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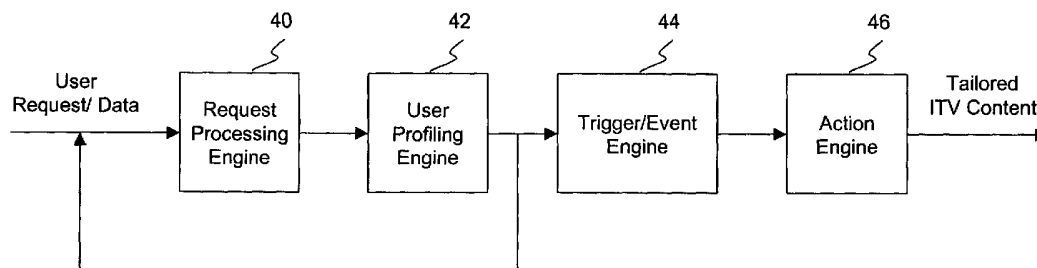
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(54) Title: INTERACTIVE TELEVISION TRACKING SYSTEM



(57) **Abstract:** An interactive television system tailoring delivery of interactive content includes a request processing engine (40) accepting user interactions with an interactive television (ITV) application. A user profiling engine (42) associates the user interactions with an individual profile or profile group. The profile group defines events that may be triggered upon receipt of certain user interactions. A trigger/event engine (44) monitors, in real-time, whether the user interactions correspond to any of the defined events. If an event is to be triggered, an action engine (46) transmits an ITV command associated with the event to an encoder. The encoder performs a real-time of encoding of the ITV command for providing viewers with dynamic ITV experience. The ITV experience provided to the viewers may also be customized based on the profile information obtained for each individual viewer.



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INTERACTIVE TELEVISION TRACKING SYSTEM

FIELD OF THE INVENTION

The present invention relates to techniques for the provision of interactive television (ITV) content associated with a television program, and more particularly, to tracking user interactions with current ITV content for tailoring delivery of the ITV content.

BACKGROUND OF THE INVENTION

Interactive television (ITV) combines conventional television with additional content (interactive content) to present a viewer with an enhanced version of a television program or commercial. As used herein, the term interactive content refers to any additional information that is used to supplement a TV signal and create an enhanced program.

Typically, the interactive content is in some way related to the television program being viewed, such as biographical information about one of the actors in the program, additional information about a topic covered in the program, and the like. If the television program is a game show, the interactive content often allows the viewer to play along with the game. For example, a viewer may answer the same questions as the contestants on the game show. The interactive content may also be associated with television commercials that a user may interact with to retrieve additional information on products and/or to purchase the products.

In order to allow a viewer to experience an enhanced television program, a television program is encoded with ITV data and broadcast to the viewers. The ITV data may take many forms, such as, for example, HTML, XML, JAVA, or JAVA Script commands. If the receiving viewer's television system is equipped with an ITV receiver, the ITV receiver may decode the embedded ITV data for accessing the associated interactive content or performing an action indicated by the command.

Today, one form of interactive television delivery depends on World Wide Web (Web) technology for delivering and viewing the enhanced content. Specific web sites,

addressed with URLs, are created and maintained as ITV sites. The content in these sites may be viewed with an ITV receiver in the same way a computer browses a web site. The ITV receiver typically includes a web browser, and can display downloaded ITV content along with TV video on a conventional television set. The ITV receiver typically obtains
5 a majority, if not all, of the ITV web content via one of the ITV web sites. The sites that are accessed and how content is displayed is determined by the ITV data contained in the video portion of the television program. One method for encoding ITV links and triggers is specified in "EIA-746-A: Transport of Internet Uniform Resource Locator Information Using Text-2 (T-2) Service," September 1998, the content of which is incorporated herein
10 by reference. Another form of interactive television delivery relies on application server technology in combination with head-end integration with cable and satellite networks.

In order to encourage users to engage and continue to stay engaged with an ITV application, it is desirable to have a system and method that provides dynamic ITV content based on one's activities with the ITV application as well as activities of other viewers.
15 Such a system and method should also provide customized ITV content based on the user's profile information in order to keep the viewer's interest.

SUMMARY OF THE INVENTION

This invention is directed to an interactive system and method for tracking viewer
20 activities with and/or within an ITV application/content. The type of experience provided by the ITV application is dynamically modified based on the viewer activities and/or profile information.

According to one embodiment of the invention, a method for tailoring delivery of interactive content in an interactive television system includes delivering a video program
25 providing an interactive television program application to a viewer, the interactive television program application presenting the viewer with a first type of interactive experience, monitoring interactions with the interactive television program application, and dynamically inserting a command into the video program based on the monitored interactions for presenting the viewer with a second type of interactive experience during
30 the video program.

According to another embodiment of the invention, the second type of interactive experience is customized based on the viewer receiving the interactive experience.

In a further embodiment of the invention, the method for tailoring delivery of interactive content includes transmitting a first portion of a video program providing an interactive television program application to a first viewer and a second viewer, receiving an interaction with the interactive television application from the first viewer, determining whether an event is to be triggered based on the interaction from the first viewer, encoding a command associated with the event in a second portion of the video program, and transmitting the second portion of the video program with the encoded command for providing the event to the first viewer and the second viewer.

In yet another embodiment of the invention, the method for tailoring delivery of interactive content in an interactive television system includes receiving a viewer interaction with an interactive television application provided by a video program, identifying a profile for the viewer, identifying a customized interactive television content based on the matched profile, and providing the customized content to the viewer.

It should be appreciated, therefore, that the present interactive system and method allows the tailoring of delivery of ITV content based on user interactions and/or preferences. Such tailored ITV content provides a dynamic experience that helps viewers stay engaged with the ITV content for longer and more frequent periods of time. In addition, because the ITV content may also be customized based on user preferences, the ITV content that is delivered is aimed to be to the liking/interest of the individual viewers.

These and other features, aspects and advantages of the present invention will be more fully understood when considered with respect to the following detailed description, appended claims, and accompanying drawings. Of course, the actual scope of the invention is defined by the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic block diagram of an interactive television (ITV) system according to one embodiment of the invention;

FIG. 2 is a schematic diagram of the components of the ITV system of FIG. 1 for allowing real-time tailoring of ITV content and/or scheduled delivery of such content according to one embodiment of the invention; and

FIG. 3 is a flow diagram of a process for real-time encoding of ITV data based on
5 real-time tracking of user interactions according to one embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

FIG. 1 is a schematic block diagram of an interactive television (ITV) system according to one embodiment of the invention. The system according to the illustrated
10 embodiment maintains real-time track of interactions of specific individual users or groups of users with ITV content/applications associated with a television program or commercial (collectively referred to as a television program). The system then provides a dynamic interactive experience during the television program based on such interactions and/or profile information. The system may also tailor the schedule of delivery of such interactive
15 experience based on the interactions being tracked.

The ITV system illustrated in FIG. 1 includes an encoder 12 coupled to a video source 10 over a serial or network link 36, such as for example, a local area network (LAN) or wide area network (WAN) link. The video source 10 may be a camera, VCR, betacam, DVD player, PC, CD-ROM player, or any other device capable of delivering live
20 or recorded video programs to the encoder for embedding ITV data into the video program.

The ITV data may be embedded, for example, in the vertical blanking interval (VBI) (for example, line 21), or an MPEG 2 private data field (or a similar field of additional video formats) of the video portion of the program. The ITV data may be triggers, HTTP, XML, JAVA, or JAVA SCRIPT commands, URLs, and/or other type of ITV links, triggers, data
25 sources, timing information, and data conventional in the art.

The encoder 12 may be an encoder conventional in the art, such as, for example, a DV2000 universal data encoder or ITV Injector, marketed by Ultech LLC, Middlebury, Connecticut. The encoder is configured to embed appropriate ITV data in the video program based on an analysis of user interactions with an ITV application or viewer profile
30 information. According to one embodiment of the invention, the ITV data is embedded

and/or modified in real-time as the video program is transmitted to a viewer. Alternatively, the ITV data is embedded ahead of time, prior to the transmission of the video program.

In yet another embodiment, the ITV data may be transmitted out-of-band to an ITV receiver via a back channel.

5 The video program is transmitted, along with the embedded ITV data, utilizing conventional transmission equipment such as, for example, a data player 16 and broadcast station 18. A person skilled in the art should appreciate that the video program may also be transmitted via other types of communication channels such as, for example, cable networks, satellite networks, computer networks, and the like.

10 Upon receipt of the video program with the embedded ITV data by an ITV receiver 20, the viewer is given an option to receive the enhanced experience provided by the ITV data. In a typical scenario, if the viewer chooses the enhancements, the ITV receiver 20 establishes a connection with an ITV server 22 over a network 26 using a back channel 32. The back channel may take the form of any type of communication channel known in the art, such as, for example, a cable connection, a telephone connection, broadband
15 connection, or any other wired or wireless connection. The network 26 accessed via the back channel may be a private local area network, wide area network, cable network, satellite network, or the like. Upon establishing the connection, the ITV receiver 20 receives an ITV content/application from the ITV server 22 or executes a command
20 embedded in the video signal for producing an interactive experience.

 According to one embodiment of the invention, the ITV servers 22 are application servers with appropriate software and hardware for receiving and processing data received from the ITV receivers 20. The data may include content requests, player registration information (e.g. for game shows), purchase transaction information, score submissions,
25 and/or other types of data and requests.

 If the data is for providing ITV content to the ITV receiver 20, the ITV server 22 accesses its content data store 24 for retrieving the appropriate ITV content to be delivered to the ITV receiver. The content data store 24 may take the form of any mass storage device known in the art such as a hard disk drive or drive arrays. The data store may also

run as an integral part of the ITV server 22. The ITV content stored in the content data store 24 and delivered by the ITV server 22 is also referred to as an ITV application.

The ITV servers 22 are interconnected over a network for transmitting data to and from the servers and other network devices, such as, for example, a central data store 28 and the encoder 12. The network may be, for example, a private local area network or a wide area network. Although the central data store 28 and ITV server 22 are depicted as being physically separate, a person skilled in the art should recognize that they may run on the same hardware.

According to one embodiment of the invention, the central data store 28 stores user profile information, player registration data, purchase transaction information, interaction information with ITV applications, user statistics information, and/or any other data useful for analyzing user interests and habits as well as maintaining track of milestones reached by the users individually, or as a group, for tailoring, in real-time, the delivery of future ITV content based on the gathered information. The central data store 28 may also store the ITV content stored in all or a portion of the content data stores 24 hosted by the ITV servers 22. The information in the central data store 28 may be used to generate end user reports and perform other non real-time functions so as to relieve the burden on the ITV servers to process the real-time functions.

It should be understood by those skilled in the art that FIG. 1 illustrates a block diagram of an ITV system without obfuscating inventive aspects of the present invention with additional elements and/or components which may be required for creating the ITV system. These additional elements and/or components, which are not shown in FIG. 1 are well known to those skilled in the art. For instance, the ITV system may include a switch or router for routing incoming user requests to an appropriate ITV server 22 based on load analysis and the like. FIG. 2 is a more detailed schematic diagram of the components of the ITV system for allowing real-time tailoring of ITV content and/or the delivery schedule of such content according to one embodiment of the invention. These components preferably include a request processing engine 40, a user profiling engine 42, a trigger/event engine 44, and an action engine 46. The various engines may be implemented as software tasks running on a single machine, such as a single network

server or platform computer (e.g. a single ITV server 22), or tasks running on two or more separate machines. The components may further be part of tasks running on the ITV server side, ITV receiver side, or a combination of both.

The request processing engine 40 accepts inputs from individual ITV applications
5 and/or processes individual user requests for services such as, for example, player registrations, ITV application game score submissions, commerce requests, profile input request, and other requests submitted within or outside an ITV application. The request processing engine 40 further monitors user interactions within and/or with an ITV application, such as, for example, user selection of particular types of information provided
10 by the application.

The user profiling engine 42 tracks and aggregates individual user inputs based on defined criteria, and groups the inputs together for building individual or group-based trend profiles. Exemplary criteria may be age, gender, time of interaction within the program, geographical data, time of day, frequency of use, depth to which a user participates in a
15 multi-tiered ITV experience, and the like.

For example, the profiling engine 42 may be programmed with a criteria to record all activity from female users between the ages of 18-25, and use the activity information for generating or updating a group profile associated with such group. The profiling component may also be programmed with a criteria to record everything submitted from
20 each user. The user interactions within an ITV application may be detected, for example, by maintaining various click IDs corresponding to different portions of the application according to conventional methods.

The profiling engine 42 may also be programmed to receive an individual user's profile information such as the user's name, home address, telephone number,
25 demographics information, favorite television channels, programs, and/or category of programs, hobbies, family structure (children, pets, etc.), and the like. The profiling engine 42 may then match the user to a particular profile group based on the user's monitored interactions and/or the user's profile information. Alternatively, individual profiles may be created and used for each user for tailoring ITV content based on the user's individual
30 profile.

The trigger/event engine 44 allows the defining and triggering of particular types of ITV content or experience based on data gathered by the profiling component. The trigger/event engine preferably monitors, in real-time, individual user profiles and/or group profiles created and updated by the profiling component, searching for activity from any
5 of the viewers matching the profile, that corresponds to one or more event triggers defined for the profile. In this regard, the trigger/event component maintains a table of various event triggers and associated event messages. When an activity corresponding to an event trigger is detected, a corresponding event message is retrieved from the table and transmitted to the action engine 46. For example, an event trigger may be that 25,000 users
10 have begun to interact with show "XYZ," and the corresponding event may be to notify the action engine 46 with a message indicating that a particular minimum number of viewers have begun interacting.

The action engine 46 receives an event message from the trigger/event engine 44 and notifies external systems that a predetermined event has taken place. According to one
15 embodiment of the invention, the action engine 46 queues and delivers ITV command messages associated with the event, to external systems such as broadcast automation systems. In this regard, the action engine 46 maintains a table of ITV commands associated with particular event messages. The action component delivers one or more ITV commands to the encoder 12 for causing the encoder to insert the commands into the
20 video program in real-time. Alternatively, the commands are delivered to the ITV receivers out-of-band via a back channel. The dynamically inserted ITV commands allow viewers to have a new ITV experience associated with those commands.

For example, upon receipt of an event message indicating that a minimum number of viewers have begun interacting with a particular show, the action engine 46 may insert
25 an ITV command into the current video program to provide each player with an X number of bonus points. Thus, viewers tuned to the particular video program may have a dynamic ITV experience based on their own activities as well as the activities of other viewers.

FIG. 3 is a flow diagram of a process for real-time encoding of ITV data based on real-time tracking of user interactions according to one embodiment of the invention. The
30 process starts, and in step 100, the ITV server 22 receives data of a user interaction from

one of the viewers of a particular ITV program. The interaction data is preferably processed by the request processing engine 40 and forwarded to the user profiling engine 42. The profiling engine 42 determines, in step 102, whether viewer providing the interaction may be matched to an individual or group-based-trend profile. If the answer is YES, the user interaction information is recorded and associated with the matched profile in step 104.

In step 106, the trigger/event engine 44 determines if the user interaction is a trigger event defined for the matched profile. If the answer is YES, the trigger/event engine retrieves an associated event message from its table in step 108, and transmits it to the action engine 46. The action engine, in step 110, retrieves one or more ITV commands associated with the event message and delivers it to the encoder 12 in step 112 for real-time encoding into the video signal. Alternatively, the ITV commands are not encoded in the video stream, but delivered to the ITV receivers via a back channel.

According to one embodiment of the invention, the ITV command encoded into the video signal provides the users of the ITV receivers 20 with the same dynamic ITV experience. For example, the ITV command may trigger the ITV receivers to retrieve the same ITV content from the content data store 24.

According to another embodiment of the invention, each ITV receiver is provided with a customized ITV experience based on the preference, habit, interest, and other types of profile information of the receiving individual. In this regard, the individual user profile information that may be maintained by the user profiling engine 42 is used in conjunction with the user interaction information to customize the ITV content provided to the individual.

For example, during a live football game where real-time play-by-play game statistics and individual player information is provided via user controllable elements in an ITV application, tracking of a particular user's interactions may disclose that the user spends a significant amount of time interacting with the section of the application that constantly displays game statistics information. In this scenario, the user may be presented, at the end of the game, with the opportunity to easily sign-up for an email delivery service that sends nation-wide game scores and statistics to an email account.

On the other hand, interactions of another viewer of the same football game may reveal that the viewer prefers to interact with individual player sections instead of game statistics. Such a viewer may instead be presented, at the end of the game, with the opportunity to purchase memorabilia of the players that he or she most frequently monitors. This may be accomplished by directing the viewer's ITV receiver to pull the identified ITV content from the ITV server.

In an alternative embodiment of the invention, the ITV server 22 may push the identified ITV content to the viewer's ITV receiver 20. According to this embodiment, the ITV server 22 may have access to multiple logical channels where each logical channel is dedicated to an ITV content that matches a particular group profile. The ITV server 22 switches from one logical channel to another based on the particular profile matched by the viewer.

In a further embodiment of the invention, the ITV receivers 20 may be individually addressable via unique identifiers. According to this embodiment, the identifier matching the particular viewer's ITV receiver may be transmitted in the video signal along with the ITV command to retrieve the identified ITV content.

Alternatively, every ITV receiver may receive a generic command to display ITV content. Upon receipt of the command, each ITV receiver retrieves a personalized ITV content from the ITV server based on the user's profile information maintained at the ITV receiver side.

Furthermore, instead of embedding the ITV commands in the video stream, the ITV receivers may receive out-of-band commands from the ITV servers via an out-of-band/back-channel path. The ITV receivers may then retrieve appropriate ITV content from the ITV servers based on the out-of-band commands.

According to another embodiment of the invention, the ITV system is configured to alter the timing and/or order of the presentation of particular elements of an ITV application based on the viewer profile and/or activity information. For example, if the system monitors over a period of time, that a particular viewer interacts with the ITV applications heavily during the middle of a show and less at the beginning, the most

appropriate content, as determined by the system, may be automatically displayed at a time in the program when that particular user is most likely to be interacting with the show.

Although this invention has been described in certain specific embodiments, those skilled in the art will have no difficulty devising variations to the described embodiment which in no way depart from the scope and spirit of the present invention. Moreover, to those skilled in the various arts, the invention itself herein will suggest solutions to other tasks and adaptations for other applications. For example, although the present invention is described in terms of real-time encoding of ITV commands and related information during the transmission of a video program, a person skilled in the art should appreciate that the commands may be pre-encoded in the video program prior to its delivery. It is the applicants intention to cover by claims all such uses of the invention and those changes and modifications which could be made to the embodiments of the invention herein chosen for the purpose of disclosure without departing from the spirit and scope of the invention. Thus, the present embodiments of the invention should be considered in all respects as illustrative and not restrictive, the scope of the invention to be indicated by the appended claims and their equivalents rather than the foregoing description.

CLAIMS:

1. A method for tailoring delivery of interactive content in an interactive television system comprising:

5 delivering a video program providing an interactive television program application to a viewer, the interactive television program application presenting the viewer with a first type of interactive experience;

monitoring interactions with the interactive television program application; and
dynamically providing a command to the viewer's receiver based on the monitored interactions for presenting the viewer with a second type of interactive experience.

10

2. The method of claim 1, wherein the second type of interactive experience is customized based on the viewer receiving the interactive experience.

3. A method for tailoring delivery of interactive content in an interactive television system comprising:

15 transmitting a first portion of a video program providing an interactive television program application to a first viewer and a second viewer;

receiving an interaction with the interactive television application from the first viewer;

20 determining whether an event is to be triggered based on the interaction from the first viewer;

encoding a command associated with the event in a second portion of the video program; and

25 transmitting the second portion of the video program with the encoded command for providing the event to the first viewer and the second viewer.

4. The method of claim 3, wherein the event is delivery of an interactive television content.

30

5. The method of claim 4 further comprising:
delivering a first interactive television content to the first viewer based on profile
information associated with the first viewer; and
delivering a second interactive television content to the second viewer based on
5 profile information associated with the second viewer.

6. The method of claim 4 further comprising:
identifying a profile for the first viewer, the profile defining a plurality of events
that may be triggered; and
10 determining whether the interaction from the first viewer corresponds to one of the
events defined for the profile.

7. The method of claim 6, wherein the profile is a group-based profile for
viewers satisfying a particular criteria.
15

8. A method for tailoring delivery of interactive content in an interactive
television system comprising:
receiving a viewer interaction with an interactive television application provided
by a video program;
20 identifying a profile for the viewer;
identifying a customized interactive television content based on the matched
profile; and
providing the customized content to the viewer.

9. The method of claim 8, wherein the profile is an individual profile
generated for the viewer.
25

10. The method of claim 8, wherein the profile is a group profile for viewers
satisfying a particular criteria.
30

11. The method of claim 8, wherein the customized content is identified and provided during the video program.

12. The method of claim 8, wherein the customized content is identified for and provided in a future video program.

13. An interactive television system tailoring delivery of interactive content, the system comprising:

means for delivering a video program providing an interactive television program application to a viewer, the interactive television program application presenting the viewer with a first type of interactive experience;

means for monitoring interactions with the interactive television program application; and

means for dynamically providing a command to the viewer's receiver based on the monitored interactions for presenting the viewer with a second type of interactive experience.

14. The system of claim 13, wherein the second type of interactive experience is customized based on the viewer receiving the interactive experience.

15. An interactive television system tailoring delivery of interactive content, the system comprising:

means for transmitting a first portion of a video program providing an interactive television program application to a first viewer and a second viewer;

a first engine receiving an interaction with the interactive television application from the first viewer;

a second engine determining whether an event is to be triggered based on the interaction from the first viewer;

an encoder encoding a command associated with the event in a second portion of the video program; and

means for transmitting the second portion of the video program with the encoded command for providing the event to the first viewer and the second viewer.

16. The system of claim 15, wherein the event is delivery of an interactive
5 television content.

17. The system of claim 16 further comprising:
delivering a first interactive television content to the first viewer based on profile
information associated with the first viewer; and
10 delivering a second interactive television content to the second viewer based on
profile information associated with the second viewer.

18. The system of claim 15 further comprising:
identifying a profile for the first viewer, the profile defining a plurality of events
15 that may be triggered; and
determining whether the interaction from the first viewer corresponds to one of the
events defined for the profile.

19. The system of claim 18, wherein the profile is a group-based profile for
20 viewers satisfying a particular criteria.

20. An interactive television system tailoring delivery of interactive content,
the system comprising:
a first engine receiving a viewer interaction with an interactive television
25 application provided by a video program;
a second engine identifying a profile for the viewer and further identifying a
customized interactive television content based on the matched profile; and
means for providing the customized content to the viewer.

21. The system of claim 20, wherein the profile is an individual profile generated for the viewer.

22. The system of claim 20, wherein the profile is a group profile for viewers
5 satisfying a particular criteria.

23. The system of claim 20, wherein the customized content is identified and provided during the video program.

10 24. The system of claim 20, wherein the customized content is identified for and provided in a future video program.

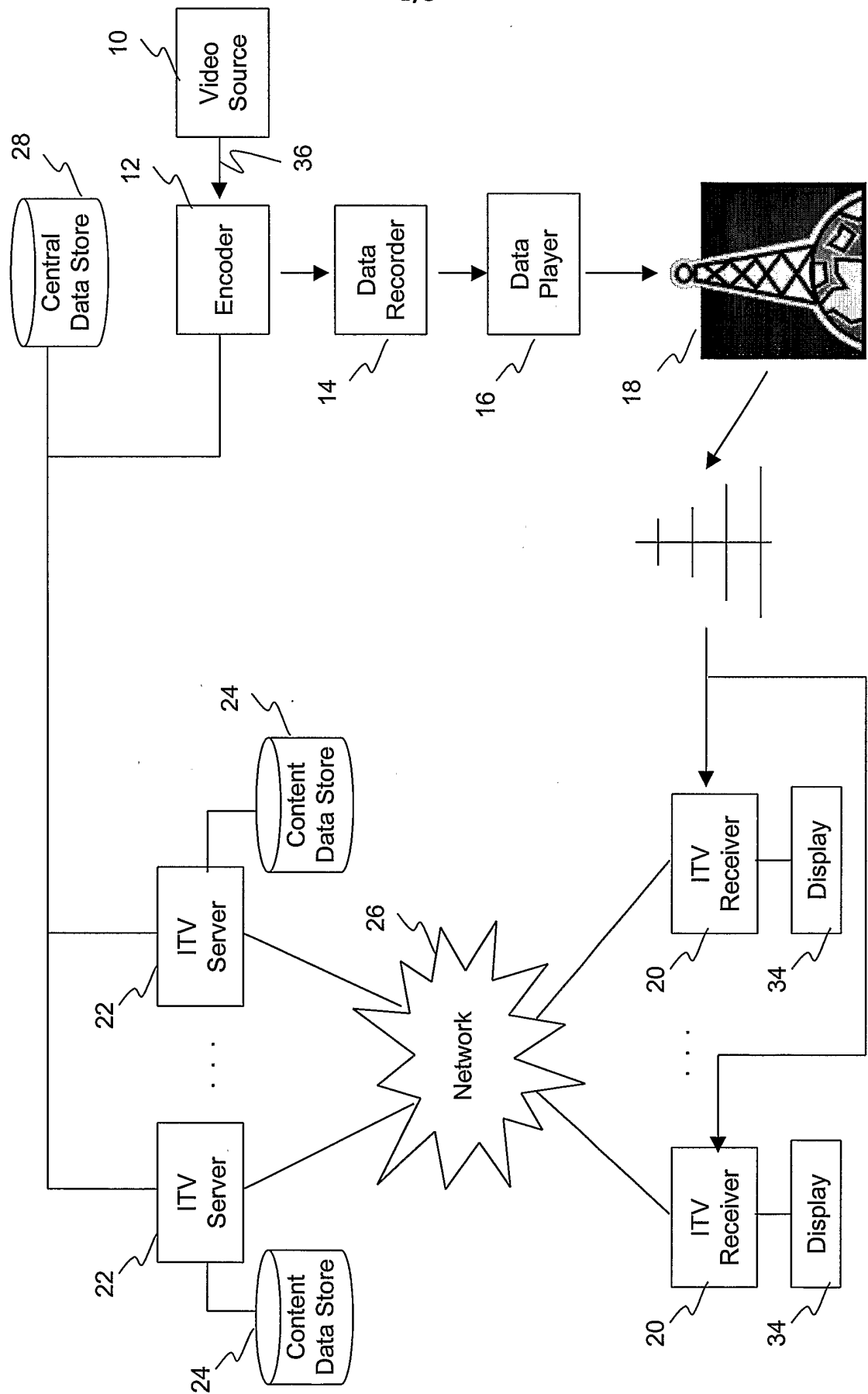


FIG. 1

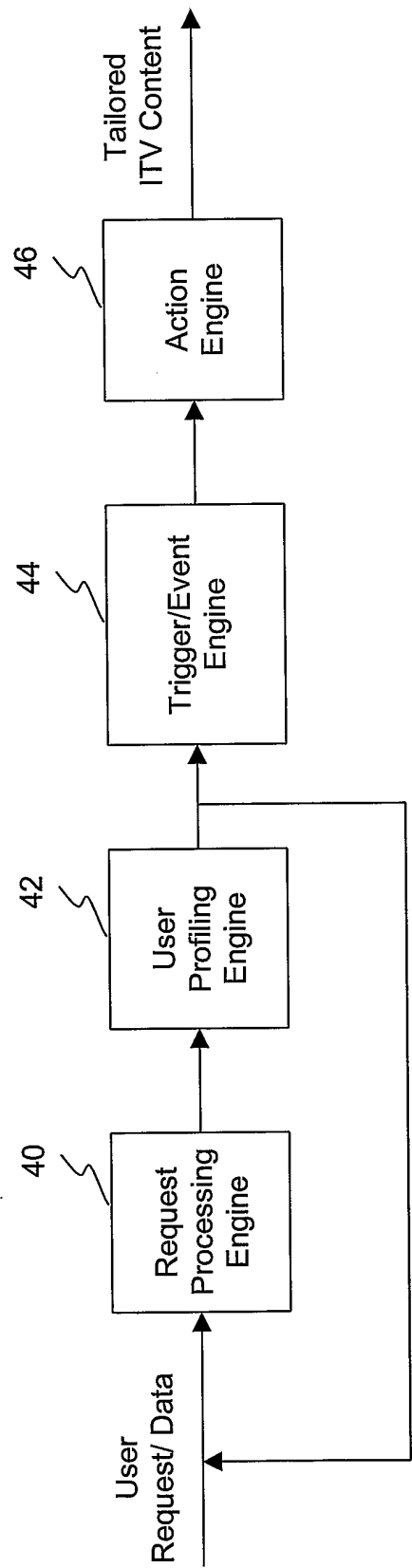


FIG. 2

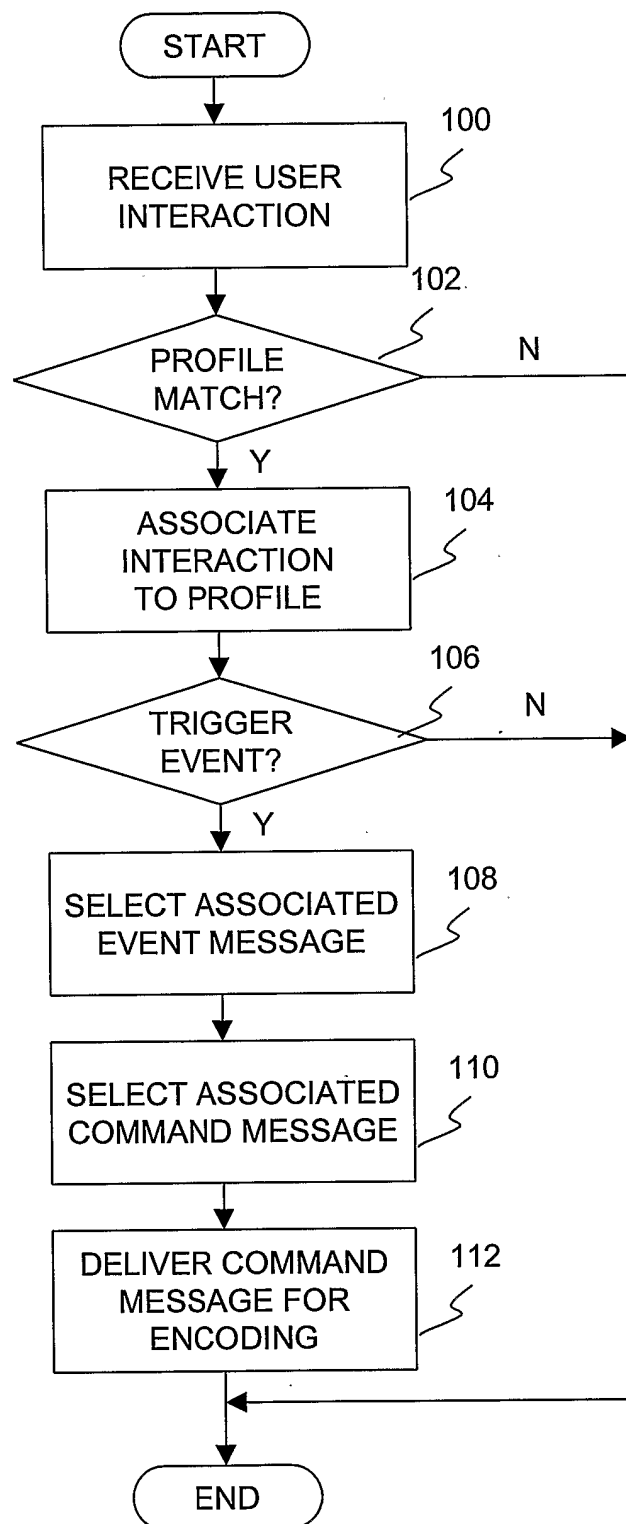


FIG. 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US02/26021

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06F 17/21

US CL : 707/500.1, 501.1; 725/105, 135

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 707/500.1, 501.1; 725/105, 135

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

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

WEST Database

search terms: interactive television, ITV, programming, user profiles, etc.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,974,398 A (HANSON et al) 26 October 1999, all.	1-24
A	US 5,396,546 A (REMILLARD) 07 March 1995, all.	1-24
A	US 5,995,943 A (BULL et al) 30 November 1999, all.	1-24
A	US 5,561,709 A (REMILLARD) 01 October 1996, all.	1-24



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"G" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

24 SEPTEMBER 2002

Date of mailing of the international search report

29 OCT 2002

Name and mailing address of the ISA/US
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