Multifunction Peripheral Devices

Field

The present invention relates to multifunction peripheral devices (MFP) such as document copiers and the like, being more particularly directed to such devices having embedded user interface touch panels (UI), such as digital copiers enhanced to support multi printing, faxing and scanning functions, and wherein the touch panel device is presently controlled during run time from software operating on pre-entered information running on a computer disposed locally internally within the MFP function device.

Background

Such present-day touch panel-controlled copiers and related MFP devices generally receive initializing information loaded at start-up time from an internal source. Thereafter, during run time, the touch panels are solely controlled by the information so pre-loaded into the internal computer of the copier or similar MFP device and controlled only from within the MFP device. Examples of such systems are current copiers from Canon, Toshiba, Xerox and others.

Some MFP devices may receive initializing information loaded into the internal computer from an external source at start-up time; but thereafter, during run time, the touch panels are solely controlled using only the information pre-loaded into the internal computer and information loaded at start-up time. In

U.S. Patent No. 5,937,150, as another illustration, the user interface touch panel of an MFP enhanced copier is modified, up-dated or initialized by preloading only when the copier is started, reset or restarted.

In accordance with the improvement of the present invention, on the other hand, far greater flexibility of UI control is attained, and with the added capability of enabling dynamic modification and expansion of information for control during run time. This enables updating and modifying of the user interface dynamically during run time, and is effected with a remote computer externally networked to the MFP internal computer; this, as distinguished from the sole internal computer control based upon and limited to information preloaded into the internal MFP copier computer itself. The invention, moreover, enables novel dynamic interaction over the network and during run time, between the MFP internal computer and the external, remote network computer.

Objects of Invention

It is accordingly a primary object of the present invention to provide a new and improved and vastly expanded method of and system for dynamically controlling, during and throughout run time, a multifunction peripheral (MFP) device touch panel user interface (UI) from an external remote network-connected computer that enables far greater flexibility of control and with dynamic modification and expansion of information continually during the MFP run operation, than is possible with just the local computer control of the touch

panel from within the MFP device based just upon the information preloaded into the MFP internal computer at initialization or reset thereof.

A further object is to provide such a novel method and system that is particularly adapted for and useful with document copiers and the like with embedded touch panel user interface displays for controlling the MFP functions and applications.

Still another object is to enable novel dynamic real-time interactive communication between the MFP internal computer and the network-connected external or remote computer of the invention, continually throughout run time, for providing and modifying display content and processing rules and the like required or desirable for updating the user interface.

Other and further objects will be explained hereinafter and are more fully set forth in the appended claims.

Summary

In summary, however, from one of its important aspects, the invention embraces a system for providing user interface (UI) display and processing information to a touch panel provided with a multifunction peripheral (MFP) device and controlled by a computer disposed internally of the MFP and connected to an external data communication network, the system having, in combination, an external computer connected on the network remotely of the MFP device; and the external computer being provided with software adapted for remotely providing information to the MFP device internal computer, via the

network, for dynamically changing the UI display and behavior during run-time of the system.

Preferred and best mode embodiments and designs are later detailed.

Drawings

The invention will now be explained in connection with the accompanying drawings, Fig. 1 of which is a simplified architectural overview block diagram over the concept underlying the present invention;

Figs. 2 and 3 are respectively somewhat more detailed block diagrams of the methodology, system and network interconnection of the MFP device (copier) and remote network-connected computer, illustrated as an external or remote PC, and representing a preferred format of the invention; and

Fig. 4 is a flow chart diagram of exemplary communication and interactive run-time operation between the MFP internal computer and the remote or external network computer of Figs. 2 and 3.

Preferred Embodiment(s) Of The Invention

Referring, first, to Fig. 1, the invention is diagrammatically illustrated as implemented by an interactive network N connected between the MFP internal computer MFP-C, normally controlling the user interface display touch panel TP, as above-explained, and the remote or external network-connected computer PC, also now employed in accordance with the methodology of the present invention.

User interface displays and processing information are provided to the MFP device (i.e. copier) touch panel TP embedded within the copier under control of the internal computer software program for enabling the copier to perform its MFP functions for copying, printing, and scanning, etc. In accordance with the invention, a network adapter (NA) included in the copier, connects the same through the communication linking network N with the remote or external computer PC which the invention uses to provide information over the network N to the copier internal computer MFP-C to dynamically change the UI touch panel (TP) display and behavior during run time operation of the copier, and as desired by the user presenting selections to the remote external PC.

The copier touch panel TP provides its display while including, as is well known, a pointing device used by MFP users to access the document scanning and also desired enterprise applications, such as, for example, document management (DM), Fig. 2, E-mail, fax server, directory services, application service providers (ASP) and document delivery services, and the like, Figs. 2 and 3. The network PC is used, as more particularly shown in said Figs. 2 and 3, as a gateway for integrating the copier (or other MFP device) with one or more of such enterprise applications running on one or more application servers. The PC software thus controls the touch panel TP of the copier to display the user interface processing information required to integrate scanned documents with the before-mentioned enterprise applications. Exemplary of the latter are

Microsoft Exchange, Lotus Notes, and Novell Group Wise as E-mail; Lotus Domino.Doc, iManage and Open Text LiveLink, as document management (DM): Captaris RightFax, Omtool Fax Sr. and Optus FACSys as fax servers; Microsoft Active Directory, Novell Directory Services as directory services; e-Fax as application service providers (ASP); and UPS as secure document delivery, as illustrations.

In run time, once the copier user inputs data (UI) using the touch panel TP, extensible mark-up language data (XML) is sent back along the network N (to the right in Figs. 2 and 3) to the network computer PC. The interactive facility accorded by the invention will, at this point, permit the external computer PC to send additional XML data back to the copier computer MFP-C required to update the UI touch panel TP in order for the copier user to supply additional data. This capability, in accordance with the invention, for the remote or external computer PC and the copier internal computer MFP-C to exchange XML data via the network N, provides the necessary integration of the above-described enterprise applications and the document scanning by the copier.

The invention also permits the use of other types of display information to be sent between the external or remote network computer PC and the internal copier computer MFP-C, such as HTML, binary data, or text, as other examples.

Through this novel methodology, moreover, a wide range of run-time updating and modifying XML data, Figs. 2 and 4, can dynamically and

continually be provided, including, but not limited to the remote network computer PC providing:

1) a description of the presentation (how to display)of the UI controls on the touch panel TP;
2) a low resolution image of the pages being scanned and display information for displaying these images on the touch panel TP;
3) a description of default values for each UI control displayed on the touch panel TP;
4) a description of the processing rules to be used by the computer program or software running on the copier internal computer MFP-C to process the data within each UI control displayed on the touch panel TP;
5) an updated description of default data values for a UI control that may differ from the initial default values of sub-paragraph 3), above.
6) The data described in one or more of sub-paragraphs 1)-5), above, that results in providing UI descriptions that are unique for each copier user (i.e. personalized presentations—identifying a name and having unique access or functions available at the touch panel for that individual).

Additionally, the interactive nature of the system of the invention enables the copier internal computer MFP-C not only to process UI selections made by

the copier user, but enables the MFP-C also to send the user-selected data via the network N to the external computer PC for further processing, as well.

Summarizing, therefore, the invention enables the remote or external network computer PC to communicate information during run time, dynamically over the network N, (to the left in the drawings) to the copier internal computer MFP-C, that can a) dynamically provide the UI presentation form data (Style Sheet description, Fig. 1); b) dynamically change the content contained in the UI; c) dynamically define the rules for processing each control within the UI at the touch panel TP; and d) dynamically change the content displayed within such a UI control. In return, the internal computer at the copier MFC-C can provide the external network computer PC with the form data selected by the UI operator or user. It should be observed, furthermore, that all of the above-described actions occur during run time and, unlike current-day practice before described, do not require an MFP device reset.

As for the external network computer PC of the invention, and again in summary, but more specifically in accordance with the invention, it is employed to describe the information required to create and process the UI on the copier (or other MFP) touch panel TP. The following specific data streams are communicated over the network:

1.) XML data providing the UI presentation (Style Sheet) that contains a description of how to display each UI control;

2.) XML data that contains:

- the definitions for each UI control,
- the initial values for each UI control, and
- the input processing rules for each UI control;

3.) XML data used by the copier (MFP) computer to initiate a request for new content within a UI control, with the network computer PC updating the XML data with new content, and returning the same via the network to the copier computer MFP-C; and

4.) XML data used to provide the UI information selected by the copier user or operator to the external network computer PC.

As before stated, Fig. 4 presents a detailed flow diagram exemplary of preferred communication between the internal copier computer MFP-C and the external network computer PC in accordance with the procedures of the invention. Steps 1-7 are illustrated at the left-hand side for operation at the copier with its internal MFP computer and UI touch panel. These are appropriately horizontally aligned with steps 1-5 illustrated at the right as performed by the remote network computer PC in response to respective interactive XML data over the interconnecting network N.

Once the copier user has selected the desired service (MFP step 1), this is communicated (to the right) as XML data over the network N to the remote network PC, where the initial XML data from the MFP copier initiates the network computer PC to initialize the MFP UI (PC step 1). The PC then sends

XML data (to the left) back to the MFP copier describing the UI and processing rules for accessing the chosen supported enterprise applications ("State 1"). At MFP step 2, the XML data is received, providing UI display (TP) and UI processing rules. The user then selects a "Scan Button" on the UI (step 3), and corresponding XML data is sent (to the right) to the remote network computer PC indicating such user selection of a "Scan Button" (step 4). At its step 2, the network computer PC receives this XML data indicating the selected "Scan Button" and creates XML Data at PC (step 3) which is sent (to the left) back to the MFP copier to initiate scanning thereat and also to describe the UI at the display TP and the processing rules for the next UI display at TP ("State 2"). In its step 5, the copier begins scanning and it also updates the UI and waits for the user to make a selection of a UI control (step 6). Upon such selection of a UI control (step 7), XML data indicative thereof is communicated to the network PC; and based thereon and the current state of the PC, either "Scan More" or begin processing for an enterprise application begins (PC step 4). As indicated in PC step 5, this may require obtaining more data from the copier user. The above process of sending and receiving XML data will then continue as desired.

The invention thus provides significant operational flexibility and enhancement over present-day copiers and the like which, as before explained, only provide capability from a pre-loaded computer running inside the copier as opposed to being external to the copier. When the copier first starts up, it loads information from an internal source or may load data from an external source;

but from that point on, it never uses an external source again. The internal computer uses only this preloaded data it stored inside its hard disc drive. This is as distinguished from the present invention where, once the copier is started up and the user starts using the copier, the UI can change based on user inputs networked to the external computer and instructions sent back by the external computer via the communication linking network to the copier internal computer. This operation, moreover, permits the further novel feature that once the user has identified himself or herself at the copier touch panel, depending on the desired scope of the user's job, an appropriate screen may automatically be presented that is unique to that individual user. The touch panel can thus dynamically present different screens as the opening screens for different users, or other user interface unique capabilities dynamically tailored for that user--and all as distinguished from today's operations where every user is presented with the same touch panel screen, or with screens pre-determined by information embedded on the copier computer itself that cannot be dynamically updated based upon who the user is, or upon the application with which there is interaction, or what changes may be desirable.

While described in connection with the important and preferred application to MFP copiers with embedded touch panels for display and control by an internal computer provided with a network-connection adapter for connection to a network, itself having a remote network computer, the technique of the invention, as also earlier noted, may also be applied to other types of MFP

devices and UI displays and controls; and such, together with further modifications that will also occur to those skilled in this art, are considered also to fall within the spirit and scope of the present invention, as defined in the appended claims.

What is claimed is:

1. A system for providing user interface (UI) display and processing information to a touch panel provided with a multifunction peripheral (MFP) device and controlled by a computer disposed internally of the MFP and connected to an external data communication network, the system having, in combination, an external computer connected on the network remotely of the MFP device; and the external computer being provided with software adapted for remotely providing information data back to the MFP device internal computer, via the network, for dynamically changing the UI display and behavior during run time of the system.

2. The system of claim 1 wherein said data for dynamic changing of the UI display and behavior comprises XML data relating to UI display content and data for providing rules for processing the updating of the UI display touch panel in accordance with MFP user selections.

3. The system of claim 2 wherein the MFP device is a digital document copier enhanced to support functions including document scanning, printing and faxing; and the touch panel serves as the user interface for controlling said functions.

4. The system of claim 3 wherein the communicating of XML data between the MFP device internal computer and the external network

computer provides integration of document scanning and enterprise applications.

5. The system of claim 2 wherein user interface display information communicated over the network between the MFP device internal computer and the external network computer is provided in the form selected from the group consisting of a) XML data describing the UI display and rules for processing MFP user requests, b) HTML, c) binary data, and d) text.

6. The system of claim 4 wherein, once an MFP device user has made a selection by inputting data on the UI touch panel and such data has been sent via the network to the external network computer, said software is adapted to send additional XML data back to the MFP device internal computer required to update the UI in order to enable the user to supply additional data.

7. The system of claim 3, wherein software operating the network computer enables providing a description of how to display or present UI controls on the touch panel.

8. The system of claim 3, wherein software operating the network computer enables providing a low resolution image of pages of the document being scanned, and display information for displaying these images on the touch panel.

9. The system of claim 7, wherein software operating the network computer enables providing a description of default data values for each UI control displayed on the touch panel.

10. The system of claim 5, wherein software operating the network computer enables providing a description of the processing rules used by a computer program running on the MFP device internal computer to process the data within each UI control.

11. The system of claim 9, wherein software operating the network computer enables providing an updated description of default data values.

12. The system of claim 1, wherein software operating the network computer enables providing UI descriptions that are unique for each MFP device user, providing for personalized touch panel presentations and capabilities, and adapted to be dynamically changed.

13. The system of claim 3, wherein the MFP device internal computer processes UI selections made thereat by the MFP device user that results in the MFP device internal computer sending the user-selected data to the network computer for further processing.

14. The system of claim 3 wherein the touch panel is provided with a display and a pointing device for use by MFP users to access said document scanning and enterprise applications.

15. A method of dynamically and remotely providing user interface (UI) display and processing information to a touch panel embedded within a multifunction peripheral (MFP) having an internal computer for controlling the touch panel, the method comprising linking the internal computer to a data communication network having an external remote computer on the network; and providing information from the remote computer via the network back to the MFP internal computer that dynamically changes the UI display and behavior during run-time of the MFP.

16. The method of claim 15 wherein the MFP is a digital document copier enhanced to support multifunctions including document scanning, printing and faxing; and the touch panel serves as the user interface for controlling said functions.

17. The method of claim 15 wherein the information provided from the remote computer comprises XML data relating to UI display content and data for providing rules for processing the updating of the UI display touch panel.

18. The method of claim 17 wherein said updating is effected in response to the interactive data communication via the network between the internal and external computers and in accordance with MFP user selections on the touch panel communicated to the external computer.

19. The method of claim 18 wherein the MFP user selection is effected by using the touch panel and sending XML data as to the same via the network back to the network computer.

20. The method of claim 19 wherein the network computer thereupon sends additional XML data to the MFP internal computer required to update the UI in order to afford the MFP user the capability to supply additional data and selection.

21. The method of claim 16 wherein the interactive communicating of data betweens the internal and external computers over the network provides integration of document scanning and enterprise applications.

22. The method of claim 21 wherein the network external computer provides a description of how to display or present UI controls on the touch panel.

23. The method of claim 21 wherein the network external computer provides a low resolution image of pages of the documents being scanned, and display information, for displaying these images on the touch panel.

24. The method of claim 22 wherein the network external computer provides a description of default data values for each UI control displayed on the touch panel.

25. The method of claim 22 wherein the network external computer provides a description of the processing rules used by a computer program running on the MFP internal computer to process the data within each UI control.

26. The method of claim 24 wherein the network external computer provides an updated description of default data values.

27. The method of claim 16 wherein the network external computer provides UI descriptions that are unique for each MFP user, providing for personalized touch panel presentations and capabilities.

28. The method of claim 27 wherein such personalized presentations and capabilities are dynamically changed, as desired, under control of the external computer.

29. The method of claim 16 wherein the MFP internal computer processes UI selections made thereat by the MFP user that results in the internal computer sending the user-selected data to the network external computer for further processing.

30. In a system for dynamically and remotely providing user interface (UI) display and processing information to a touch panel embedded within a multifunction peripheral (MFP) such as a digital copier having an internal computer for controlling the touch panel, a method that comprises linking the internal computer to an external data communication network having an external remote computer on the

network; and upon the inputting of desired selections by a user at the UI and communicating the same over the network to the external computer, providing information from the external computer via the network back to the internal computer that enables dynamically changing or updating the UI display and behavior during run time of the MFP.

31. The method of claim 30 wherein the MFP is a digital document copier enhanced to support multifunctions including document scanning, printing and faxing, and the touch panel serves as the UI for controlling said functions.

32. The method of claim 31 wherein the external computer sends additional XML data to the copier internal computer required to update the UI in order to afford the copier user the capability to supply additional data and selection.

33. The method of claim 31 wherein the interactive communicating of data between the internal and external computer over the network provides integration of the document scanning and enterprise applications.