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(54) Title: GRAPHICAL WALLPAPER LAYER OF A MOBILE DEVICE

(57) Abstract: A computer readable storage medium encoded with non-transitory software for execution by a CPU of a mobile device having a touch sensitive display. The software is configured for generating on the display a graphical wallpaper layer having a plurality of image elements arranged to collectively form a coherent background image and receiving from a remote location via a wireless connection data defining at least one functional attribute and at least one style attribute of a visual icon to be displayed on the graphical wallpaper layer. The software is further configured for displaying on the display the visual icon according to style attribute information conveyed by the style attribute and, in response to detection of user interaction with the visual icon, triggering a function defined by the functional attribute.

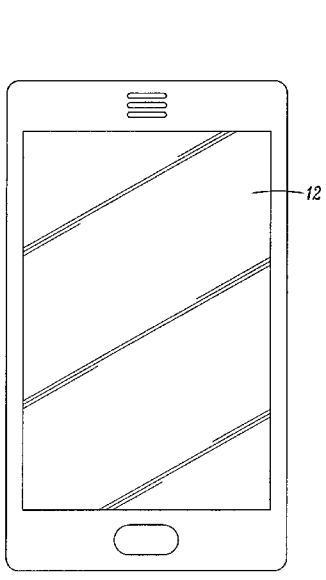

FIG. 1

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GRAPHICAL WALLPAPER LAYER OF A MOBILE DEVICE

Field of the invention

The present invention relates to computer implemented methods for generating an interactive wallpaper on the display of a mobile device. The invention also extends to devices and components thereof for performing the methods.

Background

Mobile devices such as smart phones or tablet computers that use a touch sensitive display implement, a graphical user interface that has a graphical wallpaper layer on which application icons are rendered. In its simplest form of implementation, the graphical wallpaper layer is essentially a background image that the user can generate from personal media files or can purchase from an online store. The graphical wallpaper layer can be static such as a still image or can show animation. In the latter case, the image is formed of a plurality of graphical elements that can move one with relation to the other.

It is also known in the art to provide graphical wallpaper layers which are interactive and respond graphically to interaction with the user. The interaction can be in the form of the touch screen interaction during which the user touches the display with one or more fingers. Another form of interaction can be triggered by imparting movement to the mobile, such as by shaking it. The motion is detected and a motion signal is conveyed to the logic that manages the graphical wallpaper layer and causes the graphical wallpaper layer to respond to that interaction.

In a specific example, the graphical wallpaper layer contains one or more animated objects that respond individually to a touch screen interaction. When the user touches the screen that coincides with one of the objects, an animation sequence is triggered during which the object appears to move along a certain path on the screen. For instance the object may be a ball and when "swiped" by the finger of the user, the ball moves in a direction that is consistent with the angle of the swipe.

The general drawback of currently available graphical wallpaper layers is they provide only a limited degree of user interaction such that over a short period of time the user would typically lose interest and cease to interact with the wallpaper layer.

An object of the invention is to provide a graphical wallpaper layer that has an enhanced entertainment value by providing elements of surprise which can enhance the user experience.

Summary of the invention

In a broad aspect, the invention provides a computer implemented method for generating a graphical user interface [hereinafter "GUI"] on a mobile device having a touch sensitive display. The method includes the steps of generating on the display a graphical wallpaper layer having a plurality of image elements arranged to form a background image and receiving, from a remote location via a wireless connection, data defining at least one functional attribute and at least one style attribute of a visual icon to be displayed on the graphical wallpaper layer. The functional attribute defines the behavior of the visual icon in response to user interaction when the visual icon is rendered on the display. The style attribute defines the visual appearance of the icon. The method further includes the optional step of displaying the visual icon on the graphical wallpaper layer in a predetermined spatial relationship with one or more of the plurality of the image elements, where the display is performed in accordance with the style attribute information. When the mobile detects user interaction with the visual icon, it performs the function that is defined by the functional attribute.

A plurality of application icons that reside in an application icons layer are positioned visually on top of the graphical wallpaper layer, such that the graphical wallpaper layer appears to a user to reside in the background of the application's icon layer. That is, the background image is visible through the application icons layer. In response to detection of a user interaction with an application icon, the mobile performs a process that is distinct from the function that is associated with the visual icon.

In a specific and nonlimiting example of implementation, the graphical wallpaper layer is managed by a program code that is executed by the CPU of the mobile. The program code determines the behavior of the wallpaper layer. More specifically, the program code is associated with image elements that compose a background image and optionally determines how the various elements of the background image react to user interaction. The image elements may be static and arranged one with relation to another to form a larger compound image corresponding to a certain visual theme. Yet another possibility is to use a combination of static and animated image elements, to provide an enhanced entertainment value to the user.

The program code also manages one or more visual icons that provide a certain functionality to the graphical wallpaper layer. The visual icons are graphical components that have parameters which determine their appearance and also their behavior. Specifically, the visual icons have style attributes which can be remotely set to determine how the icon will be rendered on the display. Similarly, the visual icons have functional attributes, which can also be remotely set to define the behavior of the visual icon.

The program code manages the layout of various components of the wallpaper layer, in particular the graphical elements which form the background image and the visual icons such as to create a common visual theme. This is achieved by controlling the location in the visual icon such that it is in a predetermined spatial relationship to another graphical element of the background image. For instance, if the visual icon is an airplane that moves across the display, its location will be controlled by the program code such that it remains within the portion of the background image that represents the sky. In this fashion, the visual icon appears to the user to be part of the background image and not as an extraneous element. The visual theme is thus preserved in the eye of the observer when the visual icon is rendered by the program code.

The style attributes of the visual icon can define its color, its size, the object, which the visual icon represents, and also provide animation parameters such as the speed of motion and the path of travel, among others. When the visual icon is animated, its spatial relationship with relation to one or more image elements in the background image is still controlled by the program code. If the visual icon undergoes displacement, such as an automobile or a plane,

its path of travel is constrained with relation to a particular image element in the background image. For instance, in the case of an automobile, the movement of the automobile will be constrained such that it remains within the boundaries of an image element representing a road.

The functional attributes, which determine the behavior of the visual icon, can include an URL directing the user to a website. In this case, when the user touches the visual icon, the functional attribute will open a browser and load the content at the website location defined by the URL.

This interactive wallpaper layer provides enhanced entertainment value by presenting the user periodically with surprise elements that were not observable previously in the wallpaper layer. The user can then activate selectively surprise elements.

Control of the surprise elements is performed remotely. At certain times (e.g., at periodic intervals or at other moments established according to a schedule remotely decided and managed or selected on-demand), a notification is sent to the mobile from a remote location, which communicates to the mobile data such as the style attribute and the functional attribute of one or more visual icons. This remote control mechanism makes it possible to vary, over time, the function which the visual icon will perform in response to the interaction with the user. For instance, if the function is to direct the user to a website, then by sending different URL data, the user is directed to a different website. The graphical wallpaper layer can thus be used to perform marketing by associating a visual icon to a product or a service provider. The style attribute, in the functional attributes remotely sent, can be designed to make the logo of a business organization appear, associate it with the function and direct the user to the website of the business organization.

Accordingly, the invention broadly provides a computer readable storage medium encoded with non-transitory software for execution by a CPU of a mobile device having a touch sensitive display. The software is configured for generating on the display a graphical wallpaper layer having a plurality of image elements arranged to collectively form a coherent background image and receiving from a remote location via a wireless connection data defining at least one functional attribute and at least one style attribute of a visual icon to be

displayed on the graphical wallpaper layer. The software is further configured for displaying on the display the visual icon according to style attribute information conveyed by the style attribute and, in response to detection of user interaction with the visual icon, triggering a function defined by the functional attribute.

As embodied and broadly described herein, the invention further provides a method for creating an interactive wallpaper layer on a display of a mobile device. The method including receiving at the mobile device image data from a remote location, rendering on the display on the basis of the image data a background image of a graphical wallpaper layer, the background image having a plurality of image elements arranged to collectively form a coherent background image and receiving at the mobile device from the remote location via a push notification data defining at least one functional attribute and at least one style attribute of a visual icon to be displayed on the graphical wallpaper layer. The method further includes rendering on the display the visual icon according to style attribute information conveyed by the style attribute and, in response to detection of user interaction with the visual icon, triggering a function defined by the functional attribute.

As embodied and broadly described herein, the invention further includes a method for managing a user interaction with a display of a mobile, the method comprising rendering on the display a background layer including a background image element and a visual icon, the visual icon being responsive to a user touch to trigger a function associated with the visual icon and rendering on the display a foreground layer including a plurality of application icons responsive to a user touch to launch respective applications, the rendering of the foreground layer being such as to allow at least a portion of the background image and the visual icon to remain visible. The rendering of the background layer including selecting a location for the visual icon to avoid the visual icon from overlapping with an application icon of the foreground layer. The method further includes sensing a user touch on the display that registers with the visual icon and triggering in response to the sensing the function associated with the visual icon.

As embodied and broadly described herein the invention also includes a method for managing a user interaction with a display of a mobile, the method comprising rendering on the display a background layer including a background image element and a visual icon, the

visual icon being responsive to a user touch to trigger a function associated with the visual icon and rendering on the display a foreground layer including a plurality of application icons responsive to a user touch to launch respective applications, the rendering of the foreground layer being such as to allow at least a portion of the background image and the visual icon visible. The method, in response to an ambiguous user interaction with the display including a touch on the display that registers both with an application icon and the visual icon, selecting a function to trigger among the function associated with the visual icon and a function associated with the application icon by using as a factor a priority condition indicating which layer among the background and foreground layers takes precedence during the ambiguous user interaction. The method further includes sensing a user touch on the display that registers with the visual icon and triggering in response to the sensing the function associated with the visual icon.

As embodied and broadly described herein, the invention further includes a computer readable storage medium encoded with non-transitory software for execution by a CPU of a mobile device having a touch sensitive display, the software being configured for generating on the display a graphical wallpaper layer sequentially displaying multiple scenes of a story, each scene displaying a plurality of story objects and receiving from a remote location via a push notification data defining at least one additional story object. The method further includes associating a function with the additional story object and displaying the additional story object in a scene that is being depicted by the graphical wallpaper layer, the additional story object being displayed subsequent the depiction of the scene such as to appear to the user as an element of surprise enhancing the original scene, the additional story object being contextually linked to other story objects of the scene such as to form a coherent image. The method includes in addition displaying an application icons layer such that the scene including the additional story object is visible through the application icons layer, the application icons layer including a plurality of application icons responsive to user interactions to trigger respective applications and, in response to detection of user interaction with the additional story object, triggering a function associated with the visual icon.

In a specific and non-limiting example of implementation, the function associated with the visual icon includes opening a browser and directing the user to a location defined by a URL. For instance, that location can be a web site of a commercial entity providing a product or

service advertisement. The URL can be conveyed in the push notification that defines the visual icon.

In another non-limiting example of implementation, the push notification conveys a style attribute relating to the visual icon. The software displays the visual icon according to the style attribute information. The style attribute information convey the logo of a commercial entity, when the function associated with the visual icon is one where the user is directed to the web site of the commercial entity. The visual icon can be stationary or animated. When the visual icon is stationary, the style attribute defines the location of the visual icon in the scene, for instance the location of the visual icon relative to another scene object.

The visual icon can also be animated. In such instance, the style attribute information conveys an animation parameter, such as the path of travel of the visual icon on the display and relative to other scene objects.

In another example of implementation, the software is configured for resolving an ambiguous user interaction with the display. An ambiguous user interaction occurs when a touch on the display that registers both with an application icon and the visual icon. The software selects the function to trigger on the basis of a priority indicator a priority indicator, indicating which layer among the background and the application icons layer takes precedence.

In yet another example of implementation, the software is configured to display the visual icon at a location on the display to avoid the visual icon overlapping with an application icon of the applications icon layer. When the visual icon is animated and moves along a path of travel on the display, the software being configured to compute the path of travel to avoid the visual icon from intersecting an application icon of the application icons layer.

Brief description of the drawings

Figure 1 is a perspective view of a mobile which constitutes a computer platform for executing program code to implement the graphical wallpaper layer, in accordance with a specific and nonlimiting example of implementation of the invention;

Figure 2 is a conceptual diagram of the display of the mobile showing the graphical wallpaper layer and the applications icon layer;

Figure 3 is a functional block diagram of the mobile of Figure 1;

Figure 4 is a block diagram illustrating the various functions and the general structure of the program which implements the graphical wallpaper layer, according to a specific and nonlimiting example of implementation of the invention;

Figure 5 is a flowchart of the method for generating a graphical user interface of the mobile of Figure 1 as a result of execution of the program shown in figure 4;

Figure 6 is a sub-process of the method shown in Figure 5;

Figure 7 is a flowchart illustrating a process for determining a location of the visual icon that takes into account the location of application icons;

Figure 8 is a generalized representation of a display screen of a smart phone illustrating a preferential mask for locating a visual icon;

Figure 9 is a flowchart of a process for selectively controlling the response of the visual icon depending on its location with relation to application icons;

Figures 10A to 10H show changes in an image formed by the wallpaper layer to convey a story in accordance with an embodiment of the invention;

Figures 11 and 12 show examples of visual icons included in the image formed by the wallpaper layer as the story is being conveyed;

Figure 13 shows an example of data accessible to a remote server to cause the wallpaper layer rendered on the mobile device to convey the story; and

Figure 14 is a flowchart of an example of a process for presenting episodes of the story conveyed by the wallpaper layer rendered on the mobile device.

Detailed description

Figure 1 is a generalized representation of a mobile 10 on which the graphical wallpaper layer can be implemented. The mobile 10 can be a smart phone, a tablet computer or any other generally portable computing device that can communicate wirelessly with remote stations over a data network. The Internet is an example of such data network. A wireless connection over which the mobile 10 communicates may be established on a cellular network operated by a wireless carrier, a wireless local area network (WLAN), or any other suitable wireless network.

The mobile 10, which in this particular case is a smart phone 10, has a display screen 12 on which is rendered a graphical user interface that allows the user to interact with the smart phone 10. At the physical level, the user interacts with the graphical user interface by touching the display screen 12 which is touch sensitive and can detect the location on which the finger of the user has been placed. The interaction can also involve multiple fingers and gestures such as the user swiping in different directions with a single or multiple fingers.

The user can interact with the smart phone 10 also by imparting a motion to the smart phone 10. Examples include shaking the smart phone 10 which is picked up by the accelerometer built into the smart phone 10 and which generates an appropriate signal which the operating system can process as user input. Yet another possibility is to interpret as user interaction a motion which orients the smart phone 10 toward a certain location, for example to the North which is sensed by a magnetic field sensor that generates a user interaction signal. A further possibility is to consider as user interaction the positioning of the smart phone 10 at a precise geographical location or within a certain geographical area. Geographical location information is reported by the GPS sensor of the smart phone 10 that issues a corresponding user interaction signal.

Figure 3 is a general block diagram of the smart phone 10 showing the key hardware elements of the device. The smart phone 10 is essentially a computing platform that includes

a CPU 14, a machine readable storage 16 and a user interface 18. The machine readable storage 16 can take various forms without departing from the spirit of the invention and it is designed to store program code for execution by the CPU 14. Typically, the machine readable storage 16 is designed to retain data in a permanent fashion such that when power is turned off, the data will not be lost.

The CPU 14 and the machine readable storage 16 communicate with one another over a data bus 20.

The user interface 18 collectively designates the various functions of the smart phone 10 that allow the user to input information and also to receive information. More specifically, the user interface 18 includes the touch sensitive display 12, the accelerometer (not shown in the drawings), a magnetic field sensor (not shown the drawings) and a GPS sensor (not shown in the drawings). Note that this list is not exhaustive and the smart phone 10 may include additional input means such as specific buttons placed on the casing on the smart phone 10 to activate different functions.

The collection of hardware elements that constitute the user interface 18 generate user interface signals that are directed to the data bus 20 such that those signals can be processed by the CPU 14.

In addition, the smart phone 10 includes radio transmission and reception functions to enable wireless data and voice communications. More specifically, the smart phone 10 is enabled to exchange data over a cellular network or a Wi-Fi or a Bluetooth connection.

Figure 4 includes a high-level block diagram of the software architecture that operates the smart phone 10. The software includes an operating system 22 that manages the basic functions of the smart phone 10. The operating system 22 is the software platform that enables execution of a wide range of applications. One of those applications is a wallpaper layer control module 24 that will be described in detail hereinafter. The operating system 22 has two modules that provide services to the wallpaper layer control module 24. More specifically, the operating system 22 has a notification center 26 and a user interactions

manager 28 which are generic in the sense that they also provide services to other applications executing on the smart phone 10.

The notification center 26 broadly refers to the range of hardware and software functionalities that receive messages directed to anyone of the applications executing on the smart phone 10. Examples of notifications include SMS messages and e-mail among others. The notification center 26 is designed to receive a message and determine the application among the set of applications in the smart phone 10 which is the designated recipient of the notification. This identification is performed in a known manner and there is no need to discuss it in detail. Once the determination is made, the notification is sent to the respective application for processing.

The user interactions manager 28 broadly designates the hardware and software functionalities that sense user interactions and generate a corresponding user interaction signal which is directed to the appropriate application. As discussed earlier, user interactions include user interactions with the display screen 12 and motion imparted to the smart phone 10, among others. When the user interactions module 28 senses an interaction, it generates an interaction signal which conveys the interaction parameters to the application. The interaction parameters describe the kind of interaction such as a finger touch on the display screen 12 and the interaction specifics such as the location on the display on which the interaction was sensed.

The wallpaper layer control module 24 includes three main functional blocks, namely a background image manager 30, a visual icons manager 32 and a user interaction control 34.

The background image manager 30 is responsible for generating a background image. The background image is made up of several graphical image elements which are laid out to create a compound background image. Typically, the background image represents a certain visual theme and the individual graphical image elements are components of that theme. For example, the background image theme can be the ocean floor. In such case, rocks on the floor, vegetation and marine animals are the graphical image elements that visually unite to makeup the theme.

In one possible form of implementation, the background image is a static image, hence it is formed of a single graphical image element. In another form of implementation, the background image includes several graphical elements which are static, in other words, the various image elements do not move.

Alternatively, the graphical image elements can be animated. In the case of marine animals such as fish, they can be shown as moving.

As shown in figure 4 the individual graphical image elements 36 are objects that have parameters which define how the various graphical image elements 36 will be rendered on the display 12 and optionally define a functional behavior of the graphical image elements 36. Specifically, the parameters fall in two broad categories namely style parameters which determine how the graphical image element 36 will look on the display screen 12 and functional parameters, which are optional, and which determine a behavior of the graphical image element 36. The style parameters include characteristics such as the color of the graphical image element 36, its location (to the extent that it is static) on the display screen 12, and animation characteristics if the graphical image element 36 is animated. Taking again the example of fish as a graphical image element 36, the style parameter will determine the outline and coloring of the fish, while the animation parameters determine its motion on the display screen 12.

The functional parameters of the graphical image elements 36 determine the behavior of the graphical image element 36 in response to interaction with the user. For instance, when a finger touch is detected on the display screen 12 which coincides with the location of a graphical image element 36, that element may be programmed to respond in a certain way which can be visually entertaining for a user. For example, by "touching" a ball, the ball can be caused to move, change color, change size or perform some other function.

Some or all of the parameters of the graphical image element 36 can be remotely set via the notification center 26. Specifically, a remote server 51 can send data which changes the style or the functional behavior of one or more graphical image elements 36. This is useful when it is desired to integrate in the wallpaper layer real-time notifications. Such notifications may include information about current weather conditions, traffic conditions or results of a

sporting event. Consider the example of a background image theme of a soccer match. One graphical image element 36 represents the spectators watching the sporting event. That particular element is animated when one of the teams scores a goal. The animation sequences are triggered in synchronism with a real game that is being played. In this case, the remote server which pushes notifications to the smart phone 10 has access to soccer match scores and when a goal is being scored, pushes a notification which triggers the animation cycle. The notifications may be sent by the remote server 51 at certain times, such as at periodic intervals or at other moments established according to a schedule determined and managed at the remote server 51 or selected on-demand.

In the case of weather conditions, push notifications that convey current weather conditions set the style parameters of graphical image elements 36 that represent weather elements such as the sun, clouds or rain.

The visual icons manager 32 controls the generation on the display screen 12 of visual icons that are also graphical elements. The visual icons are responsive to user interaction and thus have a functional behavior in addition to their aesthetical value. An example of a functional behavior in response to user interaction is to open a browser and direct the user to a certain website. This function can be used to deliver advertisement for the user via graphical elements that tie with the wallpaper layer theme. For instance, in the case of a marine animal theme, the visual icon could be a marine animal on which appears a company logo. The user can click on the fish which would direct the user to the advertiser's website.

The visual icons are remotely set, in the sense that the way they appear and the functions they provide can be remotely controlled. The remote control aspect of these components allows to continuously inject in the wallpaper layer new content in order to maintain user interest over a long period of time. Thus, new visual icons can be rendered on the wallpaper layer and/or visual icons rendered on the wallpaper layer can be deleted remotely (e.g., in response to user interaction).

The appearance and functional behavior of each visual icon is controlled by style attributes and functional attributes. The style attributes include information that determines how the visual icon will appear on the display screen 12. Examples of style attributes include the

image that will be rendered, such as fish, a plane, an automobile, a shoe, a ball, a tennis racket, etc. The style attribute also includes information about the color on the visual icon or the combination of colors and their relative disposition. Further, the style attribute includes marketing information such as a company name or a company logo or the product name or product logo. The style attributes may include a 3D model that can be used to display a two-dimensional image via a 3D rendering process.

Style attributes also include information that determines the location of the visual icon on the display screen 12 where it will be rendered. In the case of a visual icon which is static, in other words it is not animated, the location of the visual icon can be set in relationship to a graphical element of the background image. In this fashion, the visual icon can be positioned properly in the theme. For instance, if the visual icon is a rock on the ocean floor, its location is selected relative to be ocean floor graphical element. In this fashion, the visual icon that would appear on the display screen 12 of the smart phone 10 would be visually integrated into the marine image. The location information may be preset in the sense that it may not be remotely changeable. In this case, the position of the visual icon is predetermined with relation to another graphical element of the background image. Another possibility is to provide several optional positions for the visual icon, each position being related to one or more graphical elements of the background image. In this instance, the style attribute information which is received from the remote node may specify a location chosen among the set of predetermined locations for the visual icon.

When the visual icon is animated, the style attribute information which is received from a remote source contains animation information such as the path of travel of the visual icon on the display screen 12 and the time during which the visual icon will be seen. As in the example discussed earlier, the visual icons manager 32 may contain program code that animates the visual icon according to a series of predetermined animation sequences. Each animation sequence may include different paths of travel of the visual icon and may keep the visual icon visible for different amounts of time. The style attribute information which is sent remotely, designates an animation sequence among the set of predetermined animation sequences for the visual icon.

The animation sequences for the visual icon are all designed to locate the visual icon in relation to a graphical element of the background image, such that during the movement of the visual icon the object that it represents remains consistent with the theme of the wallpaper layer. For example, when a visual icon represents an airplane or balloon, its animation sequence is constrained to keep the icon within the boundary of a graphical element of the background image that represents the sky. In this fashion, theme and image consistency is preserved.

Thus, the style attribute information which manages the appearance of the visual icon on the display screen 12 contains different elements of information, some of or all of which can be remotely sent. In the example where the basic parameters of the visual icon are preprogrammed, such as all the allowable animation sequences or positions in the case of the static object, the information that is remotely sent only needs to specify the desired animation sequence or position among those in the predetermined set. This approach reduces the amount of information that is to be sent at the expense of flexibility, since only so many different options are available. Another example is to remotely send location information or animation information to the visual icon manager, which will then process it to render the visual icon on the display screen 12 according to those commands. In both cases, however, the rendering of the visual icon is done with relation to the position of a graphical element in the background image.

The style attribute information may be directly included in the push notification or only a reference to it may be included, such that the visual icons manager accesses the location of the information in the reference and imports it from that location. The location may be local to the smart phone 10 or it can be remote to it. For example, the location may be the pictures repository on the smart phone 10 allowing to extract one or more pictures from that repository that can be used as a basis for creating the visual icon image. If the location is remote, it can be a website which contains a vast assortment of images which can be used for generating the visual icon. In such instance, the style attribute information designates in addition to the site location the address of the image which is desired.

The functional attribute information defines, at least in part, the behavior of the visual icon when the user interacts with it. In a simple example, when the user touches the location of the

visual icon on the display screen 12, the process opens a browser and directs the user to a website. If the style attribute information contains a company name, company logo, product name or a product logo, the functional attribute information would contain the URL at which the user can obtain more information about a product or service that is designated by the company or product name or logo. The website to which the user is referred may contain simply additional information about products or services or it can be a page of an online merchant site on which the product can be directly purchased online.

Figure 2 shows an example of a wallpaper layer according to an example of implementation of the invention. The wallpaper layer is rendered on the display screen 12 of the smart phone 10 and forms the background image of the display screen 12 on top of which is placed an applications icon layer. The applications icon layer is rendered such that it visually appears to the user that it overlays the wallpaper layer. In the example shown in the drawing, the applications layer includes 5 icons that are related to different applications or functions of the smart phone 10. The user can interact with the applications layer to trigger the applications associated with the respective icons. A typical interaction would be by touching the desired icon with a finger, however, other types of interactions are possible as discussed previously.

In the example shown, the applications layer includes a phone icon to trigger the voice communication function on the smart phone 10. Thus, by touching the phone icon, the user is directed to a page at which a phone call can be initiated. There is also an icon for contacts that, in response to activation, launches a contacts page. Yet there is a browser icon which upon activation launches the browser function.

The wallpaper layer 38 displays a background image of a tennis court. The background image includes a series of graphical elements. In particular, the background image includes in its lower portion an image 40 of the tennis court itself. An image element 42 which overlays the tennis court image 40 and which is positioned in its center represents the logo of a particular tournament or challenge. The logo 42 is a graphical image element 36 that can be remotely set to match a particular tournament or challenge occurring at a certain venue.

A combination of graphical elements that are grouped make up a display board that separates the tennis courts 40 from the audience. The combination of graphical elements includes a

first section 44 that provides current weather conditions at the venue where the real tournament is being played. The graphical image element 36 which represents the first section 44 is being remotely set via push notifications to provide real-time weather information. The push notifications that drive the graphical image element 36, forming the first section 44, is thus a remote weather service.

To the left of the first section 44 is located a second section 46 that provides information on the current score. The graphical element associated with first section 44 is also active in the sense that it provides real-time score information. That information is supplied via push notifications from a sporting score service.

The third section 48 of the display board is normally blank and it appears in the background color of the board. Thus, the graphical element of the background image wallpaper layer is a static element of a certain color namely black. In the example shown, a marketing message appears but that message is a visual icon overlay that will be discussed in detail later.

Above the display board is an image of an audience 50. The graphical image element 36 which is associated with the audience 50 is normally static but can be animated in response to a push notification. Thus, the graphical image element 36 has a static state which is its normal state and also an animated state that shows people clapping or cheering when one of the opponents playing scores a point. The graphical image elements 36 representing the audience can be driven by the same push notification that drives the graphical element representing the score in the second section 46. The background image manager has a logic which upon the detection of a score change, which is done by examining the content of the push notifications directed to the graphical element representing the second section 46, causes the graphical image element 36 representing the audience 50 to briefly enter the animated state when the score changes.

Above the audience 50 is located yet another area 52 that represents the sky. Within that area 52, two flags are shown each being associated with a distinct graphical image element 36. The first flag 54 shows an image of the current tournament or challenge and it is the same as the one shown by the logo 42. The flag 54 is animated. The background image manager 30

thus contains the program code to create the graphical information movement that simulates a flag in the wind.

The other flag 56 is the flag of the country hosting the tournament or challenge. The graphical element associated with the flag 56 is also animated.

Figure 5 is a flowchart of a method which illustrates the main steps of the process performed by the wallpaper layer control module 24 in generating the wallpaper layer. During the initial step 60 the background image manager 30 generates the background image including the static graphical elements and the animated graphical image elements 36. Push notifications occasionally sent periodically refresh the information on some of the graphical image elements 36 such as the weather information and the current score.

At step 62 the visual icons manager 32 generates a visual icon within the background image which creates an element of surprise to the user by showing additional information and also additional functionality. The visual icon in this example is a banner that appears on the display board within the third section 48. The visual icon within that area is generated as a result of a push notification that contains information to define the appearance and functionality of the visual icon. In particular, the push notification conveys a name and a logo of a business organization and an associated background color, which in this example is blue. The visual icons manager 32 locates the company and logo information in relation to the other graphical elements defining the background image such that the company logo and name would appear to the observer as if they are displayed on the display board. By visually locating the icon in this position, the image and the theme integrity are preserved.

The push notification associated with the visual icon also contains the URL location at which additional information is available in connection with the company name or product or service being advertised.

At step 64, the wallpaper layer control module 24 manages user interactions. One such interaction occurs when the user touches the visual icon in area 48. When such an interaction is sensed, the wallpaper layer control module 24 triggers a browser to direct the user to the

location specified in the URL sent via the push notification. The flowchart at Figure 6 exemplifies this process.

The wallpaper layer and the applications layer are visually and functionally interrelated because they share the display screen 12 of the smart phone 10. From a visual perspective, the various icons making up the applications layer appear on top of the wallpaper layer. From a functional perspective, user interactions with the display screen 12 may need to be managed in order to resolve possible ambiguities regarding the function that the user is desirous to activate. For example, if the user touches the location of the display screen 12 on which an application icon is rendered, and which also coincides with a graphical element of the wallpaper layer that is interactive, the logic of the smart phone 10 may not be able to positively determine the function to perform; launch the process that is associated with the application icon or launch the process associated with the interactive graphical element.

One possible approach is to give priority to the applications layer. If there is any ambiguity as to what function the user interaction designates, trigger the process associated with the application icon. While this approach preserves the applications layer functionality and provides unimpeded access to it, it may not be optimal from a user experience perspective in instances when the user rather desires to interact with the wallpaper layer.

The reverse approach would be to provide priority to the graphical element, the visual icon in particular, however a similar user experience problem would arise when the user desires to trigger an application from the applications layer but invokes the function associated with the wallpaper layer instead.

Figure 7 is a flowchart of a process that allows the wallpaper layer control module 24 to manage the location of the visual icon on the display to reduce the ambiguity. At step 70, wallpaper layer control module 24 obtains from the operating system the layout of the applications layer. The information which is being provided thus designates the areas of the display screen 12 that contain application icons and which, therefore, are not suitable locations for placement of a visual icon. At step 72, the wallpaper layer control manager computed a preferential location mask for the visual icon. The preferential location mask is the portion of the display screen 12 that is not occupied by any application icon. Typically

this would be the space that exists around and in-between the application icons arrangement of the particular smart phone 10.

Figure 8 illustrates conceptually, a display screen 12 on which application icons 80 are placed. Six application icons 80 are distributed in two columns. The preferential location mask is the space 82 that exists around and between the application icons 80. This mask is the preferential space for placing the visual icon in order to prevent confusion.

Referring back to the flowchart at Figure 7, in particular to step 74, the wallpaper layer control module computes a final location for the visual icon. The final location computation takes into account all the factors indicated earlier, namely the relative location to a graphical element of the background image and the preferential mask. Note that situations may arise in which it may not be possible to determine a position for the visual icon that matches both criteria, namely placing the visual icon at a location that is not obscured by an icon of the applications layer and also it is at the proper relationship with the graphical element of the visual icon. In such case, priority is given to the relationship with the graphical element which creates the visual theme consistency.

In cases where the several positions exist for locating the visual icon relative to a graphical element of the background image, a selection process can be made to select the best position in order to avoid overlapping an icon of the applications layer. For example, if the visual icon is a marine vegetal that grows on a rock, and if several rocks are seen on the ocean floor, it may not visually matter on which rock the vegetal will be placed. In this case, several possibilities thus exist for the location of the visual icon. In such case, the step 74 performs a selection process of those locations on the basis of the preferential location mask. The process involves determining for each location whether the visual icon is within the preferential location mask, i.e. the area 82. In the affirmative, the location becomes a candidate location otherwise it is rejected. The final location is thus selected among the candidate locations, in other words the locations in which the visual icon will not overlap with an icon of the applications layer.

In situations where the visual icon is animated and it is caused to move across the display screen 12 along a path of travel, this path may be further constrained based on the

preferential location mask. Recall that the visual icons manager 32 constrains the animation space i.e. the space in which the visual icon will be allowed to move with relation to a graphical element of the background image. Step 74 adds another level of constrain to restrict the movement such that the visual icon does not overlap with the application icons. For instance, step 74 computes a path of travel that excludes from the possible areas of motion of the visual icon the areas in which application icons are located. The resulting path of travel is computed such that it does not intersect any application icon.

Another possible refinement is to selectively control the response of the visual icon when a user interaction with the display is detected. An example of a selective control is to negate any response from the visual icon when the visual icon overlaps with an application icon. This approach is particularly suitable for animated visual icons that have a path of travel that intersects one or more application icons. When the visual icon overlaps with an application icon, it does not respond to user interactions. The response to a user interaction is enabled when the visual icon does not overlap with an application icon.

Figure 9 illustrates this process. The process assumes an animated visual icon that is set in motion on the display screen 12. At step 90, the position of the visual icon is determined on the display screen 12 with relation to the application icons. Step 92 compares the position of the visual icon with the preferential location mask. Basically if step 92 determines that the coordinates of the visual icon fall in the area defined by the preferential location mask, then step 92 would conclude that no overlap with an application icon exists.

Processing then passes to step 94 that enables the response to user interaction. If a user touch is detected on the display screen 12 that registers with the location of the visual icon, the visual icon will respond in a predetermined fashion. The sequence of steps 90, 92 and 94 is repeatedly executed as long as no overlap is being detected. However, if an overlap with an application icon is detected, processing branches to step 96 that would de-activate the response of the visual icon to a user interaction. By de-activation it is meant that the response is not the same as the normal response. One example of de-activation is for the visual icon to do nothing. Another example is to provide a minimal response which does not interfere with the launch of the process associated with the application icon that is overlapping with the visual icon. A minimal response can be a sound, slight alternation of the animation sequence

or another. The point is to acknowledge the interaction but not to interfere with the application icon.

Once step 96 completes, the execution returns to step 90 and the cycle continues.

It is also possible to provide to the user a visual cue to identify whether the visual icon is in an active state or in an inactive state. This is done by changing the appearance of the visual icon when the visual icon is in a position that overlaps with an application icon. The change of position can be a process that is an extension of the process at step 96 of Figure 9. Thus in addition to disabling the response of the visual icon, its appearance is changed. The change of appearance can vary greatly without departing from the spirit of the invention. One example of a change of appearance is to hide the visual icon. The hiding can be progressive as the visual icon intercepts the application icon to provide the illusion it is passing under it. As the visual icon emerges from the other side of the application icon, it is progressively rendered, again to provide the illusion of being in the background.

Yet another possible example is to change the appearance of the application icon and also the appearance of the visual icon. When step 96 executes, it sends a signal to the operating system 22 to change the appearance of the application icon such as by making it transparent. In this fashion the visual icon can still be seen when it overlaps with the application icon, however its appearance is changed signaling to the user a change in functionality.

In some embodiments, the wallpaper layer rendered on the display screen 12 of the smart phone 10 can convey a story to the user. The story includes a sequence of episodes that are conveyed by the wallpaper layer over a period of time (e.g., a plurality of minutes, hours, days or weeks). Each episode includes a change of an image formed by the wallpaper layer to convey at least one event occurring in the story. Thus, one or more graphical image elements 36 of the image formed by the wallpaper layer, which may include one or more graphical image elements of a background image and/or one or more visual icons integrated into the background image as discussed above, are changed in each episode to convey one or more events occurring in the story. By presenting different episodes at different moments, the story can keep the user interested in viewing and interacting with the wallpaper layer rendered on smart phone 10.

A story conveyed by the wallpaper layer rendered on the display screen 12 of the smart phone 10 can be any desired story, which can have any desired length (e.g., spanning only a few minutes or hours or spanning several days or weeks) and any desired plot (e.g., a simple plot with a few events or an intricate plot with several complexly-arranged events).

For instance, an example of a story conveyed by the wallpaper layer rendered on the display screen 12 of the smart phone 10 will be discussed with reference to Figures 10A to 10H. In this example, the story is about a windmill 110 that is broken or dilapidated and gets fixed. The wallpaper layer forms an image of the windmill 110 in its environment, including the ground 112 around the windmill 110, a flowerbed 114 on which a butterfly larva 115 is located, and the sky 116 above the windmill 110.

At the story's beginning, the windmill 110 is broken or dilapidated, as shown in Figure 10A which depicts the image formed by the wallpaper layer during an initial episode of the story. Various parts of the windmill 110 are missing as if they were torn off (e.g., due to the windmill 110 having gone through a hurricane) or they deteriorated over time as the windmill 110 fell into ruin.

As the story unfolds, the windmill 110 is gradually repaired over time, as shown in Figures 10B to 10E which depict the image formed by the wallpaper layer during subsequent episodes of the story. The environment of the windmill 110 also undergoes certain changes during these episodes, as illustrated in Figures 10B to 10E. In Figure 10B, walls of a body 118 of the windmill 110 are being erected using materials 120 retrieved from the ground 112 and scaffolding 119 on the windmill's base. In Figure 10C, the body 118 of the windmill 110 is nearly completed, the scaffolding 119 is higher, and fewer of the materials 120 remain on the ground 112. In Figure 10D, the body 118 of the windmill 110 is completed, a cap 122 of the windmill 110 is being constructed, there are no more of the materials 120 on the ground 112, and a sail (i.e., vane or blade) 124 of the windmill 110 is placed on the ground 112 ready to be installed. In Figure 10E, a hot air balloon 130 appears in the sky 116 and moves towards the windmill 110. The hot air balloon 130 is thus an animated graphical image element of the image formed by the wallpaper layer.

At the story's end, the windmill 110 has been repaired and its sails 124 start to turn, as shown in Figures 10F to 10H which depict the image formed by the wallpaper layer during a final episode of the story. The windmill 110 with its sails 124 in motion is thus an animated graphical image element of the image formed by the wallpaper layer. Also, in this final episode, the hot air balloon 130 continues to move in the sky 116 towards the windmill 110. In addition, in this final episode, the butterfly larva 115 on the flowerbed 114 turns into a butterfly 135 which flaps its winds. The butterfly 135 is thus an animated graphical image element of the image formed by the wallpaper layer.

Once the story is completed, a message (e.g., a pop-up message) may be presented on the wallpaper layer rendered on the smart phone 10 to indicate to the user that the story is over. In some cases, a new story may begin to be conveyed by the wallpaper layer after a certain period of time (e.g., the following day).

While the story considered above is one example of a story that is relatively simple, as mentioned previously, a story conveyed by the wallpaper layer rendered on the display screen 12 of the smart phone 10 can be any desired story. For instance, other examples of stories that may be conveyed by the wallpaper layer rendered on the smart phone 10 may include: a story about a large bush being sculptured into an object (e.g., a dinosaur) in which the user may guess what the end sculpture will be as the sculpture evolves during the episodes; a story about a marriage proposal via a flying airplane in which the plane has a message banner and repeatedly files across the sky with progressively more and more of the message being revealed during the episodes; a story about Noah's Ark in which Noah builds the Ark during the episodes to save himself, his family, and the world's animals from a coming deluge; a comic book story in which the episodes are comic book panels that represent individual scenes often accompanied by dialog (e.g., in word balloons) and/or brief descriptive prose; or any other conceivable story.

As a story is being conveyed by the wallpaper layer rendered on the display screen 12 of the smart phone 10, a graphical image element 36 of the image formed by the wallpaper layer may be a visual icon which, if touched or otherwise acted upon by the user, triggers performance of a function according to a functional attribute associated with the visual icon, as discussed previously. For instance, in the example considered above, as shown in Figure

11, the hot air balloon 130 may be a visual icon that includes a banner 150 generated as a result of a push notification that contains information to define the appearance and functionality of the banner 150, including a name and a logo of a business organization to appear in the banner 150 and a URL location at which additional information is available in connection with the company name or product or service being advertised. When the user touches or otherwise acts upon the banner 150 of the hot air balloon 130, the wallpaper layer control module 24 triggers the mobile device's browser to direct the user to the location specified in the URL sent via the push notification.

A graphical image element 36 of the image formed by the wallpaper layer as part of a story conveyed by the wallpaper layer may be based on real-time information. For instance, in the example considered above, the graphical image element 36 depicting the sky 116 may be based on current weather conditions (e.g., sunny, cloudy, rainy, etc.) where the user is located such that the sky 116 represents these current weather conditions.

A story conveyed by the wallpaper layer rendered on the display screen 12 of the smart phone 10 may be integrated into other functions performed by the smart phone 10. For example, in some embodiments, a phone call notification, an SMS notification, a calendar alert, a ringtone, an alarm tone, a keyboard theme, or any other function of the smart phone 10 may be tailored based on the story. For instance, in the example considered above, an SMS notification may include an image of the butterfly 135 appearing in the story, a ringtone may include a bird sound reminiscent of a bird appearing in the story (not shown), etc. To that end, the remote server 51 can send data defining visual, audible, or other characteristics of the phone call notification, SMS notification, calendar alert, ringtone, alarm tone, keyboard theme, etc. tailored based on the story such that it can be processed by the operating system 22 of the smart phone 10 and executed by the appropriate application on the smart phone 10.

The user may communicate with other people based on a story conveyed by the wallpaper layer rendered on the display screen 12 of his/her smart phone 10. For example, in some embodiments, the user may interact with his/her smart phone 10 to send the image currently formed by the wallpaper layer and representing a current point in the story to another individual's mobile device. As another example, in some embodiments, the user may interact

with his/her mobile device to post an object in the story and depicted in the wallpaper layer on a social networking site (e.g., Facebook™). For instance, in the example considered above, the user may interact with his/her smart phone 10 to "cut" a flower recently grown in the flowerbed 114 during the story and post it on his/her account on the social networking site. As yet another example, the user may interact with his/her smart phone 10 to push a change to a wallpaper layer rendered on a mobile device of another user who is following the story. For instance, in the above example, the user may interact with his/her smart phone 10 to trigger appearance of a rainbow in the wallpaper layer rendered on a mobile device of another user who is following the story. The wallpaper layer control module 24 running on the smart phone 10 implements functionality to enable the user to perform these actions on the smart phone 10.

The wallpaper layer control module 24 may enable the user to interact with his/her smart phone 10 to personalize the wallpaper layer and/or functions of the smart phone 10 based on his/her favorite episode from a story that has been conveyed by the wallpaper layer. For example, the user may interact with his/her smart phone 10 to select an instance of the image formed by the wallpaper layer during a particular episode of the story and set it as a current wallpaper image on the smart phone 10 and/or to configure a call notification, an SMS notification, a ringtone, or any other suitable function of the smart phone 10 based on an object having appeared in the story.

In this embodiment, as shown in Figure 13, the remote server 51 has access to a database 75 storing data regarding stories that can be conveyed by the wallpaper layer rendered on the display screen 12 of the smart phone 10. Data 78 regarding a story that can be conveyed by the wallpaper layer rendered on the smart phone 10 includes data 68 regarding each episode of the story. The data 68 regarding a given episode of the story includes the style parameters and, if applicable, the functional parameters of the graphical image elements 36 to be displayed in the image formed by the wallpaper layer to convey the given episode of the story. The data 78 regarding the story also reflects an order of the episodes of the story to ensure that the episodes are presented in the correct sequence. The data 78 regarding the story may also include data defining visual, audible, or other characteristics of a phone call notification, SMS notification, calendar alert, ringtone, alarm tone, keyboard theme, or other

function of the smart phone 10 that may be tailored based on the story such that the remote server 51 can send this data to the smart phone 10 for processing.

Presentation of episodes of a story conveyed by the wallpaper layer rendered on the display screen 12 of the smart phone 10 may be controlled in various ways. An example of a process for presenting the episodes of the story will be discussed with reference to a flowchart shown in Figure 14.

At step 210, an initial episode of the story is presented. For instance, in this embodiment, upon the wallpaper layer control module 24 being provided (e.g., downloaded and installed) in the smart phone 10, a message (e.g., a pop-up wizard) is displayed to the user to explain that the wallpaper layer will change to convey the story and possibly that one or more functions of the smart phone 10 (e.g., a call notification, an SMS notification, a ringtone, etc.) will be adapted based on the story. The message may also prompt the user to enter certain information that can be used in adapting the story (e.g., the user's geographical location if a GPS sensor is not available in the smart phone 10). Once the user has considered the message and accepted to proceed (e.g., by clicking on an "accept" button on the display screen 12), the story begins with its initial episode being presented to the user. To that end, in this embodiment, the remote server 51 sends push notifications to the smart phone 10 to cause the image formed by the wallpaper layer rendered on the smart phone 10 to change to convey the initial episode of the story.

At steps 230 to 270, subsequent episodes of the story are presented. More particularly, at step 230, the remote server 51 determines whether a subsequent episode of the story is to be presented.

For example, in some cases, the data 68 regarding a given episode of the story may include temporal information indicative of a time at which the given episode is to be presented. The time may be an absolute time (e.g., 6:00 AM or 12:00 PM) or a relative time specified in relation to a time at which the previous episode of the story was presented (e.g., 10 minutes, 2 hours, or 24 hours after the previous episode was presented). When the time to present the subsequent episode has arrived, the remote server 51 sends push notifications to the smart

phone 10 to cause the image formed by the wallpaper layer rendered on the smart phone 10 to change to convey the subsequent episode of the story.

As another example, in some cases, a graphical image element 36 appearing in the image formed by the wallpaper layer rendered on the smart phone 10 may be a visual icon whose functional attribute is such that, when the visual icon is touched or otherwise acted on by the user, the smart phone 10 sends a trigger to the remote server 51 causing transmission of data by the remote server 51 to the smart phone 10 to change the image formed by the wallpaper layer rendered on the smart phone 10 to convey the subsequent episode of the story. For instance, in the example considered above, as shown in Figure 12, the remote server 51 may send a push notification to cause a visual icon rendered as a blinking upward arrow 167 to appear overlaid on the windmill 110 to indicate that repair of the windmill 110 is to continue. When the user touches or otherwise acts upon the upward arrow 167, the wallpaper layer control module 24 of the smart phone 10 triggers the remote server 51 to transmit data to the smart phone 10 to change the image formed by the wallpaper layer rendered on the smart phone 10 to convey the subsequent episode of the story.

As yet another example, in some cases, the remote server 51 may send a push notification to the smart phone 10 to indicate to the user that a new episode of the story is available and prompt the user to touch or otherwise interact with the smart phone 10 to trigger transmission of data by the remote server 51 to the smart phone 10 to change the image formed by the wallpaper layer rendered on the smart phone 10 to convey the subsequent episode of the story. For instance, the push notification sent to the smart phone 10 may cause display of a message (e.g., a pop-up message) advising the user that the subsequent episode is available and prompt the user to request it (e.g., a "show next episode" button).

When the remote server 51 determines that a subsequent episode of the story is to be presented, at step 250, the remote server 51 sends data to the smart phone 10 to cause the image formed by the wallpaper layer rendered on the smart phone 10 to change to convey the subsequent episode of the story.

When the remote server 51 has not determined that a subsequent episode of the story is to be presented, the process continues to determine whether a subsequent episode of the story is to be presented.

After a most recent episode of the story has been presented, at step 270, the remote server 51 determines whether this episode is the final episode of the story. If so, at step 290, the story ends and, as indicated above, this may be indicated to the user by presenting a message (e.g., a pop-up message) to that effect on the wallpaper layer rendered on the smart phone 10. In some cases, a new story may begin to be conveyed by the wallpaper layer after a certain period of time (e.g., the following day), as indicated by a dotted arrow in Figure 14. If the most recent episode that has been presented is not the final episode of the story, the process continues to determine whether a subsequent episode of the story is to be presented.

While the example above illustrates one possible process for presenting episodes of a story conveyed by the wallpaper layer rendered on the smart phone 10, episodes of a story may be presented in various other ways in other embodiments. For example, in some embodiments, data defining some or all of the content (e.g., graphical image elements 36) of one or more episodes of a story may be stored in the smart phone 10 and processed locally by the smart phone 10 without involving the remote server 51.

Any feature of any embodiment discussed herein may be combined with any feature of any other embodiment discussed herein in some examples of implementation.

Although various embodiments and examples have been presented, this was for the purpose of describing, but not limiting, the invention. Various modifications and enhancements will become apparent to those of ordinary skill in the art and are within the scope of the invention.

CLAIMS

1. Computer readable storage medium encoded with non-transitory software for execution by a CPU of a mobile device having a touch sensitive display, the software being configured for:
   - generating on the display a graphical wallpaper layer having a plurality of image elements arranged to collectively form a coherent background image;
   - receiving from a remote location via a wireless connection data defining at least one functional attribute and at least one style attribute of a visual icon to be displayed on the graphical wallpaper layer;
   - displaying on the display the visual icon according to style attribute information conveyed by the style attribute;
   - in response to detection of user interaction with the visual icon, triggering a function defined by the functional attribute.

2. Computer readable storage medium as defined in claim 1, wherein the visual icon is static.

3. Computer readable storage medium as defined in claim 2, wherein the style attribute conveys information determining a location of the visual icon on the display with relation to one or more of the image elements.

4. Computer readable storage medium as defined in claim 1, wherein the visual icon is animated.

5. Computer readable storage medium as defined in claim 4, wherein the style attribute information conveys an animation parameter of the visual icon.

6. Computer readable storage medium as defined in claim 1, wherein the functional attribute conveys a URL, the function triggered by the detection of user interaction with the visual icon including opening a browser and directing the user to a location defined by the URL.

7. Computer readable storage medium as defined in claim 1, wherein the software is further configured for displaying an application icons layer rendered such that it appears to the user as overlaying the wallpaper layer, wherein the background image is visible to the user through the application icons layer, the application icons layer including a plurality of application icons responsive to user interactions to trigger respective applications.

8. Computer readable storage medium as defined in claim 7, wherein the software is further configured for resolving an ambiguous user interaction with the display including a touch on the display that registers both with an application icon and the visual icon, the processing of the ambiguous user interaction including selecting a function to trigger among the function defined by the functional attribute and which is associated with the visual icon and a function associated with the application icon by using as a factor a priority condition indicating which layer among the background and the application icons layer takes precedence during the ambiguous user interaction.

9. Computer readable storage medium as defined in claim 7, wherein the software is configured to render the visual icon at a location on the display to avoid the visual icon overlapping with an application icon of the applications icon layer.

10. Computer readable storage medium as defined in claim 9, wherein the visual icon is animated and moves along a path of travel on the display, the software being configured to compute the path of travel to avoid the visual icon from intersecting an application icon of the applications icon layer.

11. Computer readable storage medium as defined in claim 1, wherein the coherent background image is a scene of a story having multiple scenes.

12. Computer readable storage medium as defined in claim 11, wherein the plurality of image elements correspond to scene objects collectively depicting the scene of the story, the visual icon depicting an additional scene object.

13. Computer readable storage medium as defined in claim 12, including changing periodically the image elements of the coherent background image to depict a new scene of the story.

14. A method for creating an interactive wallpaper layer on a display of a mobile device, the method including:
    - receiving at the mobile device image data from a remote location;
    - rendering on the display on the basis of the image data a background image of a graphical wallpaper layer, the background image having a plurality of image elements arranged to collectively form a coherent background image;
    - receiving at the mobile device from the remote location via a push notification data defining at least one functional attribute and at least one style attribute of a visual icon to be displayed on the graphical wallpaper layer;
    - rendering on the display the visual icon according to style attribute information conveyed by the style attribute;
    - in response to detection of user interaction with the visual icon, triggering a function defined by the functional attribute.

15. A method as defined in claim 14, wherein the visual icon is static.

16. A method as defined in claim 15, wherein the style attribute conveys information determining a location of the visual icon on the display with relation to one or more of the image elements.

17. A method as defined in claim 14, wherein the visual icon is animated.

18. A method as defined in claim 17, wherein the style information conveys an animation parameter of the visual icon.

19. A method as defined in claim 14, wherein the functional attribute conveys a URL, the function triggered by the detection of user interaction with the visual icon including opening a browser and directing the user to a location defined by the URL.

20. A method as defined in claim 14, wherein the software is further configured for displaying an application icons layer rendered such that it appears to the user as overlaying the wallpaper layer, the application icons layer including a plurality of application icons responsive to user interactions to trigger respective applications.

21. A method as defined in claim 20, wherein the software is further configured for resolving an ambiguous user interaction with the display including a touch on the display that registers both with an application icon and the visual icon, the processing of the ambiguous user interaction including selecting a function to trigger among the function defined by the functional attribute and which is associated with the visual icon and a function associated with the application icon by using as a factor a priority indicator indicating which layer among the background and the application icons layer takes precedence during the ambiguous user interaction.

22. A method as defined in claim 20, wherein the software is configured to render the visual icon at a location on the display to avoid the visual icon overlapping with an application icon of the applications icon layer.

23. A method as defined in claim 22, wherein the visual icon is animated and moves along a path of travel on the display, the software being configured to compute the path of travel to avoid the visual icon from intersecting an application icon of the applications icon layer.

24. A method for managing a user interaction with a display of a mobile, the method comprising:
    - rendering on the display a background layer including a background image element and a visual icon, the visual icon being responsive to a user touch to trigger a function associated with the visual icon;
    - rendering on the display a foreground layer including a plurality of application icons responsive to a user touch to launch respective applications, the rendering of the foreground layer being such as to allow at least a portion of the background image and the visual icon to remain visible;

- the rendering of the background layer including selecting a location for the visual icon to avoid the visual icon from overlapping with an application icon of the foreground layer;
- sensing a user touch on the display that registers with the visual icon and triggering in response to the sensing the function associated with the visual icon.

25. A method for managing a user interaction with a display of a mobile, the method comprising:
    - rendering on the display a background layer including a background image element and a visual icon, the visual icon being responsive to a user touch to trigger a function associated with the visual icon;
    - rendering on the display a foreground layer including a plurality of application icons responsive to a user touch to launch respective applications, the rendering of the foreground layer being such as to allow at least a portion of the background image and the visual icon visible;
    - in response to an ambiguous user interaction with the display including a touch on the display that registers both with an application icon and the visual icon, selecting a function to trigger among the function associated with the visual icon and a function associated with the application icon by using as a factor a priority condition indicating which layer among the background and foreground layers takes precedence during the ambiguous user interaction;
    - sensing a user touch on the display that registers with the visual icon and triggering in response to the sensing the function associated with the visual icon.

26. Computer readable storage medium encoded with non-transitory software for execution by a CPU of a mobile device having a touch sensitive display, the software being configured for:
    - generating on the display a graphical wallpaper layer sequentially displaying multiple scenes of a story, each scene displaying a plurality of story objects;
    - receiving from a remote location via a push notification data defining at least one additional story object;
    - associating a function with the additional story object;

- displaying the additional story object in a scene that is being depicted by the graphical wallpaper layer, the additional story object being displayed subsequent the depiction of the scene such as to appear to the user as an element of surprise enhancing the original scene, the additional story object being contextually linked to other story objects of the scene such as to form a coherent image;
- displaying an application icons layer such that the scene including the additional story object is visible through the application icons layer, the application icons layer including a plurality of application icons responsive to user interactions to trigger respective applications;
- in response to detection of user interaction with the additional story object, triggering the function.

27. Computer readable storage medium as defined in claim 26, wherein the function includes opening a browser and directing the user to a location defined by a URL.

28. Computer readable storage medium as defined in claim 27, wherein the push notification conveys the URL.

29. Computer readable storage medium as defined in claim 26, wherein the push notification conveys a style attribute relating to the visual icon, the software being configured for displaying the visual icon according to style attribute information conveyed by the style attribute.

30. Computer readable storage medium as defined in claim 29, wherein the visual icon is animated.

31. Computer readable storage medium as defined in claim 30, wherein the style attribute information conveys an animation parameter of the visual icon.

32. Computer readable storage medium as defined in claim 26, wherein the software is further configured for resolving an ambiguous user interaction with the display including a touch on the display that registers both with an application icon and the visual icon, the processing of the ambiguous user interaction including selecting a

function to trigger among the function associated with the visual icon and a function associated with the application icon by using as a factor a priority indicator indicating which layer among the background and the application icons layer takes precedence during the ambiguous user interaction.

33. Computer readable storage medium as defined in claim 26, wherein the software is configured to display the visual icon at a location on the display to avoid the visual icon overlapping with an application icon of the applications icon layer.

34. Computer readable storage medium as defined in claim 26, wherein the visual icon is animated and moves along a path of travel on the display, the software being configured to compute the path of travel to avoid the visual icon from intersecting an application icon of the application icon layer.

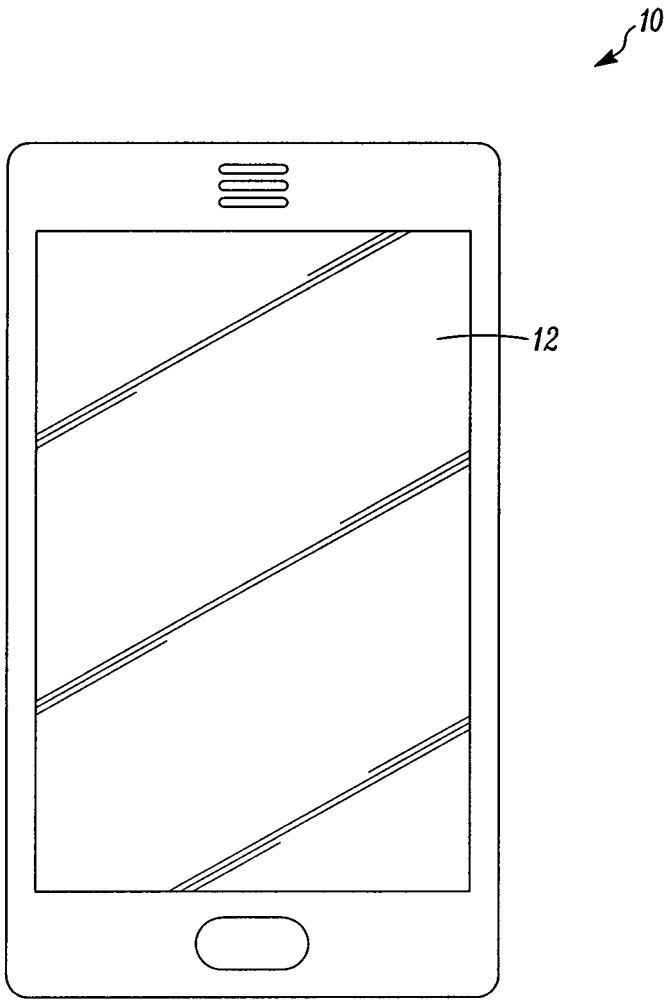


FIG. 1

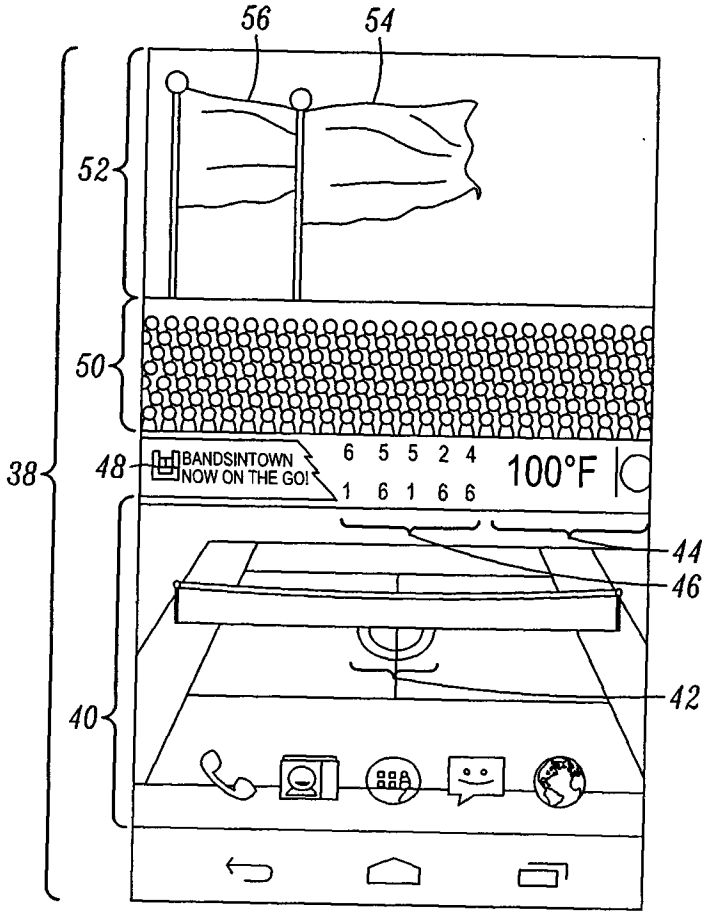

56
54
52
50
38
48
BANDSINTOWN
NOW ON THE GO!
6 5 5 2 4
1 6 1 6 6
100°F
44
46
42
40

FIG. 2

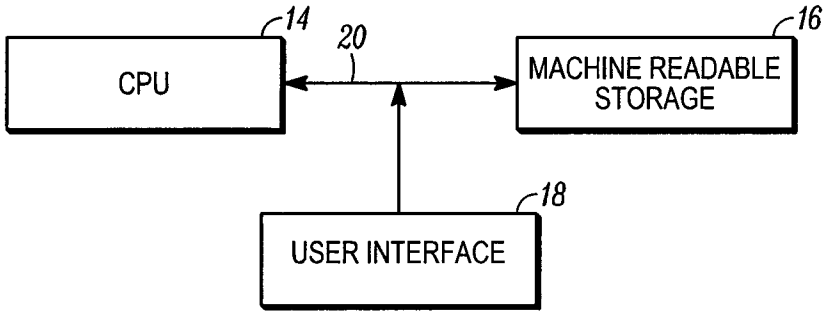

14
20
16
CPU
MACHINE READABLE STORAGE
18
USER INTERFACE

FIG. 3

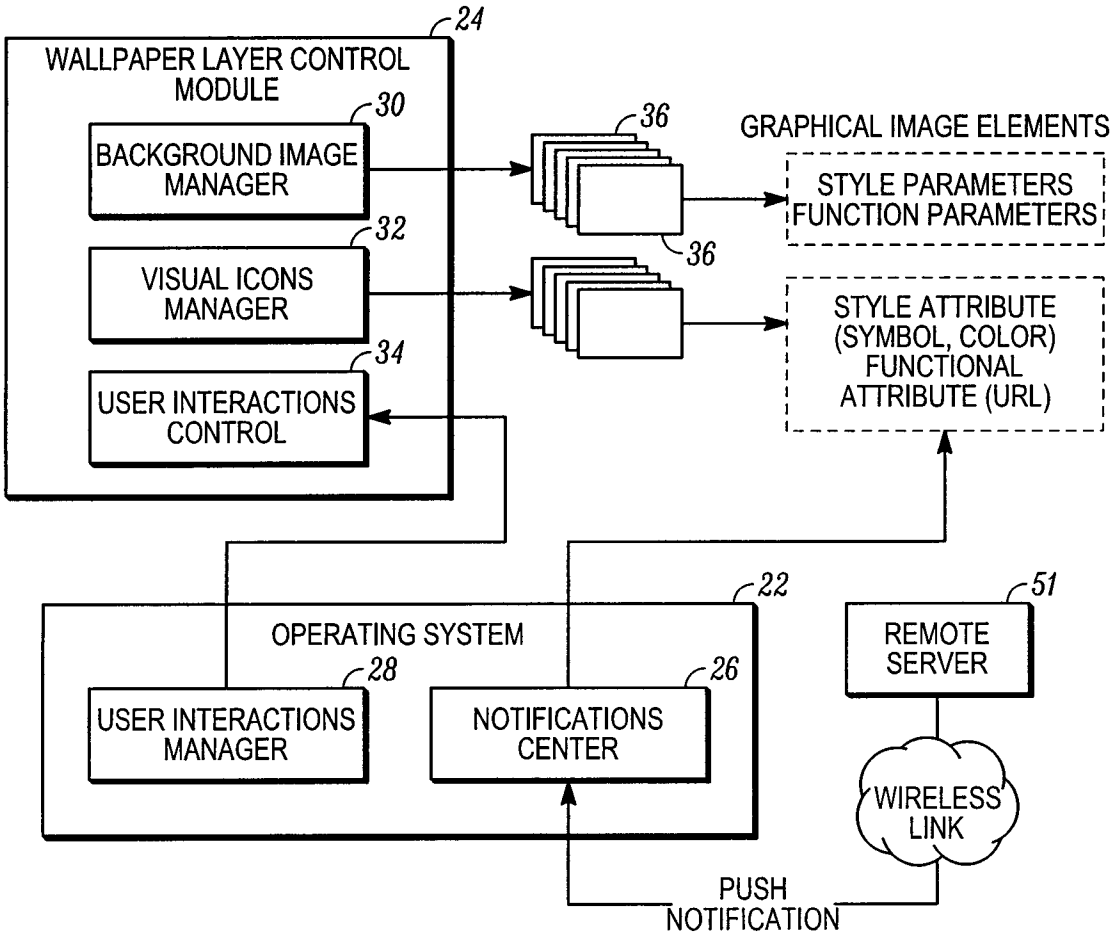

24
WALLPAPER LAYER CONTROL MODULE
30
BACKGROUND IMAGE MANAGER
32
VISUAL ICONS MANAGER
34
USER INTERACTIONS CONTROL
36
36
GRAPHICAL IMAGE ELEMENTS
STYLE PARAMETERS FUNCTION PARAMETERS
STYLE ATTRIBUTE (SYMBOL, COLOR) FUNCTIONAL ATTRIBUTE (URL)
22
OPERATING SYSTEM
28
USER INTERACTIONS MANAGER
26
NOTIFICATIONS CENTER
51
REMOTE SERVER
WIRELESS LINK
PUSH NOTIFICATION

FIG. 4

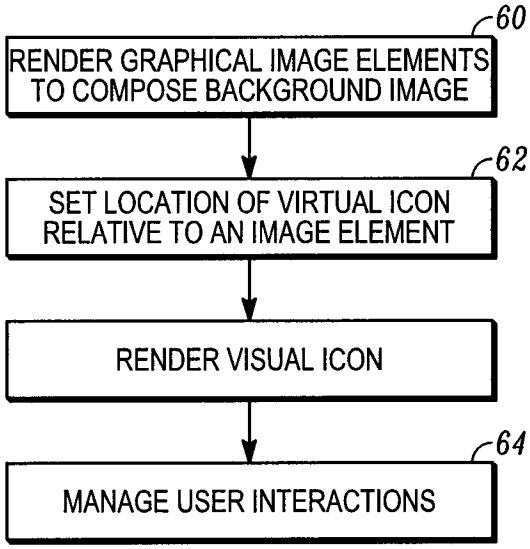


FIG. 5

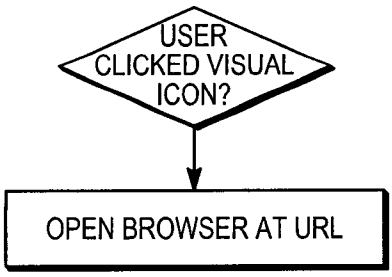


FIG. 6

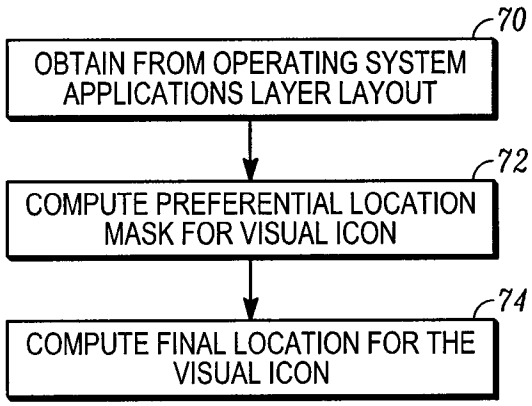


FIG. 7

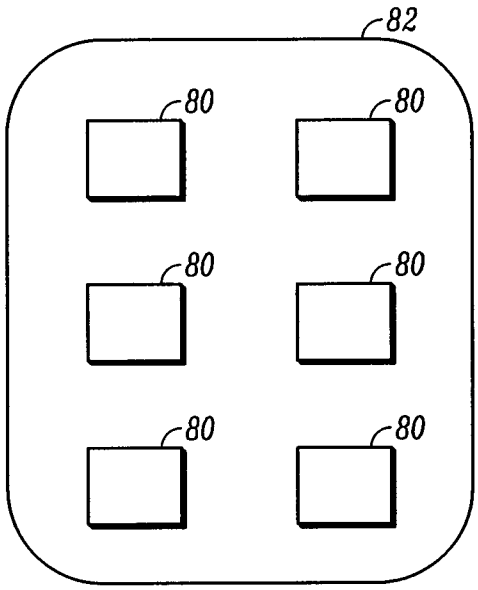

82
80
80
80
80
80
80

FIG. 8

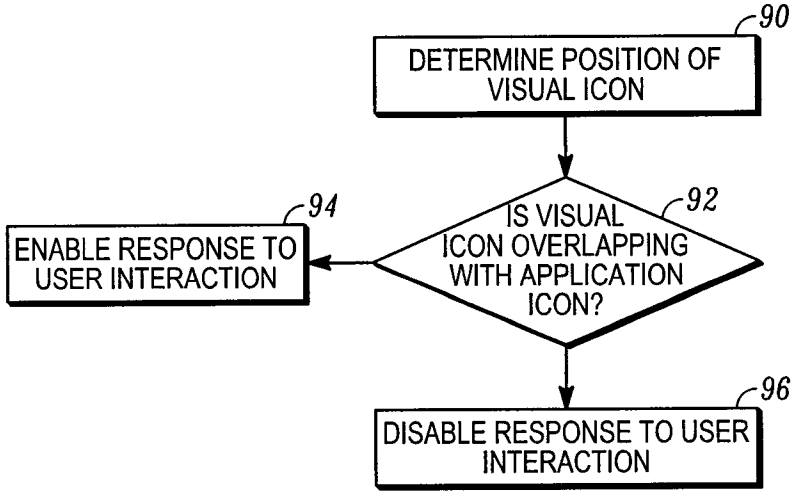

90
DETERMINE POSITION OF VISUAL ICON
92
IS VISUAL ICON OVERLAPPING WITH APPLICATION ICON?
94
ENABLE RESPONSE TO USER INTERACTION
96
DISABLE RESPONSE TO USER INTERACTION

FIG. 9

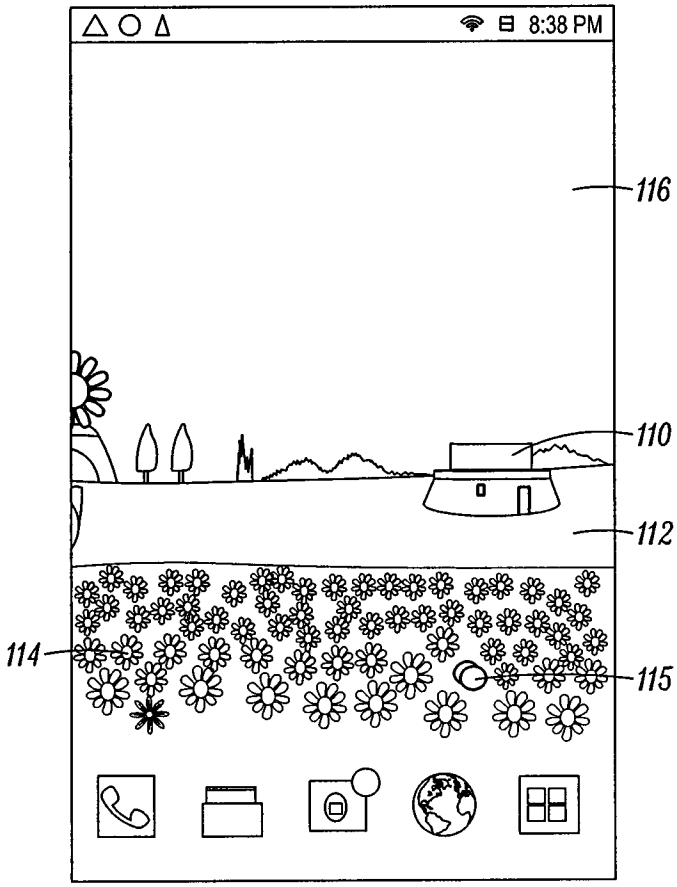


FIG. 10A

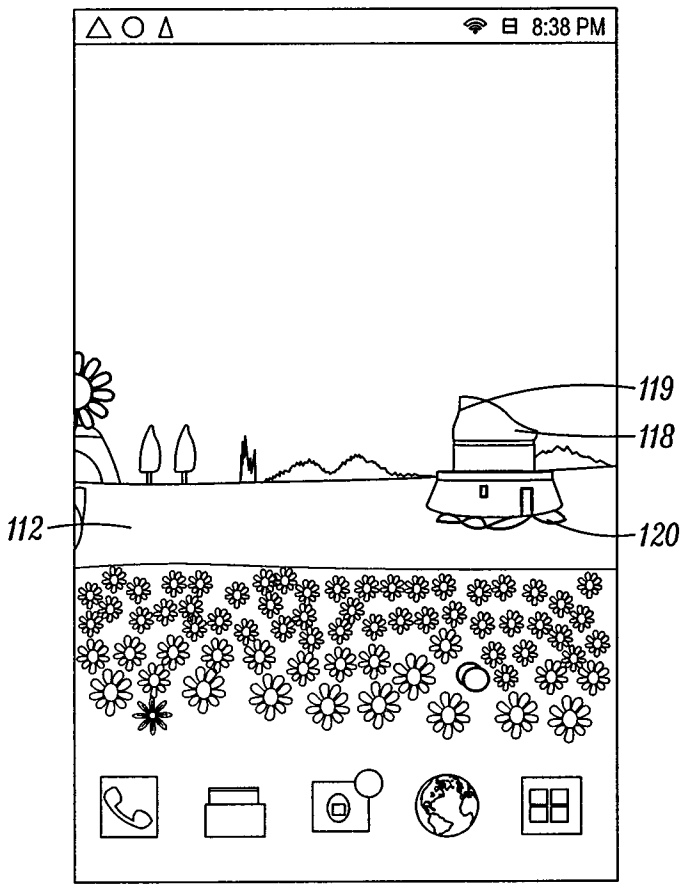


FIG. 10B

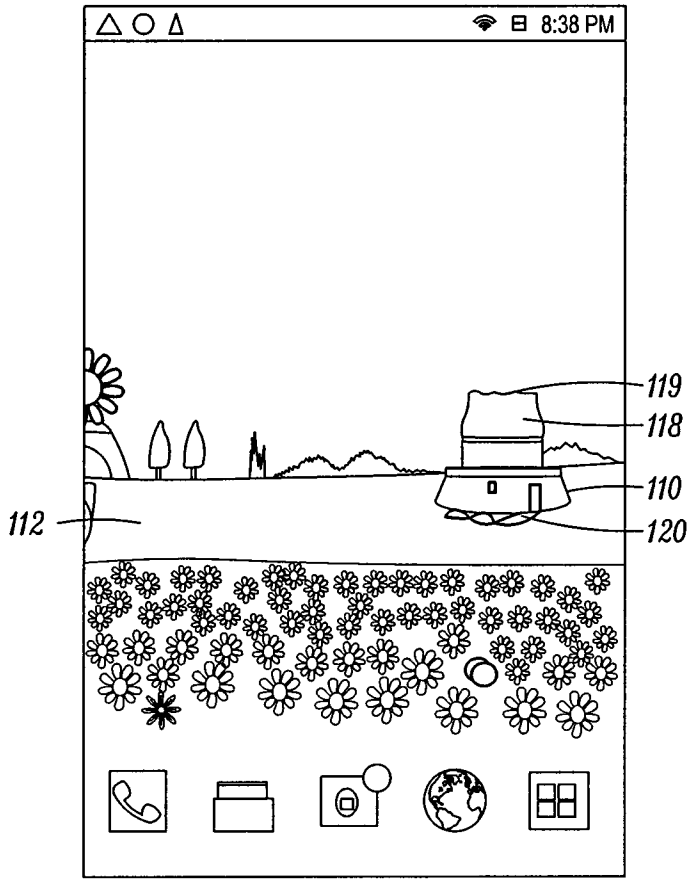


FIG. 10C

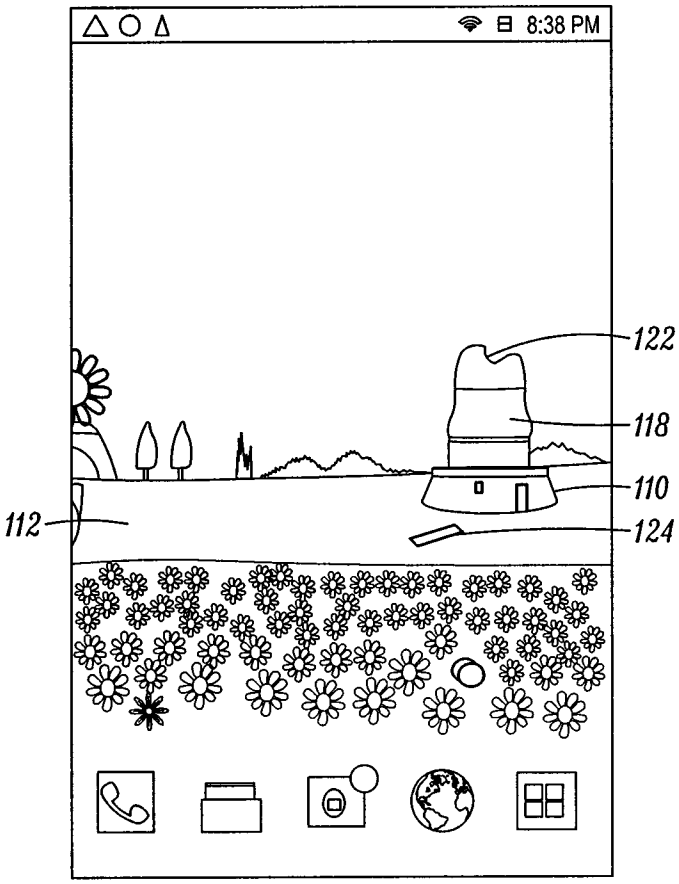


FIG. 10D

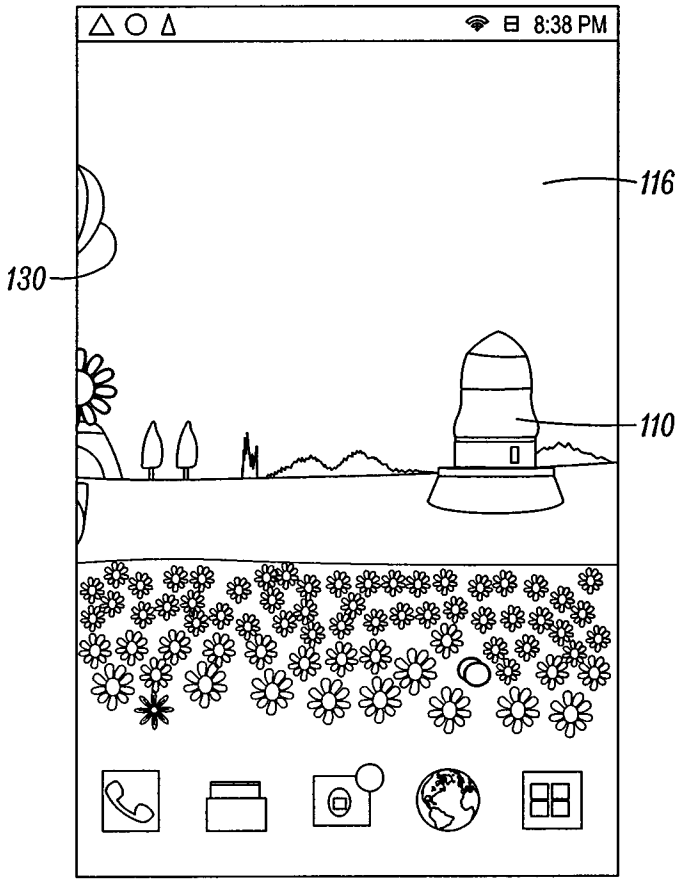


FIG. 10E

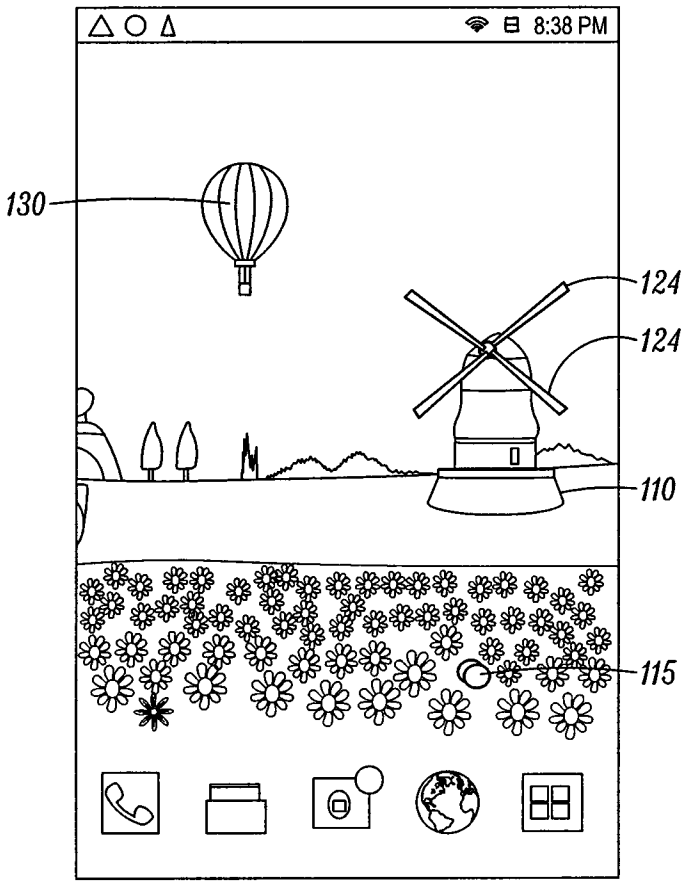


FIG. 10F

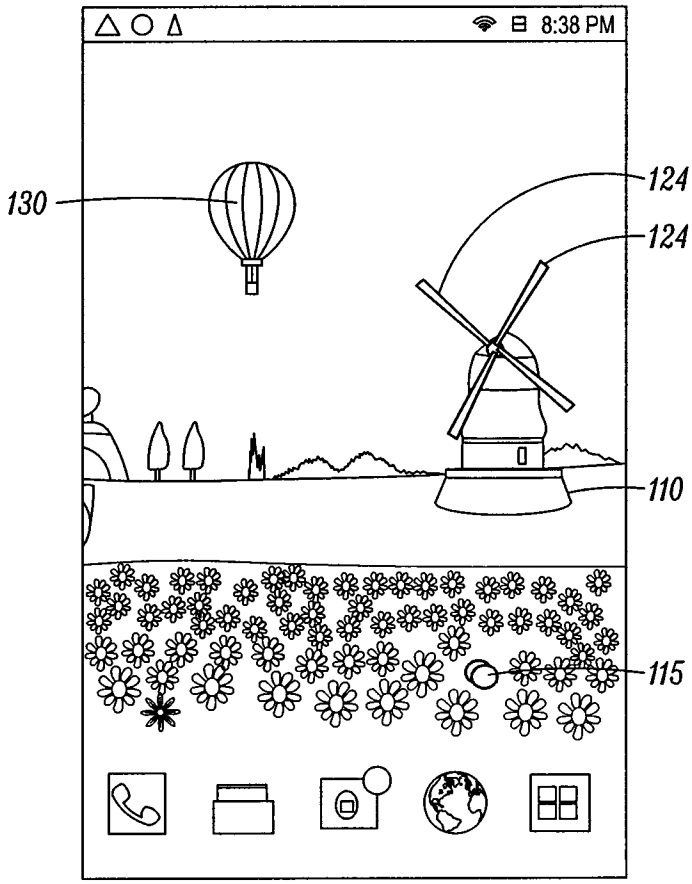


FIG. 10G

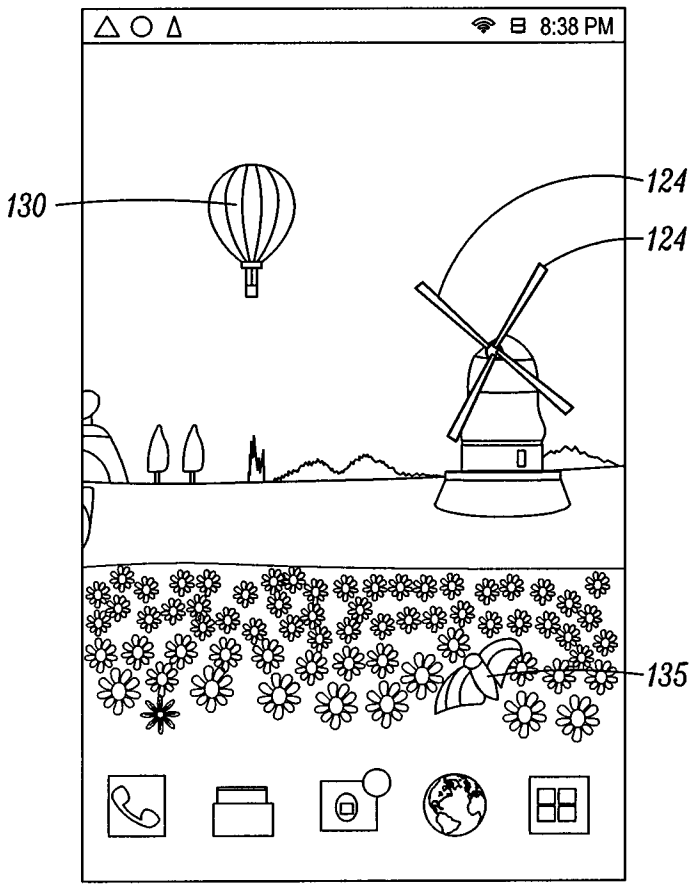


FIG. 10H

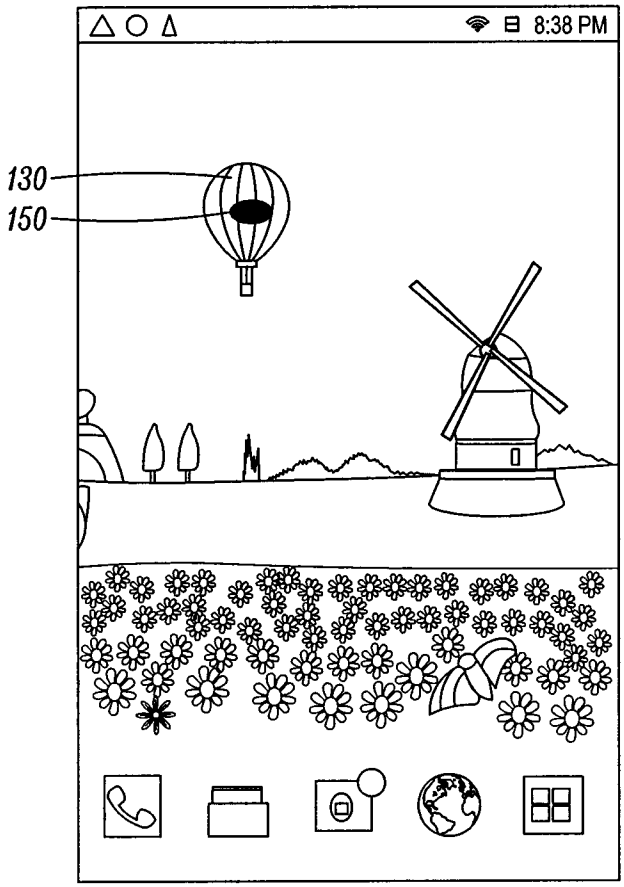


FIG. 11

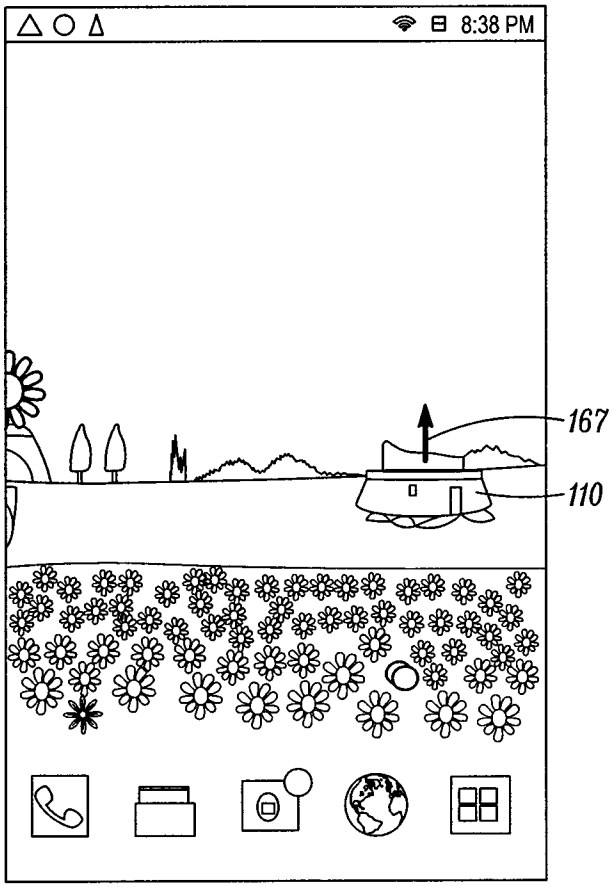
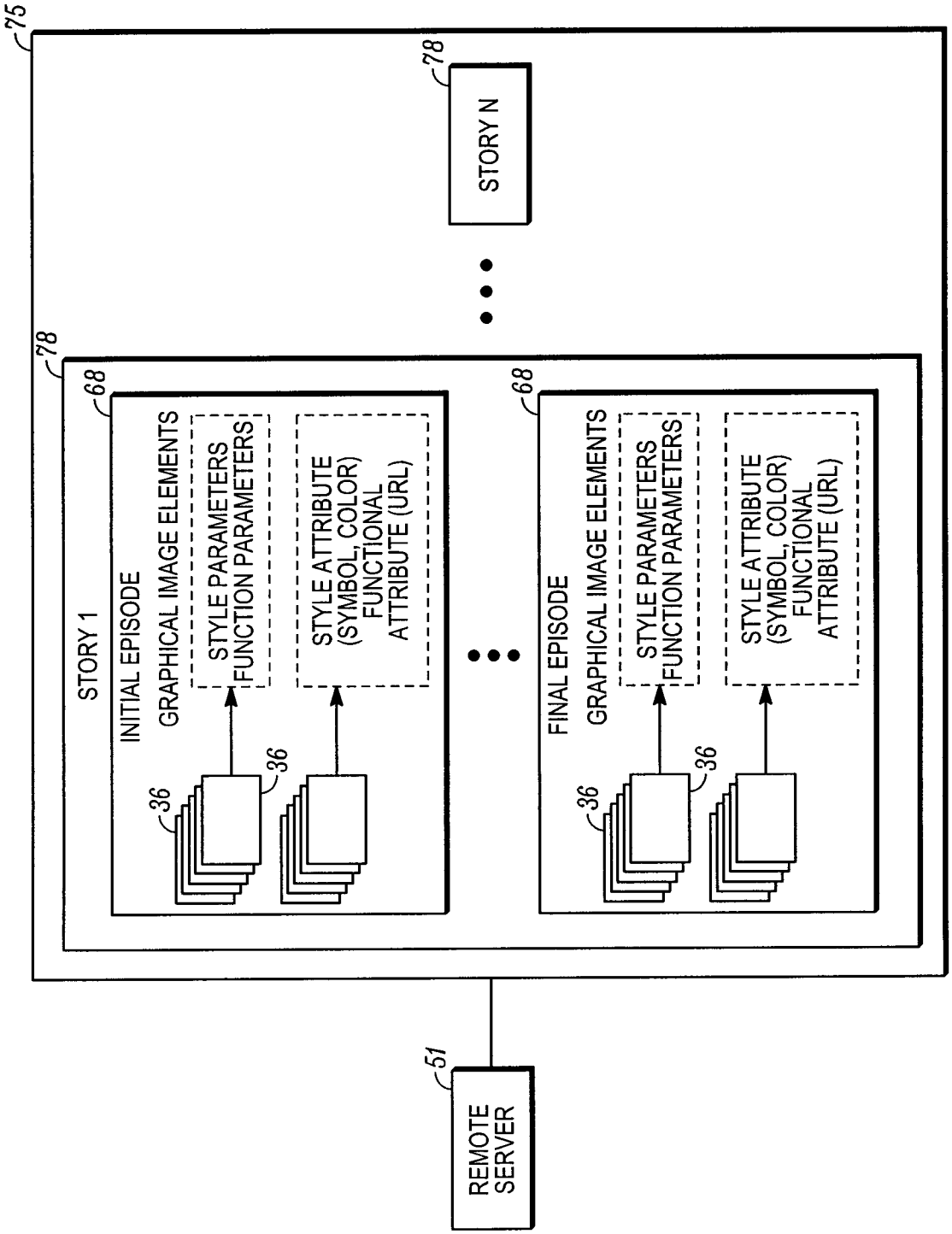


FIG. 12

FIG. 13


75
78
STORY N
78
68
STORY 1
INITIAL EPISODE
GRAPHICAL IMAGE ELEMENTS
STYLE PARAMETERS
FUNCTION PARAMETERS
STYLE ATTRIBUTE
(SYMBOL, COLOR)
FUNCTIONAL
ATTRIBUTE (URL)
36
36
68
FINAL EPISODE
GRAPHICAL IMAGE ELEMENTS
STYLE PARAMETERS
FUNCTION PARAMETERS
STYLE ATTRIBUTE
(SYMBOL, COLOR)
FUNCTIONAL
ATTRIBUTE (URL)
36
36
51
REMOTE
SERVER

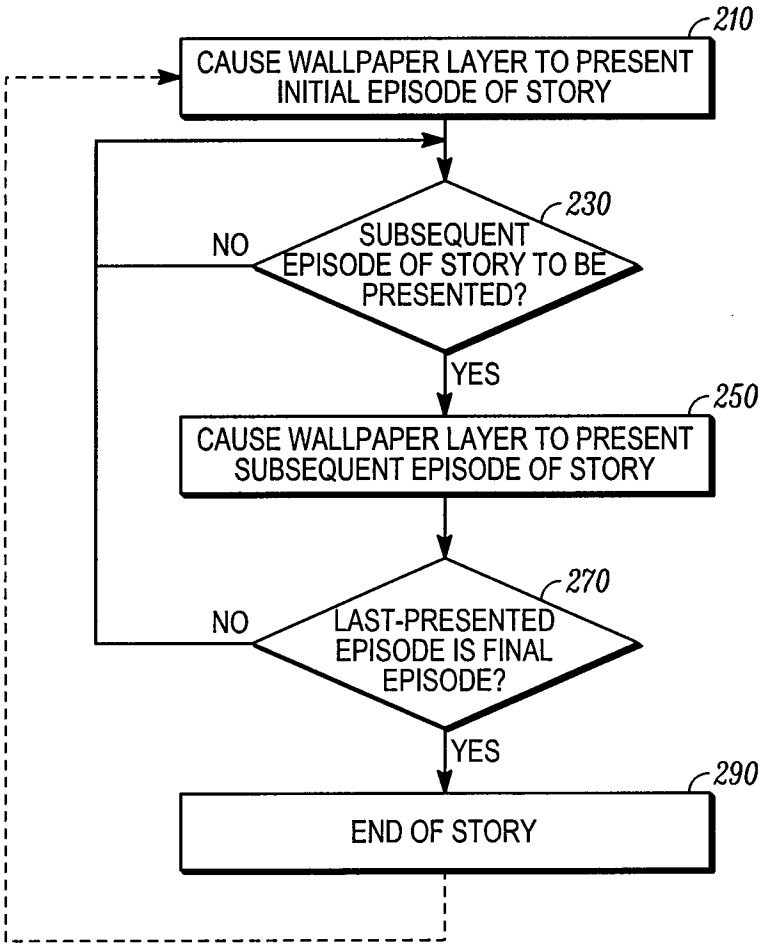

210
CAUSE WALLPAPER LAYER TO PRESENT INITIAL EPISODE OF STORY
230
SUBSEQUENT EPISODE OF STORY TO BE PRESENTED?
NO
YES
250
CAUSE WALLPAPER LAYER TO PRESENT SUBSEQUENT EPISODE OF STORY
270
LAST-PRESENTED EPISODE IS FINAL EPISODE?
NO
YES
290
END OF STORY

FIG. 14

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA2013/000620

A. CLASSIFICATION OF SUBJECT MATTER

IPC: ***G06F 3/0481*** (2013.01) , ***G06F 3/14*** (2006.01) , ***G09G 5/377*** (2006.01)

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: **ALL** (2006.01)

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

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

TotalPatent and keywords: mobile; portable; cellphone; touch; animate/animated/animation; icon/icons; object/objects; image/images; user; interactive/interaction/interactions; push; notification/notifications; wallpaper

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 2012/0023425 A1 (*Hackborn et al.*) - 26 January 2012 (26-01-2012) * [0008]; [0010]-[0011]; [0025]; [0035]-[0036]; [0056]; [0062]; Figs. 1, 3A, 9 *	1, 7, 14, 20 4, 6, 17, 19
Y	US 2002/0032603 A1 (*Yeiser*) - 14 March 2002 (14-03-2002) * [0045]-[0051]; Fig. 3 *	4, 6, 17, 19
A	US 2011/0084962 A1 (*Kim et al.*) - 14 April 2011 (14-04-2011) * the whole document *	ALL
A	US 2011/0252349 A1 (*Chaudhri et al.*) - 13 October 2011 (13-10-2011) * the whole document *	ALL

[ ] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"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)

"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

"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

"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

"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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 September 2013 (13-09-2013)	18 September 2013 (18-09-2013)

Name and mailing address of the ISA/CA	Authorized officer
Canadian Intellectual Property Office Place du Portage I, C114 - 1st Floor, Box PCT 50 Victoria Street Gatineau, Quebec K1A 0C9 Facsimile No.: 001-819-953-2476	Reginald Linco (819) 994-1683

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CA2013/000620

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
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		EP2499556A1	19 September 2012 (19-09-2012)
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		WO2011060382A1	19 May 2011 (19-05-2011)
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		AU2010350749A1	08 November 2012 (08-11-2012)
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		CN102215217A	12 October 2011 (12-10-2011)
		CN102215372A	12 October 2011 (12-10-2011)
		CN102215373A	12 October 2011 (12-10-2011)
		CN102215374A	12 October 2011 (12-10-2011)
		EP2556425A1	13 February 2013 (13-02-2013)
		EP2556665A1	13 February 2013 (13-02-2013)
		JP2013524684A	17 June 2013 (17-06-2013)
		JP2013525878A	20 June 2013 (20-06-2013)
		KR20130010003A	24 January 2013 (24-01-2013)
		KR20130016329A	14 February 2013 (14-02-2013)
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		TW201136292A	16 October 2011 (16-10-2011)
		TW201143348A	01 December 2011 (01-12-2011)
		TW201143349A	01 December 2011 (01-12-2011)
		TW201143434A	01 December 2011 (01-12-2011)
		US2011252373A1	13 October 2011 (13-10-2011)
		US8423911B2	16 April 2013 (16-04-2013)
		US2011249078A1	13 October 2011 (13-10-2011)
		US8451994B2	28 May 2013 (28-05-2013)
		US2011252350A1	13 October 2011 (13-10-2011)
		US8458615B2	04 June 2013 (04-06-2013)
		US2011249074A1	13 October 2011 (13-10-2011)
		US8502856B2	06 August 2013 (06-08-2013)
		US2011249073A1	13 October 2011 (13-10-2011)
		US2011249075A1	13 October 2011 (13-10-2011)
		US2011249076A1	13 October 2011 (13-10-2011)
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		US2011252346A1	13 October 2011 (13-10-2011)
		US2011252372A1	13 October 2011 (13-10-2011)
		US2011252374A1	13 October 2011 (13-10-2011)
		US2011252375A1	13 October 2011 (13-10-2011)
		WO2011126501A1	13 October 2011 (13-10-2011)
		WO2011126511A1	13 October 2011 (13-10-2011)
		WO2011126511A4	08 December 2011 (08-12-2011)
		WO2011126511A8	22 November 2012 (22-11-2012)