SYSTEM AND METHOD FOR TRANSMITTING AND DISPLAYING TARGETED INFORMATION

PRIORITY CLAIM UNDER 35 U.S.C. 119(e)

This application claims the benefit under 35 U.S.C. 119(e), of U.S. Provisional Application No. 60/179,736, filed February 2, 2000 and U.S. Provisional Application No. 60/191,474, filed March 23, 2000.

BACKGROUIND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to a system and method for transmitting and displaying information in a television distribution system, or the like, that is targeted to a viewer matching particular demographic data. In one preferred embodiment, the present invention provides targeted advertising based on household demographic marketing data on a cable television distribution system.

2. Description of the Background Art

Television advertising, though considered necessary to subsidize the operating expenses of broadcast television channels, is generally regarded with disdain by viewers, and often provokes actuation of a remote control's mute button and/or channel surfing to other channels by the viewer. One reason for this is undoubtedly because most advertisements are for products or services that only a small segment of the viewing audience is interested in at any given time. As a result, the effectiveness of the advertising is substantially reduced because most viewers either do not pay attention to the advertisements, or quickly turn them off when they are broadcast. Until now, broadcasters' efforts at remedying this problem have been limited for the most part to making attempts at correlating advertising with the type of programming being broadcast (e.g., sports related advertising is broadcast during broadcast of a sporting event). A need has therefore remained for a method to increase the effectiveness, and therefore value, of television advertising.

SUMMARY OF THE INVENTION

The present invention addresses the foregoing need through provision of a system and method whereby information, such as advertising, that is targeted to a viewer, based on demographic or other pertinent information of that viewer, is provided to each viewer in a cable television or other information distribution system. In the advertising application,

this arrangement enhances the effectiveness of the advertising since the advertising is tailored specifically to each viewer's interests and other demographics, such as age, gender, income level, product preferences, hobbies, etc.

To facilitate the foregoing operational capability, the preferred embodiment of the present invention makes use of the results of a demographic survey that is completed by each viewer in the system, and is entered in each viewer's set top converter box (set top), television memory or other terminal device. The survey results are used to generate a database known as a bit mask that is made up of the viewer's demographic data, and is preferably stored in the viewer's set top or other terminal device. The bit mask can be used in a number of ways to control the particular advertising or other related information that is received by each system viewer. For example, while a consumer is watching TV, a programmer or advertiser may wish to provide certain consumers with information about, or offers regarding, a program or advertised product or service. In a first technique, the transmission signal carrying the program or advertisement displayed to all viewers is embedded with one or more codes. These codes are compared to the bit mask in a viewer's set top to determine whether the viewer fits the demographic profile that the programmer or advertiser wishes to target with the particular information. If the received code matches one or more elements of the bit mask, an indication is provided to the viewer that additional information is available. At that time, the viewer may determine whether the viewer would like to view the additional information, to store the additional information for later viewing, or to obtain the information via e-mail or some other method.

In a second technique, multiple ads for demographic selective receipt by each viewer are simultaneously transmitted, either on different channels, or in different time slots of a multiplexed digital channel. In this technique, the viewer's set top will automatically receive the ads or programming designated for that viewer or household. Preferably, in a digital implementation of the invention, this is accomplished by inserting digital information at the beginning of each default advertisement that indicates in which portions or packets, known as Private Data Streams or PIDs, of a multiplexed digital channel, the alternative targeted ads are about to be transmitted. As with the first technique, each of the targeted ads has a code designation that identifies which group of viewers is to receive that ad, based on the results of the demographic survey. Using the bit mask in the set top, the set top's terminal processor determines the identity of the PIDs that contain the designated targeted advertisement for a

viewer, and access that advertisement from the channel for display on the viewer's television or monitor. Alternatively, in an analog embodiment, the targeted ads are transmitted on different channels, and the terminal processor is programmed to cause a tuner in the set top to tune to the channel on which the targeted ad for the designated code is to be broadcast. After the ad has ended, the set top terminal processor is also programmed to detect the end of the advertisement, and re-tune the tuner to the original channel that the viewer was receiving prior to the advertisement.

BRIEF DESCRIPTION OF THE DRAWINGS

The features and advantages of the present invention will become apparent from the following detailed description of a number of preferred embodiments thereof, taken in conjunction with the accompanying drawing figures, in which:

FIG. 1 is a block diagram of a cable television system that has is configured in accordance with the preferred embodiments of the present invention;

FIG. 2A is a block diagram of a digital implementation of an ad insertion module that is employed in the headend in the system of FIG. 1; and

FIG. 2B is a block diagram of an analog implementation of an ad insertion module that is employed in the headend in the system of FIG. 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 is a general block diagram of a CATV system 10 that incorporates elements for facilitating the generation and transmission of video programming, including advertising, to a plurality of system users, and is illustrative of one type of system with which the concepts of the present invention may be employed. It should be noted that the CATV system 10 is illustrated in general form since many of its detailed elements are not necessary for an understanding of the present invention. The CATV system 10 includes a cable headend 12 and a cable television distribution network 14 for interfacing the headend 12 to a plurality of set top converter boxes 16. A plurality of transmission links 17 interconnects the set top converter boxes 16 with the distribution network 14. Each of the links 17 is illustrated as being bi-directional with a plurality of downstream channels 18 and one or more upstream channels 19. For clarity, the details of only one of the set top boxes 16 and associated elements are illustrated in FIG. 1.

The cable headend 12 receives video programming and other information to be broadcast from remote sources (not shown), and transmits the video programming and other information through the distribution network 14 to the set top boxes 16. The video programming or other information is transmitted as an information or video stream that is comprised of a plurality of information selections, such as video programs, advertisements, etc. The headend 12 also preferably includes a database of subscriber information 20. The subscriber database 20 includes the name, address, telephone number, e-mail information and if desired, credit card information of the various subscribers in the cable system. Maintaining such information at the headend 12 will allow the viewer to obtain additional information or make purchases with minimal effort.

The video programming is received from the remote source(s) by the headend 12 in either an analog format or a digital format as is conventional. Typically, digital video streams are encoded using any suitable technique, such as MPEG1 or MPEG2, to reduce bandwidth requirements. The present invention can be adapted for use with either digital or analog format video streams.

A demographic encoder 22 is also located at the headend 12 that receives the digitally encoded video stream from the remote source(s), and inserts one or more demographic codes at appropriate times in the video stream. The demographic codes indicate that any of the set top boxes 16 matching the demographic code are targeted to receive the information. Preferably, the demographic inserter 22 stores the demographic codes to be inserted in the same encoded format as that of the video stream. Although it is also preferred that the demographic codes be inserted at the headend 12 by the demographic encoder 22, it will be understood to those of ordinary skill in the art that the demographic codes may also be inserted by the advertiser or programmers, or some other third party.

Each of the set top boxes 16 is interfaced via a terminal processor 24 and associated communication links 25 (e.g., cables, infrared wireless links, etc.) to a television or monitor 26, and one or more input devices, such as a wireless keyboard 28 and a remote controller 28a. In the case of digitally encoded video, as each set top box 16 receives the encoded video broadcasts from the distribution network 14, the video stream is passed through a tuner 27 to a decoder 29.

A bit mask or other database 30 is also located in the set top boxes 16, which contains demographic information about the subscriber or the subscriber's household. Preferably, the demographic information stored in the set top box 16 is obtained from an on-line survey that the viewer fills out when the viewer obtains the cable service. Because the viewer's demographic information in this embodiment remains in the bit mask 30 in the set top box 16, the viewer will not be inundated with "junk mail", as the demographic information is not shared with the cable operator, advertisers, or any other marketing company. In this way, the viewer can control the subject matter of the additional information he will receive. The bit mask 30 is also accessible to the viewer so the viewer may change at any time the demographic information in order to obtain additional information about other products or services, cease receiving information about certain products or services, or to reflect changes in status (marital status and income level, for example). While this arrangement is preferred, the demographic information may alternatively be obtained from one or more marketing sources, and then downloaded from the headend 12 into the bit mask 30 in the set top box 16. Additionally, the consumer survey can also be sent from the set top converter box 16 to a processor in the headend 12 via the upstream channel 19. The headend processor can then use the results of the survey to determine the appropriate demographics code to be assigned to that viewer's or household's set top converter box 16, and program the box 16 accordingly. Still further, a combination of any of these arrangements can be employed such that the survey information is contained both in the set top converter boxes 16 and the headend 12 and/or a remote source.

Also preferably located at the headend 12 is an information database 40, which contains additional information that the user may access. All of the video programs for the various channels to be broadcast are fed out of the demographic inserter 22 into one or more multiplexers 42 which combine the signals, and send them through the distribution network 14 to the set top converter boxes 16. It should be noted at this point that any number of the multiplexers 42 could be employed as desired to increase bandwidth.

When the program or advertisement with the encoded demographic data is transmitted through the distribution network 14, each set top box 16 that has been programmed with a viewer's demographic information examines the transmission to determine whether the program or advertisement contains a match with the demographic information contained in the bit mask 30 of the set top box 16. In this regard, the set top box 16 preferably serves as a

filter, such that the viewer will receive additional information for only those transmissions that contain a match with the demographic information stored in the bit mask 30. For example, if in the survey the viewer indicated that he or she purchases luxury vehicles, the viewer would receive additional information for Cadillac vehicles, but not for pickup trucks.

When a match occurs, the terminal processor 24 generates and displays a prompt to the viewer indicating that additional information is available on the program, product or service. The prompt could take any form, including an icon, a text overlay indicating the availability of additional information or even a voice prompt. Alternatively, the prompt may be embedded in the transmission signal at the headend 12 along with the demographic codes. Upon the display of a prompt for additional information, the viewer would then determine whether the viewer would like to view or obtain the additional information, which the viewer could do by simply pressing a specified key or set of keys on the remote control device 28, 28a. In an alternative embodiment of the present invention, the viewer may also request that the additional information be stored for later viewing or sent to the viewer via regular mail or e-mail. As previously discussed, the necessary subscriber information for this process is stored in a subscriber database 20 at the headend 12.

If the viewer would like to view the additional information, the viewer may simply press a specified key to view the information. In a two-way interactive system, the additional information may include, for example, taking the viewer to a particular web site, as described in U.S. Patent 5,999,970 and U.S. Patent 5,961,603, both of which are incorporated in their entireties by reference herein; displaying a video presentation, obtaining rebate information and coupons, or even obtaining free samples of products.

The present invention is not limited to distribution networks that have two-way interactivity. Rather, the present invention may also be employed in a one-way system. When a match occurs in a one-way distribution network, the viewer may request the additional information by pressing a specified key on the remote control device 28, 28a, as previously explained in the two-way system. In the one-way system, however, the additional information may be broadcast on a carousel basis on a dedicated channel to all users on the network, but only obtained by those who have a match with the bit mask 30, and request the additional information based on the prompt. In this instance, the headend 12 also contains one or more carousel applications 44 which cyclically repeat and transmit the additional information, which is stored in the information database 40, to the multiplexer 42 and through

the distribution network 14. When a viewer in a one-way system seeks the additional information, the set top box 16 searches the broadcast stream for a particular channel for the encoded information and retrieves it for display.

In another technique that is also preferably employed in the preferred embodiments, multiple advertisements are simultaneously transmitted by the headend 12 to the set top boxes 16, each of the advertisements being targeted at a different demographic. To accomplish this function, the headend 12 also includes an ad insertion module 46 that inserts the multiple ads at the appropriate locations in the video programming received from the various remote sources. FIGs. 2A and 2B illustrate two embodiments for the configuration of the ad insertion module 46 in the headend 12, the first of which is designed for use with digital encoded video streams, and the second of which is designed for use with analog format video streams.

Referring first to FIG. 2A, the ad insertion module 46 includes a first digital local ad inserter 48 that receives the digitally encoded video stream from the remote source(s), and inserts locally generated advertising at appropriate times in the video stream. The local ad inserter 48 stores the ads to be inserted in the same digitally encoded format as that of the video stream. Prior to a break for an advertisement in the received video program, a cueing signal is present in the video stream that is used to instruct the first ad inserter 48 to insert the appropriate local ad in the video stream. All of the video programs for the various channels to be broadcast are fed out of the ad insertion module 46 into the multiplexer 42, which combines the signals, and sends them through the distribution network 14 to the set top converter boxes 16.

To implement the multiple ad transmission technique of the present invention, two additional key elements are required in the ad insertion module 46, a second digital ad inserter 50 and a channel or Private Data Stream (PID) information inserter 52. The second digital ad inserter 50 stores ads that are targeted to particular viewers based on demographics. These ads are selectively inserted in place of the default ads stored in the first ad inserter 48. All of the advertisements in both of the ad inserters 48 and 50 are combined by the multiplexer 42 and downloaded to the set top converter boxes 16 through the cable distribution network 14.

Preferably, each advertisement to be inserted in the video stream includes a default ad from the first ad inserter 48 and some number (e.g., 3 or more) of corresponding targeted advertisements from the second ad inserter 50 that are multiplexed together, preferably on the

same RF frequency channel, but in different slots or PIDs thereof. The default ads are received by any viewers who either are not subscribed to the targeted ad service, or who have not completed the necessary survey and had their set top box programmed to receive the targeted advertising.

The channel or PID information inserter 52 inserts additional information in the advertisement data streams. More particularly, to facilitate operation of the targeted advertising, additional digital information is encoded at the beginning of each default advertisement for which alternative targeted advertising is available that includes channel or PID identification information for each targeted ad that is available for different demographic designations. As will be discussed in greater detail below, the channel or PID information is used by the terminal processors 24 in the set top boxes 16 either to automatically tune to the designated channel for a targeted ad, or to access the appropriate PID in the information stream, and then return to the original channel or PID at the conclusion of the ad. The channel or PID information is specifically inserted at the beginning of the default advertisements contained in the first ad inserter 48, and near the end of the targeted advertisements contained in the second ad inserter 50.

FIG. 2B illustrates a variation of the ad insertion module 46 that includes many of the same elements illustrated in FIG. 2A, and is preferably employed in an analog embodiment of the present invention. In this embodiment, a third, analog ad inserter 54 is provided which is designed to insert analog encoded ads into a video stream. Control signals are generated by the first digital ad inserter 48 and the analog ad inserter 54 that control operation of a targeted ad controller 56. When the targeted ad controller 56 receives a signal from either of the ad inserters 48 or 54 indicating that a default ad is about to be broadcast for which alternative targeted advertising is available, the controller 56 instructs the targeted ad inserter 50 to insert its ads into the analog video stream via the multiplexer 42. The targeted ad controller 56 also sends a control signal to the terminal processors 24 in the set top boxes 16 that instructs the boxes 16 to change channels accordingly for reception of the designated targeted ads. This is accomplished using either an out-of-band signal, or by using TCP/IP over a DOCSIS modem (not shown). The outputs from the multiplexer 42 and the analog ad inserter 54 are all fed to the distribution network 14, where they are combined and downloaded to the set top converter boxes 16.

The PID information is employed by the terminal processor 24 to identify the program number to which the set top box's tuner 27 should be tuned, based on the demographic designation code that has been programmed into the terminal processor 24. In the preferred embodiment of the present invention, the terminal processor 24 automatically causes the set top box's tuner 27 to switch to the appropriate program number when the processor 24 detects the PID information indicating that a targeted ad is about to be broadcast. After the targeted ad has concluded, the processor 24 detects the PID information at the end of the targeted ad, which then causes the tuner 27 to switch back to the original channel to which the set top box 16 was tuned.

To facilitate this operation with digitally encoded video streams, some adjustments are necessary. First, full frame data, known as I-frames, must be continually sent for the first few seconds of each targeted ad so that the set top's tuner 27 can quickly acquire the video data for that ad. Normally, digitally encoded video streams only send difference information for succeeding video image frames to reduce bandwidth requirements. A decoder can determine the full content of the video image by comparing the received difference data to the previous frame. However, this process cannot be employed at the beginning of a video transmission where there is no previous frame data. In this instance, full image I-frames must be sent. Normally, I-frames are sent at the beginning of a transmission, and every couple of seconds or so thereafter. In the preferred embodiment of the present invention, it is necessary to send the I-frames continuously at the beginning of each targeted ad, so that the set top box tuners can quickly acquire the signal. Similarly, a continuous stream of I-frames is provided for the last few seconds of the default advertisement to enable the tuners to quickly reacquire the original channel once the targeted advertisement has concluded.

Another potential concern where the transmitted video streams are MPEG encoded, for example, concerns the state of the decoder buffer. During receipt of MPEG encoded data streams, it is important that the decoder buffer not overflow or underflow (empty) to insure proper reception of the video stream. The ad inserters or remotely located encoders keep track of the buffer state, based on the flow of encoded data. However, if a data stream is interrupted and replaced by another as in the case of targeted ad insertion, the buffer state will not be known. To insure that this does not occur, the targeted ads are programmed so that just before switching to the targeted ad, the data stream is set so that the buffer is known to be at a particular state (e.g., half full), and at the end of the targeted ads, the data stream is

adjusted so that the buffer will again be in the same state when the tuner 27 switches back to the original channel and begins once again receiving the previous broadcast. In essence, this is accomplished by insuring that the default ad and the targeted ads all contain the same amount of digital encoded data. Alternatively, known MPEG splicing techniques may be employed to address this issue.

In the analog variation of the invention, the foregoing issues are not present. Instead, the set top boxes 16 receive the targeted ad channel information from the targeted ad controller 56 via out-of-band signaling, and this is used by the terminal processor to re-tune the set top box's tuner 27 to the requisite analog channels at the appropriate times so that the targeted advertisements for the viewer or household will be received. Further, once the targeted ads have concluded, the controller 56 will send another signal instructing the set top box 16 to tune back to the original channel.

Although the invention has been disclosed in terms of a number of preferred embodiments, and variations thereon, it will be understood that additional modifications and variations could be made thereto without departing from the scope of the invention as defined in the following claims. For example, while the invention has been described specifically for providing targeting advertising in a cable television system, the concepts of the invention are not limited to this application, and can be employed for broadcast of any type of targeted information, not just advertising, and in any type of broadcast communications system, not just a cable television system.

CLAIMS

1. A system for transmitting information in a broadcast distribution system that is targeted to a system user comprising:

a) a network headend for transmitting at least one information stream to a plurality of users, said information stream being comprised of a plurality of information selections and a plurality of corresponding codes, each said code identifying a characteristic of a corresponding one of said selections that is employed to identify a system user to whom either said selection should be transmitted, or additional information should be transmitted;

b) a distribution network for transmitting said information stream with said codes; and

c) a plurality of terminal devices interfaced to said distribution network for receiving said information stream, each said terminal device including a terminal processor and a user demographic database that contains demographic information about a corresponding user of said terminal device, said terminal processor being programmed to compare each code for each selection in said information stream with said demographic information in said database, and determine there from whether said user is designated to receive said selection or additional information.

2. The system of claim 1, wherein said headend further includes an encoder for generating said codes, and inserting said codes into said information stream, one each before a corresponding one of said selections.

3. The system of claim 1, wherein said information stream is a video information stream, said broadcast distribution system is a cable television distribution system, and said terminal devices are each a set top converter box.

4. The system of claim 3, wherein said information selections include advertisements.

5. The system of claim 1, wherein said terminal processor is further programmed to provide a prompt to a corresponding user if said processor determines that said user is

designated to receive said additional information.

6. The system of claim 5, wherein said headend further includes a database containing said additional information that is to be made available to selected system users, based on the demographic information in the user demographic database.

7. The system of claim 1, wherein said headend includes a multiplexer for simultaneously transmitting a plurality of said information streams on a plurality of corresponding downstream channels that are interfaced between said distribution network and said terminal devices, each said information stream including information selections that are targeted to different user demographics, and said terminal processor in each said terminal is programmed to determine a selected one of said downstream channels on which a selected information selection targeted to a user of said terminal device is to be received, and access said selected information selection.

8. The system of claim 7, wherein said terminal device further includes a tuner for selecting a one of said downstream channels to receive, and said terminal processor is further programmed to instruct said tuner to tune to said selected one of said downstream channels to receive said selected information selection.

9. The system of claim 8, wherein said terminal processor is further programmed to instruct said tuner to tune back to a previously selected channel after a designated one of said selections has been received.

10. The system of claim 7, wherein said information streams include at least one group of information selections, each selection of which is simultaneously transmitted with the other selections in said group, and is targeted to users having different demographics than those of users to which the other selections in said group are targeted.

11. The system of claim 10, wherein said headend further includes an insertion module for inserting said groups of information selections into said information streams.

12. The system of claim 10, wherein each information selection in said groups comprises an advertisement.

13. The system of claim 11, wherein each information selection is transmitted in a different PID of a common digital channel.

14. A method for transmitting information in a broadcast distribution system that is targeted to a system user comprising:

a) providing at least one information stream in a network headend, said information stream being comprised of a plurality of information selections and a plurality of corresponding codes, each said code identifying a characteristic of a corresponding one of said selections that is employed to identify a system user to whom either said selection should be transmitted, or additional information should be transmitted;

b) transmitting said at least one information stream to a plurality of terminal devices, each said terminal device including a terminal processor and a user demographic database that contains demographic information about a corresponding user of said terminal device; and

c) employing said terminal processor to compare each code for each selection in said information stream with said demographic information in said database, and determine there from whether said user is designated to receive said selection or additional information.

15. The method of claim 14, wherein said codes are inserted in said at least one information stream by an encoder in said headend. he step of providing at least one information stream further comprises obtaining a first information stream and encoding said first information stream with said codes to form said at least one information stream generating said codes, and inserting said codes into said information stream, one each before a corresponding one of said selections.

16. The method of claim 14, wherein said information stream is a video

information stream, said broadcast distribution system is a cable television distribution system, and said terminal devices are each a set top converter box.

17. The method of claim 16, wherein said information selections include advertisements.

18. The method of claim 14, further comprising the step of providing a prompt to a corresponding user if said terminal processor determines that said user is designated to receive said additional information.

19. The method of claim 18, further comprising the step of transmitting said additional information from a database in said headend.

20. The method of claim 1, wherein said step of transmitting further comprises:

1) multiplexing a plurality of said information streams and simultaneously transmitting said plurality of information streams, each said information stream including information selections that are targeted to different user demographics;

2) determining with said terminal processor a selected one of said information selections that is targeted to a user of said terminal device; and

3) accessing said selected one of said information selections from said information stream.

21. The method of claim 20, wherein said terminal device further includes a tuner for selecting a one of said downstream channels to receive, and said step of accessing further comprises instructing said tuner with said terminal processor to tune to said selected one of said downstream channels to receive said selected information selection.

22. The method of claim 21, further comprising the step of instructing said tuner with said terminal processor to tune back to a previously selected channel after a designated one of said selections has been received.

23. The method of claim 20, wherein said information streams include a at least one group of information selections, each selection of which is simultaneously transmitted with the other selections in said group, and is targeted to users having different demographics than those of users to which the other selections in said group are targeted.

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24. The method of claim 20, wherein each information selection in said group is transmitted in a different PID of a common digital channel.

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