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(54) **METHOD AND APPARATUS FOR UTILIZING MOTION USER INTERFACE**

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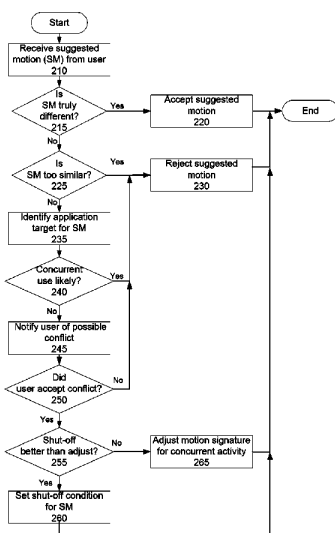
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(57) **ABSTRACT**

A method and apparatus for utilizing gestures for navigating.

21 Claims, 9 Drawing Sheets

See application file for complete search history.



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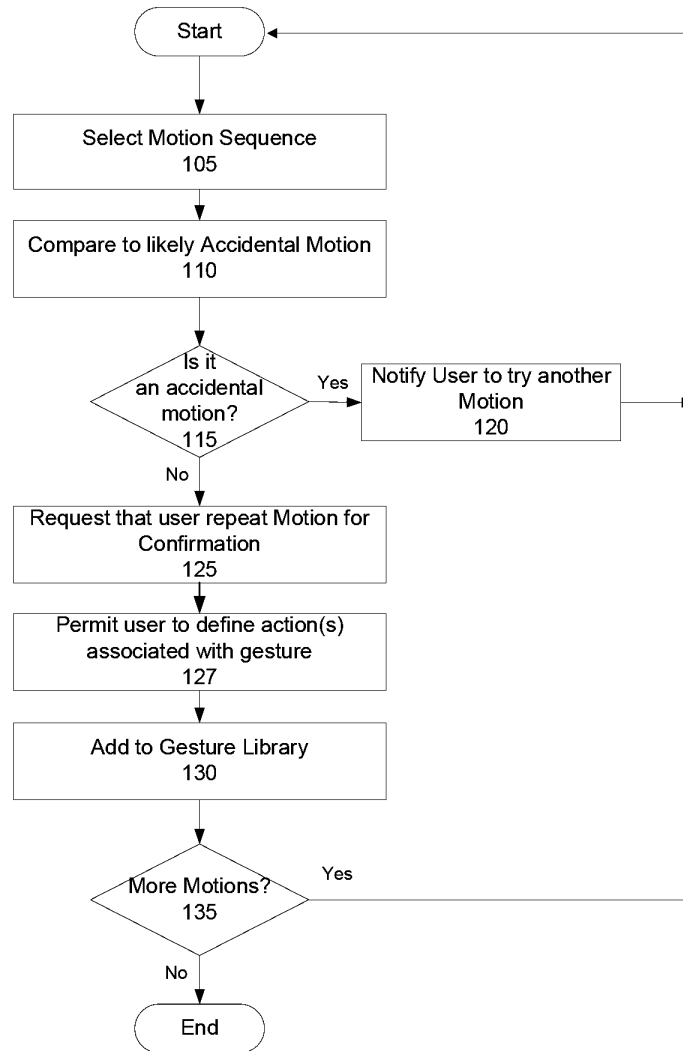


Fig. 1

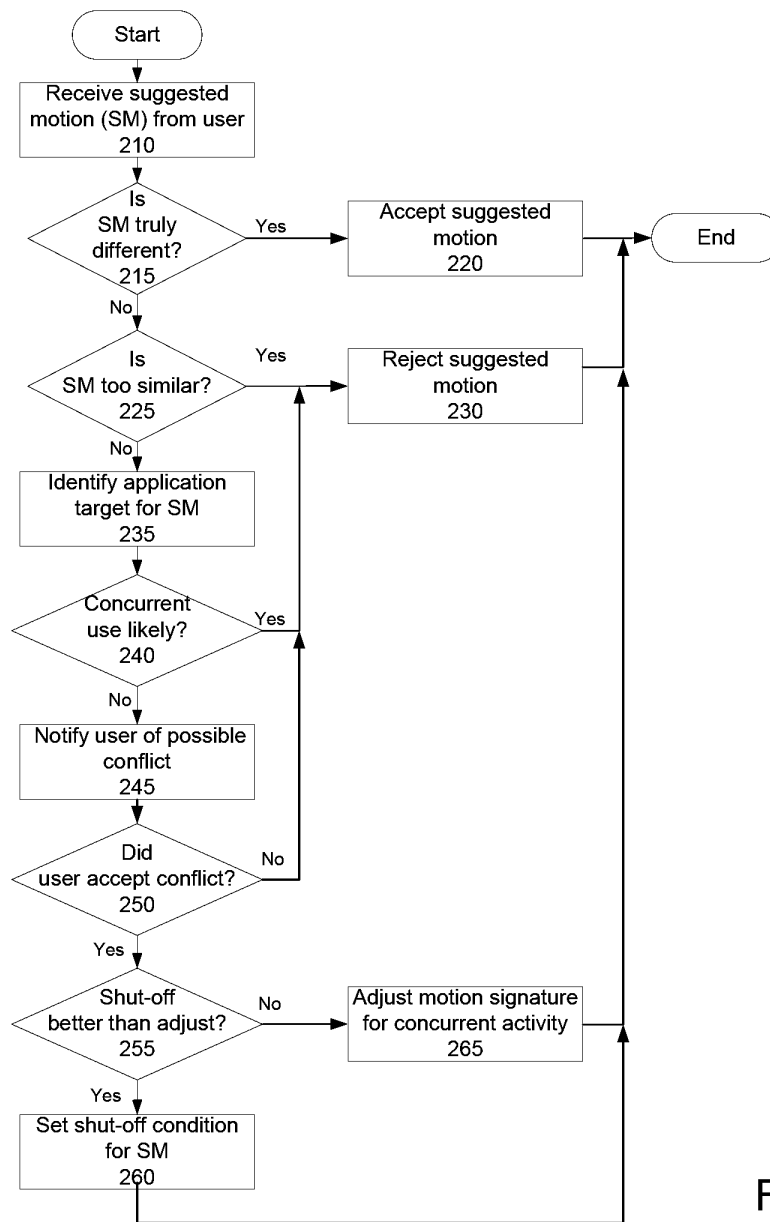


Fig. 2

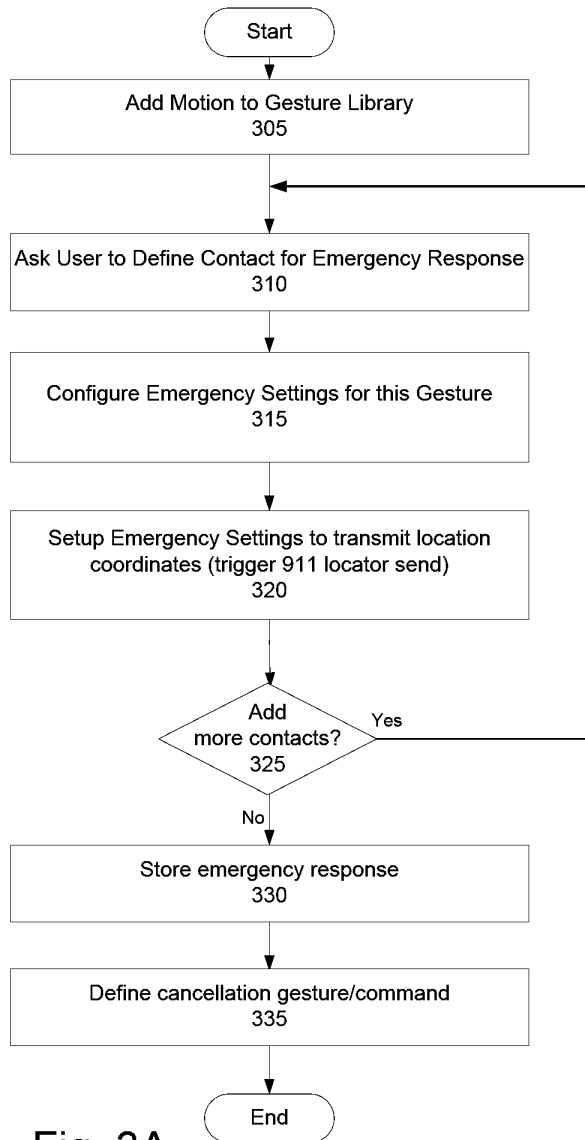


Fig. 3A

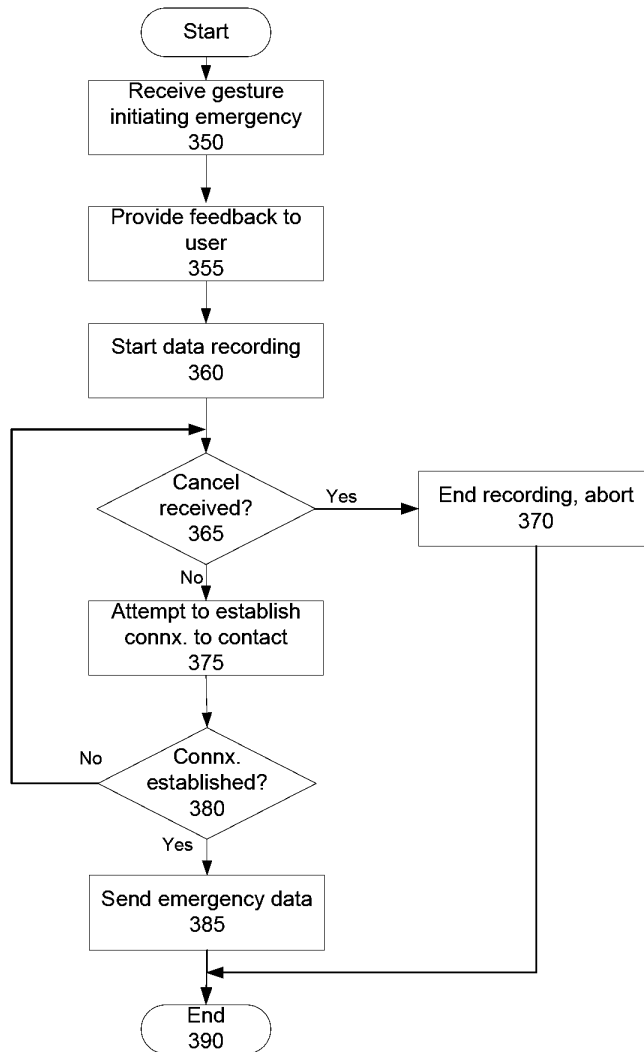


Fig. 3B

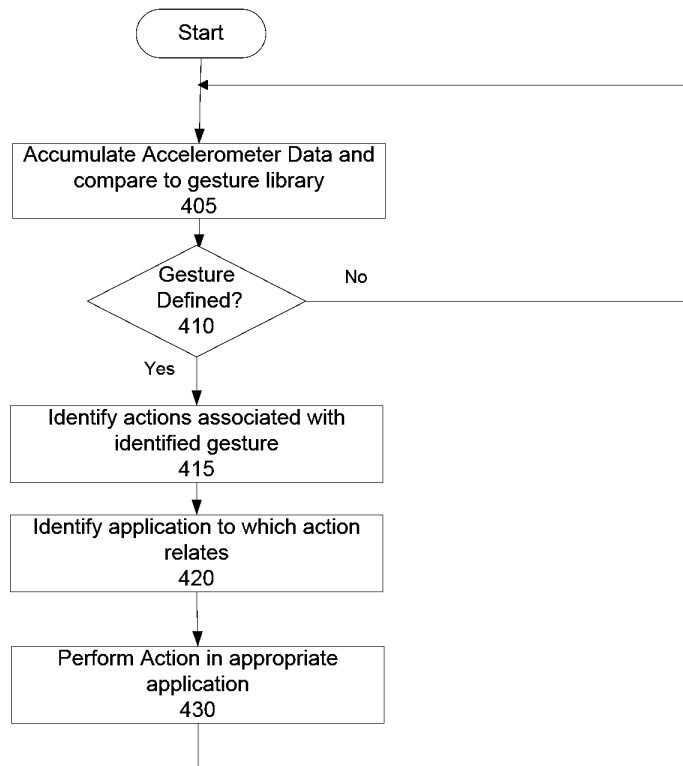


Fig. 4

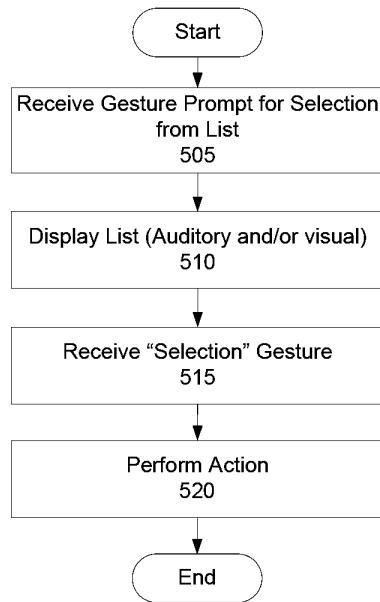


Fig. 5

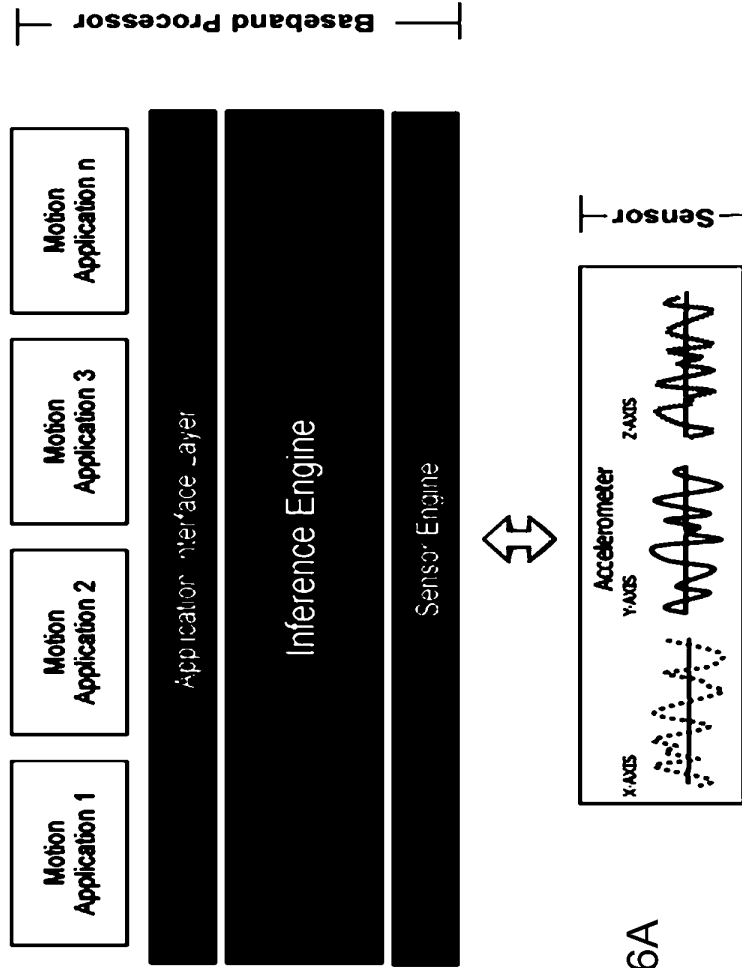


Fig. 6A

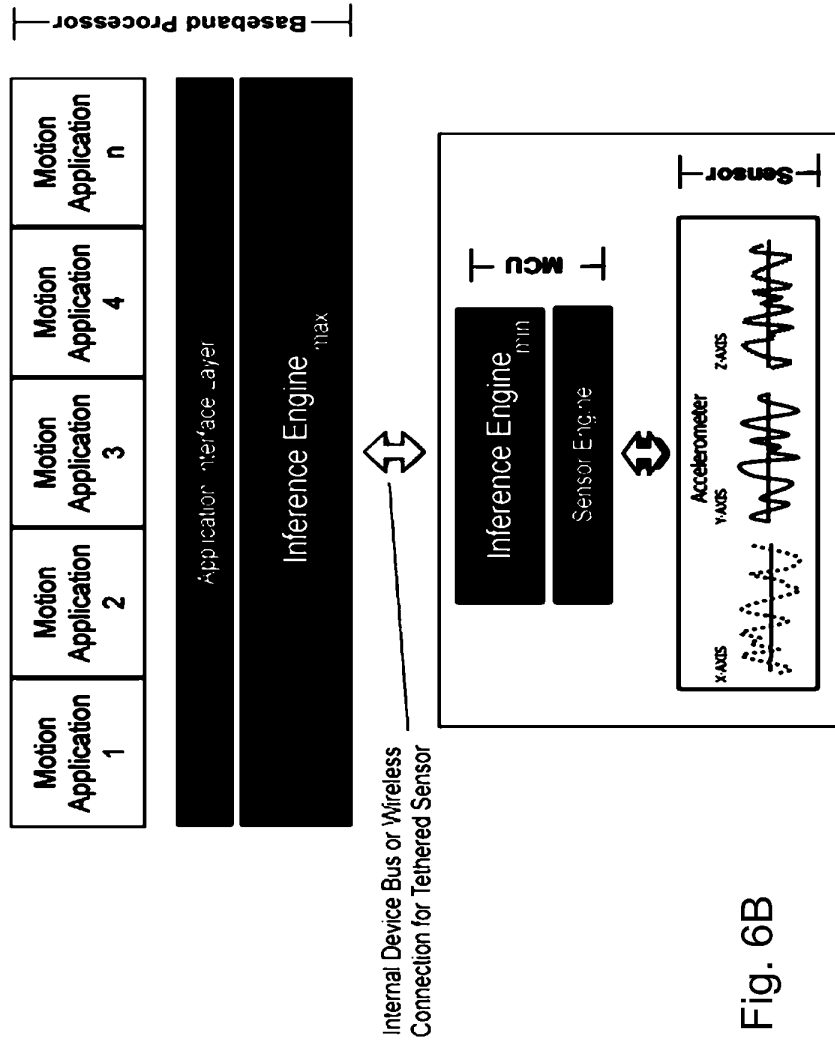


Fig. 6B

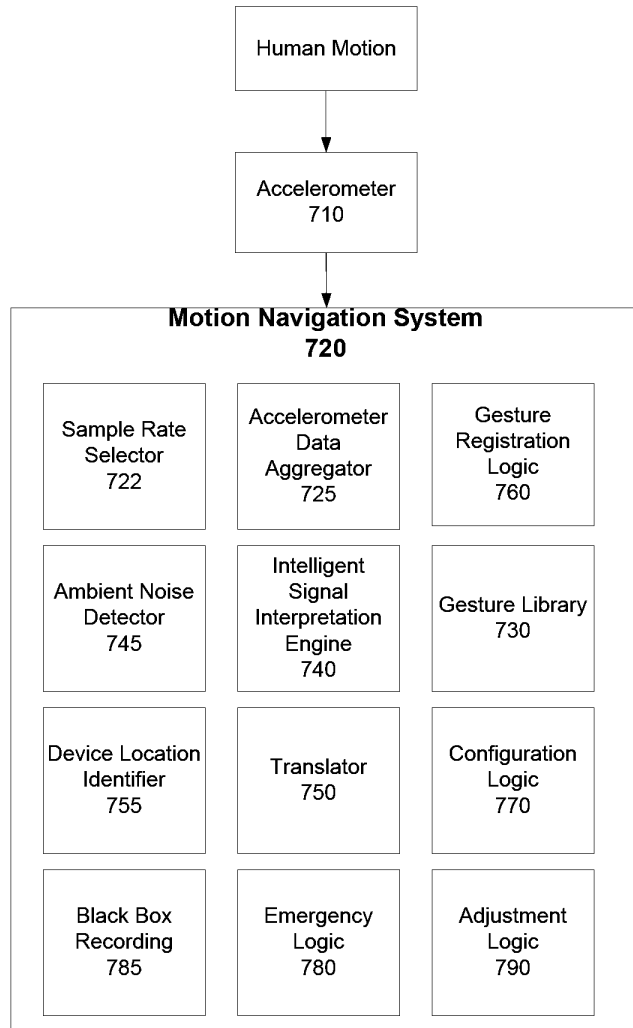


Fig. 7

**METHOD AND APPARATUS FOR UTILIZING
MOTION USER INTERFACE**

RELATED APPLICATIONS

The present invention relates to U.S. Provisional Application Ser. No. 60/830,205, filed on Jul. 11, 2006, and incorporates that application in its entirety.

FIELD OF THE INVENTION

The present invention relates to accelerometers, and more particularly to using gestures in a mobile device.

BACKGROUND

Accelerometers are becoming cheaper and more ubiquitous. Numerous mobile devices include accelerometers. For example, SAMSUNG SPH-54000 and SCH-5400 phones feature gesture recognition, enabling a user to control its functionality by moving it. There is an accelerometer built into the phone, and a user can skip songs on its MP3 player by shaking the phone from side to side, or play games by shaking the phone, rather than using a more traditional joystick. However, there are numerous problems with this interface, including the issue regarding accidental shakes. As commentators point out, if shaking the device skips songs, then jogging with the telephone would cause random skipping whenever the device was accidentally shaken right or left by the user's motions.

SUMMARY OF THE INVENTION

A method or apparatus to utilize motion data for interacting with a mobile device.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is illustrated by way of example, and not by way of limitation, in the figures of the accompanying drawings and in which like reference numerals refer to similar elements and in which:

FIG. 1 is a flowchart of one embodiment of training a device with motions.

FIG. 2 is a flowchart of one embodiment of selecting a gesture for the gesture library.

FIG. 3A is a flowchart of one embodiment of setting up an emergency response.

FIG. 3B is a flowchart of one embodiment of the use of the emergency response.

FIG. 4 is a flowchart of one embodiment of using the system.

FIG. 5 is a flowchart of another embodiment of using the system.

FIG. 6A is a device architecture diagram illustrating an exemplary network configuration which may be used with the present invention.

FIG. 6B is a device architecture diagram of an alternative network configuration which may be used with the present invention.

FIG. 7 is a block diagram of one embodiment of the motion navigation system.

DETAILED DESCRIPTION

The method and apparatus described is for the use of motions or gestures as a user interface. The gestures, or

motions, enable a user to navigate in a computing device in various ways. In one embodiment, the navigation may be for a mobile device, such as a cellular telephone, MP3 player, or other such device. In another embodiment, the navigation may be for a non-mobile device, such as a stationary computer utilizing a mobile controller, such as a mouse. The gestures or motions are detected using an embedded or wirelessly tethered accelerometer, in one embodiment. The accelerometer is also used to detect a user's activity level, in one embodiment.

The system provides the ability to interact with a device using pre-defined gestures or motion series. The system further provides the ability for a user to define interaction gestures that are preferred by the user, and are not likely to be problematic (i.e. accidentally made). Furthermore, in one embodiment, the gesture interface interacts with spoken or displayed menu items, to provide a gesture interface in loud environments.

In one embodiment, the system further modifies and/or turns off certain motion gestures, based on current activities. For example, in one embodiment, certain gesture recognition algorithms are adjusted or shut off entirely when the user is walking, biking, or running above a certain cadence. This is useful because it permits the recognition of a gesture that is easy to perform when a user is sitting holding the device, and yet ensures that the command is not accidentally set off when the user is running. For example, tapping on a device may be used as a user interface command for controlling the mobile device or an application within the mobile device. When jogging or running, the mobile device may knock against the user's leg if in a shorts pocket, on other objects in a handbag, etc. To solve this challenge, the gesture detection algorithm may be modified as the user's cadence increases so as not to be falsely triggered by the motions associated with the activity of the user.

FIG. 1 is a flowchart of one embodiment of training a device with motions. The process starts when a user attempts to train a device including the mobile user interface. In one embodiment, the process is automatically initiated when the user initializes the device. In one embodiment, the user may trigger the training process at any time.

At block 105, the user selects a suggested motion sequence. In one embodiment, the user does this by indicating the start of a motion sequence, performing the motion sequence, and indicating the end of the motion sequence. In one embodiment, the motion sequence may include more than one motion, or one complex motion.

At block 110, the process compares the suggested motion sequence to known accidental motion patterns. Accidental motion patterns include motions likely to be accidentally performed when walking, running, talking if it is mobile phone, or another activity likely to be performed by the user with the mobile component, as well as existing registered gesture sequences. It would be any motion that the user may make, that may trigger the command associated with the suggested motion.

At block 115, the process determines whether the suggested motion sequence is too similar to an accidental motion. In one embodiment, the comparison takes into account the movement type, speed, and accelerations of the motion pattern suggested. If the motion is too similar, the user is prompted to try another motion sequence. In one embodiment, the user is informed of the reason for the similarity. For example, the user may be informed that "the up-down motion resembles jogging or similar accidental motion, please select an alternative pattern." In one embodiment, the system may

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further provide suggestions. For example, the suggestion may be to “change the speed/angle/range of motion” to avoid similarity.

If the motion sequence is not too similar to an accidental motion, the process continues to block 125. At block 125, the user is requested to repeat the motion for confirmation. In one embodiment, if the two repetitions of the motion are too dissimilar, the user is requested to repeat the motion again. If the motions continue to be too dissimilar, the motion sequence is discarded as too difficult, and the user is requested to select another motion sequence.

If the repeated motions match properly, at block 127, the user is permitted to define one or more actions associated with the gesture. The actions may range from an emergency response, to dialing a particular number (defined by the user), making an item selection among a set of menu items, listing menu items on the display or via a speaker, activating an application, or any other definable action. In one embodiment, the action may relate to the mobile device as a whole, and/or to a particular application within the mobile device. In one embodiment, the user may define different actions depending on the currently active application. Thus, for example, in a music application a rapid tilt to the side may mean “advance to next song” while in the address book application the same rapid tilt to the side may mean “scroll one screen to next set of addresses.”

At block 130, the gesture and its associated action(s) are added to the gesture library. The user can, at block 135, decide to add another motion sequence to the gesture library. If the user chooses to do so, the process returns to block 105. Otherwise, the process ends. In one embodiment, a gesture may be defined not only for a particular application, but also for a particular background activity, ambient noise, or user’s motion cadence. In one embodiment, the user may define separate gestures associated with the same command based on any of these features. For example, if the user is jogging he or she may not want to use a gesture that involves rapid shaking up and down, and may instead define a different gesture to use as a command. In one embodiment, such separate gestures are provided in the default set of gestures as well.

FIG. 2 is a flowchart of one embodiment of determining whether a gesture is too similar to an accidental motion. In one embodiment, this corresponds to block 115 in FIG. 1.

The process starts at block 210, when a suggested motion is received from the user for analysis. In one embodiment, the system includes a library of accidental motions. In one embodiment, this library of accidental motions is added to as the device is utilized. For example, for someone who sprints, the accidental motions are different from someone who primarily does race walking. In one embodiment, the library of motions includes a list of activities. The user may, in one embodiment, select the set of activities performed with the mobile device.

At block 215, the process determines whether the suggested motion is dissimilar from accidental motions which may be accidentally made or made intended to activate a different command. If so, at block 220, the motion is accepted. In one embodiment, this requires that the motion be clearly non-conflicting. If the motion is not clearly non-conflicting, the process continues to block 225.

At block 225, the process determines whether the suggested motion is similar to a “standard” movement, which is performed during a normal course of action. For example, for a mobile phone, standard movements include walking, sitting, and other activities which a user is expected to perform all the time. These “standard” movements ensure that the

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motion would be a problem under normal circumstances. Therefore, the motion cannot be accepted. If so, at block 230, the motion is rejected.

Otherwise, at block 235, the process obtains identification of the application/command associated with the suggested motion. In one embodiment, the user first identifies the application/command, and then provides the motion. In another embodiment, the user first provides the application/command, and then the suggested motion. In another embodiment, the process requests the application/command only when the motion isn’t similar to a standard movement, but isn’t dissimilar enough from possible movements to be an automatic pass.

At block 240, the process determines whether the application/command is likely to be utilized concurrently with the interfering base activity. For example, a user is likely to utilize commands associated with a music player while jogging, but is unlikely to play an electronic bowling game while jogging. If they are likely to be utilized concurrently, the process continues to block 230, and rejects the suggested motion. If there is likely concurrent use, the process continues to block 230, and rejects the suggested motion.

If the commands are not likely to be utilized concurrently, at block 245 the process notifies the user of the potential conflict, and allows the user to accept the conflict. At block 250, the process determines whether the user is willing to accept the conflict. If not, the process continues to block 230 and rejects the suggested motion. Otherwise, the process continues to block 250.

At block 255, the process determines whether it would be better to shut down the availability of the motion sequence command when the interfering activity is occurring. For example, if the command is for a game, if the underlying activity is jogging, it may be best to turn off the availability of the command when the user is jogging. If so, at block 260, the system sets up a condition such that the motion command is not available when certain activity is occurring. For example, the tapping to access a particular game menu may be unavailable when the system determines that the user is jogging.

Otherwise, in one embodiment, the motion signature is adjusted for the activity, at block 265. The process then ends, at block 270.

FIG. 3A is a flowchart of one embodiment of setting up an emergency response using the gesture interface, for a mobile telephone. One of the motion sequences which may be set up by the user is an “emergency” motion sequence. The emergency motion sequence is designed to be activated by the user in an emergency when calling 911 and talking to a dispatcher directly may be too difficult or dangerous. It is designed, in one embodiment, to be usable without alerting bystanders or possible dangerous elements.

In one embodiment, the user is prompted to utilize an easy to remember motion sequence. For example, the system may suggest a beat from a song the user is familiar with, or their favorite dance move, or something similar. In one embodiment, the system further suggests that the user select a motion that can be done unobtrusively. For example, windmilling the arms may not be the best motion sequence because it is so obvious that the user is making an unnatural motion. However, the motion sequence should be one that will not be accidentally activated by the user’s normal actions.

Once the motion is defined—in one embodiment the process described above with respect to FIGS. 1 and 2 is used—the process adds the motion to the gesture library, at block 305.

At block 310, the user is asked to define a first contact for emergency response. In one embodiment, the default first

contact is the local police emergency number. In one embodiment, that number may be 911. In another embodiment, the user's local number is utilized, because calling **911** in some mobile devices connects to a central service center which may not be local to the user. In one embodiment, if the mobile device includes a GPS (global positioning system) or other location-determination mechanism, a local emergency number is identified and used.

At block **315**, the emergency settings are configured for this gesture. In one embodiment, the user may choose to change any of the default configurations. In one embodiment, the default configuration is to transmit audio, but mute incoming audio, so that it is not obvious that sounds are being transmitted. Alternatively, the configuration may be to set the telephone to act as a speaker phone, broadcasting tone as well as receiving. In one embodiment the emergency setting may also include a short audio message indicating that this is an emergency connection to whatever agency receives the call.

At block **320**, the emergency settings are set to transmit location coordinates, if the emergency contact is capable of receiving such data, and the mobile device has the capability of obtaining the data. In one embodiment, the user may define the location. In one embodiment, the data may be based on GPS (global positioning system) data, if the mobile device includes this feature. In one embodiment, the data may be based on wireless locator data. In one embodiment, the data may be based on network triangulation data.

The user is then queried whether he or she wishes to add an additional contact to the emergency response, at block **325**. If so, the process returns to block **310**, to add additional contacts. In one embodiment, the system connects to multiple contacts simultaneously, if multiple contacts are designated and the device is capable of conference calls. Alternatively, the contacts may be sequential. In one embodiment, if the contacts are sequential, the order of the contacts may be specified by the user. At block **330**, the emergency response is stored.

At block **335** the process provides the opportunity for the user to define a cancellation gesture or command. The cancellation gesture/command is designed to enable the user to cancel the emergency response, if it was accidentally triggered. In one embodiment, the cancellation command may be a numeric pass code. The process then ends.

FIG. 3B is a flowchart of one embodiment of using the emergency response system. The process starts when the gesture initiating the emergency response is identified, at block **350**.

At block **355**, feedback is provided to the user indicating that the emergency gesture was received. In one embodiment, this feedback is designed to be non-obtrusive, quiet, so as to communicate only to the user. In one embodiment, the feedback may be auditory, visual, or tactile (such as vibration), or a combination of the above.

At block **360**, the device starts recording data. This occurs, in one embodiment, substantially immediately after detection of the emergency gesture. The recording, in one embodiment, may include recording of audio data, video data, image data, movement data, and/or data from other sensors within the device. If location data is available—through GPS, network triangulation, or another source—that data is also recorded.

In one embodiment, the recording is stored in a "black box" system. This ensures that the data is not trivially erasable, and in one embodiment is designed to keep the data stored even if the mobile device is broken. In one embodiment, the data from the emergency recording can only be erased with the use of a security key, known to the user.

At block **365**, the process determines whether a cancellation gesture/command was received. In one embodiment, the user is given a short amount of time to cancel the emergency response.

If a cancellation signal was given, at block **370** the recording is terminated, and the process is aborted. The process then ends at block **390**. In one embodiment, the user is able to erase the recorded data from the black box. If no cancellation is given, the process continues to block **375**.

At **375**, the system attempts to establish a connection to the designated emergency contacts over any available channel, to send out a call for help. In one embodiment, this includes switching to roaming, sending data over WiFi (wireless connection) if so enabled, sending data via WAP (wireless access protocol), as well as sending data via the more traditional carrier network.

At block **380**, the process determines whether the connection has been established. If not, the system continues trying, until either the user terminates the emergency, or a connection is established.

At block **385**, once the connection is established, the emergency data is sent to the contact. As noted above, generally the contact would be local law enforcement or emergency response team or dispatcher. In one embodiment, an initial notification message is transmitted, which indicates that this is an emergency and the location of the user if available, and then initiates live audio/video broadcast to give the emergency response team/dispatcher additional information. In one embodiment, the location information may be converted by the system from the GPS data/network triangulation data into location data. In one embodiment, if the emergency contact's system is capable of it, the user's system may provide a data dump of collected information—i.e. recorded information that was collected prior to the connection being established. In one embodiment, the data continues being sent until either the user aborts the process, the contact aborts the process, or the device can no longer maintain a connection. In one embodiment, if the connection is lost, and the user has not aborted the emergency, the process attempts to establish a new connection.

In this way, the user is provided an emergency response mechanism which can be easily activated and provides added security.

FIG. 4 is a flowchart of one embodiment of using the system. The process is utilized whenever the gesture user interface is active. At block **405**, accelerometer data is accumulated. In one embodiment, this accumulation is always active. In another embodiment, the accumulation is active only when there is at least one active application that uses the accelerometer data.

At block **410**, the process determines whether a gesture has been defined by the accelerometer data. In one embodiment, the system includes one or more default gestures provided with the system. In one embodiment, for a mobile handset these gestures may include gestures for picking up the telephone. One example of a gesture that may be provided is described in U.S. Patent Application Ser. No. 60/948,434. As noted above, the user may also record one or more gestures during the set-up phase. In one embodiment, the user may remove or modify any of the default gestures. In one embodiment, the system continuously compares the recorded gesture data to the accumulated accelerometer data. If no gesture has been defined, the process continues to accumulate data, and make the comparison.

If a gesture has been recognized, the process continues to block **415**. At block **415**, the actions associated with the defined gesture are identified. These actions may include the

emergency response discussed above, dialing a particular number, or any other action as defined by the user.

At block 420, the process identifies the active application to which the gesture relates. At block 430, the action is performed in the designated application. The process then returns to block 405, to continue accumulating accelerometer data.

FIG. 5 is a flowchart of another embodiment of using the system. In one embodiment, the gestures may be used not to initiate an action, but to react to a particular type of display or interaction from the mobile system. For example, at block 505, the user may initiate a display of a list (such as a list of names and numbers in a telephone book). The display may be initiated via gesture, spoken command, menu selections, or other means.

At block 510, the system displays the list, via auditory and/or visual output. The user can then utilize a "selection gesture," at block 515. The selection gesture is defined by a user during training of a phone.

At block 520, the action associated with the listed item which was selected by the user is performed.

The gesture interface is especially useful in loud and badly lit environments, for example shop floors or clubs where spoken commands impossible, and visually making a selection is also difficult. It can also be useful for individuals with strong accents who have difficulty training word recognition. Gesture recognition is much easier to train, since the user can simply define any gesture to correspond to a particular type of action.

FIG. 6A is a device architecture diagram illustrating an exemplary network configuration which may be used with the present invention. FIG. 6 shows the structure in which the device that includes the accelerometer does not have a native processor. Instead, a main processor on the device interfaces with the sensor. Under this architecture, in one embodiment, the accelerometer may not be sampled at very high rates for long periods of time due to power consumption.

The sensor engine interfaces with the sensor, and controls the sampling rate etc. The inference engine does all other processing, in one embodiment. This processing includes step counting, gesture recognition, etc. In one embodiment, the inference engine resolves complex raw motion data into organized, actionable information.

FIG. 6B is a block diagram of one embodiment of a device architecture diagram. FIG. 6B shows an architecture in which the handheld device includes processing. This can be used in a scenario with a wirelessly tethered sensor (say a chest strap, mouse, etc.) or in a case where the MCU and the sensor both integrated in the device.

Under this architecture, the inference engine is divided into two components: min and max. The data analysis and computing is split between the MCU integrated with the accelerometer (min) and the main processor (max). In one embodiment, low complexity and high speed processing is done on the MCU and other more processor intensive computations are resolved on the main processor.

These are merely exemplary architectures. As is understood in the art, since none of these processes must be truly instantaneous, the processing may be performed remotely, and may be divided among the various devices and processors based on available processing power, speed requirements, and network availability and speed. In one embodiment, the handheld device may be an independent device, providing all processing during use.

FIG. 7 is a block diagram of one embodiment of the motion navigation system. Data from accelerometer 710 is fed into the motion navigation system 720. The motion navigation

system 720 includes data aggregator 725, to aggregate the accelerometer data. Intelligent signal interpretation engine (ISIE) 740 utilizes the aggregated accelerometer data, and the gesture data in the gesture library to determine whether the recorded accelerometer data corresponds to a gesture. In one embodiment, an adjustment logic 790 determines whether the identified gesture is currently available, i.e. has not be shut off. In one embodiment, the ISIE 740 also receives ambient noise data from ambient noise logic 745. Ambient noise includes any jiggling, shaking, or other motion which is "background noise." In one embodiment, people have an ambient noise level under various conditions, such as walking, talking, and even breathing deeply. Ambient noise cannot be removed from the accelerometer data, but in one embodiment the ISIE 740 can modify the recognition algorithms, depending on ambient noise level.

In one embodiment, the ambient noise level is a variable that is input in the gesture detection algorithm and is used to scale the magnitude of the gesture, i.e. if there is a lot of ambient noise, then a relatively large (more pronounced gesture) is necessary than if the device very still.

Similarly with the user's cadence when walking/jogging/running. The cadence is an input into the gesture recognition algorithms of the ISIE 740, and that input adjusts the gesture. In one embodiment, the cadence may change the gesture entirely, to a different gesture that's practical when running at that cadence.

In one embodiment, device location identifier 755 can tell from the motion signature of walking or other regular motions where the device is located. In one embodiment, this data is used by ISIE 740 to modify the gesture algorithm based on the devices location.

If the ISIE 740 identifies a gesture, and the gesture is available, the corresponding actions are retrieved from the gesture library 730. Translator 750 then translates the identified actions into commands for the mobile device.

In one embodiment, the gesture library 730 is populated by the user, using gesture registration logic 760. Gesture registration logic enables a user to define a motion, gesture, or set of motions, and associate one or more actions with the gesture. In one embodiment, the actions may be a series of actions. For example, a single motion may be used to dial a particular number, enter a passcode, and start playing a game.

Configuration logic 770, in one embodiment, allows the user to define actions which change the mobile device's configuration. For example, the emergency response may be to configure the mobile telephone to be a speaker phone, and set the volume to the maximum available volume. Configuration logic 770 interacts with the mobile device's settings, so the user may change the phone's configuration via gesture. For example, one of the defined gestures may change the mobile device's settings from "outdoors" to "meeting" without requiring the user to fuss with their telephone during a meeting.

Emergency logic 780 provides the special features associated with emergency gestures. This may include setting up a conference to enable the phone dial all identified parties substantially concurrently, providing a recorded outgoing message, turning off the incoming audio, etc. Emergency logic 780 is coupled to black box recorder 785, which provides a location to store the emergency record.

In the foregoing specification, the invention has been described with reference to specific exemplary embodiments thereof. It will, however, be evident that various modifications and changes may be made thereto without departing from the broader spirit and scope of the invention as set forth

in the appended claims. The specification and drawings are, accordingly, to be regarded in an illustrative rather than a restrictive sense.

What is claimed is:

- 1. A motion navigation system comprising:
 - an intelligent signal interpretation engine (ISIE) to receive motion data and to compare the motion data to registered motions corresponding to a gesture, and reject the motion data when the motion data does not match any of the registered motions, and to identify a gesture based on the motion data when the motion data matches the registered motions;
 - a gesture library to associate the gesture with an action;
 - a gesture registration logic to enable a user to add a new gesture to the gesture library, the gesture registration logic to compare a suggested gesture to a subset of known accidental motion patterns associated with activities that may be concurrent with the action associated with the suggested gesture prior to adding the suggested gesture to the gesture library as the new gesture, and to reject the suggested gesture when the suggested gesture matches any known accidental motion pattern in the subset of the known accidental motion patterns informing the user of the rejection and enabling the user to override the rejection and add the suggested gesture to the gesture library; and
 - a translator to generate one or more commands to execute the action associated with the gesture.
- 2. The system of claim 1, wherein the gesture registration logic is further to compare the suggested gesture to previously registered gestures.
- 3. The system of claim 1, further comprising:
 - an adjustment logic to identify an ambient noise level in the accelerometer data, and to adjust the gesture library to account for the ambient noise level.
- 4. The system of claim 1, further comprising:
 - an adjustment logic to identify a cadence of motion of the user, and to adjust the gesture library to account for the cadence of motion.
- 5. The system of claim 1, further comprising:
 - an adjustment logic to turn off availability of a gesture, when the gesture conflicts with a current activity level of the user.
- 6. The system of claim 5, wherein the gesture is only permitted registration when the current activity level and a command associated with the gesture do not occur concurrently.
- 7. The system of claim 1, further comprising:
 - an emergency logic to initiate an emergency process when an unobtrusive emergency gesture is received, the unobtrusive gesture designed to be difficult to observe by a third party.
- 8. The system of claim 7, further comprising:
 - a black box recorder to automatically initiate a full recording of data in a secure store on the device when the emergency logic initiates an emergency.
- 9. The system of claim 8, wherein the data comprises one or more of the following: audio data, video data, location data, and sensor data.
- 10. The system of claim 7, further comprising the emergency logic further to establish a connection with a contact, and to transmit data to the contact, without providing an audio or visual feedback at the mobile device.
- 11. A gesture recognition system in a handheld device including an accelerometer, the gesture recognition system comprising:

- a gesture registration logic to register a series of motions as a gesture made with the handheld device, the gesture registration logic to enable the user to register an unobtrusive emergency routine initiation gesture, the emergency routine initiation gesture designed to be easily performed and not easily viewed as an action by a third party observer, the emergency routine initiation gesture verified as not matching a subset of known accidental motion sequences associated with activities that may be concurrent with the initiation gesture;
- the gesture registration logic further to verify that a suggested gesture does not match the subset of known accidental motion sequences associated with activities that may be concurrent with the gesture, and to reject the suggested gesture when the suggested gesture matches any known accidental motion sequence in the subset of known accidental motion sequences, the gesture registration logic enabling the user to override the rejection and add the suggested gesture to the gesture library;
- an intelligent signal interpretation engine (ISLE) to recognize user movements as the emergency routine initiation gesture;
- an emergency logic to initiate an emergency sequence in response to the unobtrusive emergency routine initiation gesture, the emergency sequence designed to call for help on behalf of the user without providing visual or auditory feedback on the handheld device which may be detected by the third party observer.
- 12. The system of claim 11, further comprising:
 - a black box recorder to automatically initiate a full recording of data from the device in a secure store on the device when the emergency logic initiates an emergency.
- 13. The system of claim 12, wherein the data comprises one or more of the following: audio data, video data, location data, and sensor data.
- 14. The system of claim 11, further comprising the emergency logic further to establish a connection with a contact, and to transmit data to the contact.
- 15. The system of claim 14, wherein the data comprises one or more of the following: an emergency notification message, location data, and current data obtained by the handheld device.
- 16. A method comprising:
 - receiving a proposed new gesture for addition to a gesture library from a user;
 - determining a command associated with the proposed new gesture;
 - determining a plurality of activities that may be concurrent with the command associated with the proposed new gesture;
 - rejecting the proposed new gesture when the proposed new gesture is determined to be too close to a subset of known accidental motion patterns associated with the plurality of activities that may be concurrent with the command associated with the proposed new gesture, or when the proposed new gesture is determined to be too close to an existing gesture, and otherwise adding the proposed new gesture to the gesture library;
 - informing the user of the rejection and enabling the user to override the rejection and add the suggested gesture to the gesture library;
 - receiving accelerometer data;
 - identifying a gesture based on the accelerometer data and the gesture library; and
 - generating one or more commands based on the identified gesture.

- 17. The method of claim 16, further comprising:
rejecting the proposed new gesture if it is too close to an
existing gesture in the gesture library.
- 18. The method of claim 16, further comprising:
adjusting the gestures in the gesture library based on an ambient noise level. 5
- 19. The method of claim 16, further comprising:
an adjustment logic to identify a cadence of motion of the
user, and to adjust the gesture library to account for the
cadence of motion. 10
- 20. The method of claim 16, further comprising:
enabling registration of an unobtrusive emergency gesture
to initiate an emergency process when the unobtrusive
emergency gesture is detected.
- 21. The method of claim 16, further comprising: 15
turning off a gesture in the gesture library if the gesture
conflicts with a current activity level of the user.

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