SYSTEM AND METHOD FOR VIEWING DIGITAL VISUAL CONTENT ON A DEVICE

FIELD OF THE INVENTION

[0001] The present invention relates generally to the viewing and navigation of digital visual content. More particularly, the present invention relates to the viewing and navigation of digital visual content on devices having smaller displays than the digital visual content.

BACKGROUND OF THE INVENTION

[0002] Viewing web content on electronic devices can be difficult because, in many instances, only a portion of an entire page is shown at a given moment. This makes the task of locating specific information on the page difficult, even if the user knows roughly where specific information is located in the content. Due to the content being larger than the screen , the user is forced to scroll around the document, hoping to find the correct portion of the content. Additionally, the context of information visible on the screen at any given moment can also be unclear due to the surrounding areas in the document not being visible to the user.

[0003] Although attempts have been made to address the problems associated with large content visualization on displays of electronic devices, each of these attempts have their own drawbacks. One conventional system implements a "split screen" method which provides two views to the document. One such system is entitled Thunderhawk and manufactured by Bitstream, Inc. However, this approach has the drawback of reducing the screen size for both views. However, this system does not automatically provide a transparent overview of the document during the scrolling process.

[0004] An article by Stuart Pook, Eric Lecolinet, Guy Vaysseix and Emmanuel Barillot entitled "Context and Interaction in Zoomable User Interfaces" from Proceedings of the Working Conference on Advanced Visual Interfaces, p. 227,231, May 2000 (Palermo, Italy) discloses the concept of providing a transparent overview of a document to the user. However, this system involves the use of such a transparent overview at all times, including when a user is staying in a single portion of the document and other times when such an overview is neither necessary nor desirable. This can make it more difficult for the user to view and work within the document.

[0005] On devices having larger screens, there are several conventional information visualization methods that provide both "focus and context": a miniature frame view of the context is displayed in one area, while the readable content is displayed on another area. This solution has the drawback of the miniature frame view reserving some of the screen space such that the user cannot fully utilize the display area for viewing readable content.

SUMMARY OF THE INVENTION

[0006] The present invention addresses the above-identified difficulties by providing a system that includes a transparent overview of a document, referred to herein as a minimap, when a user scrolls through the document.

[0007] The system and method of the present invention provides several significant advantages over conventional systems. In situations where the content to be viewed is larger than the available display, the present invention gives the user an overview of the document. In familiar content, a user can easily find the desired information. The present invention provides a system where the minimap is visible to the user while the user is in the process of scrolling through the content, which is desirable and not when the user is likely to be reading the actual content, which is undesirable. The present invention provides the user with more context than conventional systems, as the user sees his or her current position on the document and where he or she might navigate next. The minimap may also fill the entire display either as a result of a specific user

action or by default. The transparency of the minimap improves the usability of the main view when the minimap is visible. Additionally, no screen space is wasted when user is not scrolling or panning inside content. In embodiments where the minimap is scrolled and updated only periodically, the processing power requirements for the implementation of the present invention are also lowered. Furthermore, the use of coloring effects on the minimap of the present invention aid the user in finding areas of the content that he or she has not yet viewed.

[0008] These and other objects, advantages and features of the invention, together with the organization and manner of operation thereof, will become apparent from the following detailed description when taken in conjunction with the accompanying drawings, wherein like elements have like numerals throughout the several drawings described below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Figure 1 is a perspective view of a mobile telephone that can be used in the implementation of the present invention;

[0010] Figure 2 is a schematic representation of the telephone circuitry of the mobile telephone of Figure 1;

[0011] Figure 3 is a screenshot of a web browser having a minimap visible during scrolling and/or panning process according to one embodiment of the present invention;

[0012] Figure 4 is a screenshot of the same document in Figure 3, wherein the screen is displaying a different portion for the content, the minimap has scrolled a designated amount and the indicator rectangle on minimap has moved;

[0013] Figure 5 is a screenshot displaying the same portion of the content as the screenshot of Figure 4, wherein the minimap is no longer visible;

[0014] Figure 6 is a screenshot of a web content demonstrating how a coloring effect can be used to show which portion of the document the user has already visited; and

[0015] Figure 7 is a flow chart showing the steps of operation according to one embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0016] The present invention involves the addition of a transparent overview of content, referred to herein as a minimap, to be displayed in conjunction with the content itself. Figures 1 and 2 show one representative mobile telephone 12 upon which the present invention may be implemented. However, it is important to note that the present invention is not limited to any type of electronic device and could be incorporated into devices such as personal digital assistants, personal computers, mobile telephones, and other devices. It should be understood that the present invention could be incorporated on a wide variety of mobile telephones 12. The mobile telephone 12 of Figures 1 and 2 includes a housing 30, a display 32 in the form of a liquid crystal display, a keypad 34, a microphone 36, an ear-piece 38, a battery 40, an infrared port 42, an antenna 44, a smart card 46 in the form of a UICC according to one embodiment of the invention, a card reader 48, radio interface circuitry 52, codec circuitry 54, a controller 56 and a memory 58. Individual circuits and elements are all of a type well known in the art, for example in the Nokia range of mobile telephones.

[0017] Figures 3-5 show a heavily downscaled version of a portion of the content, referred to as a minimap 100 or secondary image, is shown partially covering the display 32 along with a primary document view 102 or primary image. The primary document view 102 refers to that portion of the web content that is visible on the display 32 at any given moment. The present invention is discussed herein in relation to internet web pages. However, it should be understood that the present invention can be applied to virtually any type of document that is not capable of being displayed in its entirety on a display 32. The minimap 100 is drawn on top of the primary

document view 102 and, according to one embodiment of the invention, is rendered partially transparent so that the primary document view's content below the minimap 100 shines through the minimap 100 when displayed. The scaled portion of the web content shown in the minimap 100 is selected so that it contains all of the content visible in the primary document view 102, plus significant amount of surrounding areas in the document that is not visible in the primary document view 102 at that given moment. In one embodiment of the invention, the entire web content is shown in the minimap 100.

[0018] In one embodiment of the invention, a framing rectangle 104 matching the portion of the web content visible in the primary document view 102 is shown as part of or on top of the minimap 100. The framing rectangle 104 is automatically moved accordingly when the user scrolls through the web content, changing the primary document view 102. The portion of document shown in the minimap 100 is also scrolled as needed so that the portion of the document visible in the primary document view, plus a sufficient amount of the surrounding content, stays visible in the minimap 100.

[0019] Graphical indicators may also be drawn on the minimap 100 to indicate directions in which the web content continues beyond the minimap view. Possible indicators include, but are not limited to, scrollbars and directional arrows. Alternatively, a rectangle can be depicted outside of the minimap 100 to indicate the document boundaries relative to the view in the minimap 100.

[0020] In one embodiment of the invention, the minimap 100 is visible only when the user is in the process of scrolling or panning through the document. As used herein, "panning" refers to the ability to "grab" a portion of the content, such as through the use of a mouse or stylus, and drag the content in a certain direction, causing the content to scroll in the direction of the drag. "Scrolling" refers to the actuation of directional buttons or indicators on the content, causing the content to move appropriately. Any type of scrolling or panning could be used in conjunction with the present invention. When the scrolling stops, the minimap 100 fades away from view or is removed after a time period. This can be either an automatic feature

or a feature that is selectable and/or adjustable by the user. Alternatively, the minimap 100 appears or fades into view only when the system determines that the user is moving a long distance on the content. For example, if the user scrolls the page only a small amount (for example, to continue reading through a long text paragraph) the minimap 100 does not appear, instead only appearing with continuous scrolling by the user. The visibility of the minimap 100 may be further limited to continuous scrolling only, such as where a scrolling key or other item is held down, instead of a single or multiple clicks being used for small, incremental movement. In this type of situation, the minimap 100 is not shown when user scrolls down (or up) slowly for reading long texts, i.e. where the scrolling occurs only a few lines at a time. This feature is useful in that the minimap 100 could otherwise obstruct text reading, as space on the display 32 is not unnecessarily cluttered when the minimap feature is not needed.

[0021] In one embodiment of the invention, a slight color tint may be applied to the minimap 100 for a newly formatted document. This coloring is shown in Figure 6. In one embodiment of the invention, the coloring is removed, added or changed tone in the minimap 100 on those areas of the document that the user has already seen in the primary document view 102. The user can use this feature to determine which parts of the document he or she has already visited (for example, when trying to locate particular information for a large page).

[0022] As discussed above, the minimap 100 of the present invention is depicted in a partially transparent form. The minimap 100 is an additional view to the document. It has the same layout as the primary document view 102 and reflects changes to the document. It also has a different zoom level from the main view. In one embodiment of the invention, the minimap 100 is positioned on a predefined corner of the display 32. Alternatively, the position of the minimap 100 may change according to the scrolling direction. For example, if a user scrolls the view to right, the minimap 100 moves to the left side of the display 32. The minimap 100 may also fill the entire display 32 either as a result of a specific user action or by default. It should be noted that when the minimap 100 is referred to as being superimposed on the primary

document view 102, it should be understood that a situation where the minimap 100 is beneath the primary document view 102 is also covered by this terminology. It is also possible that the primary document view 102 that is shown in transparent or translucent form.

[0023] With the present invention, when a display 32 having a document that is larger than the display 32, a user is provided with an overview of the entire content the document. If the user is viewing familiar content, the user is able to easily locate the information that is desired. The present invention also provides the user with additional context, as the user sees his or her current position on the document and where to navigate next.

[0024] In one embodiment of the present invention, the minimap 100 is scrolled and updated only periodically. This feature aids in saving power on the device and reducing the device's processing power requirements. For these same performance reasons, it is also possible for the minimap 100 to not immediately reflect changes to the document.

[0025] Figure 7 is a flow chart showing a generic operation of a system constructed according to one embodiment of the present invention. At step 200, a document is shown on the screen 32, with the primary document view 102 shown. At step 210, the minimap 100 is generated and superimposed on the primary document view 102. It is also possible for steps 200 and 210 to occur concurrently, or for step 210 to be displayed before the primary document view 102 appears. At step 220, the user scrolls through the document, causing the framing rectangle 104 to move to reflect the change of the primary document view 102. At step 230, the shading of various portions of the minimap 100 can change (either automatically or based upon settings set by the user) to reflect the portions of the document that were previously viewed by the user but no longer appear in the primary document view 102. At step 240, the minimap 100 can also be adjusted to change the portion of the document appearing in the minimap 100. Other potential options include the user turning on or off the minimap feature at step 250, as well as altering various settings (such as the position

of the minimap 100, the colors used on the minimap 100 and the framing rectangle 104, etc.) at step 260.

[0026] While several embodiments have been shown and described herein, it should be understood that changes and modifications can be made to the invention without departing from the invention in its broader aspects. For example, but without limitation, the present invention could be incorporated into a wide variety of electronic devices, such as cellular telephones, personal digital assistants, and other devices. The invention could also be used on much larger screens, including wall projections, where the image to be displayed is larger than the screen. The present invention can also be used on many types of documents besides web pages, such as text documents, spreadsheet documents, graphics documents, videos, animations, graphs, vector graphics, wireless application protocol (WAP) pages, and other materials. It is also possible that the present invention could be used with three-dimensional content as well. The minimap 100, progress indicators, and other features could also be incorporated into multiple layers above and below the primary document view 102, permitting multiple transparent or translucent layers. Furthermore LCD displays can be used on top of each other, creating multiple transparent physical layers instead virtual layers. Various features of the invention are defined in the following Claims.

WHAT IS CLAIMED IS:

1. A method of viewing material displayed on an electronic device, comprising the steps of:

providing a document, only a portion of which is viewable on a display at a given moment;

displaying the portion on the display as a primary image;

generating a secondary image, the secondary image including the portion and additional material of the document not part of the primary image; and

simultaneously displaying the secondary image and the primary image on the display when a user scrolls through the document such that both the secondary image and the primary image are visible to the user.

2. The method of claim 1, wherein the secondary image is transparent such that material in the primary image positioned below the secondary image is at least partially visible to the user.

3. The method of claim 1, wherein the secondary image is not transparent.

4. The method of claim 1, wherein the secondary image is smaller in size than the primary image.

5. The method of claim 1, further comprising the step of adjusting the position of the secondary image on the display.

6. The method of claim 1, further comprising the steps of:

altering the primary image such that material on the document, previously not part of the primary image, is visible to the user on the primary image; and

automatically adjusting the secondary image to the material visible in the altered primary image.

7. The method of claim 6, further comprising the step of automatically noting material in the secondary image that was previously but is no longer viewable in the altered primary image.

8. The method of claim 1, wherein the secondary image includes the entire document.

9. A computer program product for viewing material displayed on an electronic device, comprising:

computer code for providing a document, only a portion of which is viewable on a display at a given moment;

computer code for displaying the portion on the display as a primary image;

computer code for generating a secondary image, the secondary image including the portion and additional material of the document not part of the primary image; and

computer code for simultaneously displaying the secondary image and the primary image on the display when a user scrolls through the document such that both the secondary image and the primary image are visible to the user.

10. The computer program product of claim 9, wherein the secondary image is transparent such that material in the primary image positioned below the secondary image is at least partially visible to the user.

11. The computer program product of claim 9, wherein the secondary image is not transparent.

12. The computer program product of claim 9, wherein the secondary image is smaller in size than the primary image.

13. The computer program product of claim 9, further comprising computer code for adjusting the position of the secondary image on the display.

14. The computer program product of claim 9, further comprising computer code for:

altering the primary image such that material on the document, previously not part of the primary image, is visible to the user on the primary image; and

automatically adjusting the secondary image to the material visible in the altered primary image.

15. The computer program product of claim 14, further comprising computer code for automatically noting material in the secondary image, that was previously, but is no longer viewable in the altered primary image.

16. The computer program product of claim 9, wherein the secondary image includes the entire document.

17. An electronic device, comprising:

a memory unit;

a processor operatively connected to the memory unit; and

a display unit,

wherein the memory unit includes a computer program product comprising:

computer code for providing a document, only a portion of which is viewable on the display at a given moment;

computer code for displaying the portion on the display as a primary image;

computer code for generating a secondary image, the secondary image including the portion and additional material of the document not part of the primary image; and

computer code for simultaneously displaying the secondary image and the primary image on the display when a user scrolls through the document such that both the secondary image and the primary image are visible to the user.

18. The electronic device of claim 17, wherein the secondary image is transparent such that material in the primary image, positioned below the secondary image, is at least partially visible to the user.

19. The electronic device of claim 17, wherein the secondary image is not transparent.

20. The electronic device of claim 17, wherein the secondary image is smaller in size than the primary image.

21. The electronic device of claim 17, wherein the computer program product further comprises computer code for adjusting the position of the secondary image on the display.

22. The electronic device of claim 17, wherein the computer program product further comprises computer code for:

altering the primary image such that material on the document, previously not part of the primary image, is visible to the user on the primary image; and

automatically adjusting the secondary image to the material visible in the altered primary image.

23. The electronic device of claim 22, wherein the computer program product further comprises computer code for automatically noting material in the secondary image that was previously, but is no longer, viewable in the altered primary image.

24. The electronic device of claim 17, wherein the secondary image includes the entire document.

25. A module, comprising:

a memory unit; and

a processor operatively connected to the memory unit,

wherein the memory unit includes a computer program product comprising:

computer code for providing a document, only a portion of which is viewable, on a display at a given moment;

computer code for displaying the portion on the display as a primary image;

computer code for generating a secondary image, the secondary image including the portion and additional material of the document, not part of the primary image; and

computer code for simultaneously displaying the secondary image and the primary image on the display when a user scrolls through the document such that both the secondary image and the primary image are visible to the user.

26. The module of claim 25, wherein the secondary image is transparent such that material in the primary image, positioned below the secondary image, is at least partially visible to the user.

27. The module of claim 25, wherein the secondary image is not transparent.

28. The module of claim 25, wherein the secondary image is smaller in size than the primary image.

29. The module of claim 25, wherein the computer program product further comprises computer code for adjusting the position of the secondary image on the display.

30. The module of claim 25, wherein the computer program product further comprises computer code for:

altering the primary image such that material on the document, previously not part of the primary image, is visible to the user on the primary image; and

automatically adjusting the secondary image to the material visible in the altered primary image.

31. The module of claim 30, wherein the computer program product further comprises computer code for automatically noting material in the secondary image that was previously but is no longer viewable in the altered primary image.

32. The module of claim 25, wherein the secondary image includes the entire document.