

non-area constrained web browser) in order to supply the non-area constrained user interface using the flexible-retractable peripheral surface.

[0036] In alternative embodiments, as will be discussed in connection with FIG. 5, the flexible-retractable peripherals may be implemented as separate devices apart from the hand-held unit 100. For example, separate roll-out housings may be used for the keyboard and the LCD or LPD display. A personal area network such as a Bluetooth™ network may be provided to couple the peripherals to the handheld device 100. For example, in such embodiments, the LAN/WAN interface 150 includes a Bluetooth™ interface and the non-area constrained UI driver 130 is coupled to the processor 105 via the Bluetooth™ link.

[0037] A variant of the mobile unit 100 is a “generic mobile unit 100.” The generic mobile unit 100 is a variant that does not include the components 135, 140 and 145. The generic mobile unit 100 uses its LAN interface 150 to communicate with an external and stand-alone flexible-retractable peripheral 500 as discussed in connection with FIG. 5 and/or FIG. 6. The generic mobile unit 100 may use a short-range wireless protocol or a wired protocol to communicate with the external, stand-alone peripheral 500. The generic mobile unit 100 can present an area-constrained user interface to the user using its device-specific I/O hardware 127 as controlled by the area-constrained UI driver 125. The generic mobile unit can negotiate with the external flexible-retractable peripheral 500 and use its services to provide a non-area constrained UI or an extended viewing surface such as for video viewing in a vehicle. At the present time, refresh rates for flexible displays are relatively slow, but motion picture viewing is possible and its quality (resolution and sustainable frame refresh rate) is expected to improve in the near future.

[0038] In accordance with an aspect of the present invention, the generic mobile unit 100 uses the memory 115 to hold one or more video programs. The video programs are stored in a compressed digital format such as MPEG-1 or some other video compression format such as a wavelet based video compression format. The area constrained user interface 125, 127 is used to control the downloading of video programs into the memory 115 or to cause video to be streamed into the generic mobile unit 100 via the LAN/WAN interface 150. The area-constrained UI hardware 127 preferably includes a small viewing surface for viewing, but this is optional. This variant of the generic mobile unit 100 uses the LAN (or PAN) aspect of the LAN/WAN interface 150 to transmit the video content to the external stand-alone flexible-retractable peripheral 500. This embodiment of the present invention enables a class of hand-held (or wrist-watch-worn) video players that enable users to view music videos and other forms of recorded video programming (television shows, movies, etc.). In a system in accordance with the present invention the video player involves the previously described video player and the external peripheral 500. The inventive system also preferably implements the method 600. In a preferred embodiment, the external peripheral 500 includes a video decoder circuit in its electronics section (510) so that the mobile unit can transmit the video programming in the compressed format. In some cases it will be possible for the external peripheral 500 to be powered by a power source such as a car battery, as will be

evident from the discussion below. Further discussions of such embodiments are provided in connection with FIG. 5 and FIG. 6.

[0039] FIG. 2 illustrates a method of processing 200 used in a handheld mobile unit such as a smart phone. The hand-held mobile unit presents an area-constrained user interface to a user (205). The area-constrained user interface is supported by a set of device-specific user interface hardware such as found on the front of a smart phone device. The hand-held mobile unit also provides an operating system environment for the user to run local and/or remote application programs (210). The remote application programs are typically provided by a remote Internet server or a network server supplied by a carrier network. In some cases the remote programs are supplied by a local server such as one coupled to a wireless LAN such as an 802.11 LAN or a Bluetooth™ LAN (also called a PAN—personal area network).

[0040] Next the handheld unit extends a set of one or more flexible-retractable peripherals (215). For example these peripherals are supplied on one or more rollers and the user pulls them out or one or more motors cause them to automatically roll out. Similarly to some cameras, a fold-out crank lever can also be used to manually crank the flexible-retractable peripheral from its housing. In other examples the flexible-retractable peripherals are extended by pulling them from a contracted accordion-like state. A motor can also be used to extend or retract accordion-style flexible-retractable peripherals. The flexible-retractable peripherals preferably include a keyboard and a LCD display monitor. A configuration change is signaled once the flexible peripherals are in their extended state or when a user hits a reconfiguration button or otherwise signals reconfiguration (220). Next the handheld mobile unit is operated with a non-area-constrained user interface using the extended peripherals and possibly an extra mouse device such as an external Bluetooth™ mouse or by using a button supplied on the area-constrained user interface of the handheld unit (225). In some embodiments the mouse device may be built into the flexible-retractable keyboard or LCD display monitor. In embodiments that use external peripherals as illustrated in FIG. 5, the mobile unit 100 may include an optical input-output coupling so that the mobile unit 100 itself may be used as an optical mouse (similar to the Microsoft™ optical mouse). The non-area constrained UI is used to support a non-area constrained operating system interface and/or a local or remote application program. This method and its variants will be better understood in light of FIGS. 3-5.

[0041] FIG. 3 is a schematic drawing illustrating a front view of a hand-held mobile unit 300 that uses flexible and retractable peripherals. The hand-held mobile unit 300 includes a hand-held enclosure 305. The hand-held enclosure 305 may be designed in various ways to provide a given look, feel and style to the user. The hand-held enclosure 305 may embody a smart phone, a PDA, a video player or other mobile computing device. The hand-held enclosure 305 houses the electronics as indicated by FIG. 1. Onto the hand-held enclosure 305 is built a device-specific input-output interface 310 that supports an area-constrained user interface. For example, a local application program or a remote WML-based application server will provide specialized content for display on the device-specific and area-