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(54) ENHANCED VIDEO PROGRAMMING SYSTEM AND METHOD FOR INCORPORATING AND DISPLAYING RETRIEVED INTEGRATED INTERNET INFORMATION SEGMENTS

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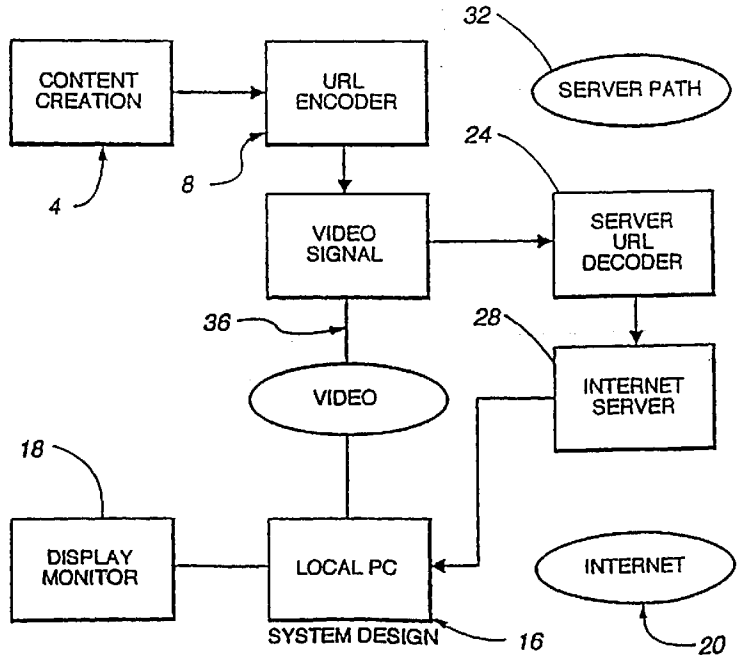
(57) **ABSTRACT**

A system for integrating video programming with the vast information resources of the Internet. A computer-based system receives a video program with embedded uniform resource locators (URLs). The URLs, the effective addresses of locations or Web sites on the Internet, are interpreted by the system and direct the system to the Web site locations to retrieve related Web pages. Upon receipt of the Web pages by the system, the Web pages are synchronized to the video content for display. The video program signal can be displayed in a video window on a conventional personal computer screen. The actual retrieved Web pages are time stamped to also be displayed, on another portion of the display screen, when predetermined related video content is displayed in the video window. As an alternative, the computer-based system receives the URLs directly through an Internet connection, at times specified by TV broadcasters in advance. The system interprets the URLs and retrieves the appropriate Web pages. The Web pages are synchronized to the video content for display in conjunction with a television program being broadcast to the user at that time. This alternative system allows the URLs to be entered for live transmission to the user.



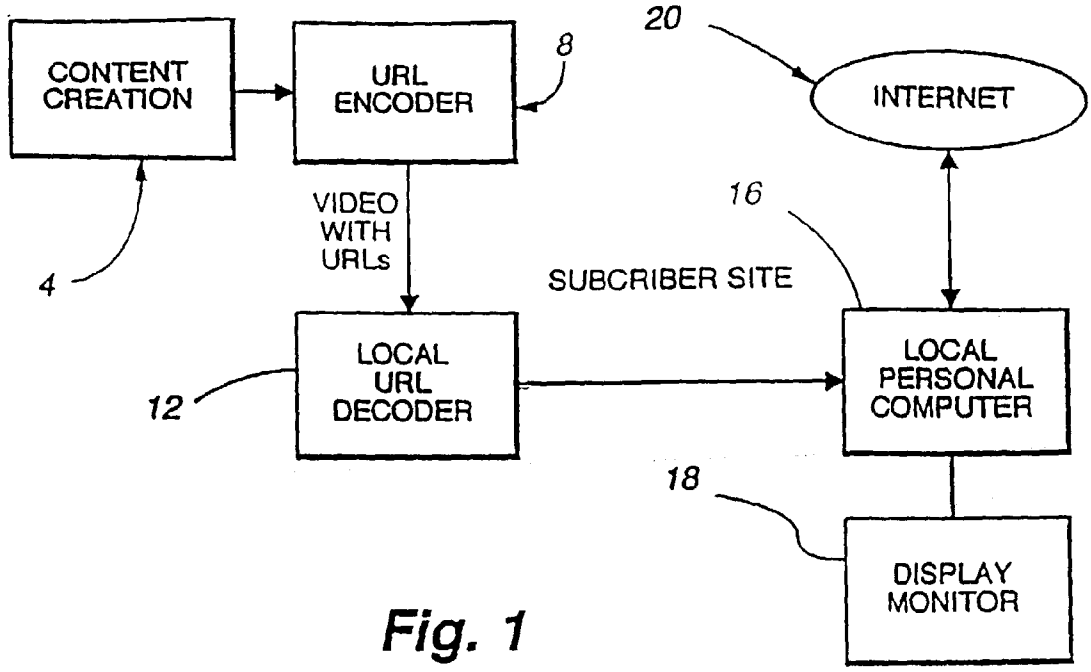

CONTENT CREATION
URL ENCODER
8
20
INTERNET
4
VIDEO WITH URLs
16
SUBCRIBER SITE
LOCAL URL DECODER
12
LOCAL PERSONAL COMPUTER
18
DISPLAY MONITOR

Fig. 1

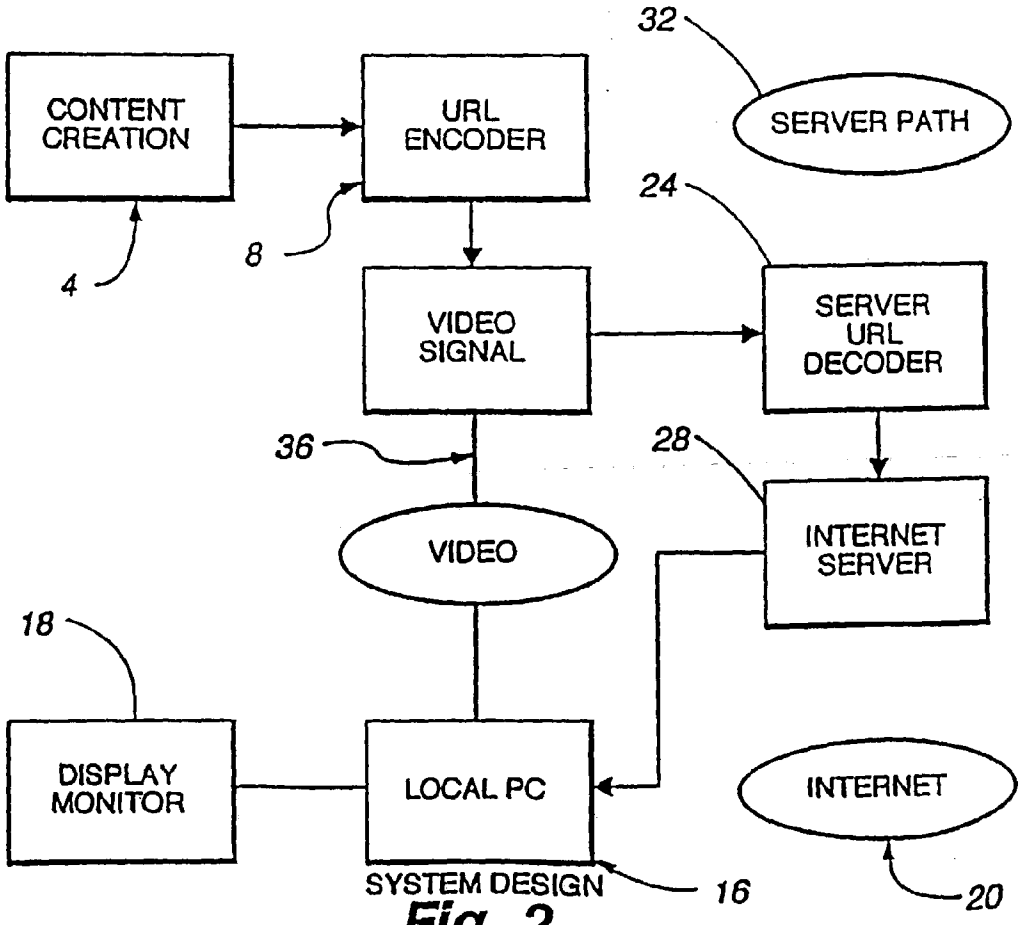
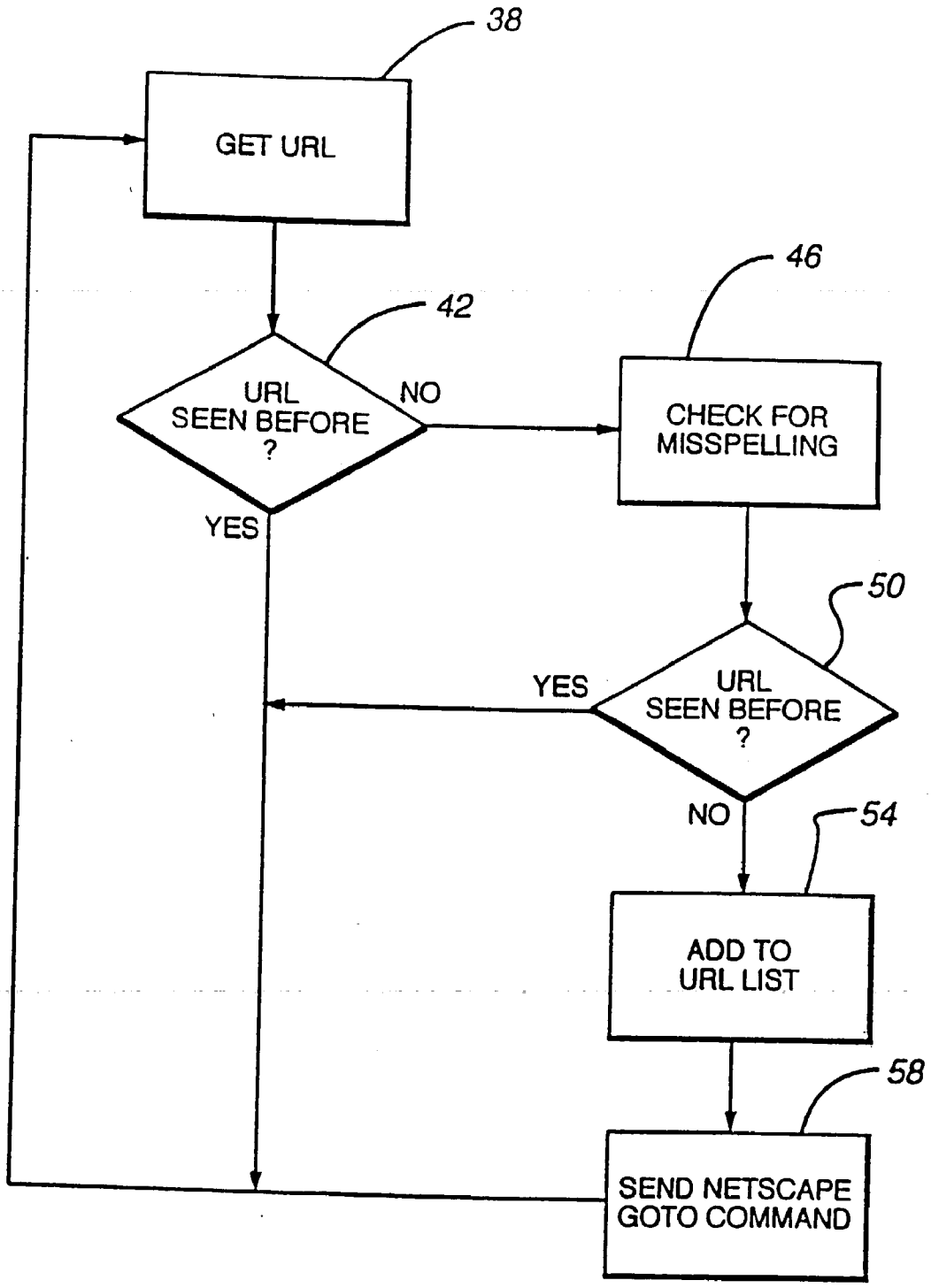

32
SERVER PATH
CONTENT CREATION
URL ENCODER
4
8
24
VIDEO SIGNAL
SERVER URL DECODER
36
28
VIDEO
INTERNET SERVER
18
DISPLAY MONITOR
LOCAL PC
INTERNET
SYSTEM DESIGN
16
20

Fig. 2



SOFTWARE DESIGN

Fig. 3

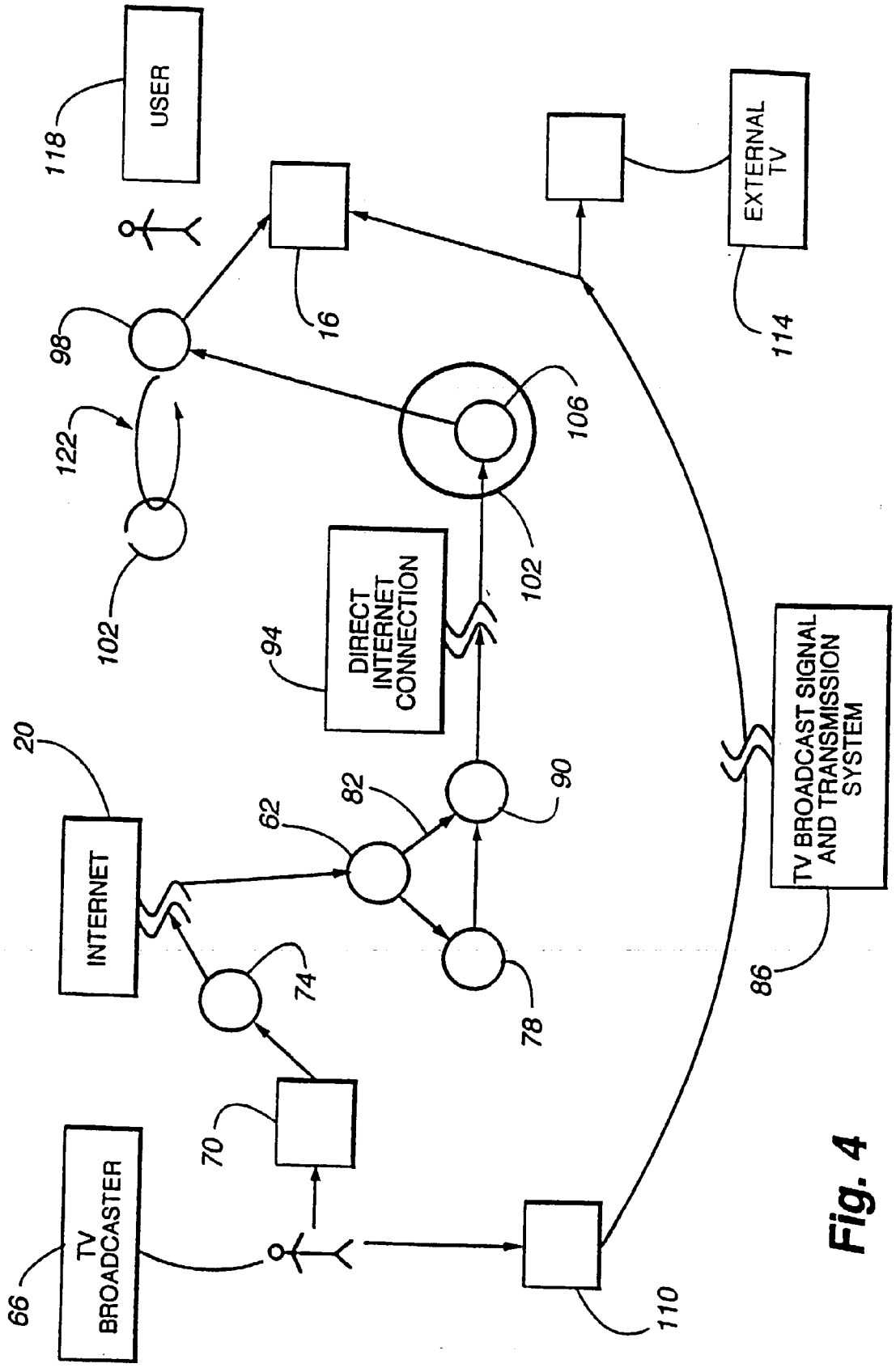

USER
118
16
98
122
102
106
102
EXTERNAL TV
114
DIRECT INTERNET CONNECTION
94
20
INTERNET
62
82
90
74
78
70
TV BROADCASTER
66
110
TV BROADCAST SIGNAL AND TRANSMISSION SYSTEM
86

Fig. 4

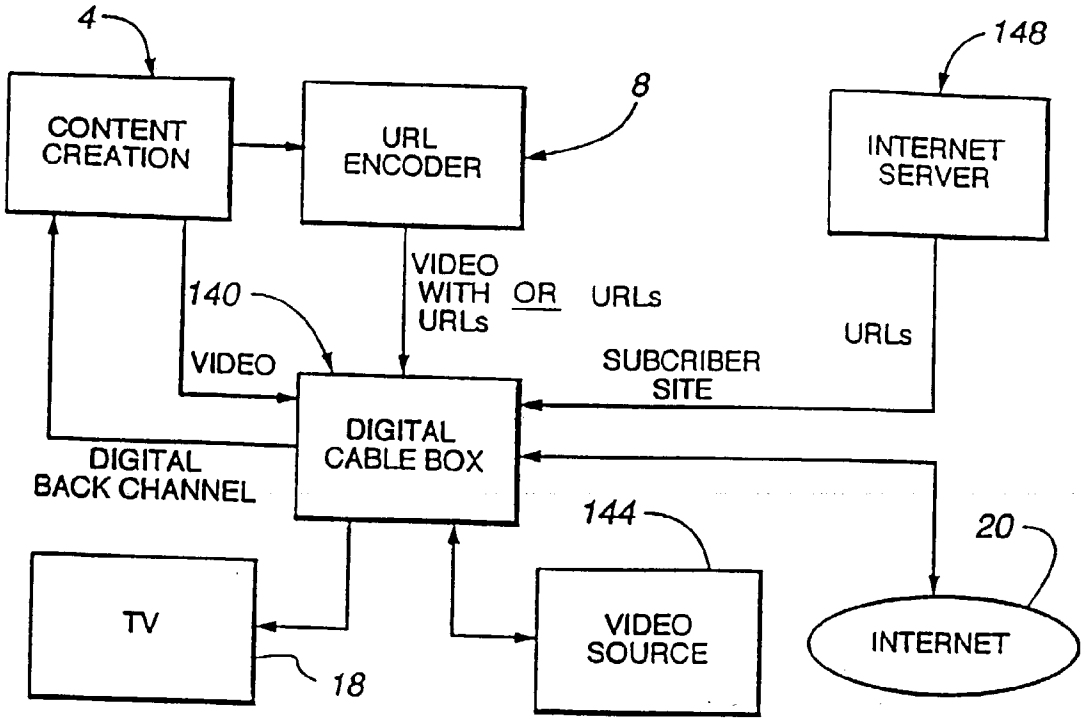

4
CONTENT CREATION
URL ENCODER
8
148
INTERNET SERVER
VIDEO WITH URLs
OR
URLs
140
VIDEO
URLs
SUBCRIBER SITE
DIGITAL CABLE BOX
DIGITAL BACK CHANNEL
144
20
TV
VIDEO SOURCE
INTERNET
18

Fig. 5

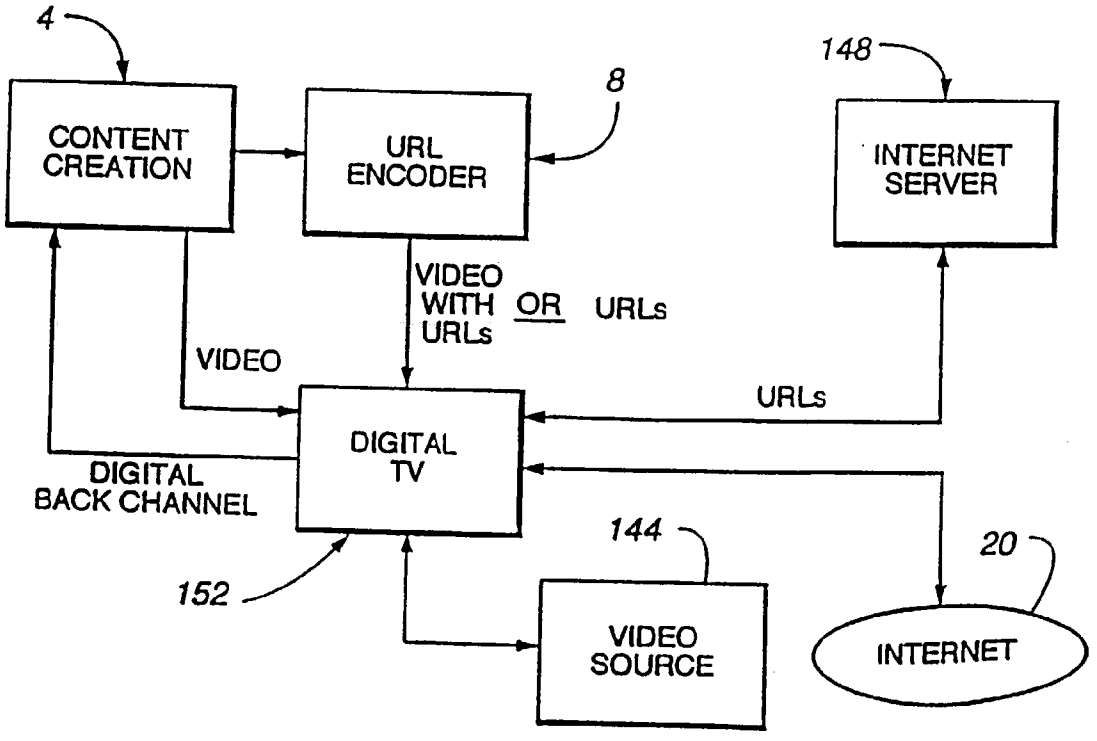

4
CONTENT CREATION
URL ENCODER
8
148
INTERNET SERVER
VIDEO WITH URLs
OR
URLs
VIDEO
URLs
DIGITAL TV
DIGITAL BACK CHANNEL
144
20
152
VIDEO SOURCE
INTERNET

Fig. 6

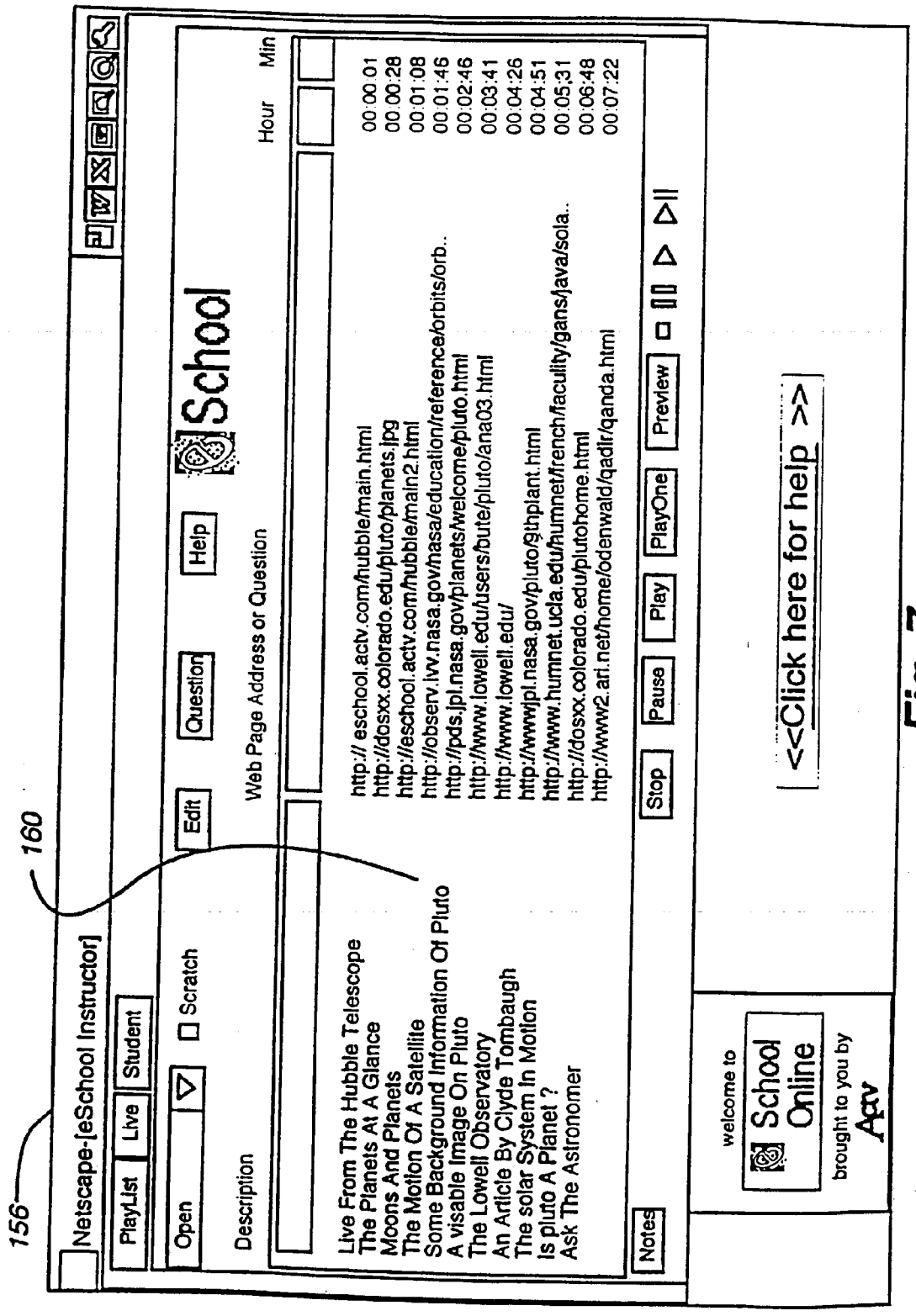

156
160
Netscape-[eSchool Instructor]
PlayList
Live
Student
Open
Scratch
Edit
Question
Help
eSchool
Description
Web Page Address or Question
Hour
Min
Live From The Hubble Telescope
The Planets At A Glance
Moons And Planets
The Motion Of A Satellite
Some Background Information Of Pluto
A visable Image On Pluto
The Lowell Observatory
An Article By Clyde Tombaugh
The solar System In Motion
Is pluto A Planet ?
Ask The Astronomer
http:// eschool.actv.com/hubble/main.html
http://dosxx.colorado.edu/pluto/planets.jpg
http://eschool.actv.com/hubble/main2.html
http://observ.ivv.nasa.gov/nasa/education/reference/orbits/orb..
http://pds.jpl.nasa.gov/planets/welcome/pluto.html
http://www.lowell.edu/users/bute/pluto/ana03.html
http://www.lowell.edu/
http://www/jpl.nasa.gov/pluto/gthplant.html
http://www.humnet.ucla.edu/humnet/french/faculty/gans/java/sola..
http://dosxx.colorado.edu/plutohome.html
http://www2.ari.net/home/odenwald/qadlr/qanda.html
00:00:01
00:00:28
00:01:08
00:01:46
00:02:46
00:03:41
00:04:26
00:04:51
00:05:31
00:06:48
00:07:22
Notes
Stop
Pause
Play
PlayOne
Preview
welcome to
eSchool Online
brought to you by
Actv
<<Click here for help >>

Fig. 7

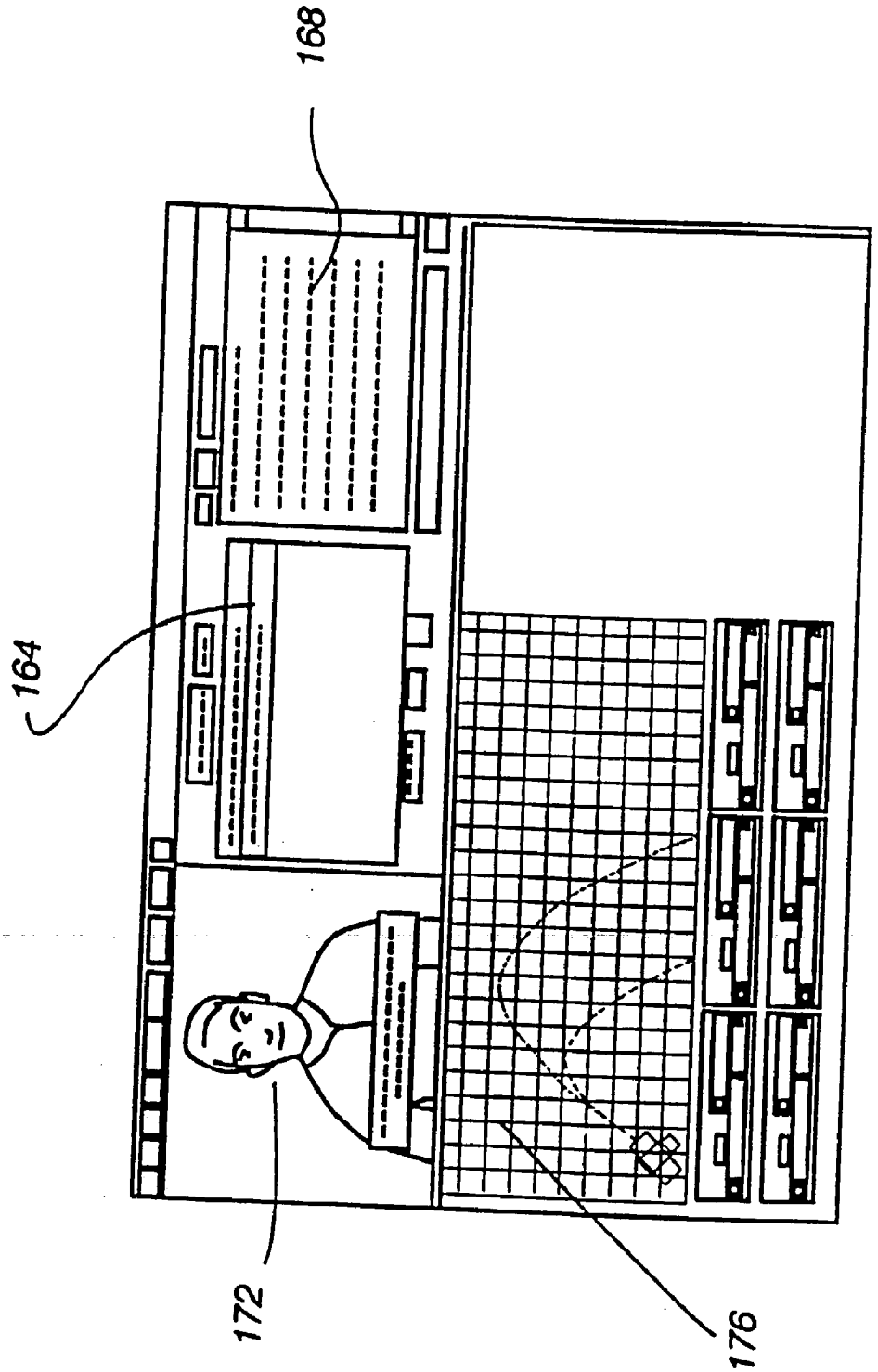


Fig. 8

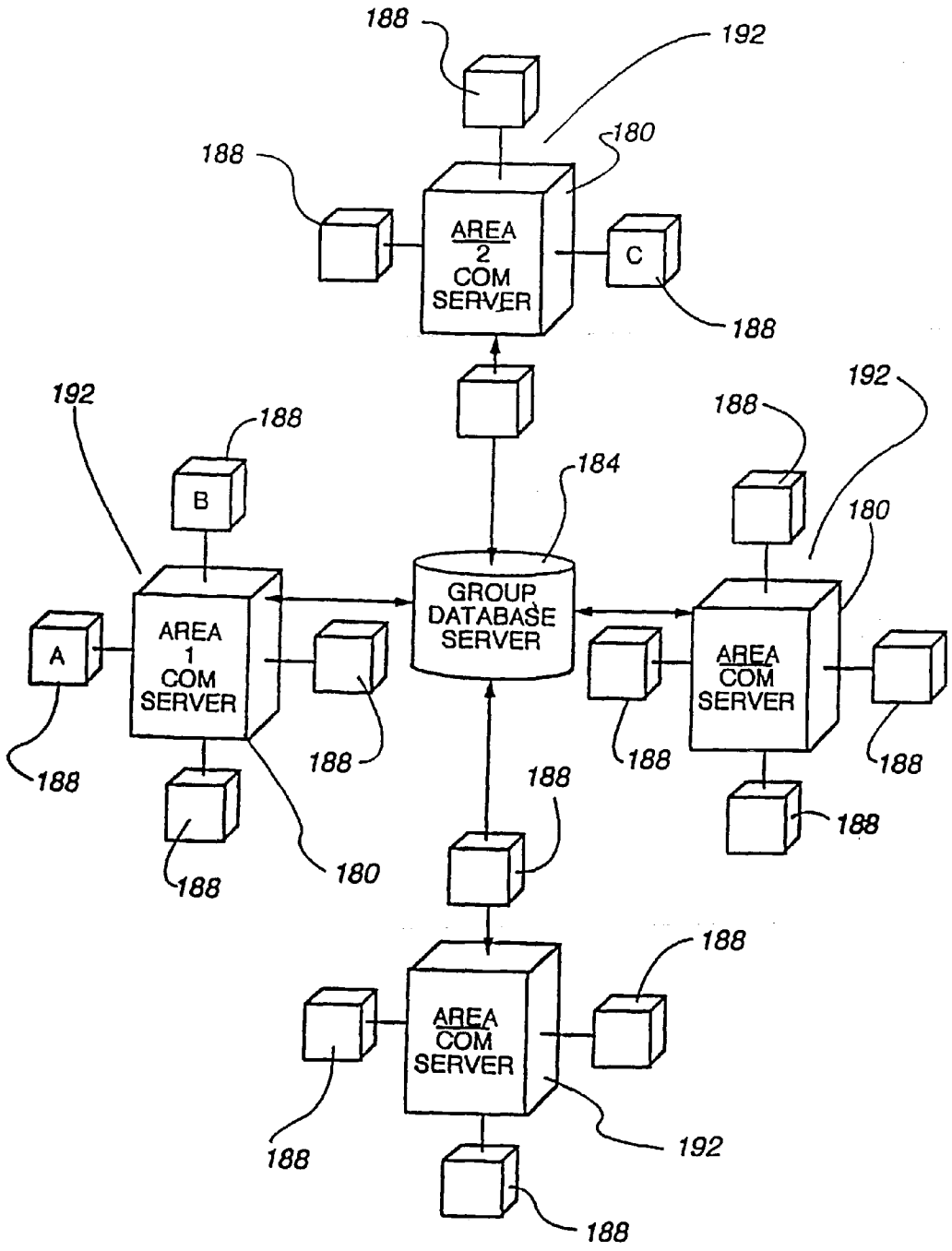

188
192
180
188
AREA 2 COM SERVER
C
188
192
188
B
184
188
192
180
A
AREA 1 COM SERVER
GROUP DATABASE SERVER
AREA COM SERVER
188
188
188
188
188
180
188
188
AREA COM SERVER
188
188
192
188

Fig. 9

ENHANCED VIDEO PROGRAMMING SYSTEM AND METHOD FOR INCORPORATING AND DISPLAYING RETRIEVED INTEGRATED INTERNET INFORMATION SEGMENTS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. application Ser. No. 09/998,592 filed Nov. 16, 2001, which is a continuation of U.S. application Ser. No. 09/633,347 filed Aug. 4, 2000, which is a continuation of U.S. application Ser. No. 09/472,385 filed Dec. 23, 1999, which is a continuation of U.S. application Ser. No. 09/109,945 filed Jul. 6, 1998, now U.S. Pat. No. 6,018,768, which is a continuation-in-part of U.S. application Ser. No. 08/615,143 filed Mar. 14, 1996, now U.S. Pat. No. 5,778,181, which is a continuation-in-part of U.S. application Ser. No. 08/613,144 filed Mar. 8, 1996, abandoned, and is related to U.S. application Ser. No. 08/622,474 filed Mar. 25, 1996, now U.S. Pat. No. 5,774,664, which is herein incorporated by reference.

BACKGROUND OF THE INVENTION

[0002] Today, the capabilities of computers to provide massive amounts of educational and entertainment information has exploded with the Internet. The Internet has the power to transform society through unprecedented levels of information flow between members. Currently, on-line systems offer a variety of different services to users, including news feeds, electronic databases (either searchable by the user directly on the on-line system, or downloadable to the user's own computer), private message services, electronic newsletters, real time games for play by several users at the same time, and job placement services, to name a few. However, today, most on-line communications occur merely through text. This currently stands in great contrast to the audio/visual presentation of the alternative electronic medium, television. However, it is expected that as multimedia's incessant growth continues, audio/visual programs will proliferate and text will become less and less dominant in the on-line environment. Even though these programs will be introduced, the Internet, will remain essentially user unfriendly due to its very massiveness, organization, and randomness. Simply stated, there is no order or direction in the Internet. Specific pieces of information are many times hard to find, and harder yet, is the ability to put that piece of information into a meaningful context.

[0003] Television, on the other hand, has been criticized for being a passive medium—"chewing gum for the eyes," as Fred Allen once observed. Television has always been something you watched, not something you do. Many social critics believe that the passivity television depends on has seeped into our entire culture, turning a nation of citizens into a nation of viewers. While interactive television systems have increased the level of user interaction, and thus, provided greater learning and entertainment opportunities, vast information resources such as databases are inaccessible from such a medium.

[0004] What is needed is a means to close the gap between video programming and the information superhighway of the Internet. What is needed is a wider, richer experience integrating audio/visual and textual database elements into an organized unique interactive, educational, entertainment experience. Currently, the Internet is a repository of information on virtually any subject. However, what is needed is a mechanism for combining the user-friendly visual experience of television with the vast information resources of the Internet.

SUMMARY OF THE INVENTION

[0005] The system of the present invention combines broadcast television programming and/or video programming which appears on a VHS or Beta tape, CD-ROM, DVD or other medium, or video programming at a video server (hereinafter "video programming") with the massive Internet, creating a new and powerful educational and entertainment medium. The system allows consumers to receive more information in a more efficient manner than either television or the Internet alone. Consumers not only can see a news report on television, but they can also read pertinent information about the report, as well as explore related information about the story. The program becomes the introduction to a particular subject, rather than the entire subject itself. The act of viewing a program has now become a more engaging, enriching experience.

[0006] The system can also create a more intimate relationship between the viewer and the program. The user might be solving problems or performing virtual experiments on the Internet site that a teacher is discussing in an educational television program. Similarly, the consumer might be solving problems that the fictional characters in a television program must solve. In both cases, the consumer is an active participant in the process, rather than a passive observer.

[0007] Instead of an undirected and unfocused exploration of Internet sites, by synching specific Internet pages to the video signal, the system puts the Internet in context. The television program producers now can decide what additional information to offer their audience. This material can now be seen in the context of the television program.

[0008] An additional advantage is that consumers don't have to search through the literally hundreds of millions of pages on the Internet to find appropriate material. The material has already been filtered by the program producers and delivered to the consumer automatically.

[0009] Another advantage of the system is that it changes the nature of advertising. Since additional information can be given to consumers automatically, advertising can now be more substantive, allowing customers to make more informed choices. Now, the act of purchasing a product seen on television can be streamlined—the consumer can be given the choice of buying the product instantly using the two-way capabilities of the system.

[0010] In addition, users can take advantage of the two-way capabilities of the Internet to respond to polls, to send e-mail or to link to additional sites. For example, a viewer watching a television news program, through the system of the invention, can receive a stream of Web pages which provide additional, specific information relating to the news content—whether background on the Presidential primaries or the latest change in interest rates.

[0011] The video programming and corresponding Internet pages can be viewed on personal computers equipped with a television card, but the open software-based approach

enables anyone with a television set and JAVA enabled PC to experience the system of the invention.

[0012] By marrying the appeal of video with the two-way data transfer capabilities of the Internet, the system creates a powerful new medium. Video producers and Internet site creators can enhance their content to extend their brand identity and differentiate their program offerings to the millions of people who are spending more time navigating through the resources of the World Wide Web rather than watching television; advertisers can speak more directly to consumers by directly sending Web pages to the consumer instead of only displaying Web addresses in their commercials; and consumers can gain a new level of interest and interactivity over a video-based medium. In addition to providing significant and immediate benefits to broadcasters and advertisers, the system will also present educational programmers with a way to more effectively use Internet resources in the classroom.

[0013] Recently, several media companies have joined to create a system for linking the Internet and television on the personal computer, called "Intercast." In this system, content will be provided simultaneously with the TV video signal. This system, however, requires that stripped down Web pages be sent in the vertical blanking interval (VBI) of the video signal, using up to three scan lines limiting effective bandwidth to approximately 28.8 kbps. This approach, however, requires specialized hardware to both insert the Web pages into the VBI and extract these codes at each PC since it takes up to three scan lines of the VBI. Thus, the complexity and cost of the PC is increased. Because the Web pages are transmitted with the video signal, the Intercast system is not a true "two-way" system, but merely a one-way "piggyback" system. In addition, the Intercast is an analog video product, and thus, cannot handle digital video data.

[0014] The system of the present invention, on the other hand, is a much more flexible, but less complex, system. The present invention supports either analog or digital television broadcasts without broadcasters or end-users having to alter their existing systems, thus enabling broadcasters to reach a wide audience within a short time.

[0015] In a first embodiment, the actual Web pages are not forced into the very limited bandwidth of the vertical blanking interval (VBI). Instead, merely eight fields of line 21 of the VBI are used to deliver the relevant Internet Web page addresses to the PC. These addresses are called "uniform resource locators" (URLs). The system then directs the particular Web browser to retrieve the identified Web pages from the Internet. Upon receipt of the particular Web page(s), the system syncs the Web page(s) to the video signal, and at the appropriate times, presents the Web pages on one portion of the computer screen with the television video signal, shown in a window on another portion of the screen, and thus, provides the synergistic Internet and television experience. One of the advantages of the system of the present invention is that no specialized chip set need be produced and implemented into the standard PC. Thus, complexity is kept to a minimum.

[0016] In another preferred embodiment of the present invention, the VBI is not used to transmit the URLs to the user. In this alternative embodiment, member broadcasters enter the Internet through a member account, and will be provided with a graphical user interface for pre-scheduling Internet addresses, or URLs, for transmission to users at particular times of day. This interface could also be used to transmit real time live transmissions of URLs to users at the same time as a broadcast. The URLs are stored in a "Link File" for later transmission over the Internet to the user at the broadcasters entered time, which corresponds to the broadcast time of an associated program. The timing of URL's could be determined in advance or can be sent out live. This embodiment eliminates the need to place the URLs in the VBI, and also allows the broadcaster to store more than one Link File for transmission to users in different time zones, for example. Further, more than one broadcaster could access the same master schedule if desired, and add or delete certain URLs to personalize the program for their local audiences. Also, personalization can be taken to the single user, or small group of users, by having the system send a different stream of URLs to each user, depending on a unique user profile, for example. Thus, the personalization feature of the present invention allows each user to receive information uniquely relevant to their interests, demographics, history, etc. This embodiment makes the transmission of URLs to the user even less complex than the first embodiment disclosed herein.

[0017] Thus, it is an object of the present invention to provide order and direction to the Internet by using television signals to place, orient and control such information in a meaningful context.

[0018] It is an object of the present invention to create a more intimate relationship between the viewer and the program by enriching the learning experience through the provision of more in-depth information.

DESCRIPTION OF THE DRAWINGS

[0019] **FIG. 1** is a diagram of the system design, showing the receipt and decoding of video signals at the subscriber location using the method of the present invention.

[0020] **FIG. 2** is a diagram showing an alternative system embodiment to achieve the integration of the Internet information with the video content by decoding the uniform resource locators at a server site and then transmitting the URLs to the subscriber stations via the Internet.

[0021] **FIG. 3** is a flow diagram of the basic software design of the present invention.

[0022] **FIG. 4** is a diagram showing another preferred system embodiment to achieve the direct transmission of URLs over the Internet to the user at a broadcaster's entered time without encoding the URLs into the VBI.

[0023] **FIG. 5** is a diagram of another preferred embodiment including a digital cable box.

[0024] **FIG. 6** is a diagram of another preferred embodiment including a digital T.V.

[0025] **FIGS. 7 and 8** are a sample display provided to a student of a lesson.

[0026] **FIG. 9** is a diagram of the distributed Com Server embodiment.

PREFERRED EMBODIMENT

[0027] The system of the present invention combines the rich visual capabilities of video with the vast resources of the

Internet. As shown in **FIG. 1, a** preferred embodiment of the invention is a computer based system for receiving a video program along with embedded uniform resource locators (URLs)—which direct the user's computer **16** to address locations, or Web sites, on the Internet 20 to retrieve related Web pages. These Web pages correspond to the video presentation. The particular video programming can be delivered in analog, digital or digitally compressed formats (e.g., MPEG2) via any transmission means, including satellite, cable, wire, television broadcast or sent via the Web.

[**0028**] The video programming is preferably created at a centralized location, i.e., content creation **4** as shown in **FIG. 1**, for distribution to subscribers in their homes, for example. Program creation is accomplished according to any conventional means known in the art. After a video program is created, uniform resource locators are embedded, in one preferred embodiment, into the vertical blank interval of the video programming by the URL encoder **8**, shown in **FIG. 1**. In this embodiment, the URLs are encoded onto eight fields of line 21 of the VBI. Line 21 is the line associated with close captioning, among other things. However, the URLs could also be embedded in other fields of the VBI, in the horizontal portion of the video, as part of the audio channel, in any subcarrier to the video, or if digital, in one of the data fields.

[**0029**] Although **FIG. 1** shows the video with URLs over the same transmission line, the URLs can be sent down independently of the video program on a data channel. In this embodiment, the URLs can be forwarded to the remote sites either prior to initiation or during the program. Preferably, the URLs have associated time stamps which indicate to the subscriber stations when, during the video program, to display the particular Web pages addressed by the URLs. Alternatively, the user can select when to call the particular Web pages for display with the video program.

[**0030**] The particular information in line 21 is not part of the visual part of the program, and thus, is not perceptible to the human eye, thereby making it ideal to send data information to the users. While the bandwidth capacity of line 21 is limited, because the system of the present invention transmits only the uniform resource locators (URLs), and not full Web pages, there is more than enough capacity. Furthermore, no additional hardware is necessary at the PC **16** to implement the elements of the present invention. Thus, the present invention has the additional advantages of being very efficient and takes advantage of conventional hardware.

[**0031**] Once the video program is created, it can be transmitted to user sites over any transmission means, including broadcast, cable, satellite, or Internet, and may reside on video servers. Furthermore, the video program, with or without embedded URLs, can be encoded on a VHS or Beta tape, DVD or other medium.

[**0032**] Preferably, each receiver station comprises any Intel ×86 machine (preferably a 486 processor, pentium processor, etc.), an Apple Computer, UNIX or any other type of standard computer workstation. The local PC **16** is preferably connected to either a cable and/or broadcast television connection or to a local VCR or other video source. At each subscriber site, the local personal computer **16** preferably receives the cable transmission by cable connection on the back of the personal computer **16**. The video/audio program can then be processed for display on the computer screen using any conventional PC card capable of displaying NTSC signals on a computer monitor, such as a WinTV card. In addition to the cable connection, however, in the present invention there is also an Internet 20 connection created concurrently with the cable connection.

[**0033**] The Internet 20 connection can be via high-speed line, RF, conventional modem or by way of two-way cable carrying the video programming. The local PC **16** has Internet access via any of the current ASCII software mechanisms. In a preferred embodiment, at each subscriber home, an associated local URL decoder **12** receives the cable video television program, as shown in **FIG. 1**. The local URL decoder **12** extracts the URLs, preferably embedded in the vertical blanking interval, with the use of any conventional VBI decoder device. The URL decoder **12** may be either a stand-alone unit or a card which is implemented into the personal computer **16**.

[**0034**] In another preferred embodiment shown in **FIG. 2**, the uniform resource locators (URLs) are encoded into the video in the same manner as described above. Again, the URLs are preferably encoded onto eight fields of line 21 of the VBI, but may also be sent independently of the video. In this embodiment, the URL decoder **24** is located at the server site, as opposed to the subscriber location. When the decoder **24** receives the video program signal, it strips out the URL codes on line 21 of the VBI and delivers these codes independently to an Internet server **28**. The URL code is then subsequently delivered over the Internet 20 to the user PC **16**. Simultaneously, the video is broadcast over conventional broadcast or cable transmission means **36** to the user's personal computer **16**.

[**0035**] Another preferred embodiment of the system, shown in **FIG. 4**, does not depend on, or even use, the VBI. In this preferred embodiment, the system will run an online service over the Internet 20. This service will be in the form of an Internet Web site **62** that provides a user-interface to a database **78** and to one or more associated data servers **90**. The service will provide member-accounts to TV broadcasters **66** who sign up to use the system of the invention in conjunction with their broadcasts. Each member broadcaster will enter the service at their computer **70** through Web browser software **74** using their member account by entering various identification and password information. Once within their account, the member will be provided with a graphical user interface for pre-scheduling URLs for transmission to users **118** over a direct Internet connection **94** at particular times of day. The same user interface, or a variation on it, can be used by broadcasters for live transmission **82** of URLs to users at the same time as a broadcast **86**.

[**0036**] For example, one example of this interface might be a scheduling calendar (daily, weekly, monthly, yearly) in which the broadcaster **66** may allocate time periods which coincide with their broadcasts **86**, and during which they will send out URLs to their users to link to Web pages. For each time period (for example, a particular hour long period during the day) determined by the broadcaster **66** to be a broadcast period (a period during which they want to transmit URLs that correspond to a television show being broadcast from their TV broadcast facility **110** to the external TV **114** of the user **118** at that time), the broadcaster **66** may then enter a series of URLs into an associated file

("Link File") for transmission over the Internet 20 at that time. This Link File might have a user interface such as a spreadsheet, table, or list, or it could be simply a tab-delimited or paragraph-delimited text-file. As an example, each of the records in the Link File consists of a data structure which could contain information such as:

[0037] (<timecode>,<URL>,<label or title>,<additional information>,<additional information>, . . .)

[0038] The above data structure is just one example. The records in the Link File preferably specify the time, Internet address (i.e. URL), label (such as an associated name), and some optional additional information, for each Web page the broadcaster **66** desires to launch during a show.

[0039] When a broadcaster **66** modifies their calendar and/or the Link File associated with any given time period(s) in their calendar, this information is saved into the database **78** that is attached to the site **62**. Each broadcaster **66** may maintain multiple calendars in the database **78** if they broadcast in different time zones, for example.

[0040] The database **78** provides the Link File records for upcoming time periods to a server **90**, which may be one server or a distributed network of server programs on multiple computers across the network, to be utilized for scaling to large national or global audiences. The server **90** provides the Link File records, including the URLs, to the user's personal computer **16**, which is connected via a network. Examples of possible networks include the public Internet **94**, a direct private network, or even a wireless network.

[0041] One feature of the above embodiment is that one or more broadcasters **66** may utilize the same schedule in the database **78** for their own broadcasts **86** or during the same broadcast. For example, a network broadcaster may develop a master schedule and various affiliate broadcasters may subscribe to that schedule or copy it (in the database) and add or delete specific URLs in the schedule for their local audiences or unique programming. This scheme enables affiliates to insert URLs for local advertisers or local subjects into a sequence of more general URLs provided by their network broadcaster **66**. In other words, the affiliate can add links that ride on the network feed and then redistribute it to their local audiences.

[0042] The above embodiment can also enable personalization in the form of unique series of URLs specific to each user's unique profile, which is directly sent over the Internet 20 to each user's specific client software **106**. This can be achieved from the broadcaster **66** to each individual user **118**, or to particular collections of users. To accomplish personalization, the service may send a different stream of URLs to each user's client software program **106**. The stream of URLs sent would depend on a user profile stored in the database **78** or the client software program **106**, a user profile which is built on demand or over time for each user **118** based on criteria such as the location of the user, choices the user makes while using a client software program **106**, or choices the broadcaster **66** makes during a broadcast **86**, or automatic choices made by an algorithm (such as a filter) residing on the service **62**. Personalization enables each user to receive URLs which are uniquely relevant to their interests, demographics, history, or behavior in the system.

[0043] System Operation

[0044] Once the URLs have reached the personal computer **16**, system operation is similar for all of the embodiments diagramed in **FIGS. 1, 2**, and **4**.

[0045] In a preferred embodiment, a JAVA enabled browser **98** as well as specialized software **106** for performing part of the method of the present invention are installed on the computer **16**. The JAVA enabled browser **98** allows the computer **16** to retrieve the Web pages **102** and is preferred software, since it is platform independent, and thus, enables efficient and flexible transfer of programs, images, etc., over the Internet 20. The specialized interface software **106** (hereinafter, "client software"), attached as Appendix A, acts as an interface between the video programming and the Internet functions of the present invention. The client software **106** retrieves URLs from the video program (embodiment of **FIG. 1**) or directly from the Internet connection (embodiments of **FIGS. 2 and 4**), interprets these URLs and directs the JAVA enabled browser **98** to retrieve the particular relevant Web pages **102**, and synchronizes the retrieved Web pages to the video content for display on the user's computer **16**, as shown in **FIGS. 3 and 4** and explained in more detail below.

[0046] In a preferred method, the URLs are encoded and embedded into the video signal by inserting them into the vertical blanking interval (VBI), as mentioned above.

[0047] In another preferred embodiment, the URLs are entered by member TV broadcasters **66** along with specified times for transmitting the URLs to the user. At the appropriate times, the URLs are sent directly over the Internet to the user's PC **16** via the client software **106** over a direct point-to-point or multicasting connection.

[0048] One method of the present invention has the capability to detect identical URLs sent directly after one another which causes the browser not to fetch URLs in these particular cases. As shown in **FIG. 3**, once the URL code is received at the computer, the client software **106** first interprets the URL and determines in step **42** whether the particular URL has been received previously. If it has already been received, the next received URL is interpreted for determination of prior receipt. If the particular URL has not been detected before, the software checks for misspelling in step **46** and any other errors, and if errors exist, corrects these particular errors. Once again, it is determined whether the URL has been previously detected. If it has, the next URL is accessed in step **38**. If the URL has not been detected, the specific URL is added to the UTRL list in step **54**. The specific URL is then sent to the Web browser, preferably a JAVA enabled browser **98**. Upon receipt of the URL, the browser **98**, in step **58**, will access the Web site address **122 (FIG. 4)** indicated by the URL and retrieve the cited Web page(s) **102** via the Internet.

[0049] Viewers can view the integrated presentation in the following manner. As mentioned above, the video signal is processed and displayed on a video window on the PC screen using a WinTV card, for example. The corresponding audio is forwarded to the audio card and sent to the PC speakers.

[0050] The actual retrieved Web pages **102**, referenced by the URL, are optionally time stamped to be displayed on the computer screen when predetermined related video content

is displayed in the video window, thus, enlightening and enhancing the video presentation by providing in-depth information related to the video content thereto. Another section on the screen is also preferably used to represent an operational control panel. This control panel provides a list of the URLs that have been broadcast and correspondingly received by the computer **16**. This control panel is updated to add a URL code each time a new URL code is received by the PC **16**. This list gives the subscriber the flexibility to go back and retrieve particularly informative or interesting Web pages that have already been displayed earlier in the program, or alternatively, to print them out for future reference. Furthermore, the list could include URLs referring to Web pages not displayed with the broadcast program, but that provide further information on a certain topic of interest to the viewer.

[**0051**] The present invention can best be understood with reference to an example. A viewer can begin watching a musical video featuring a new band, for example. As the video is received by the PC **16**, URLs are either being received with the video signal or are being received directly via the Internet 20 or another data channel, and are being interpreted by the client software **106**. Upon direction and command, the JAVA enabled browser **98** retrieves particular Web pages **102** from Internet 20 Web sites identified in the URLs. These Web pages **102** will then be displayed on the video screen at particular times. Thus, for example, while the viewer is watching the music video, biographical information on the band can also be displayed adjacently to the video window. Web pages **102** could also include an upcoming concert schedule, or even audio clips of the band's music may be downloaded from the Internet 20. As another example, a user could be watching a program relating to financial news. While the narrator is shown discussing high tech stocks, Web pages corresponding to detailed financial performance information on high tech stocks, environment and characteristics can be displayed with the video on the computer screen. If the personalization features are included, Web pages associated with a particular user's stock can be fetched and displayed on the computer screen with the video program. When the program narrator switches to a discussion on the weekly performance of the Dow Jones, Web pages presenting related financial performance information can be simultaneously displayed. Thus, it is evident that the present invention profoundly enriches the viewing and learning experience.

[**0052**] It is understood that there can exist alternative embodiments for use with the present invention. For example, the user can view the interactive program using a television set **114** or other display monitor in conjunction with the display screen of the personal computer **16**. In this embodiment, the relevant Web pages are shown on the personal computer **16** while the video program is displayed on the television monitor **114**. In this alternative embodiment, a cable set top box receives the television program from the multichannel cable. The personal computer **16** also receives the video program from the multi-channel cable and extracts the URLs, embedded in the vertical blanking interval of the video signal or directly transmitted **94** over the Internet 20. The client software **106** extracts the URLs and retrieves the particular Web pages as described above. The Web pages are then synchronized with the particular video frames and presented to the user. It is understood that a hyperlink may exist on the Web site that will allow the user to automatically load the client software and call up the specific television channel referenced in the Web site. For example, someone browsing the Internet 20 may come upon a major television network's Web site. They scroll to an interesting story then click on an hyperlink to turn on the software which tunes the TV window to the network to enhance the information residing at the Web site.

[**0053**] Furthermore, instead of receiving the video program from a transmission means, the video program can be addressed directly from the user site if the video program, with or without embedded URLs, is stored on a VHS, Beta, DVD or other medium. In this embodiment, the user PC **16** and/or television **114** are connected to a VCR, DVD player or other appropriate device.

[**0054**] **FIGS. 5 and 6** show two alternative embodiments for use with the present invention. For example, the user can view the interactive program using a television set **18** or other display monitor in conjunction with a digital cable box **140**, as shown in **FIG. 5**. In this embodiment, the digital cable box **140** performs the functions of the personal computer **16** shown in **FIGS. 1, 2** and **4**. In the embodiment shown in **FIG. 5**, the client software is stored in memory in the digital cable box **140**. In the preferred embodiment, the digital cable box **140** includes two tuners, thus allowing both the Web Page and the Video program to be simultaneously viewed on the same screen. If Video and Webstream, however, are carried on one channel, then only one timer is necessary.

[**0055**] The client software retrieves URLs from the received video program, directly from the Internet connection 20 or via a separate data channel, interprets these URLs and directs the Web enabled browser to retrieve the particular relevant Web pages, and synchronizes the retrieved Web pages to the video content for display on the television **18**, as shown in **FIG. 5**. In this embodiment, the relevant Web pages are shown in one frame of the television **18** while the video program is displayed in another frame.

[**0056**] In this alternative embodiment, the digital cable set top box **140** receives the television program from the multichannel cable. The URLs can be encoded into the digital program channel using MPEG 1, MPEG2, MPEG4, MPEG7 or any other compression video scheme. Alternatively, the URLs can be transmitted to the digital cable boxes **140** from an Internet server **148**. The digital cable box **140** decodes the URLs from the digital video signal or directly transmitted over the Internet 20. The client software decodes the URLs and retrieves the particular Web pages as described above. The Web pages are then preferably synchronized with the particular video frames and presented to the user.

[**0057**] As with all the embodiments described above, instead of receiving the video program from a transmission means, the video program can be addressed directly from a local video source **144** if the video program, with or without embedded URLs, is stored on a VHS, Beta, DVD or other medium. In this embodiment, the digital cable box **140** is connected to a VCR, DVD player or other appropriate device.

[**0058**] **FIG. 6** discloses an embodiment where a digital TV **152** is the remote reception unit. In this embodiment, the digital TV **152** performs the functions of the personal

computer, shown in **FIGS. 1, 2** and **4**, and the digital cable box **140** shown in **FIG. 5**. In the embodiment shown in **FIG. 6, a** processor means and memory are incorporated into the digital TV **152**. Further, the client software and Web browser software are implemented into memory in the digital TV **152**. All of the functions described above with reference to the other embodiments are performed in a similar manner by the digital TV **152** embodiment.

[**0059**] Although the digital cable box/TV **140**, **18** and digital TV **152**, shown in **FIGS. 5 and 6**, are incorporated into the embodiment of **FIG. 1**, in substitution for the PC **16**, they also could be substituted for the PC **16** shown in **FIGS. 2 and 4**.

[**0060**] The user can view the video and web content on one screen (in two windows), or with the video on one display screen and the Web content on a separate display monitor. Alternatively, the user can access the video or web content separately. Thus, the user can branch from video to web content and vice versa.

[**0061**] The present invention is well-suited to the education environment. In this embodiment, students and teachers access one or more Web servers. The software components include instructor and student user software, authoring software and database assessment software. In one such embodiment, an instructor uses content creation software on a personal computer to easily integrate into their curriculum current information published on the Web, through an easy to use interface **156** such as that shown in **FIG. 7**. The instructor creates a playlist (i.e. linkfile) **160**, the playlist **160** comprising a listing of Web pages, text notes and questions. The Web sites and questions are set forth in a predetermined order and can be assigned times. Preferably, the URLs identifying the Web site and time stamps are sent automatically to the desktop of each student in the virtual community, either during playback of a pre-recorded program or during a live event.

[**0062**] At each of the student workstations, the program is directed by the playlist **160**. In other words, the playlist **160** provides the structure for the program. At predetermined times as dictated by the playlist **160**, the browser will go fetch and display a Web page in a frame on the computer screen. Because program events can be set up in this manner at predetermined times, the entire program and playlist can be prerecorded and stored in a Web database for later access by students.

[**0063**] A significant advantage of the present invention for educational applications is that the students and the instructor can be located anywhere, as long as they are all connected to the Web. Because a server is essentially controlling the program, the instructor output comes from the server and the student workstations get automatically updated by the Web server.

[**0064**] This educational embodiment integrates Web content and other media with collaborative groupware functionality to create an interactive environment for students and teachers. In this embodiment, the student can receive a traditional video lesson through a frame in his or her Web browser, or from a television. Simultaneously, the present invention provides separate frames, an example of which is shown in **FIG. 8**, in the browser displaying: (1)Web pages **176** automatically delivered to each student's desktop with information or exercises that complement the video presentation; (2) a chat dialogue frame **168** for conversing with the instructor and/or other students online; and (3), an interactive playlist **164** of Web pages and questions comprising the lesson.

[**0065**] In the student interface of **FIG. 8**, each student can perform a virtual experiment during a physics lesson to learn about gravity, for example. Further, the students are conversing with one another and the instructor in the chat dialogue frame **168**. They may also send Web pages to one another and provide answers to questions from the teacher via the chat dialogue frame **168** of the student interface **176**. With the chat feature, students may break into subgroups for collaborative learning. Whenever a student in the group sends a message, the message is sent to the Internet server **20** and every other student in the subgroup receives and views the message in their Chat dialogue frame **168**.

[**0066**] The instructor, however, may retain control over the chat feature. For example, the instructor can terminate the chat feature or web pushing to terminate unruly on-line conversations or the sending of Web pages by students.

[**0067**] Unlike conventional distance learning systems, the present invention is more powerful by allowing the instructor to freely and conveniently exercise almost any time of testing strategy. The instructor can test students using a combination of the Chat dialogue feature and Web pages. For example, multiple choice questions and short answer questions can appear in the Chat window **168**. Essay questions, requiring longer answers, become Web pages. As mentioned above, students can perform virtual experiments on-line. Once the instructor's personal computer receives student answers, student scoring can be presented to the instructor in any format including tables, charts, diagrams, bar graphs, etc. The instructor, thus, can analyze the results and has the capability of providing real-time feedback to the students.

[**0068**] Students can also receive individualized feedback via branched interactive audio, video and/or graphics responses. For example, the workstation may branch to a particular audio response, preferably prerecorded in the instructor's own voice, based on the student response to a multiple choice question. In this embodiment, a plurality of potential audio responses are made available at the student's workstation according to any one of the methodologies set forth in U.S. Pat. No. 5,537,141, entitled DISTANCE LEARNING SYSTEM, herein incorporated by reference. Alternatively, personalized video, audio and graphics segments can be delivered and displayed to the student based on a student answer or personal profile in the manner set forth in U.S. Pat. No. 5,724,091, entitled COMPRESSED DIGITAL DATA INTERACTIVE PROGRAM SYSTEM, herein incorporated by reference.

[**0069**] Responses to student answers can be more substantive based on the memory feature of the present invention. The memory feature is an algorithm that selects an interactive response to the user based not only on the student's current answer selection, but also his or her previous responses, as discussed in the aforementioned applications. The algorithm, preferably stored in memory at each student's workstation and under processor control, merely selects an output interactive response based on student responses. As another example, if a student gets

three answers in sequence right, he or she receives a more difficult question. If, however, the student misses one or more of the three questions, he or she receives an easier question.

[0070] In another embodiment of the present invention, a system is described capable of handling the education requirements of several schools in an efficiently designed network. The system shown in **FIG. 9** solves the problems inherent in attempting to service large numbers of users, the most obvious obstacles being the issues of load and performance. In this embodiment shown in **FIG. 9**, communications servers **180** distribute and route messages across a LAN, WAN and the Internet. Referring to **FIG. 9**, in the center of the diagram is the Group Database server. Surrounding the database server are several Com Servers 180, each serving an area **192**. Surrounding each Com Server 180 are squares representing user stations **188**. The Communication Servers 180 are organized in node relationships with one another.

[0071] Each node is responsible for serving an Area 192. An Area 192 is defined as a Virtual location serviced by a single Communications Server 180 (or "Corn Server"). An Area 192 may be a single school, an office, or may consist of several actual physical locations. The defining characteristic of an Area 192 is that messages sent from one member of an Area 192 to another need not be routed outside of the servicing Com Server 180.

[0072] An Area member is analogous to the frequently used term "user." For example, a "user" may be a student in the educational embodiment described above with reference to **FIGS. 7 and 8**.

[0073] The Distributed Communication System of **FIG. 9** shall permit the dynamic addition of Communication Servers 180 within a group with little or no administrative tasks as well as the addition of groups within an overall communications network. A Communication Server group consists of several defined Virtual Areas 192 (preferably, consisting of no more than 250 members each), each area **192** serviced by a single Com Server 180. This system shall allow members of one Area 192, or group to easily communicate with members of another Area 192 or group without any configuration changes.

[0074] Generally, service of very large numbers of users has required large expensive servers and networks. As the user base increases, performance suffers and hardware must be upgraded to service the demand.

[0075] The Distributed Communication System of the present invention allows the same, relatively inexpensive machines to serve an ever-increasing user base. The technique by which this will be accomplished will be through the routing of messages from one server to another when necessary.

[0076] The method essentially follows the same core pattern as IP routing and DNS lookups. If a message is for a member not belonging to the current Area 192 or group, the message shall be routed through the Distributed Communication System until its destination, or someone who knows the destination and can deliver the message, is found.

[0077] The destination will be cached so subsequent messages for that member or group may be more efficiently delivered.

[0078] Referring again to **FIG. 9**, if a message is posted by member "A" and is intended only for the members of group **1** the message shall never leave Area 1 Com Server. However, if the message is intended for members of Area 1 and the members of Area 2, the Area 1 Com server forwards the message to the group database server **184**. The message shall be broadcast to the members of Area 1 and tagged in the database **184** as belonging to Area 2. The message is then routed to Area 2 and broadcast to Area 2 members. With this technique any member can potentially send a message to any other member. If the Area Com server 180 does not recognize the destination, the message is forwarded up the line. Each Com server 180 does not need to know about any other server **180**. Messages are routed until they delivered. If undeliverable, the original sender is notified.

[0079] New Areas 192 can be added on the fly. When a new Com server 188 is added to the network, it registers itself with the database application. Henceforth, any message destined for the new Area 192 can be routed properly without altering the other Area Servers 180.

[0080] This method and system works for global messages or for user to user messages. Furthermore, new Groups may also be dynamically added. Once added, each new Group Database Server **184** registers itself with the existing database servers **184**. This distribution of load permits nearly unlimited expansion with existing software and hardware. Each server manages a finite number of members, cumulatively serving a growing community.

[0081] Users need not be informed as to the particular Corn Server **180** they should connect to. Members are directed to a single URL. The selection of the server for user connection is determined by load balancing software. In this manner, the network may appear to be a global network of Servers or simply a local classroom.

[0082] The unique aspects of this architecture, using database servers as routing gateways, using techniques resembling IP routing and DNS lookup, enables this system to serve with minimum administration and configuration and with lower end, cost-effective hardware.

[0083] Using the foregoing embodiments, methods and processes, the system of the present invention creates a synergistic experience combining the vast resources of the Internet with the presentation capabilities of television.

We claim:

1. A system for providing a programming signal containing a program and at least one address identifying online content relating to the program from an online information source, the system comprising:

an encoder, wherein the encoder encodes the address and the program into the programming signal; and

a transmitter for transmitting the programming signal;

wherein, at some time after provision of the address, the online content is automatically retrieved and played to a user in conjunction with the program.

2. A system as described in claim 1, wherein the encoder and the transmitter are located at a Web hosting site.

3. A system as described in claim 1, wherein the programming signal is transmitted via at least one transmission system selected from the group consisting of: the Internet, an intranet, terrestrial broadcast, radio frequency broadcast,

cable, satellite broadcast, fiber optics, a telephone circuit, a wireless connection, a public network, and a private network.

4. A system as described in claim 1, wherein the program is a previously recorded program on a recording medium.

5. A system as described in claim 4, wherein the recording medium is at least one selected from the group consisting of: VHS tape, compact disc, digital versatile disc, magnetic tape, computer hard drive, random access memory, read only memory, CD ROM, a magnetic data storage medium, and an optical data storage medium.

6. A system as described in claim 1, wherein the program is transmitted as a live event.

7. A system as described in claim 1 wherein the program comprises at least one form selected from the group consisting of: audio, video, data, graphics, animation, text, video stills, slow frame video, and multimedia.

8. A system as described in claim 1, wherein the address is an Internet URL, the URL identifying the online information source which is an Internet site.

9. A system as described in claim 1, further comprising a memory device for storing the address prior to transmission.

10. A system as described in claim 9, wherein the memory device is at least one selected from the group consisting of: a compact disc, a digital versatile disc, a magnetic tape, a computer hard drive, a random access memory, a read only memory, a CD ROM, a server, a magnetic data storage medium, and an optical data storage medium.

11. A system as described in claim 1, wherein the online information source is an Internet service provider.

12. A system as described in claim 1, wherein the online information source is selected from the group consisting of: an intranet, the Internet, a public network, and a private network.

13. A system as described in claim 1, wherein the online content comprises content in a form selected from the group consisting of: text, graphics, video, data, audio, animation, video stills, slow frame video, and multimedia.

14. A system as described in claim 1, wherein the program is a sports program.

15. A system as described in claim 1, wherein the program is an advertisement.

16. A system as described in claim 1, wherein the online content is an advertisement.

17. A system as described in claim 1, wherein the program is a motion picture program.

18. A system as described in claim 1, wherein the program is a game show program.

19. A system as described in claim 1, wherein the program is a video program.

20. A system as described in claim 1, wherein the program is a live program.

21. A system as described in claim 1, wherein the program is an audio program.

22. A system as described in claim 1, wherein the program is a music video program.

23. A system as described in claim 1, wherein the program is a news program.

24. A system as described in claim 1, wherein the program comprises video and audio and the encoder embeds the address in a non-presented portion of the program.

25. A system as described in claim 24, wherein the non-presented portion of the program is a vertical blanking interval.

26. A system as described in claim 24, wherein the non-presented portion of the program is a horizontal blanking interval.

27. A system as described in claim 24, wherein the non-presented portion of the program is the audio portion of the program.

28. A system as described in claim 24, wherein the non-presented portion of the program is a subcarrier of the program.

29. A system as described in claim 24, wherein the non-presented portion of the program is a data field.

30. A system as described in claim 1, wherein the programming signal is in digital format.

31. A system as described in claim 1, wherein the programming signal is in analog format.

32. A system as described in claim 9, wherein multiple addresses are stored in a link file in the memory device.

33. A system as described in claim 32, wherein the link file is transmitted to the user.

34. A system as described in claim 1, wherein the address is selected based on a profile of a collection of users.

35. A system as described in claim 1, wherein the online content relates to a sitcom program.

36. A system as described in claim 1, wherein the online content relates to an interactive game show program.

37. A system as described in claim 1, wherein the online content is stored in one selected from the group consisting of: magnetic tape, compact disc, digital versatile disc, computer hard drive, random access memory, read only memory, CD ROM, a magnetic data storage medium, and an optical data storage medium.

38. A system as described in claim 1, wherein the online content relates to a polling question.

39. A system as described in claim 22, wherein the online content contains additional information related to the music video program selected from the group consisting of: biographical information on an artist, a concert schedule, and information on buying goods related to the artist.

40. A system as described in claim 1, wherein the online content contains a query for the user to respond to a poll.

41. A system as described in claim 1, wherein the online content is selected based, at least in part, on a user profile.

42. A system as described in claim 1, wherein the program is selected based, at least in part, on a user profile.

43. A system as described in claim 42, wherein the user profile is stored in a storage device at one of the locations selected from the group consisting of: a user station, a personal computer, a cable head-end, a cable box, a satellite receiver, an intranet site, an Internet site, and a satellite operations center.

44. A system as described in claim 1, wherein the address relates to a polling question.

45. A system as described in claim 1, further comprising a data management storage device, wherein information about the user is stored in the data management storage device.

46. A system as described in claim 45, wherein an analysis is performed on the user information.

47. A system as described in claim 45, wherein the user information contains user clicks made by the user on a user interface while using an online service provider.

48. A system as described in claim 45, wherein information about a plurality of users is stored in the data management storage device.

49. A system as described in claim 45, wherein the user information contains information selected from the group consisting of: the geographic location of the user, clicks made by the user on a user interface while using an on line service provider, user viewing habits, and demographics of the user.

50. A system as described in claim 45, wherein the program is selected, at least in part, based on the user information.

51. A system as described in claim 45, wherein the data management storage device is located at a location selected from the group consisting of: a user station, a personal computer, a cable head-end, a cable box, a satellite receiver, a satellite operations center, an intranet site, a public network, a private network, and an Internet site.

52. A system as described in claim 45, wherein the programming signal contains a predetermined advertisement and wherein selection of the predetermined advertisement is based, at least in part, on the user information.

53. A system as described in claim 45, wherein the online content is based, at least in part, on the user information.

54. A system as described in claim 45, wherein the address is selected, at least in part, based on the user information.

55. A system as described in claim 45, wherein the online content contains an advertisement and wherein the advertisement is selected, at least in part, based on the user information.

56. A system as described in claim 45, wherein the programming signal contains a graphics segment and wherein the graphics segment is selected, at least in part, based on the user information.

57. A method for providing a programming signal containing a program and at least one address identifying online content relating to the program from an online information source, the method comprising:

combining the address and the program into the programming signal; and

transmitting the programming signal to a user;

wherein, at some time after transmitting the address, the online content is automatically retrieved and presented to the user in conjunction with the program.

58. A method as described in claim 57, wherein the steps of combining and transmitting are performed at a Web hosting site.

59. A method as described in claim 57, wherein the programming signal is transmitted via at least one transmission system selected from the group consisting of: the Internet, an intranet, terrestrial broadcast, cable, satellite broadcast, radio frequency broadcast, fiber optics, a telephone circuit, a wireless connection, a public network, and a private network.

60. A method as described in claim 57, wherein the program is a previously recorded program on a recording medium.

61. A method as described in claim 60, wherein the recording medium is at least one selected from the group consisting of: VHS tape, compact disc, digital versatile disc, magnetic tape, computer hard drive, random access memory, read only memory, CD ROM, a magnetic data storage medium, and an optical data storage medium.

62. A method as described in claim 57, wherein the program is transmitted as a live event.

63. A method as described in claim 57, wherein the program comprises at least one form selected from the group consisting of: audio, data, video, graphics, animation, text, video stills, slow frame video, and multimedia.

64. A method as described in claim 57, wherein the address is an Internet URL, the URL identifying the online information source which is an Internet site.

65. A method as described in claim 57, further comprising the step of storing the address prior to transmission.

66. A method as described in claim 57, wherein the address is stored in a memory device, the memory device comprising at least one selected from the group consisting of: compact disc, digital versatile disc, magnetic tape, computer hard drive, random access memory, read only memory, CD ROM, a server, a magnetic data storage medium, and an optical data storage medium.

67. A method as described in claim 57, wherein the online information source is an Internet service provider.

68. A method as described in claim 57, wherein the online information source comprises one selected from the group consisting of: an intranet, the Internet, a public network, and a private network.

69. A method as described in claim 57, wherein the online content comprises content in a form selected from the group consisting of: text, graphics, video, data, audio, animation, video stills, slow frame video, and multimedia.

70. A method as described in claim 57, wherein the program is a sports program.

71. A method as described in claim 57, wherein the program is an advertisement.

72. A method as described in claim 57, wherein the online content is an advertisement.

73. A method as described in claim 57, wherein the program is a motion picture program.

74. A method as described in claim 57, wherein the program is a game show program.

75. A method as described in claim 57, wherein the program is a video program.

76. A method as described in claim 57, wherein the program is a live program.

77. A method as described in claim 57, wherein the program is an audio program.

78. A method as described in claim 57, wherein the program is a music video program.

79. A method as described in claim 57, wherein the program is a news program.

80. A method as described in claim 57, wherein the program comprises video and audio and the address is embedded in a non-presented portion of the program.

81. A method as described in claim 80, wherein the non-presented portion of the program is a vertical blanking interval.

82. A method as described in claim 80, wherein the non-presented portion of the program is a horizontal blanking interval.

83. A method as described in claim 80, wherein the non-presented portion of the program is the audio portion of the program.

84. A method as described in claim 80, wherein the non-presented portion of the program is a subcarrier of the program.

85. A method as described in claim 80, wherein the non-presented portion of the program is a data channel.

86. A method as described in claim 57, wherein the programming signal is in digital format.

87. A method as described in claim 57, wherein the programming signal is in analog format.

88. A method as described in claim 66, wherein multiple addresses are stored in a link file in the memory device.

89. A method as described in claim 88, wherein the link file is transmitted to the user.

90. A method as described in claim 57, wherein the address is selected based on a profile of a collection of users.

91. A method as described in claim 57, wherein the online content relates to a sitcom program.

92. A method as described in claim 57, wherein the online content relates to an interactive game show program.

93. A method as described in claim 57, wherein the online content is stored in one selected from the group consisting of: magnetic tape, compact disc, digital versatile disc, computer hard drive, random access memory, read only memory, CD ROM, a magnetic data storage medium, and an optical data storage medium.

94. A method as described in claim 57, wherein the online content relates to a polling question.

95. A method as described in claim 78, wherein the online content contains additional information related to the music video program selected from the group consisting of: biographical information on an artist, a concert schedule, and information on buying goods related to the artist.

96. A method as described in claim 57, wherein the online content contains a query for the user to respond to a poll.

97. A method as described in claim 57, wherein the online content is selected based, at least in part, on a user profile.

98. A method as described in claim 57, wherein the program is selected based, at least in part, on a user profile.

99. A method as described in claim 98, wherein the user profile is stored in a storage device at one of the locations selected from the group consisting of: a user station, a personal computer, a cable head-end, a cable box, a satellite receiver, an intranet site, an Internet site, and a satellite operations center.

100. A method as described in claim 57, wherein the address relates to a polling question.

101. A method as described in claim 57, further comprising retrieving information about the user from a data management storage device.

102. A method as described in claim 101, wherein the method further comprises the step of performing an analysis on the user information.

103. A method as described in claim 101, wherein the user information contains user clicks made by the user on a user interface while using an online service provider.

104. A method as described in claim 101, wherein information about a plurality of users is stored in the data management storage device.

105. A method as described in claim 101, wherein the user information contains information selected from the group consisting of: the geographic location of the user, clicks made by the user on a user interface while using an on line service provider, user viewing habits, and demographics of the user.

106. A method as described in claim 101, wherein the method further comprises selecting the program based, at least in part, on the user information.

107. A method as described in claim 101, wherein the data management storage device is located at a location selected from the group consisting of: a user station, a personal computer, cable head-end, a cable box, a satellite receiver, an intranet site, a public network, a private network, and an Internet site.

108. A method as described in claim 101, wherein the program contains a predetermined advertisement and wherein selection of the predetermined advertisement is based, at least in part, on the user information.

109. A method as described in claim 101, wherein the online content is based, at least in part, on the user information.

110. A method as described in claim 101, wherein the address is selected, at least in part, based on the user information.

111. A method as described in claim 101, wherein the online content contains an advertisement and wherein the advertisement is selected, at least in part, based on the user information.

112. A method as described in claim 101, wherein the programming signal contains a graphics segment and wherein the graphics segment is selected, at least in part, based on the user information.

113. A computer readable medium containing instructions for providing a programming signal containing a program and at least one address identifying online content relating to the program from an online information source, by:

combining the address and the program into the programming signal; and

transmitting the programming signal;

wherein, at some time after transmitting the address, the online content is automatically retrieved and presented to a user in conjunction with the program.

114. A computer readable medium as described in claim 113, wherein the steps of combining and transmitting are performed at a Web hosting site.

115. A computer readable medium as described in claim 113 wherein the programming signal is transmitted via at least one transmission system selected from the group consisting of: the Internet, an intranet, terrestrial broadcast, radio frequency broadcast, cable, satellite broadcast, fiber optics, a telephone circuit, a wireless connection, a public network, and a private network.

116. A computer readable medium as described in claim 113 wherein the program is a previously recorded program on a recording medium.

117. A computer readable medium as described in claim 113 wherein the recording medium is at least one selected from the group consisting of: VHS tape, compact disc, digital versatile disc, magnetic tape, computer hard drive, random access memory, read only memory, CD ROM, a magnetic data storage medium, and an optical data storage medium.

118. A computer readable medium as described in claim 113 wherein the program is transmitted as a live event.

119. A computer readable medium as described in claim 113 wherein the program comprises at least one form selected from the group consisting of: audio, data, video, graphics, animation, text, video stills, slow frame video, and multimedia.

120. A computer readable medium as described in claim 113, wherein the address is an Internet URL, the URL identifying the online information source which is an Internet site.

121. A computer readable medium as described in claim 113, wherein the instructions further comprise the step of storing the address prior to transmission.

122. A computer readable medium as described in claim 113, wherein the address is stored in a memory device, the memory device comprising at least one selected from the group consisting of: compact disc, digital versatile disc, magnetic tape, computer hard drive, random access memory, read only memory, CD ROM, a server, a magnetic data storage medium, and an optical data storage medium.

123. A computer readable medium as described in claim 113, wherein the online information source is an Internet service provider.

124. A computer readable medium as described in claim 113, wherein the online information source comprises one selected from the group consisting of: an intranet, the Internet, a public network, and a private network.

125. A computer readable medium as described in claim 113, wherein the online content comprises content in a form selected from the group consisting of: text, graphics, video, data, audio, animation, video stills, slow frame video, and multimedia.

126. A computer readable medium as described in claim 113, wherein the program is a sports program.

127. A computer readable medium as described in claim 113, wherein the program is an advertisement.

128. A computer readable medium as described in claim 113, wherein the online content is an advertisement.

129. A computer readable medium as described in claim 113, wherein the program is a motion picture program.

130. A computer readable medium as described in claim 113, wherein the program is a game show program.

131. A computer readable medium as described in claim 113, wherein the program is a video program.

132. A computer readable medium as described in claim 113, wherein the program is a live program.

133. A computer readable medium as described in claim 113, wherein the program is an audio program.

134. A computer readable medium as described in claim 113, wherein the program is a music video program.

135. A computer readable medium as described in claim 113, wherein the program is a news program.

136. A computer readable medium as described in claim 113, wherein the program comprises video and audio and the address is embedded in a non-presented portion of the program.

137. A computer readable medium as described in claim 136, wherein the non-presented portion of the program is a vertical blanking interval.

138. A computer readable medium as described in claim 136, wherein the non-presented portion of the program is a horizontal blanking interval.

139. A computer readable medium as described in claim 136, wherein the non-presented portion of the program is the audio portion of the program.

140. A computer readable medium as described in claim 136, wherein the non-presented portion of the program is a subcarrier of the program.

141. A computer readable medium as described in claim 136, wherein the non-presented portion of the program is a data channel.

142. A computer readable medium as described in claim 113, wherein the programming signal is in digital format.

143. A computer readable medium as described in claim 113, wherein the programming signal is in analog format.

144. A computer readable medium as described in claim 122, wherein multiple addresses are stored in a link file in the memory device.

145. A computer readable medium as described in claim 144, wherein the link file is transmitted to the user.

146. A computer readable medium as described in claim 113, wherein the address is selected based on a profile of a collection of users.

147. A computer readable medium as described in claim 113, wherein the online content relates to a sitcom program.

148. A computer readable medium as described in claim 113, wherein the online content relates to an interactive game show program.

149. A computer readable medium as described in claim 113, wherein the online content is stored in one selected from the group consisting of: magnetic tape, compact disc, digital versatile disc, computer hard drive, random access memory, read only memory, CD ROM, a magnetic data storage medium, and an optical data storage medium.

150. A computer readable medium as described in claim 113, wherein the online content relates to a polling question.

151. A computer readable medium as described in claim 134, wherein the online content contains additional information related to the music video program selected from the group consisting of: biographical information on an artist, a concert schedule, and information on buying goods related to the artist.

152. A computer readable medium as described in claim 113, wherein the online content contains a query for the user to respond to a poll.

153. A computer readable medium as described in claim 113, wherein the online content is selected based, at least in part, on a user profile.

154. A computer readable medium as described in claim 113, wherein the program is selected based, at least in part, on a user profile.

155. A computer readable medium as described in claim 154, wherein the user profile is stored in a storage device at one of the locations selected from the group consisting of: a user station, a personal computer, a cable head-end, a cable box, a satellite receiver, an intranet site, an Internet site, and a satellite operations center.

156. A computer readable medium as described in claim 113, wherein the address relates to a polling question.

157. A computer readable medium as described in claim 113, wherein the instructions further comprise the step of retrieving information about the user from a data management storage device.

158. A computer readable medium as described in claim 157, wherein the instructions further comprise the step of performing an analysis on the user information.

159. A computer readable medium as described in claim 157, wherein the user information contains user clicks made by the user on a user interface while using an online service provider.

160. A computer readable medium as described in claim 157, wherein information about a plurality of users is stored in a data management storage device.

161. A computer readable medium as described in claim 157, wherein the user information contains information selected from the group consisting of: the geographic location of the user, clicks made by the user on a user interface

while using an on line service provider, user viewing habits, and demographics of the user.

162. A computer readable medium as described in claim 157, wherein the instructions further comprise the step of selecting the program based, at least in part, on the user information.

163. A computer readable medium as described in claim 157, wherein the data management storage device is located at a location selected from the group consisting of: a user station, a personal computer, a cable head-end, a cable box, a satellite receiver, an intranet site, a public network, a private network, and an Internet site.

164. A computer readable medium as described in claim 157, wherein the program contains a predetermined advertisement and wherein selection of the predetermined advertisement is based, at least in part, on the user information.

165. A computer readable medium as described in claim 157, wherein the online content is based, at least in part, on the user information.

166. A computer readable medium as described in claim 157, wherein the address is selected, at least in part, based on the user information.

167. A computer readable medium as described in claim 157, wherein the online content contains an advertisement and wherein the advertisement is selected, at least in part, based on the user information.

168. A computer readable medium as described in claim 157, wherein the programming signal contains a graphics segment and wherein the graphics segment is selected, at least in part, based on the user information.

169. A method for transmitting to a viewer video programming and at least one address useable for retrieving over a network from at least one server on the network on-line information segments having content related to the video programming for viewing in respective predetermined timing relationship with the video programming, comprising the steps of:

providing the at least one address;

generating a signal carrying the video programming;

encoding the signal to carry the at least one address in respective specified timing relationship with the video programming; and

transmitting the signal encoded with the at least one address to a viewer,

wherein the transmitted signal is used for presenting the video programming carried by the signal for viewing, and is decoded to extract the at least one address for retrieving the related on-line information segments over the network from the at least one server for viewing in respective predetermined timing relationship with the video programming.

170. A method as described in claim 169, wherein the step of encoding the signal that carries the at least one address comprises encoding the signal to carry each one of the at least one address with an associated timing indicia for controlling when each one of the at least one address is used for retrieving respective ones of the on-line information segments for viewing in respective predetermined timing relationship with the video programming.

171. A method as described in claim 169, further comprising the steps of creating at least certain ones of the on-line information segments retrievable from respective ones of the at least one server, storing the created on-line information segments at respective ones of the at least one network server, providing at least one address for retrieving the created on-line information segments, and encoding the signal to carry the at least one address for retrieving the created on-line information segments in respective specified timing relationship with the video programming carried thereon before transmission thereof to the viewer.

172. A method as described in claim 169, wherein the decoding of the encoded signal is carried out in proximity to where the viewing of the video programming and the on-line information segments takes place.

173. A method as described in claim 169, wherein the decoding of the signal is carried out remotely from where the viewing of the video programming and the related on-line information segments takes place, and the at least one address extracted from the encoded signal is provided to the viewer over the network.

174. A method as described in claim 169, wherein the network comprises the Internet; the at least one address comprises at least one uniform resource locator; the at least one server comprises at least one Internet web site; and the on-line information segments comprise at least one web page retrieved over the Internet from the at least Internet web site using the at least one uniform resource locator.

175. A method as described in claim 169, wherein the video programming comprises educational subject matter.

176. A method as described in claim 169, wherein the video programming comprises entertainment subject matter.

177. A method as described in claim 169, wherein the video programming comprises advertising subject matter.

178. A method as described in claim 169, wherein the signal is a television signal.

179. A method as described in claim 177, wherein the television signal is analog.

180. A method as described in claim 177, wherein the television signal is digital.

181. A system for transmitting to a viewer video programming and at least one address for retrieving over a network from at least one network server on the network on-line information segments having content related to the video programming for viewing in respective predetermined timing relationship with the video programming, comprising:

a source of the at least one address;

a source of a signal carrying the video programming;

an encoder responsive to the source of the at least one address for encoding the signal carrying the video programming to carry the at least one address in respective specified timing relationship with the video programming; and

a broadcast system for transmitting the encoded signal to a viewer,

wherein the transmitted signal is used for presenting the video programming carried by the signal for viewing, and is decoded to extract the at least one address for retrieving the related on-line information segments over the network from the at least one server for viewing in respective predetermined timing relationship with viewing of the video programming.

182. A system as described in claim 181, further comprising a computer coupled to the network for creating at

least certain ones of the on-line information segments and for sending the created on-line information segments to respective ones of the at least one server on the network for storage therein, wherein the encoder encodes the signal with at least one address for retrieving the created on-line information segments in respective specified timing relationship with the video programming.

183. A system as described in claim 181, wherein the network comprises the Internet; the at least one address comprises at least one uniform resource locator; the at least one server comprises at least one Internet web site; and the on-line information segments comprise at least one web page retrieved over the Internet from the at least one Internet web site using the at least one uniform resource locator.

184. A system as described in claim 181, wherein the video programming comprises educational subject matter.

185. A system as described in claim 181, wherein the video programming comprises entertainment subject matter.

186. A system as described in claim 181, wherein the video programming comprises advertising subject matter.

187. A system as described in claim 181, herein the signal is a television signal.

188. A system as described in claim 181, wherein the television signal is analog.

189. A system as described in claim 181, wherein the television signal is digital.

190. A system as described in claim 181, wherein the broadcast system is selected from the group consisting of: a terrestrial broadcast system, a satellite broadcast system, a cable distribution system, a fiberoptic distribution system, the Internet, a private network, and a public network.

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