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(54) **PREDICTIVE KEYBOARD**

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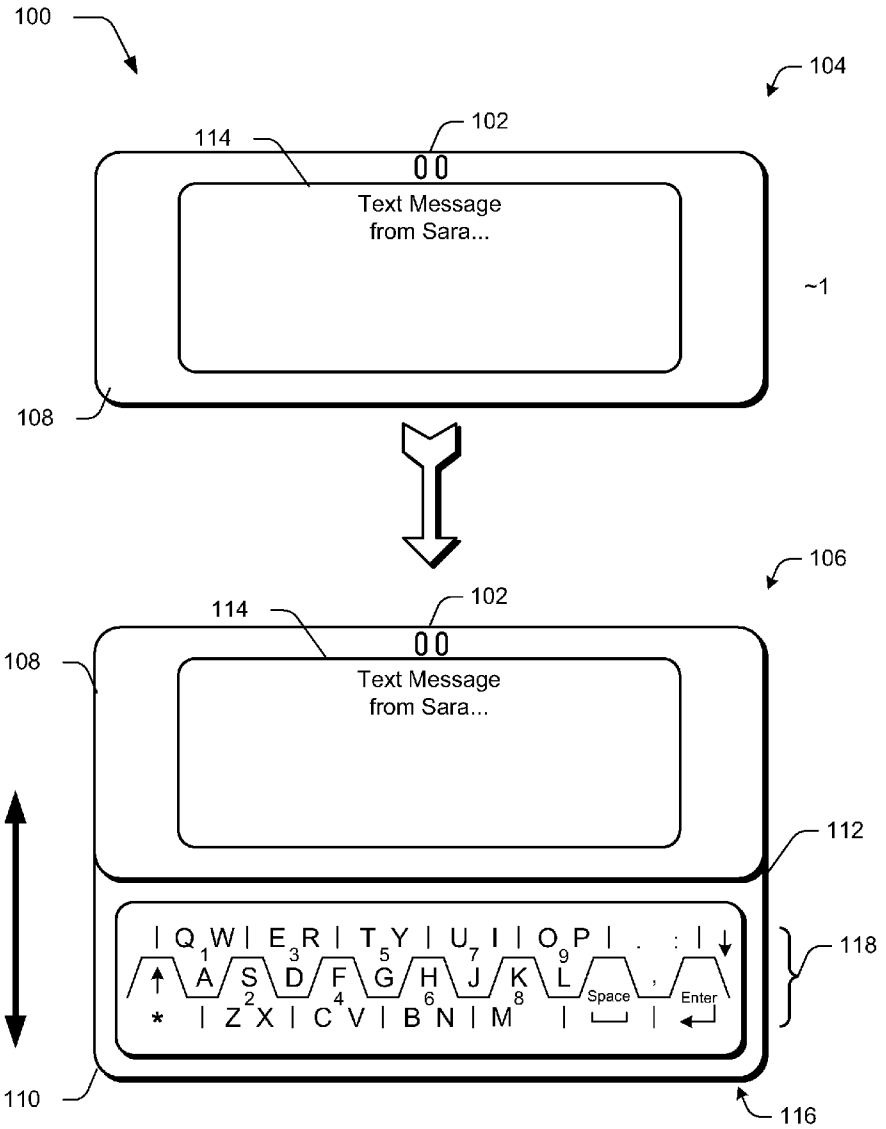
(57) **ABSTRACT**

A predictive keyboard is described. In an implementation, a keyboard comprises a plurality of indications of letters arranged, one to another, according to a QWERTY layout. Two rows of keys are arranged such that at least one of the keys includes at least two of the indications from at least two of the rows of the QWERTY layout.



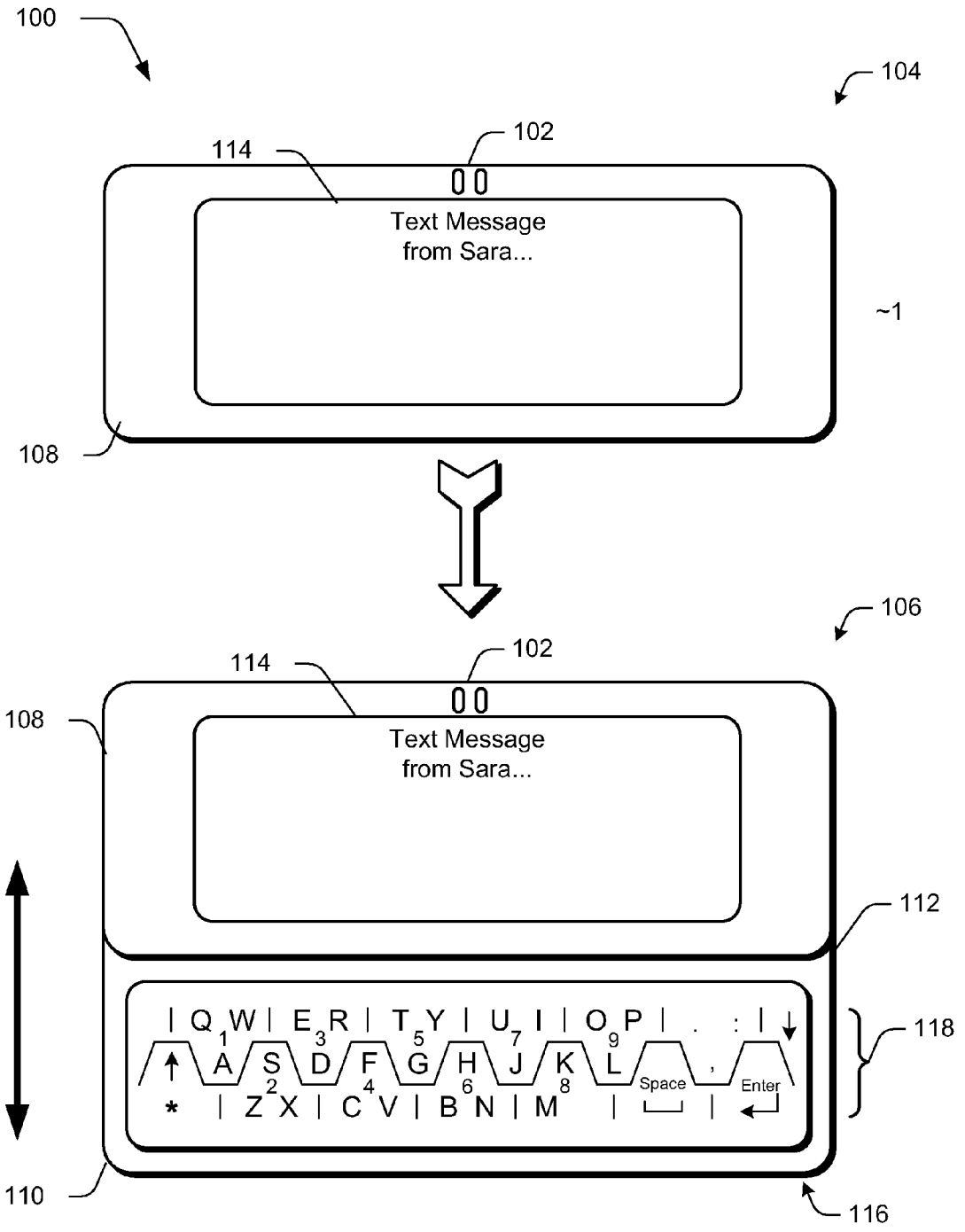

100
104
114
102
Text Message
from Sara...
~1
108
106
114
102
108
Text Message
from Sara...
112
| Q W | E R | T Y | U I | O P | . : |
A S D F G H J K L , Space Enter
* | Z X | C V | B N | M | |
118
110
116

Fig. 1

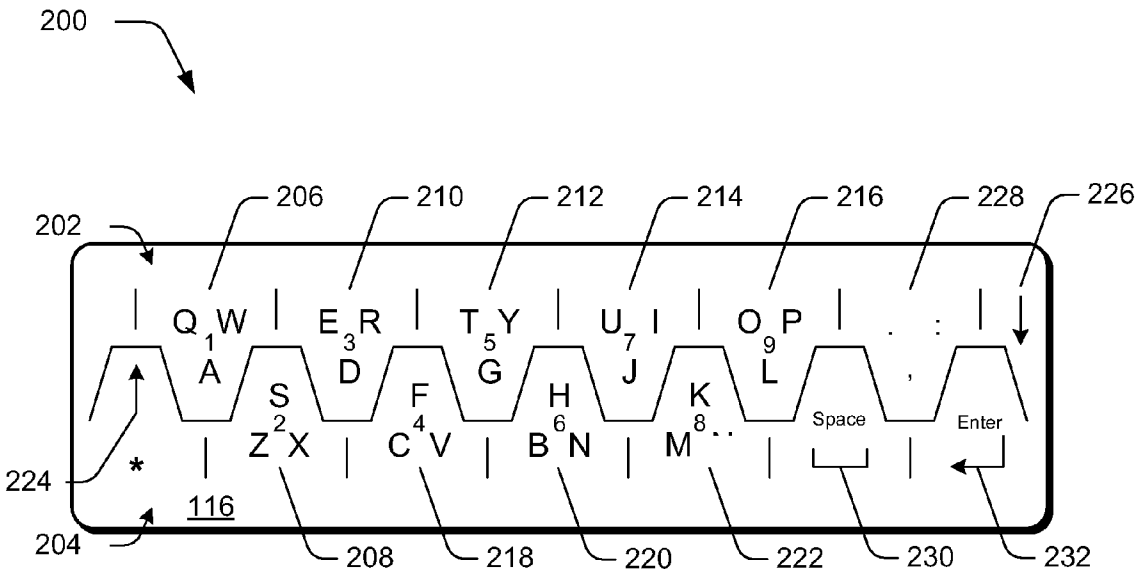

200
202
206
210
212
214
216
228
226
Q W E R T Y U I O P . :
1 3 5 7 9
A S D F G H J K L ,
2 4 6 8
Z X C V B N M
Space
Enter
*
224
116
204
208
218
220
222
230
232

Fig. 2

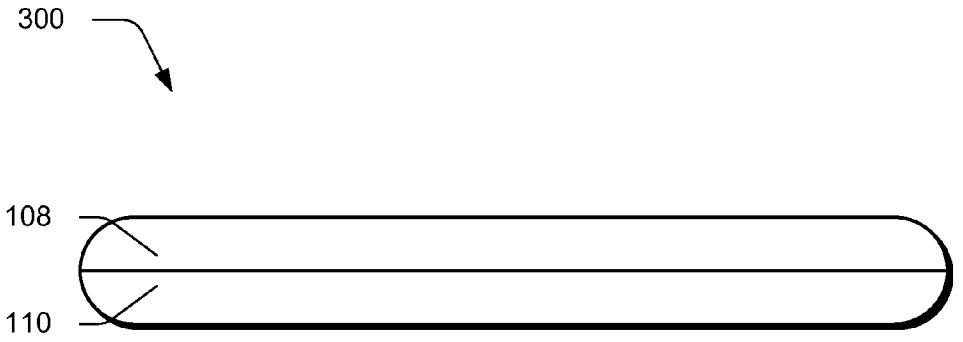

300
108
110

Fig. 3

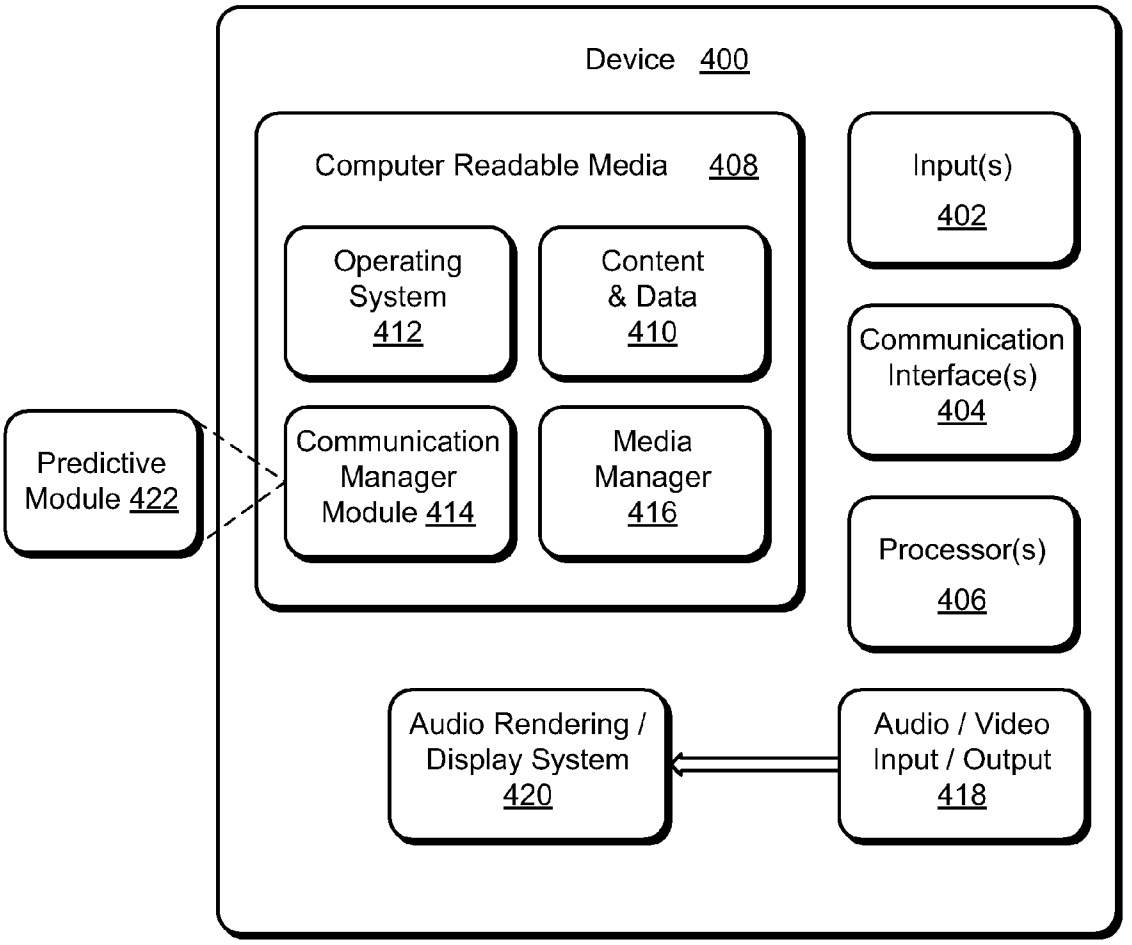

Device 400
Computer Readable Media 408
Operating System 412
Content & Data 410
Communication Manager Module 414
Media Manager 416
Input(s) 402
Communication Interface(s) 404
Processor(s) 406
Predictive Module 422
Audio Rendering / Display System 420
Audio / Video Input / Output 418

Fig. 4

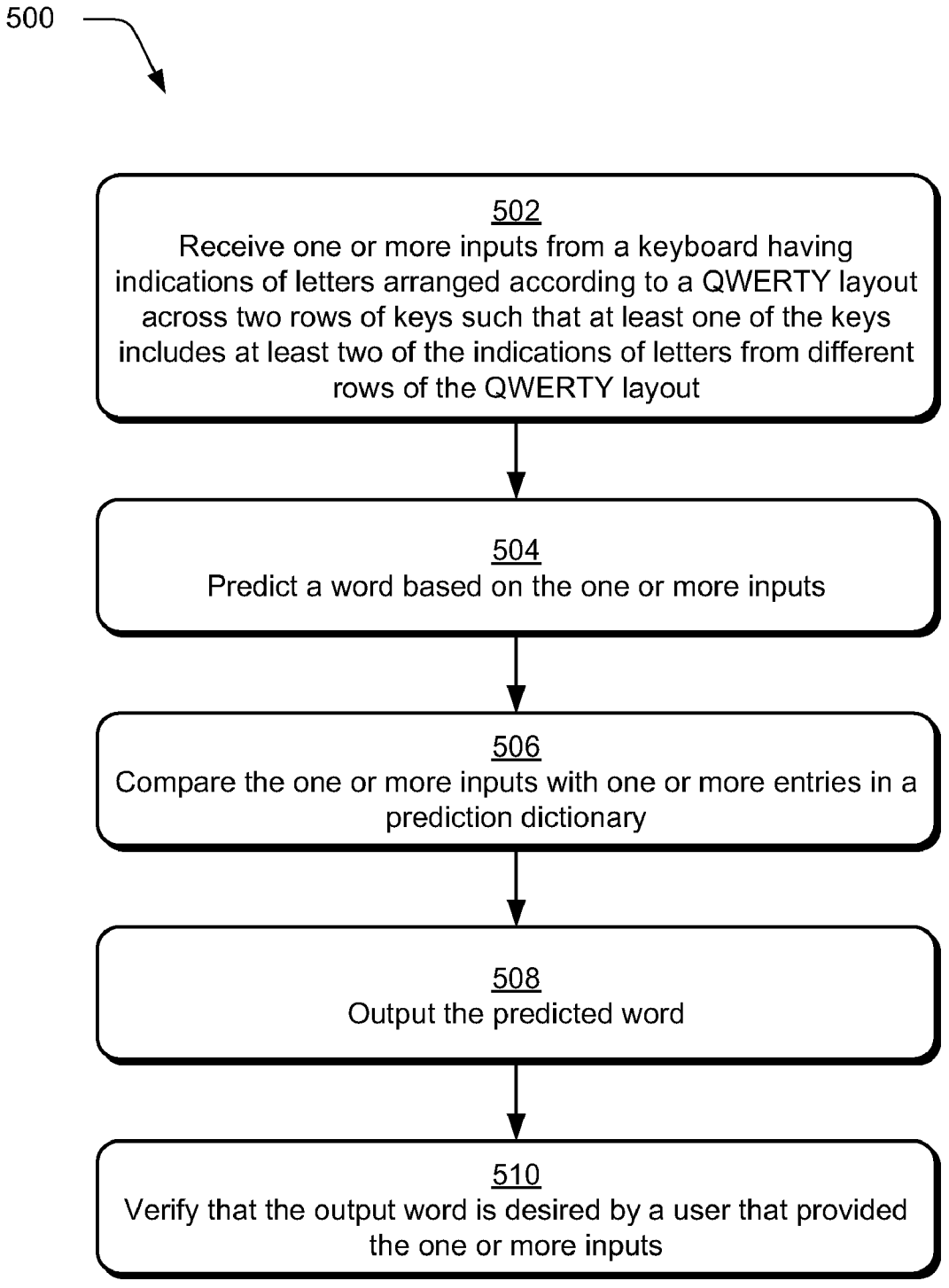

500
502
Receive one or more inputs from a keyboard having indications of letters arranged according to a QWERTY layout across two rows of keys such that at least one of the keys includes at least two of the indications of letters from different rows of the QWERTY layout
504
Predict a word based on the one or more inputs
506
Compare the one or more inputs with one or more entries in a prediction dictionary
508
Output the predicted word
510
Verify that the output word is desired by a user that provided the one or more inputs

Fig. 5

PREDICTIVE KEYBOARD

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims priority under 35 U.S.C. §119(e) to U.S. Patent Application No. 60/992,608, filed Dec. 5, 2007 and titled "Devices, Features and Systems for Mobile Communications", the entire disclosure of which is hereby incorporated by reference.

BACKGROUND

[0002] Portable devices, such as gaming devices, mobile communications devices and so on, have become an integral part of everyday life. Additionally, the functionality that may be accessed using these devices has increased. For example, advances have been made to provide a variety of different communication techniques, e.g., text messaging and email. However, inclusion of these additional communication techniques on mobile communications devices having traditional form factors may cause these devices to become unwieldy and less suitable for mobile applications. For example, traditional input devices that were employed by these communication techniques may be less suitable when utilized by traditional mobile communications devices than when implemented by full size devices.

SUMMARY

[0003] A predictive keyboard is described. In an implementation, a keyboard comprises a plurality of indications of letters arranged, one to another, according to a QWERTY layout. Two rows of keys are arranged such that at least one of the keys includes at least two of the indications from at least two of the rows of the QWERTY layout.

[0004] In an implementation, a mobile communications device comprises a keyboard and one or more modules. The keyboard has indications of letters arranged according to a QWERTY layout across two rows of keys such that at least one of the keys includes at least two of the indications of letters from different rows of the QWERTY layout. The one or more modules are configured to predict a desired word from one or more inputs received via one or more of the keys of the keyboard.

[0005] In an implementation, a method includes receiving one or more inputs from a keyboard having indications of letters arranged according to a QWERTY layout across two rows of keys such at least one of the keys includes at least two of the indications of letters from different rows of the QWERTY layout. A word is predicted based on the one or more inputs.

[0006] This Summary is provided to introduce a selection of concepts in a simplified form that are further described below in the Detailed Description. This Summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used as an aid in determining the scope of the claimed subject matter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The detailed description is described with reference to the accompanying figures. In the figures, the left-most digit(s) of a reference number identifies the figure in which the reference number first appears. The use of the same reference numbers in different instances in the description and the figures may indicate similar or identical items.

[0008] FIG. **1** is an illustration of an example implementation of an example mobile communications device in accordance with one or more embodiments of devices, features, and systems for mobile communications.

[0009] FIG. **2** is an illustration of an example implementation showing a keyboard of the mobile communications device of FIG. **1** in greater detail.

[0010] FIG. **3** is an illustration of an example implementation showing the mobile communications device of FIGS. **1** and **2** in a side view.

[0011] FIG. **4** is an illustration of various components of an example device that can be implemented in various embodiments as any type of a mobile communication device to implement embodiments of devices, features, and systems for mobile communications.

[0012] FIG. **5** is a flow diagram depicting a procedure in an example implementation in which a desired word is predicted based on one or more inputs received via one or more keys of the keyboard that includes indications of letters of a QWERTY layout across two rows of keys.

DETAILED DESCRIPTION

[0013] Overview

[0014] Users continually desire increased functionality from portable devices, e.g., gaming devices, wireless phones, mobile messaging devices, calendaring devices, and so on. For example, users may maintain a calendar, a list of contacts, send and receive text messages, access the Internet, send and receive email, take pictures and so on. However, interaction with this increased functionality in traditional mobile communications devices may be difficult due to a traditional form factors that were employed to keep the device "portable", which traditionally resulted in small keys that were difficult to use and/or a large form factor that became less and less portable in order to provide sufficient space for each of the keys of a keyboard.

[0015] Predictive keyboard techniques are described. In an implementation, letters of a QWERTY keyboard that were traditionally provided using three rows of keys are provided using two rows of keys. Indications of letters, for example, may be arranged, one to another, according to a traditional QWERTY layout in three rows. However, these indications may be spread across two rows of keys such that at least some of the keys have a plurality of indications.

[0016] For instance, a single key of the keyboard may include indications for letters "q", "w" and "a". This technique may be continued across additional keys, e.g., another key of the keyboard may include indications for the letters "s", "z" and "x" and so on. Therefore, in this instance indications of letters in a "middle" row of a QWERTY layout may alternate between the top and bottom rows of keys of the keyboard. Thus, a user may be presented with a familiar QWERTY layout even though two rows of keys are used to implement the layout.

[0017] Predictive techniques may then be employed to determine which word is likely desired by a user that is interacting with the keys, e.g., such as to auto complete the word. In this way, the overall amount of space consumed by the keyboard may be reduced (e.g., a height of the keyboard may be reduced), thereby making the keyboard better suited for portable devices. Additionally, each of the keys themselves may be made larger (when compared to a traditional

QWERTY layout in which each of the letters is provided on its own separate key) thereby aiding a user's selection of the keys.

[0018] In the following discussion, a variety of example implementations of a predictive keyboard are shown. Additionally, a variety of different devices that may employ a predictive keyboard are described, which may be implemented in that example as well as in other described examples. Accordingly, example implementations are illustrated of a few of a variety of contemplated implementations. Further, although a mobile communications device having one or more modules that are configured to provide telephonic functionality are described, a variety of other portable devices are also contemplated, such as dedicated messaging devices, game devices and so forth.

Example Implementations

[0019] FIG. **1** is an illustration of an example implementation **100** of a mobile communications device **102** in accordance with one or more embodiments of devices, features, and systems for mobile communications. The mobile communications device **102** is illustrated as assuming a plurality of configurations, examples of which include a first configuration **104** and a second configuration **106**.

[0020] The mobile communications device **102** is further illustrated as including a first housing **108** and a second housing **110** that are connected via a slide **112** such that the first and second housing may move (e.g., slide) in relation to one another. Although sliding is described, it should be readily apparent that a variety of other movement techniques are also contemplated, e.g., a pivot, a hinge and so on.

[0021] The first housing **108** includes a display device **114** (e.g., a touchscreen) that may be used to output a variety of data, such as a caller identification (ID), information related to text messages as illustrated, email, multimedia messages, Internet browsing, game play, music, video and so on.

[0022] The second housing **110** is illustrated as including a keyboard **116** that may be used to provide inputs to the mobile communications device **102**. Although the keyboard **116** is illustrated as a QWERTY keyboard, a variety of other examples are also contemplated, such as a twelve key numeric pad found on basic telephones, keyboards configured for other languages (e.g., Cyrillic) and so on.

[0023] In the example shown in FIG. **1**, the first and second housings **108**, **110** of the mobile communications device **102** are rectangular. For example, a plane defined by an outer surface of the display device **114** may be parallel to a plane of the first housing **108** that approximates a rectangle, which may be the same as or different from the plane defined by the display device **114**. In other words, the width and height of the plane taken from the first housing **108** that is parallel to the other surface of the display device **114** is greater than one-to-one. Likewise, the second housing **110** may be considered rectangular along a plane that is parallel to and/or is the same as an outer surface of the keyboard **116** disposed within the second housing **110**.

[0024] In the first configuration **104**, the mobile communications device **102** is closed such that the first housing **108** covers the second housing **110**. Consequently, the keyboard **116** disposed on the second housing **110** is covered and is not available to receive input from a user of the mobile communications device **102**. In an implementation, telephonic functionality is still available when the mobile communications device **102** is in the first configuration **104**, e.g., to receive a telephone call.

[0025] In the second configuration **106**, the first housing **108** is moved (e.g., slid) "away" from the second housing **110** using the slide **112**. In this example configuration, at least a majority of the keys of the keyboard **116** is exposed such that the exposed keys are available to receive inputs from a user. Accordingly, the second configuration **106** may be considered an "open" configuration. Further, the second configuration **106** results in an extended rectangular form factor of the mobile communications device **102** as contrasted with the rectangular form factor of the mobile communications device **102** in the first configuration **104**. In an implementation, the planes of the first and second housings **110**, **112** that are used to define the rectangular form factor are parallel to each other, although other implementations are also contemplated.

[0026] In the illustrated implementation **100**, the display device **114** remains viewable by a user in each configuration, examples of which are shown in the first and second configurations **104**, **106**. In the first configuration **104**, example text "Text Message from Sara" is illustrated as being displayed on the display device **114**. Additionally, the example text is illustrated as being orientated with respect to the second housing **110**, which in the illustrated implementation **100** the example text and indications of functions of the keyboard **116** (e.g., numbers and/or letters) are aligned, generally.

[0027] In the second configuration **106**, the example text is again illustrated as orientated with respect to the second housing **110** as was previously shown and described in relation to the first configuration **104**. For instance, example text "Text Message from Sara" displayed on the display device **114** is approximately aligned with the keyboard **116**, e.g., indications of text for respective keys of the keyboard **116**. Thus, in this manner a user of the mobile communications device **102** is provided with a consistent and intuitive approach to interaction with the mobile communications device **102** in a plurality of configurations, e.g., the first and second configurations **104**, **106**.

[0028] The rectangular form factor employed by the mobile communications device **102** may be suitable to support a wide variety of features. For example, the keyboard **116** is illustrated as supporting a QWERTY configuration. This form factor may be particularly convenient to a user to utilize the previously described functionality of the mobile communications device **102**, such as to compose texts, play games, check email, "surf" the Internet and so on.

[0029] The keyboard **16** is illustrated as having a reduced height **118** through implementation using two rows of keys. Even though two rows of keys are utilized, indications are provided that conform with a traditional QWERTY layout that typically arranges letters into three rows. In this way, the user is provided with a familiar QWERTY layout in a reduced form factor, further discussion of which may be found in relation to the following figure.

[0030] FIG. **2** illustrates an example implementation **200** showing the keyboard **116** of FIG. **1** in greater detail. The keyboard **116** is illustrated as having a first row **202** of keys and a second row **204** of keys. Even though first and second rows of keys **202**, **204** are utilized, indications of letters are arranged according to a traditional QWERTY layout having three rows. For example, a first row of indications includes a letters "Q", "W", "E", "R", "T", "Y", "U", "I", "O" and "P". Thus, each of the first row of indications of letters is included

in the first row **202** of keys of the keyboard **116**. Continuing with this example, a third row of indications includes letters "Z", "X", "C", "V", "B", "N" and "M". Each of indications of letters in the third row of the QWERTY layout is included in the second row **204** of keys of the keyboard **116**.

[0031] The second row of indications of letters of the QWERTY layout, however, in the keyboard **116** of FIG. **2** alternate between inclusion in the first and second rows **202**, **204**. For example, the indication of the letter "A" is included on a first key **206** in the first row **202** with indications of the letters "Q" and "W". The indication of the letter "S", however, is illustrated as being included on a first key **208** of the second row **204** with letters "Z" and "X".

[0032] Letters included in the second row of indications in the QWERTY layout may continue to alternate between the first and second rows **202**, **204** of keys as illustrated in FIG. **2**. For instance, the second, third, fourth and fifth keys **210**, **212**, **214**, **216** of the first row **202** may alternate inclusion of indications of letters with the second, third and fourth keys **218**, **220**, **222** of the second row **204**. Thus, keys in the first row **202** are staggering in relation to the keys in the second row **204**.

[0033] Functionality may also be included on the keyboard **116** in addition to entry of letters. For example, buttons **224**, **226** may be used for navigation functions such as "up" shown for a button **224** and "down" shown for button **226**. Punctuation may also be entered, examples of which are shown in relation to button **228**. "Space" and "enter" indications are also shown in relation to buttons **230**, **232**, respectively. Additionally, numbers may also be entered, such as a number "1" which is illustrated for the first key **206** of the first row **202**. A variety of other functionality and indications for functionality are also contemplated. A user may then interact with the illustrated keys to input a variety of data, further discussion of which may be found in relation to the following procedures.

[0034] FIG. **3** illustrates an example implementation **300** showing the mobile communications device **102** of FIGS. **1** and **2** in a side view. As illustrated, the first housing **108** substantially covers the second housing **110** such that the keyboard **116** of FIGS. **1** and **2** is covered and therefore protected from inadvertent input, contamination, and so on. Further, edges of the first and second housings **108**, **110** are illustrated as rounded such that the mobile communications device **102** may be comfortably grasped by a user. A variety of other implementations are also contemplated.

[0035] FIG. **4** illustrates various components of an example device **400** that can be implemented in various embodiments as any type of a mobile communication device to implement embodiments of devices, features, and systems for mobile communications. For example, device **400** can be implemented as any of the mobile communications devices **102** described with reference to respective FIGS. **1-3**. Device **400** can also be implemented to access a network-based service, such as a content service.

[0036] Device **400** includes input(s) **402** that may include Internet Protocol (IP) inputs as well as other input devices, such as the keyboard **116** of FIGS. **1-2**. Device **400** further includes communication interface(s) **404** that can be implemented as any one or more of a wireless interface, any type of network interface, and as any other type of communication interface. A network interface provides a connection between device **400** and a communication network by which other electronic and computing devices can communicate data with device **400**. A wireless interface enables device **400** to operate as a mobile communication device for wireless communications.

[0037] Device **400** also includes one or more processors **406** (e.g., any of microprocessors, controllers, and the like) which process various computer-executable instructions to control the operation of device **400** and to communicate with other electronic devices. Device **400** can be implemented with computer-readable media **408**, such as one or more memory components, examples of which include random access memory (RAM) and non-volatile memory (e.g., any one or more of a read-only memory (ROM), flash memory, EPROM, EEPROM, etc.).

[0038] Computer-readable media **408** provides data storage to store content and data **410**, as well as device applications and any other types of information and/or data related to operational aspects of device **400**. For example, an operating system **412** can be maintained as a computer application with the computer-readable media **408** and executed on processor(s) **406**. Device applications can also include a communication manager module **414** (which may be used to provide telephonic functionality) and a media manager **416**.

[0039] Device **400** also includes an audio and/or video output **418** that provides audio and/or video data to an audio rendering and/or display system **420**. The audio rendering and/or display system **420** can be implemented as integrated component(s) of the example device **400**, and can include any components that process, display, and/or otherwise render audio, video, and image data. Device **400** can also be implemented to provide a user tactile feedback, such as vibrate and haptics.

[0040] The communication manager module **414** is further illustrated as including a predictive module **422**. The predictive module **422** is representative of functionality to predict a desired word from one or more inputs received via the keyboard **116** of FIGS. **1** and **2**. For example, the predictive module **422** may compare inputs received via the keyboard **116** of FIGS. **1** and **2** and compare the inputs to a prediction dictionary to determine one or more words that have a likelihood of being desired by a user based on the inputs. The determined one or more words may then be entered automatically or output for verification by the user (e.g., such as to provide auto complete functionality), further discussion of which may be found in relation to the following procedures.

[0041] Generally, the blocks may be representative of modules that are configured to provide represented functionality. Further, any of the functions described herein can be implemented using software, firmware (e.g., fixed logic circuitry), manual processing, or a combination of these implementations. The terms "module," "functionality," and "logic" as used herein generally represent software, firmware, or a combination of software and firmware. In the case of a software implementation, the module, functionality, or logic represents program code that performs specified tasks when executed on a processor (e.g., CPU or CPUs). The program code can be stored in one or more computer readable memory devices. The features of the techniques described above are platform-independent, meaning that the techniques may be implemented on a variety of commercial computing platforms having a variety of processors.

Example Procedures

[0042] The following discussion describes predictive keyboard techniques that may be implemented utilizing the pre-

viously described systems and devices. Aspects of each of the procedures may be implemented in hardware, firmware, or software, or a combination thereof. The procedures are shown as a set of blocks that specify operations performed by one or more devices and are not necessarily limited to the orders shown for performing the operations by the respective blocks. In portions of the following discussion, reference will be made to the environment and devices of FIGS. **1-4**.

[0043] FIG. **5** depicts a procedure in an example implementation **500** in which a desired word is predicted based on one or more inputs received via one or more keys of the keyboard that includes indications of letters of a QWERTY layout across two rows of keys. One or more inputs are received from a keyboard having indications of letters arranged according to a QWERTY layout across two rows of keys such that at least one of the keys includes at least two of the indications of letters from different rows of the QWERTY layout (block **502**). For example, the keys of the keyboard may be displayed on a touchscreen display of a portable device (e.g., a gaming device), preconfigured from hardware on a mobile communications device, and so on.

[0044] A word is predicted based on the one or more inputs (block **504**). This prediction may be performed in a variety of ways to arrive at a word that has increased likelihood of being a word intended to be input by a user. For example, the one or more inputs may be compared with one or more entries in a prediction dictionary (block **506**). The predicted word may then be output (block **508**), such as to verify that the output word was desired by a user that provided the one or more inputs (block **510**). In another implementation, however, the word may be automatically entered without verifying that the user specifically intended that word. A variety of other implementations are also contemplated, such as to cease the prediction of the desired word when punctuation and or other non-alphanumeric character (e.g., a space or enter key) is encountered.

[0045] Although the invention has been described in language specific to structural features and/or methodological acts, it is to be understood that the invention defined in the appended claims is not necessarily limited to the specific features or acts described. Rather, the specific features and acts are disclosed as example forms of implementing the claimed invention.

What is claimed is:

1. A mobile communications device comprising:

a keyboard having indications of letters arranged according to a QWERTY layout across two rows of keys such that at least one said key includes at least two said indications of letters from different rows of the QWERTY layout; and

one or more modules to predict a desired word from one or more inputs received via one or more said keys of the keyboard.

2. A mobile communications device as described in claim **1**, wherein the keys in a first said row are staggered in relation to the keys in a second said row.

3. A mobile communications device as described in claim **2**, wherein:

the keys in the first said row of the keyboard include indications of the letters "q", "w", "e", "r", "t", "y", "u", "i", "o" and "p"; and

the keys in the second said row of the keyboard include indications of the letters "z", "x", "c", "v", "b", "n" and "m".

4. A mobile communications device as described in claim **2**, wherein:

a first said key in the first said row of the keyboard includes particular said indications that include "q", "w" and "a";

a second said key in the first said row of the keyboard includes particular said indications that include "e", "r" and "d";

a third said key in the first said row of the keyboard includes particular said indications that include "t", "y" and "g";

a fourth said key in the first said row of the keyboard includes particular said indications that include "u", "i" and "j";

a fifth said key in the first said row of the keyboard includes particular said indications that include "o", "p" and "l";

a first said key in the second said row of the keyboard includes particular said indications that include "s", "z" and "x";

a second said key in the second said row of the keyboard includes particular said indications that include "f", "c" and "v";

a third said key in the second said row of the keyboard includes particular said indications that include "h", "b" and "n"; and

a fourth said key in the second said row of the keyboard includes particular said indications that include "k" and "m".

5. A mobile communications device as described in claim **1**, wherein the at least one said key includes at least two said indications of letters taken from a first said row of the QWERTY layout and another said indication of a letter is taken from a second said row of the QWERTY layout.

6. A mobile communications device as described in claim **5**, wherein another said key includes at least two said indications of letters taken from a third said row of the QWERTY layout and yet another said indication of a letter taken from the second said row of the QWERTY layout.

7. A mobile communications device as described in claim **1**, wherein the at least one said key includes at least two said indications of letters taken from a first said row of the QWERTY layout and another said indication of a letter is taken from a second said row of the QWERTY layout.

8. A mobile communications device as described in claim **1**, wherein the one or more modules are further configured to provide text messaging functionality.

9. A mobile communications device as described in claim **1**, wherein the one or more modules are further configured to provide email functionality.

10. A mobile communications device as described in claim **1**, wherein the one or more modules are further configured to provide telephonic functionality.

11. A mobile communications device as described in claim **1**, wherein the at least one said key also includes an indication of a corresponding number.

12. A mobile communications device as described in claim **1**, wherein selection of punctuation via the keyboard causes the one or more modules to stop the prediction of the desired word.

13. A keyboard comprising:

a plurality of indications of letters arranged, one to another, according to a QWERTY layout; and

two rows of keys arranged such that at least one said key includes at least two of the indications from at least two rows of the QWERTY layout.

14. A keyboard as described in claim **13**, wherein:

a first said row of said indications includes letters "q", "w", "e", "r", "t" and "y";

a second said row of said indications includes letters "a", "s", "d", "f" and "g"; and

a third said row of said indications includes letters "z", "x", "c", "v" and "b".

15. A keyboard as described in claim **13**, wherein the keys in a first said row are staggered in relation to the keys in a second said row.

16. A keyboard as described in claim **15**, wherein:

a first said key in the first said row includes particular said indications that include "q", "w" and "a";

a second said key in the first said row includes particular said indications that include "e", "r" and "d";

a third said key in the first said row includes particular said indications that include "t", "y" and "g";

a fourth said key in the first said row includes particular said indications that include "u", "i" and "j";

a fifth said key in the first said row includes particular said indications that include "o", "p" and "l";

a first said key in the second said row includes particular said indications that include "s", "z" and "x";

a second said key in the second said row includes particular said indications that include "f", "c" and "v";

a third said key in the second said row includes particular said indications that include "h", "b" and "n"; and

a fourth said key in the second said row includes particular said indications that include "k" and "m".

17. A method comprising:

receiving one or more inputs from a keyboard having indications of letters arranged according to a QWERTY layout across two rows of keys such that at least one said key includes at least two said indications of letters from different rows of the QWERTY layout; and

predicting a word based on the one or more inputs.

18. A method as described in claim **17**, wherein the predicting is performed for a plurality of said words to form a phrase.

19. A method as described in claim **17**, outputting the predicted word.

20. A method as described in claim **19**, wherein the outputting is performed such that the predicted word is verifiable as being intended by a user that provided the one or more inputs.

* * * * *