 filed on July 09th, 2012;
- application number 61671741 filed on July 15th, 2012;
- application number 61674358 filed on July 22th, 2012;
- application number 61679858 filed on August 06th, 2012;
- application number 61683219 filed on August 15th, 2012;
- application number 61697414 filed on September 6th, 2012;
- application number 61699408 filed on September 11th, 2012;
- application number 61704682 filed on September 24th, 2012;
- application number 61705164 filed on September 25th, 2012;
- application number 61711798 filed on October 10th, 2012;
- application number 61714842 filed on October 17th, 2012;
- application number 61718297 filed on October 25th, 2012;
- application number 61723860 filed on November 08th, 2012;

- application number 61730130 filed on November 27th, 2012 ;
- application number 61730584 filed on November 28th, 2012;
- application number 61737951 filed on December 17th, 2012;
- application number 61746581 filed on December 28th, 2012;
- application number 61749338 filed on January 06th, 2013;
- application number 61754707 filed on January 21th, 2013;
- application number 61760770 filed on February 5th, 2013;
- application number 61761321 filed on February 6th, 2013;
- application number 61764078 filed on February 13th, 2013;
- application number 61765751 filed on February 17th, 2013;
- application number 61766747 filed on February 19th, 2013; and
- application number 61769285 filed on February 26th, 2013.

The drawings and text of the above applications are incorporated herein by reference. The titles used in this application and in the related applications may preferably not be considered as part of the descriptions.

Glide and hold for selecting a text written in said trajectory

According to one embodiment, a word or a chain of words may be selected by a predefined type of interaction such as a gliding action including a holding action (e.g. glide and hold, press and hold and glide) on said word (e.g. or chain of words) or preferably near said word (e.g. or chain of words) in the direction/trajectory that said word (e.g. or chain of words) has been entered. In this case, according to one method, a press and holding action on the screen/picture may correspond to another function such as for example a horizontal trajectory for a text to be entered.

Using online graffiti

Sharing real time

Private fonts, Share fonts, share tools

The image editing application/functions described herein may permit providing/typing graffiti on a background image / textbox. As such according to one embodiment a social picture sharing application may be created so that user can, edit (e.g. write graffiti preferably simultaneously, an image in a cloud server.

Reserved location on an image

According to one embodiment, the image editing system may be designed such that to not allow (e.g. editing) access in a predefined location on an image, preferably unless a user has an authorization (e.g. through a password). For example, access to the bottom right of an image may be reserved to an editor's signature or an advertisement, etc.

According to one embodiment, mouse function of the system may be used to edit an image. As an example, if the user provides a press-and-holding action (e.g. anywhere or between the keys) on an

image/screen, the system may show several mouse functions such as select, select all, copy, cut, past, preferably around his/her finger. The user then may slide the finger towards one of the functions to activate it. As an example:

Select: a portion of an image may be selected by many means. As an example, the menu of the system may have several selection pattern (e.g. square, round, free pattern, etc.) buttons, wherein after interaction with such a button, the user may provide a gliding action on a desired location on the picture, and the system may select a portion of the picture according to the shape of the selected pattern and preferably the length of the gliding action. Optionally, a press-and-holding-and-gliding action at any moment on the screen/image may result in selecting a portion of the image based on a predefined or the last selected pattern.

According to one embodiment, the selected portion may be resized by for example touching a predefined point of it and dragging said point. According to one method, providing a long pressing action combined with gliding action in a predefined direction may resize the selected portion accordingly. According to one method a such gliding action in the middle of the selected portion drags the portion in the corresponding direction on the screen.

Copy: after selecting a portion of picture, a press and holding action combined with a gliding action in the direction of the Copy function/icon may preferably copy the selected portion of the image.

Cut: after selecting or copying a portion of picture, a press and holding action combined with a gliding action in the direction of the Cut function/icon may preferably cut the selected portion from the image.

Paste: after selecting or copying a portion of picture, a press and holding action in a desired location on the screen/picture combined with a gliding action in the direction of the Paste function/icon may preferably paste the copied portion, preferably on in the pressed position, on the image/screen.

Select-All: a press-and-holding-and-gliding action at any moment on the screen/image in the direction of Select-All function may select the whole image.

It must be noted the features and methods of editing an image/picture as described herein are created to permit a simple and quick picture taking/picking, editing, and sharing procedure(s).

Preferably during the modifications/editing (e.g. of the/a word/text) described above, the image/picture on which the editing procedures are being applied is shown to the user so that he can rectify apply and/or rectify his/her modifications accordingly (e.g. according to the image or a portion of the image characteristics).

According to one embodiment of the invention, preferably, an interaction, such as press-and-holding action or a gliding action, corresponding to mouse functions is not provided on a text or on a selected portion of an image (e.g. herein may be referred to as the selected content) to not interfere with other functions such as dragging a selected content. As such according to one

example, after selecting a content such as an image or a text (e.g. one or more words. Note that a grabbed word or a word being entered is also considered as a selected text) if a user provides a gliding action including a press and holding action (e.g. at the beginning of the gliding action) at a position/location on the screen wherein said gliding action corresponds to a pasting action, the selected content may be pasted at that position/location. Fig. 438A shows as an example, a picture 438010 being displayed on the screen of an electronic device such as a smartphone or tablet, and wherein a menu 438011 relating to selecting patterns is also shown/poped up. After the user selects one of the patterns 438012, he may provide a gliding action 438013 on a desired location on the screen to select the portion of the image 438014 at that location corresponding to the shape of the pattern and the length of the gliding action. Then, as shown in fig. 438B, by providing a press and holding action (e.g. or a press and holding action combined with a gliding action in a predefined direction) on a desired position on the screen/image and the system may paste the selected portion at that location. Preferably (not shown), after selecting a selecting pattern, the menu is removed from the screen so that to permit the access to the whole image/screen for the pasting action. Note that, (e.g. after providing a press-and-holding action) the different directions of the gliding actions corresponding to different mouse function may be those described before in related/previous patent applications filed by this inventor (e.g. gliding towards lower-right direction may correspond to selects all/select the whole picture, towards lower-left may correspond to paste function. Gliding towards upper-left direction may correspond to cut function. Gliding upper-right direction may correspond to copy function, etc.

It must be noted that the functions, interactions, procedures, methods. etc., relating to editing a picture as described throughout this and the related patent applications filed by this inventor may not be restricted to editing a picture. The may be used to provide functions in any other application.

The keyboard used with the picture editing applications/concepts/functions/etc., as described in this and the related patent applications filed by this inventor may be of any type. As an example, said keyboard may be a keypad of the invention having any number of (e.g. letter) keys (e.g. two to eight) wherein at least some (e.g. one) of the keys corresponds to several characters/letters, and use a word prediction software to predict words from a corresponding database. According to one method, the letter keys of such keyboard may be related to all of the letters of a language excluding a/the predefined zone corresponding to non-preferred characters. According to another method, such keyboard may include one or more predefined zones corresponding to non-preferred character. Preferably, the letter keys may be split into two or more groups wherein each group is located on a different side/edge of the (e.g. screen of) the corresponding device, and wherein such a/the zone may be located between said split groups. According to another example such keyboard may be a QWERTY keyboard. According to another example, such keyboard may be a keyboard wherein

each of its letter keys corresponds to a precise letter/character/symbol and wherein its keys may be (preferably) arranged on the sides of the screen of the corresponding device.

When a (e.g. an edited) picture is shared with another party, preferably at the similar time the receiving party may receive a means such as for example a link/button preferably next/on the picture such that interacting with said means may permit the user to type on the edited picture preferably instantly and may share it (e.g. back) with the sender and/or others. If the corresponding data entry / input system is not installed in the receiving party device, said system may automatically downloaded (e.g. and installed) into the receiving party's device.

A spelling help feature/method used by the system has been described before in detail. According to one embodiment of the invention, the system may be designed such that a user may enable/disable (e.g. switch on/off) said spelling help feature/method. According to one method, said method/features may be enabled or disabled from a settings menu corresponding to the system. According to one method, when activated, said spelling help method, may be applied from the first character of a word being entered. According to one embodiment of the invention (e.g. when the spelling help is enabled), (e.g. during the entry of a text) preferably, said spelling help may be applied to a word being entered only if the user provides at least a predefined number of (e.g. at least two) key presses (e.g. herein said predefined number may be referred to as "required minimum key presses") from the (e.g. four) letter keys (e.g. from the narrowly ambiguous keys, and/or from the precise letter mode keypad). As an example, by considering the keypad of fig. 436B, if said required key presses number is two and the user provides four consecutive tapping actions on the zone 436107 between the keys (e.g. broadly ambiguous zone), the system does not use the spelling help mode even if it is activated (e.g. from the settings), to for example provide the word "much". In this example, the system relates said tapping actions to the non-preferred characters assigned to said zone and does not relate any of said tapping actions provided on the said zone to any of the preferred characters (e.g. which are assigned to the (e.g. four) ambiguous letter keys). Accordingly, according to one example, if the user taps on the key 436101, taps two times on the zone 436107, and taps on the keys 436101, the system may ambiguously relate each of the two tapping actions on the zone 436107 to any of all of the characters assigned to said zone (e.g. non-preferred characters) and to the characters assigned to the four letter keys (e.g. preferred characters) (This matter has been described before in detail) and proposes some words including the word that has the highest priority among the corresponding words. It must be noted that the system may also include a word completion means/software such that to, accordingly, propose completed words based on receiving partial input information corresponding to a (e.g. beginning) portion of a word being entered.

According to one embodiment of the invention, if the device/screen is in portrait mode, the word list may preferably be shown vertically and if the device/screen is in landscape mode, the word list may preferably be shown horizontally (e.g. as shown before).

According to one embodiment of the invention, if a word being entered is entered through interacting with the keypad of the system in precise mode, then preferably said word may simultaneously be entered in the text and in the word list (e.g. as the current predicted word). If a word being entered is entered through interacting with the keypad of the system in predictive mode, then preferably said word may be entered in the word list alone (e.g. as the current predicted word).

Methods of swapping words (e.g. in a word list) have been described before. According to one embodiment, if in the word list, in addition to the current predicted word, one or more candidates are also proposed, then a predefined swapping action for example by means of a gliding action simulating another gliding action provided from the current predicted word towards a candidate (e.g. or vice versa), wherein said gliding action is provided on the word list or in the zone between the keys, may replace the current predicted word by the first candidate word next to the current predicted word. Accordingly, an additional such gliding action may replace the current predicted word by another candidate preferably the second word next to the current predicted word, and so on. Note that, one or more such candidates may be shown on each side of the current predicted word. As such one or more gliding actions provided in a similar direction corresponding to each of the sides of the current predicted word may preferably correspond to the first, second, or other corresponding candidates on a corresponding side of the current predicted word.

With continuous description of the current embodiment, after providing a swapping action, preferably when the user appends a letter/character to or deletes a letter/character from the swapped word, the system may preferably consider the characters of the swapped portion as being precise characters (e.g. herein may be referred to as fixing a word/stem). According to one method, if the user desires to fix the current predicted word, he/she may provide a back and forth gliding action in a predefined direction such as upwards or downwards in preferably the/a predefined zone and/or on the wordlist. Now, a swapping action was applied on the current predicted word, when appending characters to said word or deleting characters from said word, the swapped portion of the new word may be considered as fixed (e.g. precise)

According to one embodiment of the invention, the system may use one or more database of words including 1 to N (e.g. 5) gram entries. When the user enters the input information corresponding to a current predicted word, the system may preferably consider N-1 words prior to the word being entered (e.g. prior to the cursor) in the text (e.g. herein may be referred to “prefixed portion”) and combine it with the input information corresponding to the current word being entered (e.g. herein may be referred to combined word information” to predict one or more words from the

N gram database. Subsequently, then the system may consider N-2 words prior to the word being entered (prior to the cursor) combined said input information being entered to predict one or more words from N-1 gram database. And so on until (including) N=0 (e.g. until proposing 1-gram words). If the words preceding the current predicted word being entered are n number of words wherein $n < N-1$, then the system considers said n words combined with the input information corresponding to the current predicted word and begins to search in the entries of n+1 gram database then, then n, then n-1 until the 1 gram database. It must be noted, that after searching for the corresponding words, the corresponding words may be presented to the user (e.g. according to their priorities) until the user selects one of them. Note that in the search procedure as described, if a combined word information matches an entry in the database, then preferably, the system selects the last gram of said entry and proposes it to the user.

In most cases, a 2 gram word database may provide enough information to the word predictive system to accurately predict a word. But in some cases, in an N gram entry, the first beginning gram of the entry may not provide enough information to the system if it is constituted of one of a number of words such as "the", "a", "of", "to", etc. (e.g. herein may be referred to as non-informing words). In this case, an N gram database wherein $N > 1$, may preferably mainly include entries that their first gram exclude a non-informing word. This may permit to have a reduced sized N-gram database (e.g. that also includes 1-gram entries) for an accurate prediction.

The arrangement of an N gram database to be used by a/the word prediction system for accurate and fast prediction have been described in detail in previous patent application filed by this inventor. They may preferably be included in/with this application by reference. As an example, the first gram of gram N gram entries (e.g. $N \geq 0$) may preferably include or be constituted of one or more special characters. In this case, for example, a dot character as the first gram of an N-gram entry (e.g. wherein $N=2$) may provide information to the system that the second word of the entry is a word that is generally entered at the beginning a sentence.

According to one method, different identified character/word (e.g. '~') or a predefined code may be assigned to different categories of entries in a database. For example, in an N-gram (e.g. 2-gram) database, a first type of character (e.g. "~") delimiting grams from each other, wherein the last gram letters are lowercased letters may be used. In a same database, a second type of character (e.g. "^") delimiting grams from each other, wherein the at least one of the last gram letters is an uppercased letter, may be used. According to another example, a third type of character (e.g. "|") delimiting grams from each other, wherein at least one of the characters of the last gram includes a character other than a letter, may be used. And so on. When the user enters a word having a characteristic such as those just described, the system may be designed such that the system

searches for the corresponding word/entries within the database having at least one of said characteristics. This method permits a quicker search in the database.

According to a first method of search, when the system is looking for a word based on the input information provided by the user, the system first look in the corresponding N-gram (e.g. 2-gram) entries of the database wherein the input information provided by the user corresponds to all of the characters of the corresponding (e.g. last) gram. If there is no corresponding word found, the system may then proceed to the 1-gram entries wherein the input information provided by the user corresponds to all of the characters of the corresponding gram.

If there is no corresponding word found, the system then looks in the corresponding N-gram (e.g. 2-gram) entries of the database wherein the input information provided by the user corresponds to the beginning characters of the corresponding (e.g. last) gram. If there is no corresponding word found, the system may then proceed to the 1-gram entries wherein the input information provided by the user corresponds to the beginning characters of the corresponding gram.

According to a second method of search, when the system is looking for a word based on the input information provided by the user, the system first look in the corresponding N-gram (e.g. 2-gram) entries of the database wherein the input information provided by the user corresponds to all of the characters of the corresponding (e.g. last) gram. If there is no corresponding word found, the system then looks in the corresponding N-gram (e.g. 2-gram) entries of the database wherein the input information provided by the user corresponds to the beginning characters of the corresponding (e.g. last) gram.

If there is no corresponding word found, the system may then proceed to the 1-gram entries wherein the input information provided by the user corresponds to all of the characters of the corresponding gram. If there is no corresponding word found, the system may then proceed to the 1-gram entries wherein the input information provided by the user corresponds to the beginning characters of the corresponding gram.

According to one embodiment of the invention, the user may type a word or grab/select a word within a text and then he/she may be enabled to delete said word from the dictionary / word-database used by the system. According to one method, the user may long-press on said word (e.g. which is preferably in a word list) to delete it. After providing the long pressing action on the word, the user may be informed of the deletion of said word by, for example, changing the color of the word or the words background to, for example, red. Note that, before deleting a word, the system may ask the user to confirm the deletion action. A words/entry deleted from the/a database may be saved along with its frequency of use such that if the user decides to re-insert it in the database, the system may insert its corresponding frequency. According to one method, delting a word from the

dictionary may cause deleting it from all of the entries of an N-gram database. According to another method, said word may be deleted from the 1-gram database only.

As mentioned before, the keyboard used with the picture editing software/feature may be of any type such as for example a QWERTY keyboard. According to one embodiment of the invention, a gliding action or a long-pressing action provided from/on said keyboard may be related by the system to the trajectory of the text being entered over a/the image which preferably is printed on the screen wherein preferably a portion of it is located under said keyboard.

According to one embodiment of the invention, the keys of the keypad/keyboard (e.g. preferably in the ambiguous mode) of the invention used with a/the picture editing software/feature may be transparent/invisible so that to permit to see the content (e.g. a portion of a/the image) under said keypad/keyboard. As such, according to one embodiment, only a/the frame of a key may be shown on the screen. In the visible mode, in addition to the frame, the characters/letters assigned to a key may be printed within said frame but preferably, the rest of the key may be transparent/invisible. According to one aspect, the letters on such a key may be printed in two contrasted colors (e.g. white and black) such that regardless of the color of the content under a/the key, at any moment said characters/letters may be visible to the user. An example of a key of such keyboard/keypad is shown on different background colors (e.g. white, black, and red) in Figs. 437A to 437C.

Swapping procedure (e.g. by tapping on a word)

Methods of replacing the current predicted word/stem being entered by another candidate (e.g. another word) relating to the input information provided by the user has been described in detail before. According to one method of the invention, a predefined interaction, such as a tapping action, on any of the words of a list (including the current predicted word) of predicted words (e.g. herein may be referred to as a word list) may preferably set said word as the current predicted word. Preferably, the system also fixes the characters of the selected word (e.g. the system considers all of the characters of said selected word as precisely entered characters). According to one method, in addition to the word list, the system may preferably show the selected word also in the corresponding text field. Additionally, the system may propose/predict one/more longer-word(s) beginning with the characters of the selected word as a new word list. According to one aspect, at this point in time, on one hand, if the user provides an end-of-word signal such as pressing the Space key, the selected word may preferably be entered into the text and the word list may disappear. On the other hand if the selected word/stem is the beginning of a desired longer-word, at least two scenarios may be considered:

1. The desired word of the user is among the words of the new word list. In this case, the user selects that word (and enters a Space character); and
2. the desired word is not a word of the words in the new word list. In this case the user proceeds to enter/append additional characters at the end of the selected word. By considering the fixed selected portion and the input information corresponding to the additional characters, the system predicts corresponding longer-words (e.g. beginning with the fixed selected portion).

According to one method, after a word is selected, if the user deletes one or more of the selected word, the remaining characters still remain fixed and corresponding longer words may preferably be proposed/predicted (e.g. in a word list of one or more words).

As an example, in order to enter the word “actionable” the user may first tap the keys corresponding to the word/stem “act”. The system may propose the word “why” as the current predicted word and several more words which includes the word “act”. The user may tap on the word “act” (e.g. in the wordlist) to select it. Preferably, at this time, the word “act” becomes the current (e.g. predicted) word. Now the system may propose longer words that begin with the word/stem “act” including the words “actually”, “activity”, and “action”. At this time the user may select the word “action” by tapping on it. Now the word “action” becomes the current (e.g. predicted) word. At this time the system proposes several longer words beginning with the word/stem “action”, including words “actionable”, “actions”, “action’s”. The user taps on the word “actionable” to select it. At this time the word “actionable” becomes the current predicted word and the user may press the Space key to enter said word.

Note that after selecting each of said word/stems, in addition or in replacement of within the word list, the system may also show any of the selected word/stems in the text itself.

In the current embodiment, if a provides a predefined interaction, such a tapping action, on the current predicted word (e.g. in the word list) this may result in fixing the current predicted word. As a result, if the user continues to append additional characters to the fixed current predicted word, the fixed portion may remain unchanged and based on the input information, including said fixed portion and additional characters, the system may propose one or more words.

For ease of explanation, predefined interactions such as tapping or sliding actions have been used to describe the principles of the data entry system. Note that this was only used for demonstration

purposes and said predefined interactions can be used for the same purpose and can be replaced by any kind of interaction, such as speech commands, interacting with a button, or gestures in the air, etc.

Organizing a database of words

Based on the principles just described above, according to one embodiment, a database of words may be organized/created such as to include at least the most commonly used stems (e.g. “pre”, “con”, “com”, “dia”, “multi”, “multi-”). According to one concept, preferably, the length of said at least most commonly used stems may be limited to a predefined number of characters (e.g. up to 3). According to one method, the user may provide the input information corresponding to a desired stem.

- If the desired stem (e.g. a stem of a long word may, by itself, be a complete word) is in the word list proposed by the system, the user may select that stem and thereafter the system may propose another word list having longer words (e.g. in some cases said a longer word may be the beginning stem of a still longer word) that may include the user’s desired word/stem, as described above. And so on. Note that, as described earlier, at any moment the user may proceed to appended additional characters to the selected stem/word or to delete characters from selected stem/word.

Note that after providing said input information corresponding to the desired stem, if said stem is not in the word list as proposed by the system, the user may provide a predefined interaction so that the system may propose an additional word list corresponding to said input information, and so on.

Note that the N-Gram database including said at least most commonly used stems may be an N-gram database (e.g. $N > 0$) wherein said stems created as such are preferably located/positioned as the last gram of the corresponding entries of the database.

Word list

- **Wordlist in order based on length**

- o **Blue on the top**

The predicted/proposed words may be presented in a word list according to different methods. According to a preferred method, the current predicted word may be presented at a predefined location (e.g. on the top, bottom, left side, or right side) in a word list, and the other predicted/presented words may be presented based on their length next to (e.g. under, above, right side, or left side, respectively) the current predicted word. When a proposed word (e.g. among the list) is selected, said word may preferably replace the

current predicted word and additional words/candidates may be predicted based on the selected word and be presented preferably next to the current predicted word (e.g. below the current predicted word). The order of presentation of said additional predicted word(s) may preferably be based on their length and preferably, based on the alphabetical order in a same length.

Double/more taps on a same word provides more choices

According to one aspect, repeating an interaction such as a tapping action on a same predicted/candidate provides additional candidates based on said word/stem.

- **Spelling help starts after selection**

According to one aspect, after a word is selected, the automatic spelling help feature described before in detail, may preferably be activated.

- **3 chars stem list**

○ **On the left**

○ **Based on 300ms pause**

- **Next applies to both sides of to the side where the gesture is provided (e.g. gesture can be applied on the wordlist itself)**

According to one embodiment of the invention, a database of words used by the system, may include may include at least substantially significant number of stems wherein their length preferably is up to three characters.

According to one embodiment of the invention, in addition to or in replacement of some of the words of a list/number of words corresponding to the input information provided by the user during the entry of a desired word as described earlier, additionally, at least some corresponding stems, preferably the beginning stem of corresponding words, may be proposed preferably on a different location. For example, the word list described throughout this application may be presented on the right side of a screen and said additional stems may be proposed on the left side of a screen. According to one method, said additional stems may be printed on the screen if the user pauses for at least a predefined period of time during the entry of the input information (e.g. key interactions) corresponding to the desired word. According to one method, said stem(s) may be presented to the user, after the user provides the input information corresponding to (e.g. at least) a predefined number of characters (e.g. two) of the desired word preferably regardless of the/a (e.g. at least a) predefined length of a stem to be shown to the user. As a first example, after providing the input information corresponding to the first two characters of a word, in addition to longer words, the system may preferably show/present at least some (e.g. preferably, all) of the corresponding beginning stems (e.g. of words to be proposed corresponding to the input information) having two

characters. As a second example (e.g. a preferred method), after providing the input information corresponding to at least (e.g. preferably, the first) four or five characters of a word, (e.g. on or starting from that moment) in addition to the corresponding words, the system may preferably show at least some (e.g. preferably, all) of the corresponding beginning stems having two characters.

With continuous description of the current embodiment, if the user selects one of the proposed stems, the system may present/predict/propose the word(s) corresponding to the input information provided by the user wherein their first (e.g. two) characters begin with the selected stem.

According to another embodiment of the invention, when a user selects a proposed/predicted word (e.g. in the word list), the system may preferably consider a predefined number of its (e.g. beginning) characters and propose other words corresponding to the input information provided by the user and having (e.g. beginning with) said characters.

According to another method, during the entry (e.g. of the input information) of a word, the proposed stems may correspond to any predefined portion of a word being entered.

Stems

Proposing the beginning stems

Can have any length

- **System decides, based on the number of different stems**
- **From a predefined number**

Stems shown in a tree-based order

- o **Tap several times on the stem**
- **Can include all of the stems such that to not require more key presses**

Different length in a same list

According to one embodiment of the invention, during the entry of a word the system may propose the stems corresponding to a portion of a word corresponding to the input information being entered. The length of said stems may be defined differently according to several aspects such as:

- a) The (e.g. length of the) stems may be constituted as a predefined number of characters such as, for example, two characters (e.g. herein may be referred to as “fixed length stems”). They may be shown to the user at a predefined moment during the entry of the input information corresponding to the word being entered.
- b) The length of the stems and/or the moment to be shown to the user may dynamically be defined by the system based on various parameters. As a first example, different stems

corresponding to the input information being provided by the user may be presented to the user when the number of (e.g. different) stems is less than a predefined number.

According to one method, the length of the stems being proposed at any instance may be different from each other (e.g. hereafter may be referred to as “free length stems”).

Preferably, each of the stems proposed to the user is a different beginning portion of the word(s) corresponding to the input information being entered.

According to one embodiment, the first time (e.g. fixed length) stems are presented to the user is when a user provides the input information corresponding to preferably a predefined number of characters. If the user selects one of said stems, then the system may propose also longer words including/beginning with said stem. Preferably, the system also proposes a number of new stems corresponding to a longer portion of the word(s) corresponding to the input information provided until then (e.g. the key interactions and the selected (e.g. fixed length) stem). The user may select one of the new stems and so on. Note that, preferably, the length of the new stems may vary based on the corresponding words preferably such that to reduce the number of key interactions required for entry of a desired word, preferably also considering that the number of presented stems are considered as not being significant (e.g. not more than seven so as to not occupy a large portion of the screen). According to another aspect, if the number of various stems is significant (e.g. more than a predefined number), the system may first show a/some of them. According to one aspect, the system may propose more stems after the user provides a predefined rejecting/next interaction. The order of the stems shown/proposed (e.g. in a stem list) may be of any kind such as based on the frequency of use of the corresponding words, alphabetical order, etc.

It is understood that after a list of stems is shown to the user, the user has the option to select a stem or continue typing without selecting one.

Figure 439 shows a flow chart relating to a preferred method of for entering words while using/interacting with stems and/or complete words and/or the keyboard. In step 439001, the user enters the input information (e.g. appending characters by tapping on the keys of the keyboard) corresponding to a number of characters of a desired word. Said number of characters may be a predefined number of characters or the number may be defined dynamically by the system depending on the number of the corresponding various stems relating to the provided input information. In step 439001, the system shows/proposes the corresponding words corresponding to the provided input information. At step 439003 the system shows/displays, at preferably the same time as step 439002, a number of various stems corresponding to the beginning characters of the words of the database corresponding the provided input information. According to a preferred method, the length of said stems may a fixed and/or limited number of characters such as, preferably, two characters. Note that the number N, in step 439001, may vary depending on the

nature of the database. Preferably, the relationship between the said various stems and the input information may be such that the stems may be presented/proposed given that the number of such various stems complies with set criterion/criteria (e.g. predefined number or limit). At the condition 439011, if as shown in step 439004, the user selects a proposed stem or a complete word, then as shown in step 439005, the system may propose new word(s), if at all any, wherein their beginning characters start with the selected stem or word of step 439004. Now, as shown in step 439006, the system may propose/show new stems (e.g. longer than the previous stems) preferably beginning with the selected word/stem and corresponding to the input information provided to the user until then. At this point, as shown in condition 439010, if the user provides an end of word (EOW) signal, such as tapping on the Space key, the system may enter the selected word. If not, the system goes to condition 439011.

With the continuous description of the current example, after exiting step 439003 or exiting condition 439010, if at the condition 439011, the user ignores the proposed/presented stems and/or completed words and proceeds to the step 439007 by continuing to input additional input information (e.g. appending characters), the system may show/propose new words and/or stems. Note that if the system enters step 439007 from a path including step 439003, then the length of the proposed stems may preferably be similar to those stems as described in step 439003. Alternatively, if the system enters step 439007 from a path including condition 439010, then the length of the proposed stems may preferably be similar to or longer than the stems proposed/shown in step 439006.

Note that it may happen that the length of the stem and the length of the selected word are equal.

A character in remaining portion which is rarely used with others

According to one embodiment of the invention, instead of or in addition to the stems, during the entry of a word the system may show/propose a specific character of a word corresponding to the input information provided by the user. Preferably, said character may be a character (e.g. z, x, b) that is rarely used in the corresponding words.

In the current embodiment of the invention, providing a predefined interaction corresponding to informing the system that the words in the word list at some location (e.g. on the right side) are rejected so as to cause the system to show more corresponding words, may also cause the system to show more stems at some location, preferably on the left side of a screen.

According to another embodiment of the invention, a first predefined interaction causing the system to show more stems, may be a different predefined interaction from said first predefined interaction such as, for example, sliding on a proposed list of stems.

- **Priority to inverse for stems/ show less priority first**

According to one method, the stems shown to the user corresponding to the input information provided by the user, may be presented according to some criterion/criteria, such as, for example, according to their stem frequency/priority such as, for example, from highest to lowest or, as another example, from lowest to highest.

According to a preferred embodiment, the order of stems being presented to the user based on the corresponding input information entered by the user, may preferably be based on the beginning stems of a word that requires many key presses before being predicted/proposed by the system.

Precise letters in predictive mode for stems

Showing precise and/or ambiguous words, simultaneously (e.g. on opposite sides of a screen), based on user interactions with the keys/zones of a keypad has been described in detail herein.

According to one embodiment of the invention, in the word list corresponding to ambiguous key presses provided by the user one or more words corresponding to precise characters relating to said key interactions may be proposed to the user. As such, at any moment during the entry of a word, a user may enter a desired stem of a word and then interact (e.g. tap on) with that stem to select it and to later provide longer words, as described herein, where the beginning portion of the longer word corresponds to the selected stem. According to one embodiment, the keys used for such purpose are ambiguous keys of the invention displaying the preferred (e.g. and/or none-preferred characters).

Precise Characters/Stems

According to one method of the invention, a stem/portion, preferably the beginning stem/portion of a word, may be entered precisely, letter by letter. The method of entering precise characters using/through ambiguous keys has been described in detail before. As an example, according to one method, when the system is in ambiguous mode, interacting with a key (e.g. such as a tapping action on a key) may simultaneously be interpreted by the system as ambiguous interactions and precise interactions. As mentioned before, when a user taps on a key, the system may consider the tap as being ambiguously related to any character on said key. Simultaneously, the system may also relate said tapping action on the key to an identified character on which, or on a zone to which, said said character is assigned and wherein said tapping was provided. Other characters on said key may be entered precisely by providing corresponding gliding actions on/from said key. According to one method, preferred characters may also be entered precisely by providing corresponding (e.g. short) gliding actions as described before (e.g. upward, downward, leftward/rightward). As an example, if the user desires to enter the word “organization” the user may first tap precisely on the letters ‘o’

and 'r' on the corresponding keys, then provide a gliding actions corresponding to the letter 'g' to enter it precisely. By considering said tapping and gliding actions (e.g. input information), the system may propose two kinds of words. A first type of word is provide/presented as if all the characters relating to the word are considered by the system as being entered precisely. In this case, the word/stem "org" is proposed. Simultaneously, one or more second type of word(s) may be proposed based on ambiguous key interactions (e.g. except the character 'g' that was entered precisely). In this example, the system may propose 'dog', 'dogs', 'organic' and 'roger'. At this time the user may tap on the precise chain of characters to select it, and the system may propose a number of longer words beginning with said precise chain of characters/stem "org" (e.g. the words: 'organic', 'organized', 'organizes', 'organization'). Selecting a stem to provide longer words/stems and methods of entering any of them have been described in detail before.

Note that, after the user provides such key interactions/input information, according to various methods, the system may provide one or more longer words based on or considering said chain of characters as being precisely entered and one or more words (e.g. same sized words or longer words) by (e.g. simultaneously) considering said input information as being ambiguously entered.

- 1 precise word, others ambiguous
 - o **Show the after that precise**
 - o **Show the list**

After entering such input information and selecting one of the proposed words if the user provides additional input information (e.g. key interactions), according to one method the system may consider said additional input information as being ambiguously entered and/or precisely entered and may provide words correspondingly.

Note that, ambiguous input information preferably refers to input information wherein said information refers to at least one or more ambiguous characters even if said input information also refers to one or more precise characters. Preferably, the word list corresponding to proposed words/stems may include both precise stem(s) and one or more words corresponding to the provided input information.

- **Include special chars**

Providing short and/or long gliding actions in a predefined direction on/from a key/zone for entering two different characters (e.g. a letter and/or a special character, respectively, or vice versa) has been described before in previous patent applications filed by this inventor. According to a preferred embodiment of the invention, in addition to tapping precisely on the preferred letters on the keys, when the system is in the ambiguous mode, short gliding actions provided on an ambiguous key may correspond to entering precise characters/letters assigned to said key and

longer gliding actions on/from said key may preferably correspond to entering special characters assigned to said key. Accordingly, a long pressing action on an ambiguous key may correspond to entering a special character, too. Preferably, after beginning a gliding action and/or providing a long pressing action on/from a key, the system may show the letters and special characters assigned to said key (e.g. including or excluding preferred characters as shown in Figure 440B) so that the user can see them while providing said gliding and/or long pressing actions. Figure 440A shows, as an example, the keypad of the invention in ambiguous mode before providing a gliding and/or long pressing action on/from any of the keys of the keypad. Figure 440B shows the keys of said keypad during providing a gliding action (e.g. short/long) and/or long pressing action, provided on any one of the keys of the keypad. A key of this keypad, in such a case, herein may be referred to as 'expanded key.' According to one method, only the key on which said gliding and/or gliding action is provided is expanded. According to another method, all of the keys may be expanded during providing of a gliding action and/or long pressing action on any key. In the example of the keypad of Figure 440B, the preferred character 'w' can, preferably, be entered by providing a tapping action on it or on a zone assigned to it. On the other hand, as shown in Figure 440B, said preferred character may also be entered precisely by providing a short gliding action 440212 in its direction (e.g. upward for 'w', downward for 'n', leftward/rightward for 'a'), this matter has already been described in detail before. On the other hand, providing a longer gliding action 440211 may preferably correspond to entering the special '2'. In this example, a long-pressing action on the key 440202, without providing a gliding action, may correspond to entering a center character (e.g. the special character '5' in this example). Alternatively, a back and forth gliding action may correspond to entering a center character.

In such case, according to one method, the expanded keys of the keypad may not be shown to the user, while such interactions are provided. This may permit, may permit the user to type on invisible keys. Preferably the invisible keys, in ambiguous mode, may be presented/displayed only by a frame as described before.

- Short and long press
- Center char long press
- Show the keys
 - Can include precise preferred letters
- additional key presses based on ambiguous or precise
- Grabbing a word

According to one embodiment of the invention, the word already entered may be grabbed (for example, for editing) by providing a double tapping action on said word.

According to one embodiment of the invention, providing a (e.g. short) gliding action, corresponding to a letter, including a holding action may change the case of the letter (e.g. from lower case to upper case, or vice versa).

Preferably, when a user provides a long pressing action or short gliding action, the center of the corresponding expanded key may be located under the touching point under the user's finger.

- **Applies to any kb**
 - o **QWERTY**
 - o **User can type approximately**

As mentioned before, any of the principles, features, concept, aspects, etc., may be applied to /used with any type keyboard for example a QWERTY keyboard. For example, in the embodiments above, after typing a the beginning of a word, the system may propose some candidate beginning with the beginning portion, and the user may interact with a proposed word so that the system propose additional words beginning with/based on the interacted word. According to one embodiment, after providing a beginning portion of a word, when the user interacts with a key of such keyboard, the system may also ambiguously correspond said interaction with the neighboring keys of the interacted key, and by considering said beginning portion and one or more such key interactions the system predicts corresponding one or more words. In this embodiment, because the beginning portion is entered precisely, an approximate interaction with the keys corresponding to one or more remaining characters of a corresponding desired word may be enough for predicting said word.

The principles, herein described, of swapping/replacing words/stems being selected and used as a fixed portion (e.g. preferably the beginning portion) of another word/stem (e.g. and if desired/needed) appending or deleting characters from the selected word establishes a new way of inputting (e.g. typing) by mixing interactions of keys/zones of a keyboard (e.g. having ambiguous and/or precise keys) and the presented/predicted/proposed words/stems to predict a (e.g. desired) word.

- **Korean**

The principles of using stems/words mixed with keyboard interactions and word/stem interactions described herein may be applied to any type of (e.g. alphabetic) language such as Roman based languages (e.g. English, Italian), Korean, Hindi, Arabic, Hebrew, etc.

Chinese/Japanese

The principles of swapping and/or selecting words/stem as just described may be used for the entry of the phonetic transcription for languages such as Chinese or Japanese (e.g. hereafter, may be referred to as a phonetic alphabet). As an example, Chinese language uses Pinyin input method wherein the Chinese characters are represented by the Roman phonetic transcription. A word of a Chinese language may be constituted of one or more characters, each may be represented by a pinyin phonetic transcription (e.g. herein may be referred to as a pinyin representation of a word). According to one embodiment of the invention, a database of pinyin representation of words may be used by the data entry system of the invention. As such, a pinyin representation of a word having more than one syllable may be entered by providing the input information corresponding to said syllable. A word list that may include the corresponding pinyin representations of words may be presented to the user. If the presented word list does not include the desired pinyin, the user may provide a predefined interaction such as a gliding action as described for Roman-based languages, and the system may propose/present a new word list. If needed the user may repeat this procedure until the system proposes the desired word. The user may select a desired pinyin representation of a word within the/a corresponding word list as described earlier (e.g. by tapping on it). The system may preferably fix the characters of the selected pinyin representation of a word, and preferably, may propose longer pinyin representations of words beginning with the fixed characters, and preferably also show the corresponding hieroglyphic words preferably based on their frequency of use. And so on. According to one method, during proceeding to providing the input information corresponding to the next pinyin representation of a word of the desired word, by considering the selected pinyin representation and said input information, the system may propose one or more corresponding pinyin representations of words wherein their first pinyin **representation of a word** is the selected one the user may either select one of the new proposed pinyin representations of words (e.g. as the desired pinyin representation of a word or as a stem of a longer pinyin representations of a words word) or he may continue typing the next one. And so on.

In the current embodiment, according to one method, at any moment (e.g. for each selected pinyin representation of a word) during the entry of a pinyin representation of a word, the user may select its/their corresponding symbol(s) or he may select all of the symbols of his desired word after all of the pinyins of the desired pinyin based word is entered.

For the sake of clarity, in the embodiments relating to the Chinese language as described herein, a pinyin representation of a word in case of Chinese language is preferably be considered as a stem of a word in a language with an alphabetic system (e.g. English).

- **Double list**
- **Next applies to both symb/character and pinyin**
 - **Sp applies to symb/character**
 - **Selects a character at any moment**

According to one embodiment, the pinyins corresponding to the input information provided by the user, may be presented on a first predefined location of a screen such as the right side of a screen and the corresponding hieroglyphic symbols may be presented on another predefined location of a screen such the left side of a screen.

According to one embodiment, when the user provides the input information corresponding to a hieroglyphic word, such as a Chinese word, the corresponding predicted phonetic words (e.g. having one or more pinyins in the case of the Chinese language) may be presented in a word list, for example, on the right side of the screen. When a user selects one of said presented phonetic words, by for example tapping on said word, the system may show the corresponding hieroglyphic words at, preferably, another location (e.g. on the left side of the screen). According to a preferred embodiment, a rejecting interaction before selecting a presented phonetic word may result in the system presenting more phonetic words. According to one embodiment, after selecting a phonetic word a same interaction may correspond to the system resulting in presenting more hieroglyphic words corresponding to the selected phonetic word.

Note that, according to a preferred embodiment, when a user inputs information corresponding to a desired word, the system may preferably show the corresponding phonetic word(s) and preferably show the hieroglyphic words corresponding to the phonetic word having the highest priority in the list. Preferably, after the user selects another phonetic word, the system may show the corresponding hieroglyphic word(s).

Picture editing functions/application

- **For a current predicted word or after selecting an already entered word (by press and holding on it), then:**

Methods and principles of editing a picture/image/photo/video have been described before in detail. According to a preferred embodiment of the invention, a method of applying functions to a word being entered (e.g. the current (e.g. predicted) word) or to a selected word which has been previously entered (e.g. an already previously entered word may be selected by providing a predefined interaction such as a long-pressing action on said word) (e.g. hereafter the current word and/or selected word may be referred to as target words) may be considered, such as:

- **A tap on the screen (e.g. outside the selected word, if any) brings the menu, another same tap hides the menu**
- In the case that a word being entered, a predefined action such as a tapping action (e.g. anywhere outside the keypad and/or corresponding broadly ambiguous zone) on the screen, may display a menu.
- In the case that a previous word is selected, a predefined action, such as a tapping action, may be preferably provided not on the selected word.
- In the case of a targeted word, a predefined action such as a tapping action (e.g. anywhere outside the keypad and/or corresponding broadly ambiguous zone) on the screen, may display a menu. Said predefined action may preferably not be provided on the selected word or on a zone assigned to the selected word.
- After the menu is displayed, an interaction with a function of the menu may apply to the targeted word. Preferably, said application of the function may be executed in real time so that the user can see effect of the function on the targeted word. As an example, said function may be change of the color, font, size, font, shadow, style, etc. of the targeted word.

According to one method, functions other than functions relating to a menu may be applied to a targeted word. For example, in the case of a targeted word on a touchscreen, providing a gesture in a direction may cause the system locate the targeted word under the user's fingers in the direction of the gesture. Preferably, a press-and-holding action anywhere on the screen and a slide of a finger in a direction may cause to move the targeted word in said direction (e.g. preferably from the targeted word's original location, or optionally under the user's finger) without changing the trajectory of the targeted word itself. Note that said press-and-holding action with gesture may also be provided on the targeted word itself.

With continuous description of the current embodiment, according to one method, a tapping action on a selected word unselects said selected word. Additionally, in case of a targeted word and during the display of a menu on the screen, according to one method, a predefined action (e.g. such as a tapping action anywhere on the screen (e.g. preferably not on the targeted word)) may hide the menu.

According to one method of the invention, a gliding action on the screen may cause the system to display the keyboard on the screen without a menu being displayed on the screen.

According to one method of the invention, when a gliding action is provided on the screen, the trajectory is shown to the user preferably in the form of a line. In the case of a targeted word, according to one method, in addition to said trajectory or in replacement of said trajectory, the targeted word is displayed.

According to one embodiment of the invention, a complex gliding action such as a sequence of continuous gliding actions may be provided on the screen before enter several words. After entering said several words, the system may preferably display said several words according to the trajectory of the complex gliding action on the screen. According to one method, the system may assign each of the gliding action trajectories of said complex gliding action to each word of said several words. Optionally, the system may assign trajectories to said to the whole of said complex gliding action, and adjust the trajectories of each word accordingly.

- **Menu for design**
- **Long-press to release the selected word**
 - o **Tap anywhere including on the selected word for menu/keyboard**

According to one embodiment of the invention, a long pressing action on a selected text (e.g. one or more words) may preferably release (e.g. unselect) said text. According to this approach preferably a tapping action anywhere on the screen (e.g. preferably outside the broadly ambiguous zone, if a (e.g. corresponding such) keyboard is popped up one the screen) including on a selected text may correspond to displaying the/a menu and/or a/the keyboard. In this embodiment, a tapping action on the/a selected word may preferably not unselect said word.

It must be noted that in different paragraphs in this application, a gliding action has been described to combine a long pressing action. It must be noted that the long pressing action can be provided at any moment such as at the beginning, in the middle, or at the end of during said gliding action.

It must be noted that throughout this application, the terms such as “interacting with the first keypad in the precise mode” or interacting with the first keypad to enter a precise character”, etc., may have been used. It must be noted that such terms are used for entering precise characters using the first keypad of the invention in its corresponding precise mode. In said corresponding precise mode, each of the keys of the keypad may be replaced by a another keypad/ having different appearance. Optionally, the second keypad may have the same appearance as the first keypad,

which in this application is referred to as the ‘second keypad’. According to one method, a key of a first keypad in the Precise Mode may be divided into a plurality of zone/keys each corresponding to an identified character. In the Precise Mode the plurality of divided zones/keys of the first keypad may be considered to form a corresponding second keypad. Therefore, tapping on a zone of the first keypad may be considered as tapping on the corresponding key of the corresponding second keypad.

It must be noted that in some embodiments the term “special characters” may be considered to refer to special characters and/or functions.

The keys of the first keypad such as the split keypad of the of system may be located on a single surface or they may be distributed on more than one separate surfaces.

A keypad of the invention may be positioned on a pop-up surface (or programmatic pop-up graphic and input mechanism) on the screen of a device. Accordingly, each of the portions of a split keypad may be positioned on a different pop-up. Said pop-up surfaces (or programmatic pop-up graphic and input mechanisms) may preferably have substantially the size of the keypad or its portions, respectively.

In the embodiments and examples described throughout this application, a first group of symbols (e.g. letters) to a key of the first keypad has been described to be selected by a first predefined type of interaction with a key (e.g. taping, double-taping, gliding on or from said key (if on screen key), press and holding, taping on said key and touching a zone of the screen outside said key, etc.) of the first keypad. Then, said selected symbols had been assigned to the keys of a second keypad of the invention. One of said symbols could be entered by a predefined interaction with (the appropriate key of) the second keypad. The same procedure was described for a second group of symbols (e.g. special characters such as digits 0-9) assigned to said key of the first keypad, wherein said second group of symbols could be selected by a second predefined type of interaction with a key of the first keypad, and one of said symbols could be entered as described for the entry of the symbol of the first group as just described. Clearly, the examples of the embodiments have been provided to describe the procedure of the entry of a symbol through the data entry systems of the invention. It is understood that the order of the assignment of said groups of symbols to the key of the first keypad may be reversed (e.g. the digits group being selected by said first type of interaction, said letters group being selected by said second type of interaction) by people skilled in the art. Note that in all of the embodiments, the type of interaction described is exemplary and may be replaced by any other type of interaction such as those described known by people skilled in the art. For example, a press-and-holding action on a first key for at least a predefined of time to enter said key into a mode instance may be replaced an interaction such as pressing a second key and simultaneously interacting with said first key.

Additionally, many types of interactions with a key (of the first keypad) for assigning a different group of characters to each of them may be considered by people skilled in the art. For example, each of, touching a key and preferably touching another key, touching a key and touching a different predefined location on the screen, touching a key and touching any location on the screen, etc, may be considered as a different type of interaction with said key.

Thus, while there have been shown and described and pointed out fundamental novel features of the invention as applied to alternative embodiments thereof, it will be understood that various omissions and substitutions and changes in the form and details of the disclosed invention may be made by those skilled in the art without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the claims appended hereto. It is to be understood that the drawings are not necessarily drawn to scale, but that they are merely conceptual in nature. It must be noted, that any of the systems, features, means, methods, etc., described in this patent application may be used separately or being combined with systems, features, means, methods, etc., of other different embodiments of the invention.

It must be noted that the number of keys, configuration of letters on said keys, key arrangements, type of keys, etc., are being described as examples. They can be designed differently by people skilled in the art by considering the principles of the invention. It must also be noted that a touch sensitive surface may be touchpad, a touch screen, etc.

It must be noted that although during this application there has been described that a user may touch/press on a key such as the center key of a keypad to provide a gliding action, as described in detail before, if the second keypad of the invention is a dynamic keypad, then the user may touch anywhere on the screen/surface or anywhere on a dedicated zone on the screen/surface (e.g. such as the zone not including one or more keys of the first keypad as described in some embodiments), and that touching point may predefined to correspond to the center of said keypad which, preferably, may dynamically form under the touching point or on another location on the screen. The user then may provide the desired corresponding gliding action.

It must be noted that although in some embodiments through this application for describing the principle of the data entry system of the invention, a touch screen has been used as an example, obviously, any type of touch sensitive surface, any other type of surface, any number of said surfaces on which to which at least a portion on the input interface (e.g. the input keys/zones used by the system) may be considered for the same purpose.

Optionally all of the input interactions described throughout this patent application may be provided in the air. To intercept such interactions different types of detecting means such as camera(s), accelerometer(s), etc., may be user. According to one embodiment, as an example, a first predefined type of gesture(s) using a first predefined number if fingers (e.g. one finger) provided in

the air may correspond to a plurality of first input signal, and a second type of predefined gesture(s) using a second number of fingers (e.g. more than one finger) provided in the air may correspond to a plurality of second input signal. As an example, the plurality of the first predefined gestures may be used for entering ambiguous input information corresponding to a word, and the plurality of the second predefined gesture may be used for entering precise/identified characters. This type of interaction may be used with the word predictive data entry system of the invention such as for example, the general data entry of the vertical (e.g. GPG, content search (e.g. relating to TV)) such as those described throughout this application.

It must be noted that the data entry system preferably in some cases uses more than one interaction with a key and/or zone simultaneously by for example press/glide and holding on/from a first key and pressing/gliding on/from another key/zone. Obviously, if the user desires to use one hand only with the system, then according to one method, the user may first press/glide on/from said first key and remove his finger. Then he may provide said pressing/gliding on/from said another key/zone.

It is noted that, although according the preferred principle/embodiment of the invention a full set of the letters of a language are distributively assigned to few (e.g. four) keys of a first keypad and another same full set of the letters of the same language are distributively assigned to few keys of a second keypad (e.g. to eight keys of a telephone-type) such that any key of said letter keys of said first keypad and any key of said letter keys of said second keypad have at most one common letter, however, minor modifications/variations may be considered/provided to this principle by people skilled in the art. For example, one (or more) of the (e.g. ambiguous) keys of the first keypad and one (e.g. ambiguous) key of the second keypad (e.g. as just mentioned above) (for some reason) may have more than one common character (although this may augment the ambiguity and slow down the recognition capacity of the system requiring more user's input information).

The input system of the embodiments of the present invention may be used with substantially any electronic and/or computerized device, such as cellular phones, GPS devices, remote controls, handheld devices, television settop boxes and music players. This input system is particularly useful for small sized and/or portable devices on which it is inconvenient to place an entire keyboard. In addition, these input devices may be used on appliances not primarily intended for data input, such as washing machines, refrigerators and the like, which conventionally do not include large keyboards.

It is noted in many paragraphs a first and a second keypad have been named to be used with the data entry system of the invention, obviously. The system may instead use a first and a second

group of (different) input signals for the same purpose. Said input signals may be provided by any other input means.

It must be noted that although in this patent application “key” and “(predefined) type of interaction with key” has been used to demonstrate different embodiments and methods as described, obviously, any (predefined) input means (e.g. providing a first and a second group of input signals) and any (predefined) type of interaction provided through said input means to provide a (predefined/different) input signal may be used for the same purpose. For example, instead of distributively assigning the set of letters of a language to the keys of a first keypad, said letters may be assigned to a first predefined type of interaction (e.g. single-pressing action on said keys) with each of said keys of said keypad. Also, instead of distributively assigning another set of letters of said language to the keys of a second keypad, said letters may be assigned to a second predefined type of interaction (e.g. double-pressing action, pressing (e.g. and holding) a mode key and single-pressing, etc.) on/with each of said keys of said first keypad. Obviously, based on the principles of the data entry systems of the invention as described above, the distribution/assignment of the letters to said first and second type of interaction with said keys may be such that letters assigned to the first type of interaction with any on the keys of said keypad and letters assigned to the second type of interaction with said key of said keypad have at most one common character.

It must be noted that the features such as keypads, key arrangements, number of keys, assignment of a set of characters of a language to each of a first and second set of keys (e.g. or to each of a second and a second type of interactions with one set of keys), type of keys, type of interactions, etc., as described and shown in this patent application are shown as examples to describe different embodiments of the invention. Obviously, other type of such features can be considered by people skilled in the art.

It must be noted that the first and the second keypad of the invention can have any number of keys. For example, in some embodiments, the second keypad is shown to be a telephone-type keypad having nine keys and in some other embodiments it is shown to have twelve keys.

It must be noted that in addition-to or in replacing-of the correction procedure of the invention, the system may include a method to propose to the user words other than the one predicted by the system. For example, if the predicted word is not the desired word, the user may provide a predefined interaction for example on the screen and the system may show a second keypad wherein its keys include the other words (e.g. having less frequently of use) that correspond to the input information provided until that moment by the user for entering a desired word. Then if the user's desired word is one of said proposed word, the user then may for example provide the corresponding gliding action for selecting/entering his desired word. If any of the words proposed by the system is not what the user desires to enter, then, preferably while holding his finger on the

screen, the user may touch another location on the screen and the system shows another second keypad with additional corresponding words (e.g. having less frequently use). And so on.

It must be noted that the procedure of entering a symbol of a group of symbols through the second keypad of the invention wherein the number of symbols of said group of symbols are more than the keys of the second keypad by providing multiple touches to provide multiple second keypads of the invention until the second keypad includes the user's desired symbol as described may be used for any symbol. For example it may be used for entering any punctuation mark character even if the number of the characters of the group is more than the keys of the second keypad. By using such procedure there is no limit to the number of symbols that each group may include. The same method may also be used for providing words during the word completion procedure. For example after the user enters into the word completion procedure, if he touches the screen the system may show the second keypad of the invention including some of the words beginning with the user's key presses. As an example if the desired word is not on a key of the presented second keypad, then preferably while holding that finger in touching position on the screen the user may touch with another finger a location on the screen and the system may open another second keypad with more words. The user may repeat this procedure if the system does not show his word on said another second keypad.

As mentioned, according to one method, in embodiments such as the media search and word completion, a gliding action in a direction may correspond to a list of words or elements. If the list of the words/items/stems in a gliding action direction is long, then according to one method, several gliding actions in said direction may be provided wherein each of said gliding actions may correspond/include some of said words/items/stems. The order of said words/items/stems may be based on a predefined principle such as frequency of use or alphabetical order.

According to one embodiment of the invention, one of the groups of symbols assigned to a predefined interaction with a key of the first keypad such as the backspace key may be called MENU to which menu functions such as User Guide, Language, Reset Settings, etc. may be assigned.

It is noted that the first and second groups of keys may include substantially any suitable number of keys which may be hard or soft keys or combinations of hard and soft keys. The keys may be organized in various configurations and the characters and symbols may be assigned to the keys in any suitable manner. The symbols of the system may be grouped in any number of symbol modes based on any (e.g. arbitrary) category. Optionally, the first group of keys has fewer keys than the second group, as mainly the first group of keys are intended to be used in entering text.

The term key is meant to include any device which identifies finger actuations including pressure sensors, thermal sensors, acceleration sensors, optical systems for tracking movements of

the finger, finger caps and gloves with sensors. The sweeping gestures of embodiments of the invention including embodiments for dialing telephone numbers may be identified using various touch sensitive surfaces including internal or external touch screens and a mouse pad. Alternatively, sweeping gestures may be identified by an electronic stylus, acceleration sensors and/or other sensors for identifying user finger movements. The sensors may be mounted on a surface, on finger caps, on gloves and/or on any other suitable mount. The keys or touch screen may be included with processor in the same housing or may be included partially or entirely in a separate unit connected through wires or wirelessly (e.g., using Bluetooth or Wi-Fi) to the unit including processor.

According to one embodiment of the invention the sweeping gestures may be provided in the air and are detected by suitable sensors such as a camera and/or acceleration sensors.

In some embodiments of the invention, the data entry systems are adapted to provide synthesized voice feedback on the letters or symbols entered and/or the current symbol mode such that the user need not look at the screen while entering data.

While the above description relates to the Latin alphabet, the principles of the invention may be implemented on other alphabets.

The special characters on the second keypad may be assigned mainly to a same key so that the user may easily remember their location. If the second keypad is a standard telephone-type keypad said special characters may be assigned to the key to which the digit "1" is assigned.

The data entry device in accordance with any of the above described embodiments may be included in a mobile phone, a PDA, a computer or any other device.

According to one embodiment of the invention, after the user provides the input information (e.g. key presses) ambiguously corresponding to several words (e.g. of the dictionary of words of the system), the system may show a first selection of at least some of said corresponding words on the screen. According to one method, said first selection of words may be shown on a (e.g. an imaginary) second keypad (model) of the invention such as a three-by-three matrix keypad as described throughout this application wherein, preferably, a key of said second keypad has at most one word of said first selection of words. According to one method, the user may select one of said selected words by interacting with the corresponding key of the second keypad using a method of interaction such as one of the methods described throughout this application (e.g. tapping/gliding, etc.). If the number of the words corresponding to the input information is more than the number of keys of the second keypad and the user's word is not within the keys of the second keypad, then, the user may provide a predefined interaction, such as a long gliding action, etc., and the system may show a second selection of the said corresponding words on the keys of said second keypad, and so on.

According to another embodiment, after the system shows said first selection of at least

some of said corresponding words on the (e.g. an imaginary) second keypad (model) of the invention as described above, the user may select one of said words that begins with the first letter of his desired word. If said word is the only word corresponding to the user's input information, or if the user provides an end-of-the-word signal such as a space character, then, the system may consider said word as the user's desired word and enters it. If said word is not the only word corresponding to the user's input information, then, the system selects all of the words corresponding to the user's combined input information (e.g. the words corresponding to said input information and beginning with said first letter) and shows them on the keys of the second keypad. At this time, the user may select one of said words presented on the second keypad if it is for example, his desired word. If his word is not on any of the keys of the second keypad and the system includes more words relating to said combined input information, then, the user may provide a predefined interaction such as a long gliding action, etc., and the system may show another selection of the words corresponding to the combined input information on the keys of said second keypad, and so on.

It must be noted, that a procedure such as a method of the data entry assigned to a first type of interactions with a key of the keypad of the system may be assigned to a second type of interaction with a key, and vice versus. For example, assignment of two different methods of entering a precise character within a word being entered, by relating said precise character to replacing an ambiguous character or inserting/adding it within the word being entered, to two different type of interaction with a letter key, may be reversed between said two types of interaction (e.g. the first type of interaction may be a gliding action provided on/from a letter key relating to a letter on said key, and the second type of interaction may be a tapping action on a letter/letter-zone on said key during the Precise Character Mode Instance.

It must be noted that the examples of interfaces such as a first and second keypads are used to describe the principles of the data entry system of the invention. It must be noted that other types of interface may be used for the same purpose, for example, when a user rejects a predicted word, instead of or in additions to the second (e.g. precise) keyboard (e.g. the plurality of second keypads of the invention), the system may have available or may enable/present another interface such as a microphone and a speech recognition system so that the user being able to enter for precise characters (e.g. for the correction purpose).

It must be noted that the term “combined predicted word” is used in some embodiment, generally refers to an N-gram Current word.

Note that, the term of “during the entry of a word” used throughout this application may preferably refer to a word (e.g. the current predicted word) being typed before an end-of-the-word signal such as a space character is entered at the end of the word.

It will be appreciated that the above described methods may be varied in many ways, including, changing the specific elements used and their layout. It should also be appreciated that the above described description of methods and apparatus are to be interpreted as including apparatus for carrying out the methods and methods of using the apparatus. The present invention has been described using non-limiting detailed descriptions of embodiments thereof that are provided by way of example and are not intended to limit the scope of the invention. Many specific implementation details may be used. The above embodiments may be implemented in hardware, software, firmware or combinations thereof.

It should be understood that features and/or steps described with respect to one embodiment may be used with other embodiments and that not all embodiments of the invention have all of the features and/or steps shown in a particular figure or described with respect to one of the embodiments. Variations of embodiments described will occur to persons of the art. Furthermore, the terms "comprise," "include," "have" and their conjugates, shall mean, when used in the claims, "including but not necessarily limited to."

It is noted that some of the above described embodiments may describe the best mode contemplated by the inventors and therefore may include structure, acts or details of structures and acts that may not be essential to the invention and which are described as examples. Structure and acts described herein are replaceable by equivalents which perform the same function, even if the structure or acts are different, as known in the art. Therefore, the scope of the invention is limited only by the elements and limitations as used in the claims.

The titles used in this application and in the related applications may preferably not been considered as part of the specifications.

It must be noted that all of the interactions such as (key) pressing/tapping actions, gestures, movements, handwritings, drawings, etc., as described throughout this application may be provided in the air. A movement detecting means such as a camera, an accelerometer, etc., may be used to detect and/or perceive/capture those interactions.

Note that the titles in this application may preferably not be considered as part of the specifications.

It must be noted that in some embodiments specific types of interactions such as a first and/or second types of the interaction are being used to describe the embodiment. Obviously, instead of said specifically described interactions any type(s) of other interactions may be used for the same purpose in said some embodiments.

Abstract

A word predictive data entry system comprising a plurality of first input signals to which one to a few characters are assigned, and an input signal, separate from said first plurality of input signals, to which a significantly larger number of characters are ambiguously assigned. Said system using a database of words wherein upon receiving a sequence of said input signals the system predicts one or more words from the database of words.

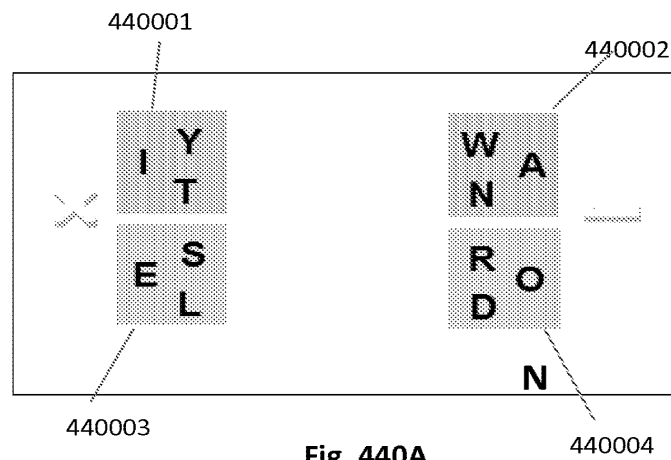


Fig. 440A

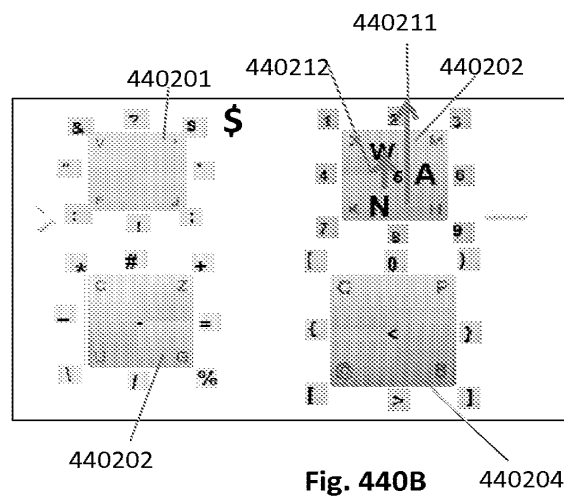


Fig. 440B

SCORE Placeholder Sheet for IFW Content

Application Number: 61772066

Document Date: 03/04/2013

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

- Drawings – Other than Black and White Line Drawings

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

To access the documents in the SCORE database, refer to instructions developed by SIRA.

At the time of document entry (noted above):

- Examiners may access SCORE content via the eDAN interface.
- Other USPTO employees can bookmark the current SCORE URL (<http://es/ScoreAccessWeb/>).
- External customers may access SCORE content via the Public and Private PAIR interfaces.

Form Revision Date: February 8, 2006