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(54) **Title:** METHOD, APPARATUS, AND SYSTEM FOR PROVIDING INFORMATION

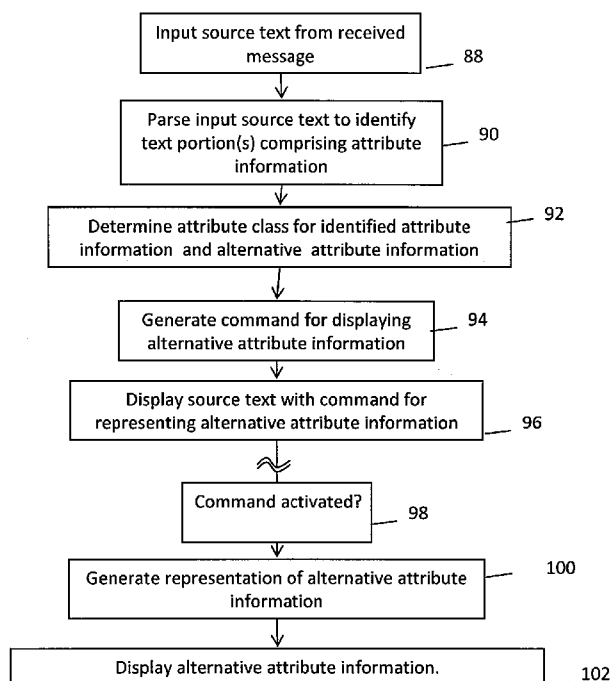


FIGURE 7B

(57) **Abstract:** A method is provided which identifies, by parsing source text, at least one portion of the source text comprising a source attribute value having a source attribute type; determines an attribute class for said source attribute type; and determines, using a processor, if an alternative attribute type to the source attribute type is designated for said attribute class, wherein said attribute class comprises at least said source attribute type and said alternative attribute type.



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METHOD, APPARATUS, AND SYSTEM FOR PROVIDING INFORMATION

Embodiments of the invention relate generally to a method, apparatus, and system for providing information.

- 5 Some embodiments relate, in particular, but not exclusively, to identifying attribute information in a source text and providing an alternative version of the attribute information.

Some embodiments provide the alternative version of the attribute information by parsing the source text providing the attribute information to automatically identify one or more source attribute values and source attribute types. If an alternative attribute type has been designated
10 for a class of attributes types which includes the source attribute type, an attribute value having that alternative attribute type is determined. The alternative attribute value together with the alternative attribute type provides alternative attribute information to that provided in the source text. In some embodiments, the alternative attribute type determined for a class of attribute types is directly or indirectly derived from one or more settings of the communications device
15 and/or one or more applications installed on the device.

BACKGROUND

When generating text on a device, a user of the device is able to provide information in a context with which they are personally familiar. When viewing a source text, if an information item comprises values for attributes which are not in a context or format with which the reader
20 using the device is familiar, the user of the device may misunderstand the information provided and/or need to exit the application used to view the source text to refer to conversion or

explanatory information in order to be able to put the information provided in the source text into the right context.

For example, if a user is used to thinking of an attribute such as a height in meters, if the user views a source text indicating a horse is 15 hands, or that someone is 5ft 2" tall, even if the user understands from the context provided in the source text that "ft" refers to feet and " " to inches and that "foot" and "inch" and "hand" are "height" type attributes, the user may not know which is the taller.

Moreover, when viewing source text including attribute information presented using unfamiliar attribute types, it may not be easy to recognize the attribute class that an attribute type belongs to. For example, it may not be obvious to all readers that a "hand" is intended here to refer to a height type of attribute as in the English language the word "hand" can also indicate a body part.

Accordingly, in the example of a source text including the phrase "The horse is 15 hands", where the attribute value of 15 qualifies the attribute type "hands" in the attribute class "height", unless a reader is familiar with the context that "hands" is a term used to indicate the height of a horse they might not be able to recognize the value 15 refers to a height attribute. They would then not know how they could convert value given in "hands" to an alternative and more familiar form, for example, by converting the attribute value 15 for the attribute type "hands" to an attribute value 1.54 for the alternative attribute type "meters".

To transform attribute information provided in a source text to an alternative version providing the same type of information but in more familiar context, currently another application may need to be launched, for example, a unit converter may be needed to perform a numerical conversion between two different measurement units. Such unit converters need a user to

manually select the source and alternative attributes types for conversion and require the user to also enter the source text attribute value. On electronic devices which are not capable of displaying two application screens concurrently, accessing a conversion application will remove the source text from prominence on a display. Handheld communication devices in particular are often provided with small display areas or limited processing capacity and the original application used to view the source text may need to be terminated or otherwise removed from prominence on the display in order to provide such information for attribute value conversion/calculation. Whilst some users are able to easily remember some values and/or measurement units/contexts, others may not, and it is also possible that a user may not know the correct context of the attribute information provided.

In addition, any information converted to an alternative or more familiar context which is not stored in association with the original source text is lost unless saved in association with the source text. This can result in a user either needing to repeat the conversion process or rely on their own, imperfect, memory to provide some context for the information each time they refer back to the source text.

SUMMARY STATEMENTS RELATING TO SOME EMBODIMENTS

One example of an aspect according to an embodiment of the invention provides a method comprising:

- identifying, by parsing source text, at least one portion of the source text comprising a source attribute value having a source attribute type;
- determining an attribute class for said source attribute type; and
- determining, using a processor, if an alternative attribute type to the source attribute type

is designated for said attribute class, wherein said attribute class comprises at least said source attribute type and said alternative attribute type.

In at least one embodiment, if an alternative attribute type is determined for a said attribute class, the method further comprises :

determining an attribute value for said alternative attribute type in dependence on the source attribute value and a relationship between said source attribute type and said alternative attribute type.

10 In at least one embodiment, the determined attribute value depends on a dynamic relationship between said source attribute type and said alternative attribute type.

In at least one embodiment, said method further comprises:

causing display of a representation of said alternative attribute value having said alternative attribute type.

In at least one embodiment, the representation of said alternative attribute value having the alternative attribute type is caused to be displayed concurrently with a representation of said source text.

20

In at least one embodiment, the representation of said alternative attribute value having said alternative attribute type is included in the representation of said source text.

In at least one embodiment, the representation of said alternative attribute value having the

alternative attribute type replaces the representation of the source attribute value having the source attribute type in the representation of the source text.

In at least one embodiment, an attribute type comprises a quantifiable measurement unit and an attribute value comprises a quantifying value for that quantifiable measurement unit.

In at least one embodiment, the source text is provided by one of: a short-message-service message, a multi-media message, an email message.

In at least one embodiment, the alternative attribute type is designated by a user-specified setting as preferred a attribute type.

One example of an aspect according to an embodiment of the invention provides an apparatus comprising:

at least one processor; and

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

identify, by parsing source text, at least one portion of the source text comprising a source attribute value having a source attribute type;

determine an attribute class for said source attribute type; and

determine, using a processor, if an alternative attribute type to the source attribute type is designated for said attribute class, wherein said attribute class comprises at least said source attribute type and said alternative attribute type.

In at least one embodiment, if an alternative attribute type is determined for a said attribute class, the apparatus is further caused to:

5 determine an attribute value for said alternative attribute type in dependence on the source attribute value and a relationship between said source attribute type and said alternative attribute type.

In at least one embodiment, the determined attribute value depends on a dynamic relationship between said source attribute type and said alternative attribute type.

10 In at least one embodiment, the apparatus:

 causes display of a representation of said alternative attribute value having said alternative attribute type.

15 In at least one embodiment, the representation of said alternative attribute value having the alternative attribute type is caused to be displayed concurrently with a representation of said source text.

In at least one embodiment, the representation of said alternative attribute value having said alternative attribute type is included in the representation of said source text.

20

In at least one embodiment, the representation of said alternative attribute value having the alternative attribute type replaces the representation of the source attribute value having the source attribute type in the representation of the source text.

In at least one embodiment, an attribute type comprises a quantifiable measurement unit and an attribute value comprises a quantifying value for that quantifiable measurement unit.

In at least one embodiment, the source text is provided by one of: a short-message-service
5 message, a multi-media message, an email message.

In at least one embodiment, the alternative attribute type is designated by a user-specified setting as a preferred attribute type.

10 One example of an aspect according to an embodiment of the invention provides an apparatus comprising:

means arranged to identify, by parsing source text, at least one portion of the source text comprising a source attribute value having a source attribute type;

means arranged to determine an attribute class for said source attribute type; and

15 means arranged to determine, using processing means, if an alternative attribute type to the source attribute type is designated for said attribute class, wherein said attribute class comprises at least said source attribute type and said alternative attribute type.

One example of an aspect according to an embodiment of the invention provides a computer
20 program product comprising at least one non-transitory computer-readable storage medium having computer-executable program code portions stored therein, the computer-executable program code portions comprising program code instructions for:

identifying, by parsing source text, at least one portion of the source text comprising a source attribute value having a source attribute type;

determining an attribute class for said source attribute type; and

determining, using a processor, if an alternative attribute type to the source attribute type is designated for said attribute class, wherein said attribute class comprises at least said source attribute type and said alternative attribute type.

5

In at least one embodiment, if an alternative attribute type is determined for a said attribute class, the program code instructions are further for :

determining an attribute value for said alternative attribute type in dependence on the source attribute value and a relationship between said source attribute type and said alternative
10 attribute type.

In at least one embodiment, the determined attribute value depends on a dynamic relationship between said source attribute type and said alternative attribute type.

15 In at least one embodiment, wherein said computer code instructions are further for:

causing display of a representation of said alternative attribute value having said alternative attribute type.

In at least one embodiment, wherein the representation of said alternative attribute value having
20 the alternative attribute type is caused to be displayed concurrently with a representation of said source text.

In at least one embodiment, the representation of said alternative attribute value having said alternative attribute type is included in the representation of said source text.

In at least one embodiment, the representation of said alternative attribute value having the alternative attribute type replaces the representation of the source attribute value having the source attribute type in the representation of the source text.

5

In at least one embodiment, an attribute type comprises a quantifiable measurement unit and an attribute value comprises a quantifying value for that quantifiable measurement unit.

In at least one embodiment, the source text is provided by one of: a short-message-service
10 message, a multi-media message, an email message.

In at least one embodiment, the alternative attribute type is designated by a user-specified setting as a preferred attribute type.

One example of an aspect according to an embodiment of the invention provides a
15 communications system comprising at least one apparatus according to the above example apparatus aspect in which the determined attribute value depends on a dynamic relationship between said source attribute type and said alternative attribute type, the communications system further comprising at least one server arranged to provide to the apparatus via at least one communications network, time-varying information for use in evaluating said dynamic
20 relationship.

The above aspects and accompanying independent claims may be combined with each other and/or with one or more of the above embodiments and accompanying dependent claims in any suitable manner apparent to one of ordinary skill in the art.

BRIEF DESCRIPTION OF THE DRAWINGS

Some embodiments of the invention will now be described with reference to the accompanying drawings which are by way of example only and in which:

Figure 1A shows schematically an example of apparatus according to an example of an
5 embodiment of the invention;

Figure 1B shows schematically an enlarged view of a portion of the apparatus shown in Figure 1A;

Figure 1C shows schematically an alternative enlarged view of a portion of the apparatus shown in Figure 1A;

10 Figures 1D to 1H show other examples of apparatus according to examples of embodiments of the invention;

Figure 2 shows schematically internal components of an example of an apparatus according to an example of an embodiment of the invention;

Figure 3 shows schematically another example of internal components of apparatus according
15 to an example of an embodiment of the invention;

Figure 4 shows schematically functional components of apparatus according to an example of an embodiment of the invention;

Figure 5 shows schematically components in an example of a communication system arranged to implement an example of an embodiment of the invention.

Figures 6A, 6B, 6C and 6D show schematically an example of an apparatus implementing some examples of embodiments of the invention; and

Figure 7A, and 7B shows schematically steps in examples of methods according to examples of embodiments of the invention.

5 DESCRIPTION OF SOME EXAMPLES OF EMBODIMENTS

In the following description, for the purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of some examples of embodiments of the invention. It will be apparent to one of ordinary skill in the art, however, that other embodiments of the invention may be practiced without these specific details or with an equivalent
10 arrangement. Accordingly, the drawings and following description are intended to be regarded as illustrative examples of embodiments only. Each element shown in the accompanying Figures is intended to serve as an example only and as such, functional equivalents may exist which, for the sake of clarity and for maintaining brevity in the description, cannot necessarily be explicitly described or depicted in the drawings. Nonetheless, such features which are apparent
15 as suitable alternative structures or functional equivalents to those of ordinary and unimagined skill in the art for a depicted or described element should be considered to be implicitly disclosed herein unless explicit reference is provided to indicate their exclusion. In other instances, well-known structures and devices are shown in block diagram form in order to avoid unnecessarily obscuring the examples of embodiments of the invention.

20 Various examples of an electronic apparatus 10 comprising various examples of embodiments of the invention are described below with respect to a user of the electronic apparatus 10. In some embodiments, apparatus 10 comprises a wired and/or wireless communication device.

Figures 1A to 1H show schematically various examples of such an apparatus 10.

Examples of wireless communication devices include mobile communication devices 10a, 10d, 10e, 10f and 10g such as are shown in Figures 1A, 1D to 1G.

Examples of mobile communication devices using wireless communication networks include but
5 are not limited to mobile phones and other types of devices with communication features, such as cameras, computers, personal digital assistants or tablets. Examples of wireless communication networks include cellular networks (e.g. GSM, GPRS, CDMA, WDMA) and wireless local area (e.g. Wi-Fi, Imax) or ad-hoc or short-range radio networks (e.g. Bluetooth™) and also including point to point radio communication links (e.g. near field communications
10 (NFC). The term wireless communication device also includes other electronic devices which may use wireless communications but which are not necessarily considered mobile (for example, apparatus 10h shown in Figure 1H).

Examples of wired communication devices include devices capable of forming a connection via one or more wired communications network, for example, a local area network (Ethernet), or
15 optical network, including the public switched telephone network (PSTN), etc. etc.

As shown in Figures 1A to 1C apparatus 10 comprises a mobile communications device 10a having audio output 12, audio input 14, a display 16, and provides for user input via one or more of physical keys and/or buttons 18a, 18b and/or input sensitive regions 24 of display 16. Figure 1B shows schematically an enlarged view of the example of apparatus 10a shown in Figure 1A
20 in which display 16a comprises a touch-sensitive display. In Figure 1B, a touch input element 20 (illustrated as a user's digit or stylus) has interacted with the currently displayed screen on display 16a at a touch input region 22 to provide user input. Other examples of a touch input

element 20 include a stylus type device, which may be passive or active if it includes a user-activable feature such as switch which enables additional interaction with the touchscreen 20 of device 10a, and user-digits such as a finger, thumb, toe, tongue, a palm, hand-edge or any other suitable part of the human anatomy, and as such a touch input element may provide
5 multiple touch events on the touchscreen 16a (for example, several fingers or a finger and a thumb or the side of a hand can provide multi-touch or extended touch events).

Figure 1C shows another view of a touch screen 16a in which a plurality of soft-keys are provided as icons 24 comprising user activable menu items in a screen shown on the display 16a. In this embodiment, an icon 24 is selectable using a suitable touch gesture which
10 generates a touch input event.

As mentioned above, apparatus embodying the invention is not limited to apparatus 10a of the type shown in Figure 1A, and may comprise any electronic device configured to cause source text containing attribute information to be parsed for the purposes of providing an alternative form of the same attribute information.

15 Figure 1D to 1H show some examples of apparatus 10 comprising alternative types of devices 10d,e,f,g,h.

In Figure 1D, the example of apparatus 10 comprises device 10d which includes physical keys or buttons 18d to access certain functionality. The physical keys 18d may include so-called soft-keys whose functionality changes dynamically depending on the operational state of device
20 10d. The example of apparatus 10e shown in Figure 1E includes a physical navigation key 18e which enables navigation of a cursor (not shown) and/or the selection of control items such as application icons shown on display 16e.

Other examples of apparatus 10 include the devices 10a, 10f, and 10g shown respectively in Figures 1A, 1F and 1G. In these examples of apparatus 10, navigation and/or the selection of a control item such as icons is enabled by a user directly providing input at the desired location on respective touch-sensitive type displays 16a, 16f, and 16g. The example of apparatus 10 shown in Figure 1F as mobile communications device 10f includes physical input means such as keys 18f, as well as soft input keys 24f provided by a touch-sensitive screen 16f. Figure 1G illustrates an example of apparatus 10 comprising a tablet-style device 10g which may in use require one or two-handed operation also having a touch-sensitive screen 16g, and Figure 1H shows an example of apparatus 10 which comprises a device 10h such as a laptop or desktop PC, for which user input is provided by a physical keyboard 18h. In addition, screen 16h may also directly receive user input if it includes any touch-sensitive regions associated with menu icons 18h.

In addition to the examples shown in Figures 1A to 1H, another example of an apparatus 10 may comprise near-eye displays, for example, a head-mounted display may be provided by spectacles, or be mounted on helmets and/or visors for example, the Nokia™ Exit Pupil Expander (EPE) technology. Such displays may be used with conventional user input interfaces using wired or wireless connections.

In addition to the examples of apparatus 10 shown in Figures 1A to 1H as apparatus 10a, 10d to 10h, other examples of apparatus 10 include devices used having a user interface providing a brain-computer interface input and/or enabling three-dimensional gesture type of user input, which may be detected, for example, using cameras and/or using movement sensors. Other examples of apparatus may include appliances including a display and having wireless communications functionality. Apparatus such as domestic appliances (in particular for example,

appliances such as refrigerators and cooking appliances) having the ability to scan information labels may use the information scanned as source text according to some examples of embodiments of the invention.

Other examples of apparatus 10 according to examples of embodiments of the invention may
5 comprise chip-set type apparatus, such as that shown in Figure 2. Components such as at least one processor, at least one memory, and computer code, may configure the apparatus 10 to implement an embodiment of the invention, for example, by providing means to implement steps in a method according to an embodiment of the invention. As an example, such components may at least cause the apparatus to parse a source text to identify one or more
10 source attribute information comprising source attribute values having source attribute types and to determine, for each source attribute type so identified, whether an alternative attribute type has been designated. If so, the apparatus may be configured to generate alternative attribute information by changing the source attribute type to the alternative attribute type, and to modify the source attribute value to an alternative attribute value depending on the
15 relationship between the source attribute type and the alternative attribute type.

The examples of apparatus 10 comprising the devices 10a, 10f, 10g, and 10h shown in Figures 1A, 1F, 1G and 1H are described as having so-called touch-sensitive displays 16a, 16f, 16g, 16h respectively. Here the term "touch-sensitive displays" refers to any suitable type of display technology capable of detecting user input applied to the display surface region. Such displays
20 may comprise at least one touch-input sensor which uses resistive or capacitive technology to provide at least one region of the display which is sensitive to a touch user-input. The touch user input applied to the surface of the "touch-sensitive display" includes input which is detectable as one or more physical contact touch input events as well as input detectable as

one or more “non-physical” or “hover” input events (in which input events may be triggered by detecting just a proximity of an input element to the display without physical contact with the display).

A touch input event may be triggered by touch input from a touch input element comprising part
5 of a human body such as a finger, toe, hand, a hand or stylus or by another suitable input means. Any suitable technology can be used to implement the “touch” or “hover” sensitivity, for example, by using capacitive and/or resistive touch sensor technology. In some examples of embodiments of apparatus 10, display 16 is provided on a first side of the apparatus whereas touch-input is provided to another side of the apparatus, i.e., to the rear of the apparatus 10.

10 Moreover, although the displays 16a, 16d to 16h of the devices 10a, 10d to 10h shown in Figures 1A to 1H are two-dimensional, some examples of apparatus 10 according to embodiments of the invention may use three-dimensional displays. Both two-dimensional and three-dimensional displays may be provided with alternative user input means to the virtual and real key/button/icon style of user-input used for the embodiments of the apparatus 10 shown in
15 Figures 1A to 1H, for example, camera technology may be used to detect gestures.

Some examples of apparatus 10 may be further or instead configured to receive non-touch type input such as audio input or mental activity-related input if a suitable brain-computer interface is supported by the apparatus. In brain-computer input user interfaces, control signals are generated by mental activity and the detected signals provide input via the user interface to the
20 apparatus 10. Some examples of brain-computer input user interface technology is described in more detail below with reference to other examples of apparatus 10 shown in the Figures.

Gesture control may be also used where a user's actions are either captured via a camera of

the apparatus 10 (not shown in any illustrated examples, see later herein below) or, for example, if a three-dimensional holographic display is provided, user input can be received through gesture control through other means such as the disturbance of projected light forming the display.

- 5 The embodiments of the apparatus 10a, 10d to 10h are capable of being implemented via software, hardware, firmware or a combination thereof.

In some embodiments of the invention, the example of the apparatus 10 enabling implementation of an example of an embodiment of the invention comprises a sub-set of the components of apparatus 10. For example, Figure 2 shows schematically an example of an
10 electronic chip set 26 which also may form an apparatus 10 in one embodiment of the invention. Chip set 26 may be configured and/or programmed to provide an example of a method according to one or more examples of embodiments of the invention described later herein below and includes, for instance, suitable processor and memory components such as those known to persons of ordinary skill in the art. Apparatus 10 whether provided as a device 10a,
15 10d to 10h or chip set 26, or a portion thereof, thus comprises a means for performing one or more steps of a method according to an embodiment of the invention.

The example of chip set 26 shown schematically in Figure 2 includes a suitable communication mechanism such as a bus 28 for passing information among the components of the chip set 26. At least one processor 30 is provided, and this has connectivity to the bus 28 to execute
20 instructions and process information stored in, for example, a memory 36. A processor 30 may include one or more processing cores with each core configured to perform independently, so that a multi-core processor enables multiprocessing within a single physical chip set.

Alternatively or in addition, the processor 30 may include one or more microprocessors configured in tandem via the bus 28 to enable independent execution of instructions, pipelining, and multithreading.

In the example shown in Figure 2 the chip-set 26 includes specialized components 32, 34 which
5 perform certain processing functions and tasks, however, in other embodiments, these functions and tasks may be performed by processor 30. As shown in Figure 2, the specialized components comprise one or more digital signal processors (DSP) 32 and one or more application-specific integrated circuits (ASIC) 34. A DSP 32 typically is configured to process real-world signals (e.g., sound) in real time independently of the processor 30. ASIC 34 may be
10 configured to performed specialized functions not easily performed by a general purpose processor. Other specialized components which may in some embodiments of the invention also be provided to aid in performing the functions described herein including one or more field programmable gate arrays (FPGA) (not shown), one or more controllers (not shown), or one or more other special-purpose computer chips.

15 In the example chip set 26 shown in Figure 2, the processor 30 and accompanying components 32, 34 have connectivity to at least one type of memory 36 via the bus 28. The memory 36 may be implemented by a dynamic memory (e.g., RAM, magnetic disk, writable optical disk, etc.) and/or static memory (e.g., ROM, CD-ROM, etc.) and is arranged to store executable instructions that when executed perform the steps of any method embodiments of the invention
20 described herein. The memory 36 may also store the attribute class type data and/or attribute type identification data and/or any other data associated with or generated by the execution of the inventive steps.

FIG. 3 is a schematic diagram showing some internal components of an example of apparatus 10 comprising a wireless communications device, such as the wireless communications devices 10a, 10d to 10h of depicted in Figures 1A, and 1D to 1H.

In some embodiments, the wireless communications apparatus 10 shown in Figure 3, or a portion thereof such as the chipset 26 shown in Figure 2, comprise means for performing one or more steps in a method embodiment of the invention.

As shown in Figure 3, at least some examples of wireless communications devices 10a, 10d, 10e, 10f, 10g, and 10h comprise a radio receiver 38 which is now described in terms of front-end and back-end characteristics. The front-end of the receiver 38 encompasses all of the Radio Frequency (RF) circuitry whereas the back-end encompasses all of the base-band processing circuitry. As used in this application, the term 'circuitry' refers to all of the following: (a) hardware-only circuit implementations (such as implementations in only analog and/or digital circuitry) and (b) to combinations of circuits and software (and/or firmware), such as (as applicable): (i) to a combination of processor(s) or (ii) to portions of processor(s)/software (including digital signal processor(s)), software, and memory(ies) that work together to cause an apparatus, such as a mobile phone or server, to perform various functions) and (c) to circuits, such as a microprocessor(s) or a portion of a microprocessor(s), that require software or firmware for operation, even if the software or firmware is not physically present.

This definition of 'circuitry' applies to all uses of this term in this application, including in any claims. As a further example, as used in this application, the term "circuitry" would also cover an implementation of merely a processor (or multiple processors) or portion of a processor and its (or their) accompanying software and/or firmware. The term "circuitry" would also cover, for

example and if applicable to the particular claim element, a baseband integrated circuit or applications processor integrated circuit for a mobile phone or a similar integrated circuit in server, a cellular network device, or other network device.

Other internal components of the example of apparatus 10 shown in Figure 3 include a Main Control Unit (MCU) 44, a Digital Signal Processor (DSP) 46, and an audio input/output component 48 comprising a receiver/transmitter unit including suitable microphone/speaker gain control components.

The user interface (UI) components of the apparatus 10 shown in Figure 3 includes suitable UI output components such as a display component 56 for configuring a display. Display component 56 includes display circuitry configured to cause display of at least a portion of a user interface and is also capable of causing representations of source text to be displayed. Additionally, the display and display circuitry are configured to facilitate user control of at least some functions of the wireless communications devices 10a, 10d, 10e, 10f, 10g, and 10h.

The audio component 48 of the wireless communications device 10a, 10d, 10e, 10f, 10g, and 10h comprises audio function circuitry for the input and output of audio, for example, a microphone and microphone amplifier that amplifies the speech signal output from the microphone. The amplified speech signal output from the microphone is fed to a coder/decoder (CODEC) before being passed to DSP component 46.

The wireless communications devices 10a, 10d, 10e, 10f, 10g, and 10h use the radio signal receiver/transmitter component 38 for performing radio communications. Radio receiver/transmitter 38 includes components arranged to amplify the power of radio signals generated by apparatus 10 and components to perform frequency modulation for

communications via a mobile communication system (not shown) for example, via a suitable form of radio signal antenna 40. Other components of the receiver/transmitter 56 which not shown in Figure 3 include a power amplifier (PA) and transmitter/modulation circuitry (which can be operationally responsive to the MCU 44 in some embodiments, MCI 44 is described in more detail later). The output from the PA component may be provided to the antenna 72 via a suitable duplexer/ circulator/antenna switch as known in the art. For mobile wireless communications devices 10a, 10d,e,f,g, the radio component 38 is suitable coupled to a power control unit 42 which includes a battery interface (not shown in Figure 3).

When in use for voice communications, a user of a wireless communications device 10a, 10d, 10e, 10f, 10g, and 10h speaks into a microphone and his or her voice along with any detected background noise is converted into an analog voltage. The analog voltage is then converted into a digital signal through an Analog to Digital Converter (ADC). The digital signal into the DSP 46 for processing therein, such as speech encoding, channel encoding, encrypting, and interleaving. In one embodiment, the processed voice signals are encoded, by units not separately shown, using a cellular transmission protocol such as global evolution (EDGE), general packet radio service (GPRS), global system for mobile communications (GSM), Internet protocol multimedia subsystem (IMS), universal mobile telecommunications system (UMTS), etc., as well as any other suitable wireless medium, e.g., microwave access (WiMAX), Long Term Evolution (LTE) networks, code division multiple access (CDMA), wideband code division multiple access (WCDMA), wireless fidelity (WiFi), satellite, and the like. Such units may also enable data communications to be provided over suitable wireless communication data networks. Alternatively, such communications may be separately handled by MCU 44 and passed to the radio receiver/transmitter 38 for data transmission over a wireless

communications network.

The encoded signals may be processed to compensate for any frequency-dependent impairments that occur during transmission through the air such as phase and amplitude distortion. After equalizing the bit stream, a modulator in the radio component 38 combines the received signal with a RF signal and the signal then converted to the desired frequency for transmission, amplified to an appropriate power level, for example, by a power amplifier . The signal is then transmitted via wireless via antenna 40 to a local base station (not shown), which can then forward the received wireless signals onwards to their destination over one or more communications networks using appropriate wired and/or wireless communications protocol(s).

In the examples of wireless mobile communications devices 10a, 10d, 10e, 10f, and 10g voice and data signals are received via the antenna 40 and processed to provide a digital bit stream to DSP 46. If the signal received comprises audio data, the signal is forwarded as an audio data signal to the audio component 48 where a Digital to Analog Converter (DAC) converts the signal so that audio output is transmitted through a speaker (or earphone(s) of a headset attached to apparatus 10). Non-audio data signals received may be forwarded to an appropriate memory for storage after being processed internally by the processing components, which may be controlled by the Main Control Unit (MCU) 44.

Various of the components shown in Figure 3 may be controlled by the Main Control Unit (MCU) 44. MCU 44 may be implemented as a Central Processing Unit (CPU) in some embodiments of the invention which provides data processing functions for applications running in the foreground of the wireless communications device 10a, 10d, 10e, 10f, 10g, and 10h, (such as, for example, applications launched directly when triggering events comprising touch user input

are detected by the user interface component 54) and/or for applications running in the background. Accordingly, MCU 44 may be responsive to various input signals including user input signals from a user interface input component 54 comprising a touch-sensitive display of a wireless communications device 10a,d,e,f,g,h.

5 As mentioned above, one or more types of user interface input component 54 may be provided. The wireless communications device 10h includes a keyboard user interface component 54. The wireless communication device 10a includes a touch-sensitive screen capable of displaying a virtual keyboard providing user input when a touch sensitive region 22 of the display 16a detects a touch input event. Some other types of input components include, for example, voice
10 input, brain-wave input, and also physical inputs from button(s) or key(s), dial(s), lever(s), roller(s), trackball(s), mice, switch(s) or the like. Where a device is arranged to project a three-dimensional display, then the input component 54 may receive input derived from three-dimensional gestures interacting with the display. In some embodiments, the wireless communications devices 10a, 10d, 10e, 10f, 10g, and 10h may be configured to support more
15 than one type of input.

In some examples of apparatus 10 which are configured to receive input generated by mental activity, such as if the input component 54 shown in Figure 3 comprises a brain-computer user interface, the input component 54 may include or require a specific receiver component for detecting certain types of mental activity by a user of the device as input.

20 Such mental activity generates one or more detectable signal components which if associated with input events, can cause commands to be executed by the apparatus. Such alternative types of brain-computer input components are known in the art, for example, see the early

overview entitled Brain-computer interfaces for communication and control by Wolpaw et al, in Clinical Neurophysiology 113 (2002), 767-791, and more recently the implemented brainwave input component which work with devices such as emotive neurosets which are worn by the user. An example of such a brainwave input component is provided, for example, by Tilvus who
5 provide a brain-computer interface (BCI) switch to enable commands and text input to be provided by a user wearing an Emotiv EPOC neuroheadset which is used with their "Cognitiv Suite" software to read the user's brain waves as input for their Tilvus Assistive interface. Similarly, three-dimensional input components known in the art, include, for example, the systems described in Dhawale, P., M. Massoodian, and Rogers B., (2006), Bare-hand 3D
10 gesture input into interactive systems, CHINZ'06: Proceedings of the 6th ACM SIGCHI New Zealand's chapter's international conference on Computer-human interaction, New York, NY, USA, ACM Press, pp. 25-32.

The input component 54 and the MCU 44 in combination with other user interface components (such as, for example, an audio input component (e.g. a microphone)) comprise user interface
15 circuitry for managing user input. MCU 44 may run user interface software to facilitate user control of at least some functions of the apparatus 10 to implement an embodiment of the invention. The MCU 44 may also deliver any display commands and any switch commands to the display 56 and to the speech output switching controller, respectively. Further, the MCU 44 may exchange information with the DSP 46 and can access an optionally incorporated SIM card
20 52 and at least one form of memory 50. Examples of memory 50 include, but are not limited to, flash memory, CD, DVD, ROM, RAM, EEPROM, optical storage, or any other non-volatile storage medium capable of storing digital data. Additional memory components may be provided in a removable form. In addition, the MCU 44 executes various control functions

required of the apparatus 10. The at least one form of memory 50 is arranged to store various data including application related data for applications running on apparatus 10, call incoming tone data and is capable of storing other types of data, for example downloaded content data such as music data files received, for example, the Internet.

5 As shown in Figure 3, in at least some example embodiments, at least one SIM card 52 is provided (which is removable in some embodiments of the invention). As mentioned above, SIM 52 serves primarily to identify the apparatus 10 in a wireless communications network. Secure memory may be provided on the SIM card 52 for storing secure information and in some embodiments, the SIM card 52 contains additional memory for storing a user inputted
10 information, such as, for example, contact information (e.g. address and contact number), content such as video and/or audio and or text data, including emails and short message server (SMS) messages and multi-media messaging service (MMS) messages and some or all user specific mobile terminal settings. In some embodiments of wireless communications devices 10a, 10d, 10e, 10f, 10g, and 10h, the SIM functionality may be integrated into another
15 component or otherwise provided as a virtual SIM.

Software provided on the apparatus 10 may reside in RAM memory, flash memory, registers, or any other form of writable storage medium known in the art.

Figure 4 shows schematically in block form some functionality implemented by software comprising an example of a computer program product 58 executed on apparatus 10 to
20 implement a method according to an embodiment of the invention. The computer program product 58 includes at least one non-transitory computer-readable storage medium having computer-executable program code portions stored therein, the computer-executable program

code portions comprising program code instructions for implementing the operations of an embodiment of the invention. Examples of a method according to an embodiment of the invention which the operations of computer program product 58 may implement include, for example, the method shown schematically in Figures 7A, 7B, and Figure 8 and in the accompanying method claims. Those of ordinary skill in the art will be aware that the functional blocks shown are by way of example only and that the software may be alternatively depicted using different functional blocks.

As shown in Figure 4, a source text which is provided as input 60b to the computer program product 58 is parsed by a text parser 66. The text parser seeks to identify one or more text portions of the source text with a reference data source comprising known attribute type identification data 68. If an attribute type is identified, the attribute class into which that attribute type belongs is determined by referring to a suitable data source comprising attribute class related data 64. Attribute class related data 64 includes data records which associate classes of attribute types with an alternative attribute type, which may be designated as a preference selection, for example, by providing data as preference settings input 60a. Preference settings input 60a may be manually provided or it may be pulled from other settings for the device and/or applications running on the device.

The text parser 66 comprises any suitable form of text parser capable of identifying, by the parsing of the source text, attribute information comprising one or more attribute types and attribute values for each attribute type represented by portions of the source text.

In some embodiments the source text is received by apparatus 10 in a pre-formatted form, for example, from a source remote from the apparatus 10 such as another device 67 or server 69

(see Figure 5), as opposed to being formed from information previously entered by a user of the apparatus 10 or otherwise received by the device. Examples of source text include, for example, not just communications network delivered messages, such as a short messaging system messages (SMS messages), or multi-media system messages (MSMs), web-pages, files, but
5 also text content determined by processing images (e.g. using optical character recognition) or by otherwise recognizing glyphs) taken using a camera, or text derived by processing information scanned from radio frequency identification (RFID) tags.

Text communications are usually made available for display to a user of the apparatus 10 by an appropriate communications application running on the apparatus. In some embodiments, the
10 source text may be parsed to identify attribute values and/or attribute types prior to the source text being made available for access by and/or forwarded to a communications application. Alternatively, the source text may be duplicated and one duplicate version processed in parallel to the version forwarded to the communications application used to display a representation of the source text to a user of apparatus 10. In some embodiments, the communications
15 application is first launched to view the source text, and only when the source text is opened within the communications application is computer program 58 triggered to parse the source text for possible attribute information.

If a representation of an attribute type is identified by the parsing process, and an alternative attribute type has been designated for the attribute class of the attribute type, only the text
20 portions of the source text comprising the attribute value and/or attribute type modified to have an alternative attribute information form are provided as output 70. The output 70 may then be used to generate a representation of the alternative attribute information when displaying a representation of the source text. The alternative attribute information includes a modified

attribute value which is determined by the relationship between the first, source-text, attribute type and the second, alternative, attribute type and the source-text attribute value of the first, source-text attribute type. The attribute class related data includes the attribute class of the source-text attribute type for which an alternative attribute type is known and also data

5 indicating the relationship between the source and alternative attribute types, which may be static or dynamic. The data record for an attribute class/attribute type accordingly may indicate how a formula or query operation is to be performed to determine alternative attribute value for a source text attribute value in some embodiments of the invention.

Table 1 shows an example of an attribute class having a dynamic relationship between a source

10 attribute type and a designated alternative attribute type comprising a currency attribute class. Some examples of the many different attribute type members of the currency attribute class are shown in Table 1. Using the attribute class data record shown in Table 1, a source text including a "\$" attribute type, which when parsed is identified as including the "\$" as a "dollar" attribute type, can be determined by reference to the attribute class related data as being in the

15 currency unit attribute class. This attribute class has here the alternative attribute type "£" designated for all of its members (only three examples, rupees, dollars, and pounds sterling are shown below). Each attribute type is related to the alternative attribute type by a dynamic relationship which is retrieved in this case remotely from an exchange server.

ATTRIBUTE CLASS	ATTRIBUTE TYPE	ALTERNATIVE ATTRIBUTE TYPE	ATTRIBUTE TYPE RELATIONSHIP
CURRENCY UNIT	RUPEES	POUNDS STERLING	RETRIEVE FROM EXCHANGE SERVER
CURRENCY UNIT	DOLLAR	POUNDS STERLING	RETRIEVE FROM EXCHANGE SERVER

CURRENCY UNIT	EUROS	POUNDS STERLING	RETRIEVE FROM EXCHANGE SERVER
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Table 1 – Currency attribute type conversion

In Table 1 the preferred attribute type unit for all currency information items to be converted to is pounds sterling, which is represented when displaying the alternative attribute values with the currency symbol attribute type “£”.

- 5 Such a type of data record enables an apparatus 10 to show an amount of money expressed in a source text in an unfamiliar currency in to be provided in an alternative currency, for example, so that when viewing the source text the more familiar currency value is also capable of being viewed concurrently. If the alternative currency unit is one which seeks to indicate a user-preference currency, the user of the apparatus who is viewing the source text may find the
- 10 representation of the equivalent sum of money expressed using the alternative currency more understandable in terms of what the amount means to them personally.

Figure 5 shows schematically an embodiment of apparatus 10 which may be configured to query a remote server 69 to obtain the latest exchange rate between the source attribute type as provided in the source item (for example, US dollars, e.g. (\$)) and the alternative attribute

15 type (for example, UK pounds (£)).

More generally, Figure 5 shows schematically an embodiment of a communications system according to the invention in which apparatus 10 provides dynamically adjusted alternative attribute values which determined from data retrieved from any suitable server 69 via communications network 71 as alternative attribute information. Also as shown in Figure 5, the

20 communications system may optionally extend to apparatus 10 communicating with another

device 67 either via the communications network 71 or directly by establishing a direct wired or wireless communications link, for example, a wireless short-range radio link such as that provided using a near field communications (NFC) type of communications protocol or using a Wi-Fi direct communications link or the like.

- 5 The operation to convert the source attribute value to the alternative attribute value in some embodiments comprises a mathematical function depending on the relationship between the source attribute type and the alternative attribute type. Examples of embodiments in which attribute values are determined using fixed values or in which attribute values depend on a static relationship between the source text and alternative attribute types include attribute values
- 10 associated with attribute types in attribute classes for measurement units, such as, for example, attribute classes comprising attribute types quantifying measures of: volume, liquid amount, temperature, length, weight, depth, height, size, clothing or footwear sizes (e.g. dress size, shirt collar size, etc.), pressure, depth, etc.

In some embodiments, instead of an explicit alternative attribute type being designated as

15 “meters”, a more flexible designation such as “metric” may be designated collectively for a plurality of attribute classes. Once the alternative attribute value and attribute type have been determined, in some embodiments, the output 70 enables a representation of the alternative attribute value and alternative attribute type to be displayed with the source text. In some embodiments, the representation(s) of alternative attribute value(s) and attribute type(s) replace

20 displayed representations of the source attribute value(s) and source attribute type(s) in the source text.

So, for example, if an apparatus 10 receives a communications message such as an SMS or

email which comprises in its body the source text "This horse is 15 hands", the source attribute value is "15" and the source attribute type is "hands". The text parser 66 identifies "hands" as matching a known attribute type in the attribute class for height measurement units. In one embodiment, an alternative attribute for the attribute class of height measurement units has been designated as "meters high". Having identified that "meters high" comprises an alternative attribute type has been designated for the height attribute class of the "hands" attribute type, the attribute value 15 of the source attribute type is converted to an alternative attribute value, for example, the value 1.54 of the alternative attribute type "meters high". In this embodiment, the output 70 of computer product 58 comprises at least a textual representation of the alternative attribute value and attribute type "The horse is 1.54 meters high".

Figures 6A to 6C show examples of embodiments where apparatus 10 comprises a mobile communications device 75. The communications device 75 has received a SMS communications message 72a, 72b, and 72d which includes the source text "The valuation is \$250,000" (see Figures 6A and 6B). The source text is provided as input 60b to the computer product application 58, which causes the source text to be parsed.

In at least one example embodiment as shown in Figure 6A, by parsing the source text, the text portion comprising the 250,000 is determined to be a source attribute having the attribute type "\$" where the text portion comprising the "\$" symbol is identified as a source text attribute type. In at least one example embodiment, the source text attribute type is then determined to be a currency attribute class attribute type, and in this example "£" has been indicated as a user-preferred currency for all attribute types in the currency attribute class. In at least one example embodiment, by performing a dynamic look-up operation with an exchange server to determining the current exchange rate between the source text currency attribute type "\$" and

the preferred currency attribute type “£”, the alternative attribute information comprising the attribute value “150,000” and a representation for the alternative attribute type “£” are determined. The alternative attribute is then caused to be displayed on the mobile communications device 75.

5 As shown in Figure 6A, an alternative communications message 74a which includes the source text but with the original attribute information replaced by the alternative attribute information is caused to be displayed together with the original full version of the communications message 72a providing the source text. In Figure 6C, an alternative communications message 74c is shown which includes the source text but without the original attribute information, also referred
10 to herein as the source text non-attribute information. As shown in message 74c, however, included with the body of text comprising the source text non-attribute information, is the alternative attribute information. This message 74c, in which the source text version of the attribute information has been replaced by the alternative attribute information is caused to be displayed instead of the original version of the communications message 72b comprising the
15 source text shown in Figure 6B.

In at least one embodiment, as shown in the example depicted in Figure 6B, a communications message 72b is displayed with its original attribute information modified to provide with an interactive command element 76b so that by activating the command, the screen displayed transitions to that shown in Figure 6C.

20 In at least one embodiment, as shown in the example of an alternative message 74c shown in Figure 6C, the alternative attribute information may be provided with an interactive command element 78c. Activating this command causes the screen to transition to the original source text

version of the message, as shown, for example, in Figure 6B.

Many possible examples of attribute types can thus be converted to an alternative or user-preferred attribute type according to embodiments of the invention. For example, if the source

text included the phrase "The temperature is going to be 90°F", then the text portion(s) "90°F"

5 could comprises the source attribute type "°F" which is in the temperature unit attribute class,

and the attribute value "90". This information in the source text can be converted to the

alternative attribute value "32.2" having the attribute type "°C", and caused to be displayed in a

suitable way. One suitable way may be to modify the representation of the source text displayed to append the alternative attribute information adjacent to the source attribute

10 information, for example, to modify the source text to "The temperature is going to be 90°F

(32.2°C)".

Figure 6D shows another example of an embodiment of the invention in which message 72d comprises the same source text as shown in Figure 6A. In this example, the original source text message 72d includes various attribute information, and the text message 74d which includes

15 alternative attribute information is caused to be displayed concurrently with the source text

message 72d. In this embodiment, the alternative attribute information includes a dynamic attribute type conversion (in this example, between the \$ and £ currency attribute types). Accordingly, additional attribute conversion information may be caused to be displayed to clarify how the attribute information was converted to the alternative attribute value. This may be represented as additional attribute information. In the example of an embodiment of the invention shown in Figure 6D, in addition to the alternative attribute information comprising the different currency value and currency type designation represented in the message shown as 74d, a visual indication is also provided of the relationship between the source currency attribute type and the alternative currency attribute type which was used to convert the source text attribute information.

Although the embodiments described herein above have been described in relation to source text comprising Latin-American alphanumeric text characters, other embodiments of the invention provide attribute conversion for non-Latin texts, including pictorial types of text. Attribute information described as comprising attribute values having attribute types which are identifiable by one or more "keywords", may, in some embodiments, include "keywords" comprising symbols, or a sequence of one or more alpha-numeric characters. As an example, a symbol used in a source text may comprise an attribute value having an attribute type for which an alternative symbol or expression exists. Some examples include fractions, e , π , surds, etc, which may also be provided as numeric expressions in a number base (e.g. a binary, decimal number base). The attribute information comprised by the one or more identified

attribute keyword text portions of the source text is accordingly altered to have the alternative form.

Other embodiments of the invention may use other ways of displaying and/or indicating converted information items and convertible information items. For example, pop-up windows
5 may be provided, or a drop-down box used, to show the original and/or converted information item, as are known in the art.

Figures 7A and 7B show steps in some examples of methods according to some embodiments of the invention. Not shown in the examples of Figures 7A and 7B are the known functions performed by apparatus 10 to input source text to application 58 for parsing, which may differ for
10 different text sources.

Figure 7A is an example of a method which may cause display of a screen such as is shown in Figure 6A, whereas the method shown in Figure 7B is an example of a method which may provide the displays shown in Figures 6B and 6C.

As shown in Figure 7A, source text is analyzed to identify, by parsing, if the source text includes
15 any text portions comprising attribute information (step 80). An attribute information text portion may be formed of a sequence of one or more letters, numbers, symbols, including non-Latin text symbols and/or scientific symbols. The recognition of what text portion(s) represent an attribute type and/or attribute value may be performed by a look-up operation with regard to finding a match for the text portion being parsed with an attribute type of a stored set of possible attribute
20 types (for example, the set of attribute types held in an data store of attribute identifier data such as is shown schematically in functional block form in Figure 4). If a match is found, this identifies that portion of the text at least as comprising an attribute type. In some examples of

embodiments of the invention, a similar operation may be performed to identify any attribute values. In some embodiments, instead of first identifying an attribute type and then an attribute value, an attribute value may be first identified and then its attribute type identified.

Once a portion of the parsed text has been identified as an attribute type, the identified attribute
5 type is mapped to an attribute class data record which may or may not include an alternative attribute type for the source attribute type (step 82). An alternative attribute value is then determined for the alternative attribute type (step 84) from source text attribute value and the relationship between the source text attribute type and the alternative attribute type.

In some embodiments a form of artificial intelligence and/or prediction means provided by a
10 suitable semantically-aware text engine may be provided on and/or off the apparatus 10. This enables non-explicit attribute types to be identified from the context of a source text in some embodiments of the invention, which may be used to determine then an alternative attribute value having a different implicitly attribute type context.

Once the relationship between the source attribute type and the alternative attribute type for
15 converting the source attribute value to the alternative attribute value is known and the alternative attribute value determined, the source text portion(s) not comprising the attribute information (also referred to herein as the source text non-attribute information) is(are) displayed with the alternative attribute information text portions (step 86). In some
embodiments, a representation of the alternative attribute text is displayed concurrently with the
20 source text (see, for example, Figures 6A, 6D).

In Figure 7B source text is input from a received a text message is received (step 88), and is analyzed by parsing the source text to identify one or more text portions of the source text

comprising attribute information (step 90). The source attribute type is associated with an alternative, preferred attribute type (step 92). Steps 94 and 96 are equivalent steps to steps 80 and 82 shown in Figure 7A, and as these have been discussed in some detail in the context of the embodiment shown in Figure 7A, no further detailed discussion of these steps will take place with regards to the embodiment shown Figure 7B.

In Figure 7B, after the attribute type of the source text attribute information has been identified, a command is generated to enable the attribute type to be associated with an attribute class (94). This command is then displayed with the original attribute information and source text (step 96). This command can be subsequently activated at any time when viewing a representation of the source text (step 98) and may comprise, for example, a tag or other user activable indication that the attribute information in the source text has been associated with the command.

As examples, the attribute information may be high-lighted, colored differently, or have a different font type or size, and/or have another font attribute, such as underlining, applied to the text portions representing the attribute information in the source text. When an input trigger event is detected for the command, the alternative attribute information is generated using the attribute class data (step 100), and an representation of the alternative attribute is then displayed (step 102).

Optionally, in some embodiments of the invention, the command and/or alternative attribute information can be saved in association with the source text.

For example, consider if the source text is stored on the apparatus 10 and viewed at some subsequent point in time again. In this case, activating the command (step 98) to cause the

display of the alternative attribute information comprising the alternative attribute type and the alternative attribute value will cause the current alternative attribute value to be determined at the point in time when the command is executed when a dynamic attribute type relationship applies.

- 5 More generally, whilst the above embodiments have described attribute information in the form of attribute values and attribute types, in some embodiments attribute information may comprise attribute values which intrinsically have an attribute type.

In some embodiments, an alternative attribute type may be designated by a user in an attribute settings menu, but alternatively, the alternative attribute type may be derived from other data on
10 the apparatus. In either case, the alternative attribute types for some groups of attribute classes may be individually determined from settings applied to the group of attribute classes. For example, one or more groups of distance and/or height and/or weight attribute classes may be set to use “metric” or “Imperial” attribute types.

In some embodiments, the attribute class data and attribute type identification data may be
15 stored in the same physical or logical data store or data record type structure, for use by the parser component and any attribute value determining components.

In some instances, it is possible that new attribute types may be provided by a user for an attribute class in addition to the user designating a preferred alternative attribute type for an attribute class. This input manually extends the type of attribute information which is convertible
20 to an alternative, preferred form.

In the above embodiments, whilst attribute class-related data and attribute identification data has been described as stored on the apparatus, in some embodiments, the data is stored on a

server instead. This information can be used to update the information type identifier data store.

In some embodiments, attribute information comprising a numeric value and measurement unit which is provided in a source text in a first context or format can be indicated in an alternative way, such as by changing the measurement unit and associated numerical value, by changing
5 the context determining the attribute type, or by changing the representational format of the numerical attribute value. In this way, in some embodiments of the invention which parse a source text including as attribute information a numerical expression such as, for example, a first numeric value and first measurement unit, the alternative attribute information comprises a second numeric value and second measurement unit, where the relationship between the first
10 and second measurement units and the first numeric value determines the second numeric value.

Many different types of attribute types and attribute classes are possible, for example, attribute classes comprising a plurality of quantifiable attribute types include, for example, angle, area, currency, data size, data rate, energy, flow (volume), force, fuel consumption, length, power,
15 pressure, radioactivity, speed, temperature, calendar date, time, torque, typography, volume, weight (mass), luminance, illuminance. Whilst in no way exhaustive, to provide an additional indication of the huge range of possible attribute classes, some attributes which are known to have a plurality of alternative attribute types as measurement units and/or equivalent ways of being expressed include: Numerals such as Roman numerals (e.g. I, V, L, M) may be
20 represented alternatively in Arabic form (e.g. 1, 5, 50, 1000), Frequency, Paper size (A4, vs. size in mm/cm etc.), TV & monitor size (inches(“) vs. cm for example) , Body mass index (BMI), Motion (speed, acceleration etc.) , Shoe size (which is expressed in a different value depending on manufacturing/marketing region), Clothes: dress and suit, density, kinematic viscosity,

dynamic viscosity, bandwidth, data storage, electricity, capacitance, electric charge, electric current, electric potential, electrical conductance, electrical resistance, inductance, fuel consumption, flow rate, mass flow rate, volumetric flow rate, magnetism, magnetic field, magnetic field strength, magnetic flux, magneto motive force, photometry, radioactivity, equivalent dose, radioactive decay, absorbed dose. In addition to more well-known types of attribute, scientific and medical information items may also have very specialized attribute types and value formats. As an example, , so , for example, a color can be indicated in terms of Red = #FF0000 = RGB (255, 0, 0) = CMYK (0, 99, 100, 0) = HSB (0, 100, 100) = LAB (54, 81, 70).

Information conversion to the appropriate measurement unit for medical communications is also complicated by the way certain measurements may differ not just in terms of the units but the characteristics used. When a doctor is receiving communications from a number of patients reporting their condition on their mobile devices, depending on the type of technology that each patient is using, they may report their condition differently, and it is helpful for medical practitioners to have access to such information in a consistent form for all patients at a glance.

As an example, the international standard for measuring blood glucose levels uses a molar concentration, measured in mmol/L (millimoles per litre; or millimolar, abbreviated mM). However, in the United States, mass concentration is measured in mg/dL (milligrams per decilitre). The difference between the two scales is a factor of 18, so that 1 mmol/L of glucose is equivalent to 18 mg/dL. In addition, some diabetes is measured using a whole-blood glucose level, whereas sometimes it is measured as serum/plasma levels, where to convert from whole-blood glucose, multiplication by 1.15 has been shown to generally give the serum/plasma level. Thus, in addition to the whole-blood preference or serum/plasma preference, a user may also have a preference for seeing glucose levels in either mmol/L or mg/dL.

Quantity measurements of such attribute classes can be expressed in a number of different ways.

In addition, the attribute values comprising quantifiable values for such attributes may have a number of different formats, depending in part on the attribute type of the information, for example, a quantifiable information value may have one of: a numeric format, a date format, a time format, a scalar format, a vector format, or an array format having a dimension of at least one. A two-dimensional array format is also known as a matrix, and as such, some matrix values can be expressed in a preferred form using eigenvectors and eigenvalues for example. Numerical values may be expressed as surds, or rounded to a certain number of decimal places, or presented in different numerical base forms such as binary, decimal, hexadecimal. Numbers themselves can be expressed in alternative forms such as for example, using Roman or Arabic numerals.

Other information types for which a user may wish to view in a preferred form include the date which in different cultures may have a different value in the calendar used. For example, Lunar calendar, Solar calendar, or Gregorian, Mayan, or other types of calendars which may be based on religious or regional preferences, for example, in the Lunar calendar 11th November 2012 is equivalent to 23rd December 2012.

In some embodiments, instead or in addition to attribute value conversion using attribute type preferences which are predetermined, a user may be presented when viewing a source text using an application with a drop-down menu in the application providing options to convert certain text portions to an alternative form. In addition, the user may be able to view possible candidate alternative attribute types if no alternative attribute type has been designated for a

particular attribute class to which an attribute type which exists in the source text belongs.

Accordingly, in one embodiment, a command to enable a user to interact with a portion of the source text (for example, by activating a tag associated with the identified attribute information) causes a drop-down type menu to appear in which possible alternative conversions of the attribute information provided in the source text are listed. In this way, attribute information conversion preferences may be expressed dynamically by a user when they are viewing the source text without another application being required to locate a source of attribute conversion data and/or having to manually enter the attribute information for conversion.

In some embodiments, a mobile communications device is suitably configured to implement an embodiment of the invention to extract alternative attribute types from one or more user-specified settings for the apparatus. For example, a device may be configured to store the nationality of the user and/or the language to be used for input and/or display, and the preferred date and time format (i.e., it may indicate if a 12hour expression of time is preferred instead of a 24 hour time expression). If an input language is associated with a state which uses metric measurement units, then this might be used to configure the alternative attributes as to use metric units, on the basis that these may be preferred by a user.

While the invention has been described in connection with a number of embodiments and implementations, the invention is not so limited but covers various obvious modifications and equivalent arrangements, which fall within the purview of the appended claims. Although features of the invention are expressed in certain combinations among the claims, it is contemplated that these features can be arranged in any combination and order.

WHAT IS CLAIMED IS:

1. A method comprising:
identifying, by parsing source text, at least one portion of the source text comprising a source attribute value having a source attribute type;
5 determining an attribute class for said source attribute type; and
determining, using a processor, if an alternative attribute type to the source attribute type is designated for said attribute class, wherein said attribute class comprises at least said source attribute type and said alternative attribute type.
- 10 2. A method as claimed in claim 1, wherein, if an alternative attribute type is determined for a said attribute class, the method further comprises :
determining an attribute value for said alternative attribute type in dependence on the source attribute value and a relationship between said source attribute type and said alternative attribute type.
- 15 3. A method as claimed in claim 2, wherein the determined attribute value depends on a dynamic relationship between said source attribute type and said alternative attribute type.
4. A method as claimed in any previous claim, wherein said method further comprises:
20 causing display of a representation of said alternative attribute value having said alternative attribute type.
5. A method as claimed in claim 4, wherein the representation of said alternative attribute

value having the alternative attribute type is caused to be displayed concurrently with a representation of said source text.

6. A method as claimed in claim 5, wherein the representation of said alternative attribute value having said alternative attribute type is included in the representation of said source text.

7. A method as claimed in claim 5, wherein the representation of said alternative attribute value having the alternative attribute type replaces the representation of the source attribute value having the source attribute type in the representation of the source text.

10

8. A method as claimed in any previous claim, wherein an attribute type comprises a quantifiable measurement unit and an attribute value comprises a quantifying value for that quantifiable measurement unit.

15 9. A method as claimed in any previous claim, wherein the source text is provided by one of: a short-message-service message, a multi-media message, an email message.

10. A method as claimed in any previous claim, wherein the alternative attribute type is designated by a user-specified setting as preferred a attribute type.

20

11. An apparatus comprising:
at least one processor; and
at least one memory including computer program code, the at least one memory and computer program code being configured to, with the at least one processor, cause the

apparatus to at least:

identify, by parsing source text, at least one portion of the source text comprising a source attribute value having a source attribute type;

determine an attribute class for said source attribute type; and

5 determine, using a processor, if an alternative attribute type to the source attribute type is designated for said attribute class, wherein said attribute class comprises at least said source attribute type and said alternative attribute type.

12. Apparatus as claimed in claim 11, wherein, if an alternative attribute type is determined
10 for a said attribute class, the apparatus is further caused to:

 determine an attribute value for said alternative attribute type in dependence on the source attribute value and a relationship between said source attribute type and said alternative attribute type.

15 13. Apparatus as claimed in claim 12, wherein the determined attribute value depends on a dynamic relationship between said source attribute type and said alternative attribute type.

14. Apparatus as claimed in any previous claim, wherein said apparatus:

 causes display of a representation of said alternative attribute value having said
20 alternative attribute type.

15. Apparatus as claimed in claim 14, wherein the representation of said alternative attribute value having the alternative attribute type is caused to be displayed concurrently with a representation of said source text.

16. Apparatus as claimed in claim 15, wherein the representation of said alternative attribute value having said alternative attribute type is included in the representation of said source text.

5 17. Apparatus as claimed in claim 15, wherein the representation of said alternative attribute value having the alternative attribute type replaces the representation of the source attribute value having the source attribute type in the representation of the source text.

18. Apparatus as claimed in any one of previous claims 11 to 17, wherein an attribute type
10 comprises a quantifiable measurement unit and an attribute value comprises a quantifying value for that quantifiable measurement unit.

19. Apparatus as claimed in any one of previous claims 11 to 18, wherein the source text is provided by one of: a short-message-service message, a multi-media message, an email
15 message.

20. Apparatus as claimed in any one of previous claims 11 to 19, wherein the alternative attribute type is designated by a user-specified setting as a preferred attribute type.

20 21. An apparatus comprising:
means arranged to identify, by parsing source text, at least one portion of the source text comprising a source attribute value having a source attribute type;
means arranged to determine an attribute class for said source attribute type; and
means arranged to determine, using processing means, if an alternative attribute type to

the source attribute type is designated for said attribute class, wherein said attribute class comprises at least said source attribute type and said alternative attribute type.

22. A computer program product comprising at least one non-transitory computer-readable storage medium having computer-executable program code portions stored therein, the computer-executable program code portions comprising program code instructions for:

identifying, by parsing source text, at least one portion of the source text comprising a source attribute value having a source attribute type;

determining an attribute class for said source attribute type; and

determining, using a processor, if an alternative attribute type to the source attribute type is designated for said attribute class, wherein said attribute class comprises at least said source attribute type and said alternative attribute type.

23. A computer program product as claimed in claim 22, wherein, if an alternative attribute type is determined for a said attribute class, the program code instructions are further for :

determining an attribute value for said alternative attribute type in dependence on the source attribute value and a relationship between said source attribute type and said alternative attribute type.

24. A computer program product as claimed in claim 23, wherein the determined attribute value depends on a dynamic relationship between said source attribute type and said alternative attribute type.

25. A computer program product as claimed in any previous claim, wherein said computer

code instructions are further for:

causing display of a representation of said alternative attribute value having said alternative attribute type.

5 26. A computer program product method as claimed in claim 25, wherein the representation of said alternative attribute value having the alternative attribute type is caused to be displayed concurrently with a representation of said source text.

10 27. A computer program product as claimed in claim 25, wherein the representation of said alternative attribute value having said alternative attribute type is included in the representation of said source text.

15 28. A computer program product as claimed in claim 27, wherein the representation of said alternative attribute value having the alternative attribute type replaces the representation of the source attribute value having the source attribute type in the representation of the source text.

20 29. A computer program product as claimed in any one of previous claims 22 to 28, wherein an attribute type comprises a quantifiable measurement unit and an attribute value comprises a quantifying value for that quantifiable measurement unit.

30. A computer program product as claimed in any one of previous claims 22 to 29, wherein the source text is provided by one of: a short-message-service message, a multi-media message, an email message.

25 31. A computer program product as claimed in any one of previous claims 22 to 30, wherein the alternative attribute type is designated by a user-specified setting as a preferred attribute type.

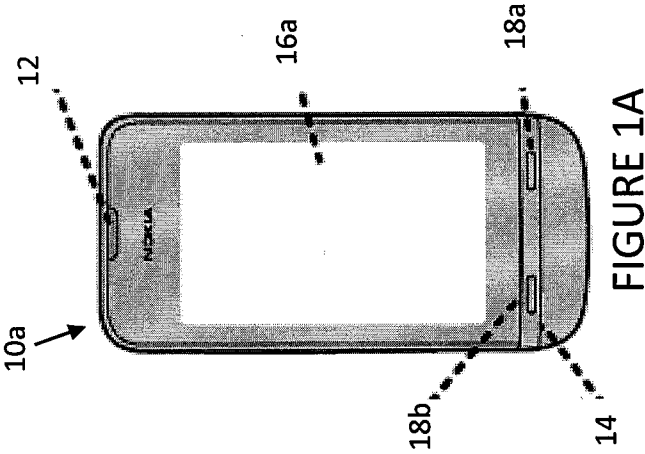


FIGURE 1A

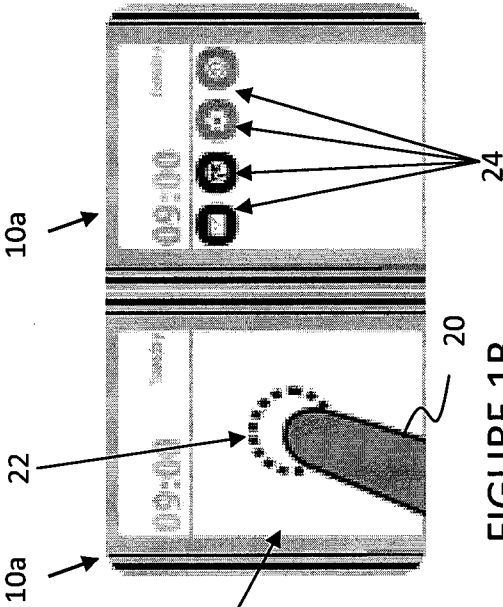


FIGURE 1B

FIGURE 1C

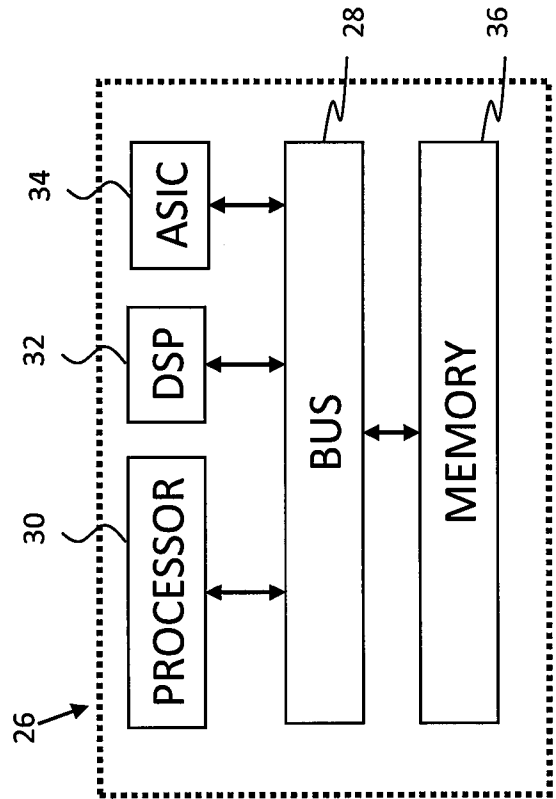
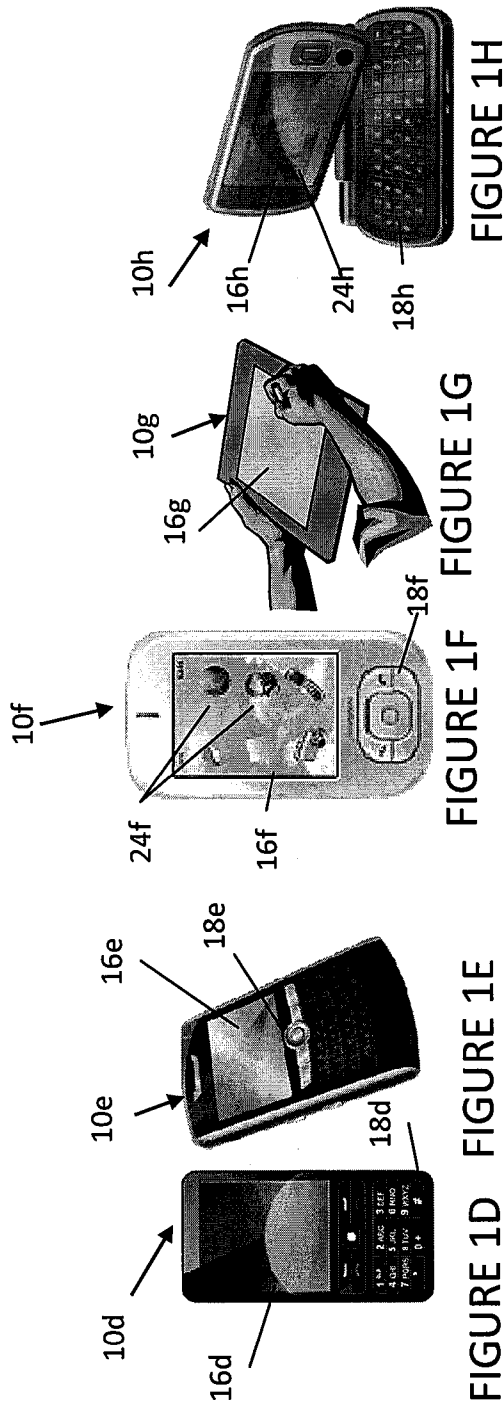


FIGURE 2

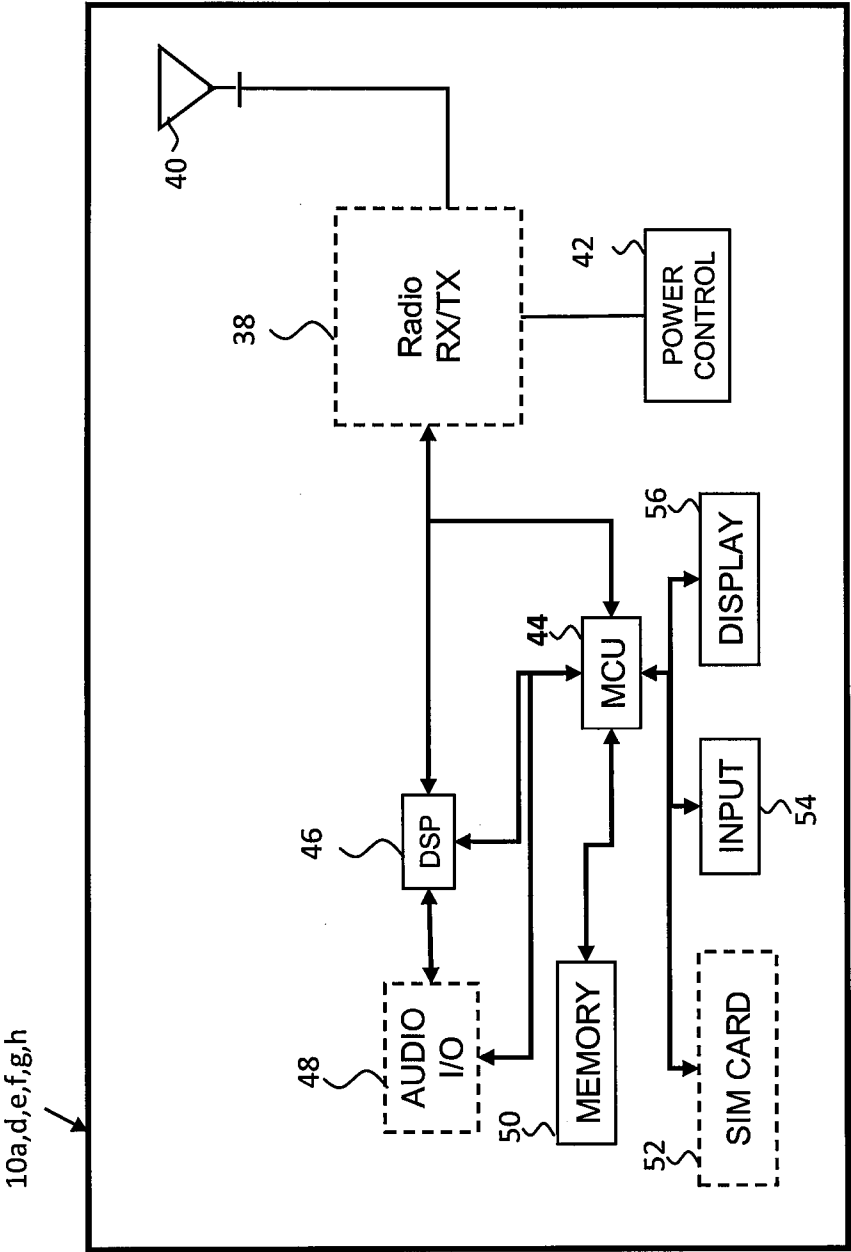


FIGURE 3

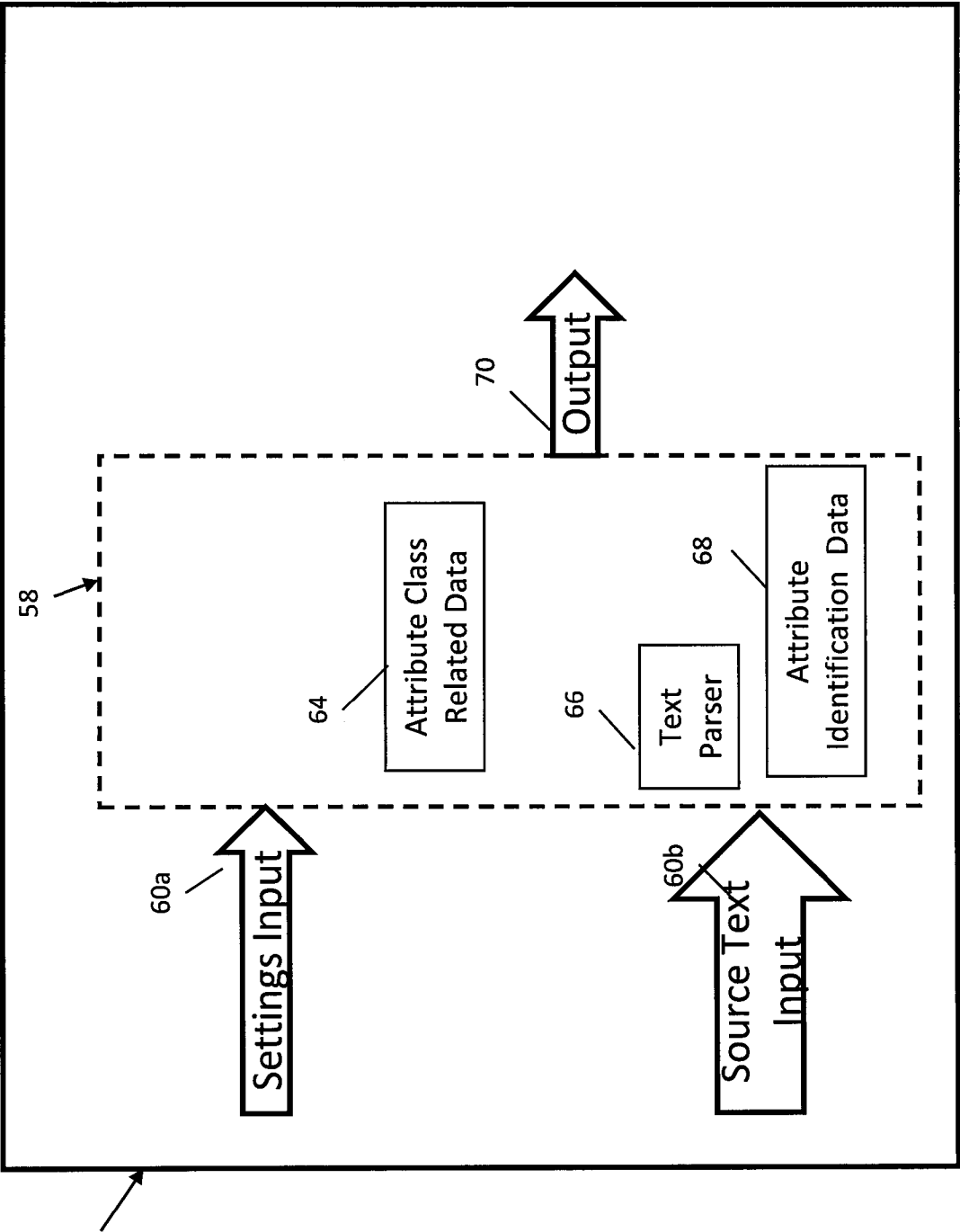


FIGURE 4

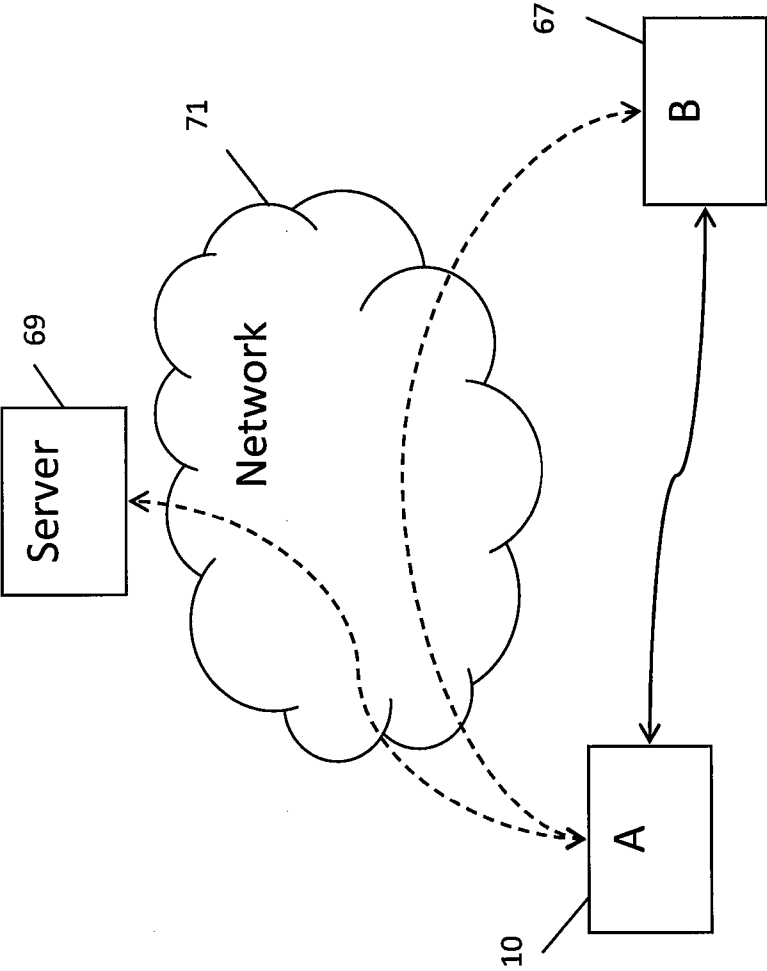


FIGURE 5

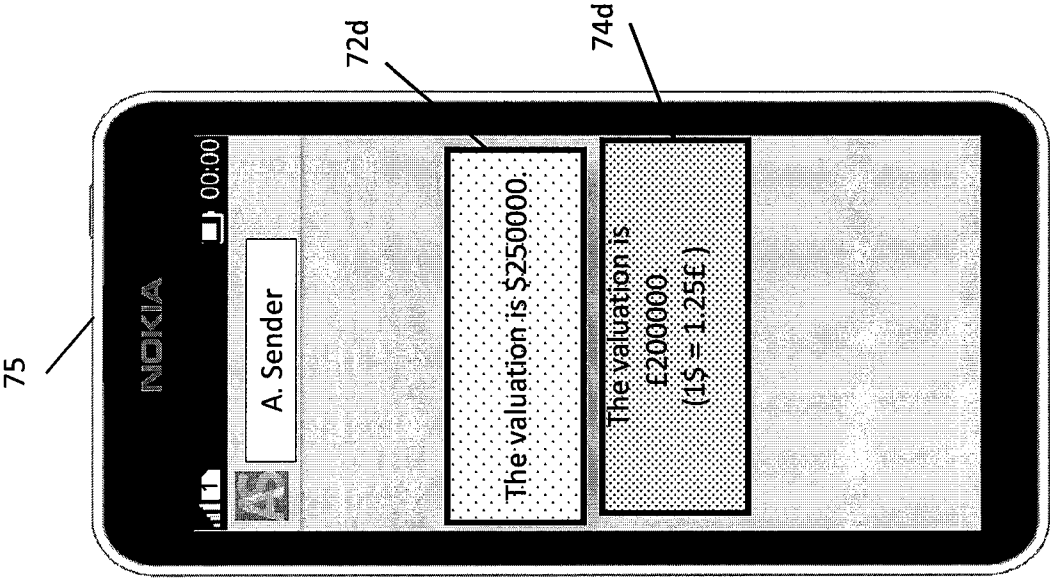


FIGURE 6D

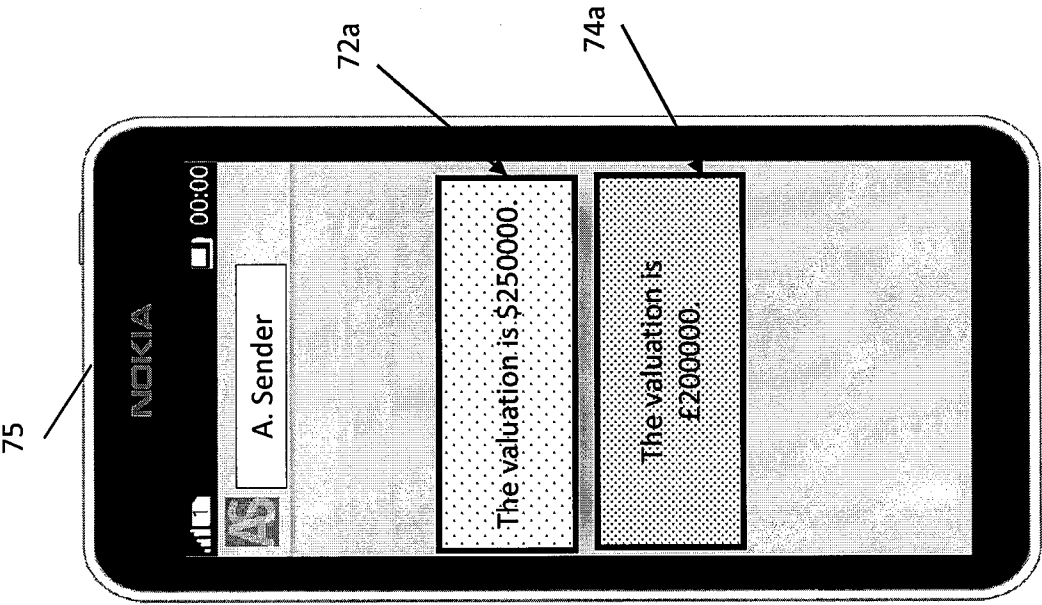


FIGURE 6A

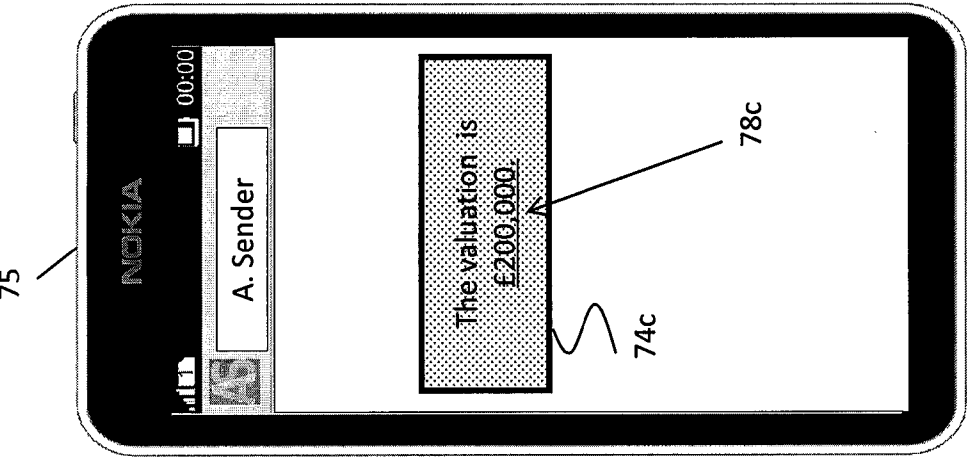


FIGURE 6C

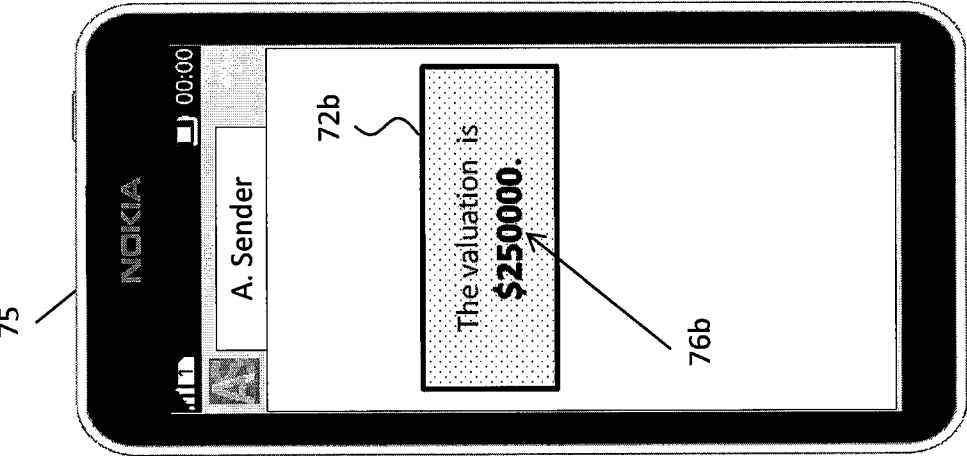
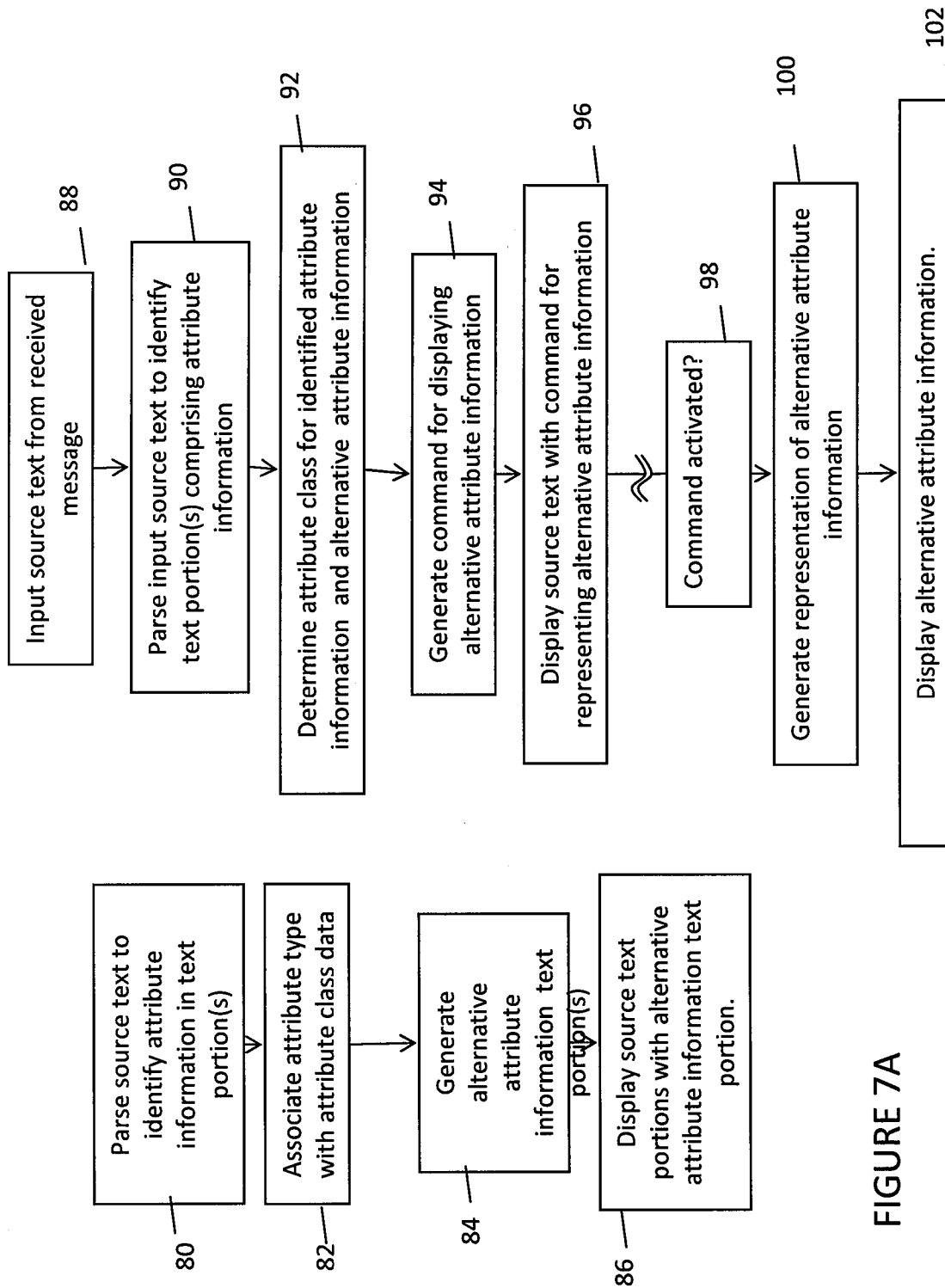


FIGURE 6B



INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2012/088045

A. CLASSIFICATION OF SUBJECT MATTER

G06F 17/18 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: G06F 17/-; G06F 3/-

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

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

CNPAT, WPI, EPODOC, CNKI: convert+, number+, determin+, unit, measure+, text, string, message?, clas+, type, replac+, analyz+, recogniz+, alternative, display+, currency, money, input

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/0212527 A1 (MOORE, Thomas G. et al.) 13 November 2003 (13.11.2003) description, paragraphs [0029] to [0036], [0041], [0052] to [0058], and figures 1 to 7	1-31
A	US 2012/0036063 A1 (SIVAPATHASUNDRAM, Sumithran et al.) 09 February 2012 (09.02.2012) the whole document	1-31
A	CN 1677415 A (LI, Xiaofang) 05 October 2005 (05.10.2005) the whole document	1-31
A	CN 1752972 A (MICROSOFT CORP.) 29 March 2006 (29.03.2006) the whole document	1-31
A	CN 101520693 A (HANWANG TECHNOLOGY LLC.) 02 September 2009 (02.09.2009) the whole document	1-31

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

☒ See patent family annex.

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

Date of the actual completion of the international search
13 September 2013 (13.09.2013)

Date of mailing of the international search report
17 Oct. 2013 (17.10.2013)

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Telephone No. (86-10)62414440

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2012/088045

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