

[0014] According to a third aspect of the invention, a communication system is provided including a base station and also including a wireless terminal as in the second aspect of the invention.

[0015] According to a fourth aspect of the invention, a method is provided for use by a wireless terminal, including: a step, responsive to a tactile sensation pattern and responsive to instructions on how to interpret a tactile sensation pattern, of providing a control signal; and a step, responsive to the control signal, of producing a tactile sensation sensible to a user of the mobile phone; wherein the tactile sensation is expressive of information intended to be communicated to the user of the apparatus and exclusive of information indicating a call is waiting to be answered.

[0016] Thus, the inventors have taken the mobile phone ringing tones ("audible icons") and visual icons/smilies as two modes of message each packed in a compact, non-verbal, stylized way and extend the notion of compact, non-verbal, stylized message modes to include the tactile mode.

[0017] In contrast with the prior art, the invention enables the user of a mobile phone to determine the type of the vibration (i.e. the vibration pattern) to be communicated over the mobile phone. There is in principle no restriction on the type of vibration (or tactile icon) that can be communicated. A user can choose a tactile icon from a menu or create one on the fly. A description of the vibration pattern so determined can then be sent via a mobile communication system according to various paradigms, including SMS, ringing tones, and picture messages according to enhanced SMS or some other bearer service (such as multimedia message service) or protocol (such as wireless access protocol). The vibration pattern being communicated can have but is not limited to a logical meaning, or can be a rhythm, or be an imitation of the vibratory force that would be caused by a bouncing ball.

[0018] Users of mobile phones can then of course further enrich their communication experience by combining vibration patterns (tactile icons) with text (lexical icons), pictures (visual icons), animations (enhanced visual icons) or sounds (vibrations in the audible range, and as such, audible icons). These various icons/modes of messaging, when used in combination, have a synergistic effect enriching the communication experience.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The above and other objects, features and advantages of the invention will become apparent from a consideration of the subsequent detailed description presented in connection with accompanying drawings, in which:

[0020] **FIG. 1** is a block diagram of a mobile phone according to the invention;

[0021] **FIG. 2** is an illustration of a very few of many different possible vibration patterns (tactile icons) of use according to the invention;

[0022] **FIG. 3** is an illustration of different ways in which a vibration pattern of use according to the invention can vary; and

[0023] **FIG. 4** is a flowchart of the invention.

BEST MODE FOR CARRYING OUT THE INVENTION

[0024] In providing a tactile message mode for a mobile phone, the inventors first used the original vibration motor in a mobile phone mock-up to create different kind of vibration patterns, each such pattern being identified as a tactile icon. The inventors performed a user study and discovered that such tactile icons (such as different vibration patterns, but also including other tactile sensations discernible by the sense of touch or feel) convey meanings and suggest associations for people and between people. The inventors determined that tactile icons can be sent and received as smart messages in much the same way as ringing tones and business cards are sent and received by mobile phones, and can also be sent as an attachment to a text message, a picture message, or any other multimedia message.

[0025] No additional hardware is needed to implement tactile icons even in existing mobile phones including an ordinary vibration motor. All that is needed is software to produce the tactile icons and to handle their messaging.

[0026] **New Use of the Vibrating Element of an Ordinary Mobile Phone**

[0027] An ordinary mobile phone is equipped with a component able to create vibrations, which are conducted to the user via the casing of the mobile phone (when the casing is in direct or indirect physical contact with the user). Typically the vibrating component is a small eccentric electric motor, i.e. an electric motor having a weight mounted on its axis where the center of the mass of the weight does not lie along the axis of the motor. The vibrating component can be any type of vibratable device, including for example a linear vibrator and a piezoelectric device.

[0028] According to the invention, such a vibration motor of an ordinary mobile phone is used to create different kinds of vibration patterns.

[0029] Referring now to **FIG. 1**, an ordinary mobile phone includes a vibration motor **100** under the control of a microcontroller **106**; the microcontroller controls the action of the vibration motor via a DC driver (not shown). The vibration motor produces a vibration, used in the prior art to give a silent alarm notifying the user of the mobile phone of an incoming call or a waiting message. Preferably, frequencies between 130 Hz and 250 Hz are used when producing vibration with a vibration motor.

[0030] According to the invention, such a microcontroller is programmed to cause the vibration motor to produce different kinds of vibration patterns (tactile icons), as determined by the user of the mobile phone using software specially developed for the task of composing tactile icons or selecting tactile icons from a menu. The program used by the microcontroller in causing the vibrations, i.e. the vibration pattern interpreter **140a**, is held in non-volatile memory **140** in the mobile phone. The memory **140** also holds a vibration pattern composer program **140b** by which a user interfaces with the mobile phone to create new tactile icons/vibrations patterns or edit existing tactile icons, stored vibration patterns **140e** either created by the user (using the composer) or downloaded from a service providing tactile icons using another stored program, a vibration pattern downloader **140c**, or saved from an already received mes-