RECEIVER AND SYSTEM USING AN ELECTRONIC QUESTIONNAIRE FOR ADVANCED BROADCAST SERVICES

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ABSTRACT

According to one embodiment of the invention, a computer-implemented method for a digital broadcast system is described. The method involves an operation of receiving an electronic questionnaire that includes a plurality of questions registered to avoid duplication of any one of the plurality of questions. The electronic questionnaire, when processed by a receiver of the digital broadcast system, generates for display a plurality of questions. The receiver acquires answers to the electronic questionnaire, where the answers are used in adjusting content subsequently downloaded to the receiver.
FIG. 1
FIG. 2
FIG. 4
FIG. 5
START

600

COLLECT ANSWERS TO PDI QUESTIONNAIRE

610

RECEIVE CONTENT DISTRIBUTED BY SERVICE PROVIDER

620

CAPTURE/MATCH/FILTER CONTENT BY THE RECEIVER BASED ON PDI ANSWERS

630

STORE CONTENT OF INTEREST IN STORAGE DEVICE

640

COLLECT PDI QUESTIONS (QUESTIONNAIRES) AND CORRESPONDING ANSWERS AS USER INTERACTS WITH RECEIVER

END

FIG. 6
REGISTRATION ENTITY

SERVICE PROVIDER

FIG. 7A

FIG. 7B
**FIG. 8A**

START

PDI QUESTIONNAIRE PRESENT IN RECEIVING DEVICE?

YES

DOWNLOAD PDI QUESTIONNAIRE

NO

AVAILABLE QUESTIONNAIRE NEWER THAN STORED VERSION?

YES

UPDATE PDI QUESTIONNAIRE

NO

END

**FIG. 8B**

START

ACCESS USER INTERFACE SETUP SCREEN

PDI QUESTIONNAIRE PRESENT IN STORAGE DEVICE?

YES

DISPLAY PDI QUESTIONS

NO

DISPLAY "RETURN LATER" SCREEN

END

RECEIVE INPUT FROM USER BASED ON PDI QUESTIONNAIRE

STORE PDI ANSWERS IN STORAGE DEVICE
Do you enjoy camping and outdoor recreation? (Only one selection)

- Never
- Occasionally
- Frequently

Do you have any idea to make interactive TV services much more attractive?
<table>
<thead>
<tr>
<th>QUESTION IDENTIFIER</th>
<th>QUESTION ELEMENT</th>
<th>QUESTION TYPE IDENTIFIER</th>
</tr>
</thead>
<tbody>
<tr>
<td>•</td>
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**FIG. 10**
RECEIVER AND SYSTEM USING AN ELECTRONIC QUESTIONNAIRE FOR ADVANCED BROADCAST SERVICES

CROSS-REFERENCE TO RELATED APPLICATIONS


FIELD

[0002] Embodiments of the present invention relate to the field of communications, and in particular an advanced digital television receiver and a corresponding method of distributing and responding to a preference, demographic and/or interest (PDI) questionnaire.

BACKGROUND

[0003] Traditional media distribution systems such as broadcasting lack the ability to effectively characterize and respond to consumer preferences in order to provide customized media content, namely content that includes targeted advertising or marketing material directed to interests of a particular user. In other words, conventional broadcasting does not account for situations where different viewers have different interests, and thus, their preferences with respect to programming and information differ vastly. For example, some viewers may want to watch sports broadcasting while other viewers may prefer a different genre (e.g., home improvement, historical fact based programs, etc.).

[0004] Furthermore, due to geographic location, some viewers may not be interested in certain media content. For example, a particular advertisement for local services may be suitable for viewers living in the geographic area served by the advertiser, but may not be suitable for viewers living in a different area.

[0005] Currently, there are no standardized methods to specify how viewers might customize their viewing preferences with respect to the content and services they receive. Existing systems may typically filter out program content based on viewer preference settings established in the receiver by the manufacturer of that receiver, with no input from the service provider as to the types of filtering criteria that might be suitable for the particular service.

[0006] Also, service providers do not have access to the viewer preference settings, and thus are unable to directly tailor the user's experience of the service based on those settings. Yet, even if service providers had access to viewer preferences, there is no mechanism that is configured to avoid redundant inquiries to learn about the viewer’s preferences, as different service providers may solicit the same information through different, but highly similar inquiries.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Embodiments of the present invention are illustrated by way of example, and not by way of limitation, in the figures of the accompanying drawings and in which:

[0008] FIG. 1 is a block diagram illustrating one embodiment of a digital broadcasting system.

[0009] FIG. 2 is a block diagram illustrating one embodiment of a digital receiver implemented within an electronic device of the digital broadcasting system.

[0010] FIG. 3A is a block diagram illustrating one embodiment of a receiver receiving a triggered declarative object (TDO).

[0011] FIG. 3B is a block diagram illustrating one embodiment of a receiver receiving non-real time (NRT) triggered declarative objects (TDOs).

[0012] FIG. 4 is a block diagram illustrating another embodiment of a receiver that is adapted to receive non-real time (NRT) content

[0013] FIG. 5 is a block diagram illustrating one embodiment of a system for storing and manipulating a PDI questionnaire in a receiver.

[0014] FIG. 6 is a block diagram illustrating one embodiment of a system for altering content based on answers to a PDI questionnaire in a receiver.

[0015] FIG. 7A is an exemplary diagram illustrating a first embodiment directed to the registration of questions within a PDI questionnaire.

[0016] FIG. 7B is an exemplary diagram illustrating a second embodiment directed to the registration of questions within a PDI questionnaire.

[0017] FIG. 8A is an exemplary diagram illustrating one embodiment of a system and method for receiving a PDI questionnaire.

[0018] FIG. 8B is an exemplary diagram illustrating one embodiment of a system and method for interacting with the viewer to receive answers to the PDI questionnaire at a receiver.

[0019] FIG. 9 is an illustration of an example of a data structure in XML format for representation of PDI questions. As illustrated, standardization of preferences, demographics, and interests (PDIs) involve definition of a standard format for a representation of a downloadable questionnaire.

[0020] FIG. 10 is a block diagram illustrating one embodiment of a PDI container.

DETAILED DESCRIPTION

[0021] One embodiment of the invention relates to a digital receiver described herein. According to this embodiment of the invention, the digital receiver comprises a storage device and logic. The storage device is configured to store both (i) questions received from at least one service provider of a digital broadcast system and (ii) answers to the questions by one or more users. The logic is configured to process data received from the at least one service provider based on answers provided by the user(s).

[0022] Herein, according to one embodiment of the invention, the questionnaire and answers are stored locally. As an example, a first eXtensible Markup Language (XML) schema may be configured to represent a first set of questions and associated answer formats registered and accessible to all service providers. Similarly, a second XML schema may be configured for answers to the first set of questions for at least one user of the digital receiver. It is contemplated that the questions set forth in the first XML schema may be subject to public redistribution to avoid duplicative questions from being posed to the user during set-up, immediately after power-on, or at another point in time while the receiver is in operation.

[0023] Alternatively, it is contemplated that the first XML schema may represent (i) the first set of registered questions
that are accessible to all service providers, (ii) a second set of registered questions that are service provider specific and have access restrictions (e.g., only accessible by the specific service provider), and (iii) answers formats for both sets of questions.

[0024] Herein, certain terminology is used to describe features of the invention. For example, the term “logic” is generally defined as hardware and/or software. As hardware, logic may include processing circuitry (e.g., a microprocessor, a programmable gate array, a controller, an application specific integrated circuit, etc.), semiconductor memory, combinatorial logic, or the like. As software, the logic may be one or more software modules, such as executable code in the form of an application, an application programming interface (API), an applet, a routine, or one or more instructions. These software modules may be stored in any type of a suitable non-transitory storage medium such as a programmable circuit, a semiconductor memory such as a volatile memory (e.g., random access memory (RAM), etc.) or non-volatile memory (e.g., read-only memory, power-backed RAM, flash memory, etc.), a hard disk drive, an optical disk drive, a portable memory device (e.g., a Universal Serial Bus “USB” flash drive, optical disc, etc.), or the like.

[0025] An “electronic device” generally represents electronics with information processing capabilities such as a digital receiver for example. As optional features, electronic device may include a display (e.g., liquid crystal diode (“LCD”), organic LCD (OLED), plasma, etc.) and speakers to support video/audio playback.

[0026] An “interconnect” is generally defined as a communication pathway established over an information-carrying medium. This information-carrying medium may be a physical medium (e.g., electrical wire, optical fiber, cable, bus traces, etc.), a wireless medium (e.g., a radio in combination with wireless signaling technology) or a combination thereof.

[0027] A “service provider” generally represents a source and/or distributor of content. Examples of a service provider may include, but are not limited or restricted to a television network operator (e.g. local network television station, affiliate, cable television provider, telco, terrestrial, satellite TV provider, Internet service provider, etc.), an entity supplying access to stored content (e.g., Netflix®, etc.), or the like.

[0028] Certain details are set forth below in order to provide a thorough understanding of various embodiments of the invention, albeit the invention may be practiced through many embodiments other that those illustrated. Well-known logic and operations are not set forth in detail in order to avoid unnecessarily obscuring this description.

[0029] FIG. 1 is an exemplary block diagram illustrating one embodiment of a digital television service system 100. A broadcast system 110 receives content from one or more service providers 120, and thereafter, transmits such content to an electronic device 130 over interconnect 140.

[0030] According to one embodiment of the invention, the transmitted content includes one or more of the following: non-real-time (NRT) content, real-time or linear content, metadata associated with content, a questionnaire, and a triggered declarative object (TDO).

[0031] Herein, the NRT content comprises content that may be delivered faster or slower than real-time or may be delivered based on a request. For instance, according to one embodiment of the invention, the NRT content may include video and/or audio, images, text (e.g., descriptions of available video and/or audio for download), and/or hyperlinks to websites that can be displayed by a web browser executed by electronic device 130.

[0032] According to one embodiment of the invention, a user can select NRT content from a list of NRT content stored at service provider 120 for later download. The user can also navigate and select NRT content from among previously downloaded content or the downloading of content may be performed in accordance with advanced services.

[0033] According to one embodiment of the invention, “advanced services” may include user-controlled downloading of non-real-time content, user interactivity with the downloaded content, or any user-controlled feature supported by Advanced Television Systems Committee (ATSC) or other specifications developed for digital television transmission over terrestrial, cable and satellite networks. Of course, the invention may be applicable to advanced services in compliance with other data conveyance standards, including Internet Protocol Television (IPTV).

[0034] Herein, advanced services associated with NRT content may be request-based or automated where electronic device 130, at least including a digital receiver, updates content associated with a service. For automated services, the receiver caches service-related content and automatically updates files as new versions are made available. For request-based “push” service, content that has been preloaded is displayed.

[0035] Metadata associated with content describes the available content and services.

[0036] The electronic questionnaire is adapted to allow users to specify various items of information about themselves, which allows electronic device 130 to tailor advanced services based on the users’ individual interests and preferences. According to one embodiment of the invention, the questionnaire includes a data structure having a standardized format of preferences, demographics, and/or interests (PDIs) common to one or more service providers. For example, the format of the PDI questionnaire includes questions, each with an answer in a predefined format. Possible answer formats could include yes/no or true/false, text string (with maximum length), multiple choice, integer (with range limits), checklist, among others. FIG. 9 illustrates an example of a format and data structure of an example PDI questionnaire.

[0037] A TDO is a downloadable object created by one of service providers 120 in a content distribution chain, ranging from an original creator or source of the content to the manufacturer of the electronic device adapted to receive the content. According to one embodiment of the invention, a TDO comprises declarative content (e.g., scripts, text, descriptive markup, graphics, etc.) whose function and behavior are tied in some way to the television programming they accompany. For example, a TDO may be adapted with multiple functions such as to collect user response data such as voting on a game show or contest, feedback on televised programming or commercials, feedback on anticipated future events by the user (e.g. activities, upcoming purchases, etc.), or the like.

[0038] Referring still to FIG. 1, according to one embodiment of the invention, electronic device 130 may be implemented as a set-top box or a display device (e.g., television) that comprises a digital receiver 150. Digital receiver 150 includes logic 160 configured to process content received from broadcast system 110 as further described below. In one embodiment, logic 160 includes a processor capable of han-
dling services broadcast according to Advanced Television Systems Committee (ATSC) standards.

FIG. 2 is a block diagram illustrating one embodiment of digital receiver 150 implemented within electronic device 130. Digital receiver 150 is adapted to receive both real-time television broadcasts and NRT content. Receiver 150 includes a tuner/demodulator 200, a demultiplexer 210, an audio/video decoder 220, processing logic 230, and a storage device 240.

Tuner 200 receives a modulated input signal, tunes and demodulates the signal to produce an output transport stream. Demultiplexer 210 demultiplexes the stream to produce data to processing logic 230. In the case of conventional real-time (linear) TV content, audio and video packets from tuner/demodulator 200 are supplied, via demultiplexer 210, to A/V decoder 220 for decoding. A/V decoder 220 supplies an audio output signal and a video output signal to audio and video circuitry of the display device (not shown).

Content including audio/video, PDI questionnaires, NRT files, metadata, and TDOs received at demultiplexer 210 is routed via processing logic 230 to storage device 240. According to one embodiment of the invention, storage device 240 stores one or more PDI questionnaires 250, answers 260 to PDI questionnaire(s) 250, as well as content and metadata 270. Herein, a PDI questionnaire 250 is a downloadable list of questions that is generated by at least one service provider and has a standardized data structure. These questions can be presented to the user as selective, displayable images or as audio.

Storage device 240 may include a disc drive, a non-volatile memory, or any other types of data storage device. When a user instructs the system to play a selected item of NRT content, that content is then processed by processing logic 230 and the processed content is demultiplexed by demultiplexer 210 to provide audio and video packets to A/V decoder 220. These audio and video packets are eventually presented to the user.

FIG. 3A is an exemplary block diagram illustrating one embodiment of receiver 150 receiving triggered declarative objects (TDOs). As previously discussed, TDOs are downloadable objects configured to interact with a user to enhance his/her viewing experience. A user may be notified that an enhanced (interactive) experience is being offered and accompanies a given program.

For instance, according to one illustrative example, a user viewing an advertisement is offered the option to visit a website pertinent to the product or service being advertised. If the questionnaire includes an entry for “what is your zip code,” a Detailed Product Info TDO can condition the response to the user’s interest in the product or service on that viewer’s physical location. Thus, if the user lives on the west side of the city, the link could take him or her to a dealer located on the west side of the city, or if he or she lives somewhere else, to a different web page.

In another example, the playback of NRT content can be conditioned on answers to the PDI questionnaire. Again using the zip code as an item of personal information known to the system, when the user plays NRT content, specific items of content can be selected based on the viewer’s physical location. Thus, an advertisement for a car dealer located in the viewer’s neighborhood can be placed into the output stream for that viewer, while other viewers residing in different locations could get alternative advertisements as appropriate.

TDO 300 (e.g., scripts and associated data such as graphics, text, audio files, HTML, etc.) may be stored in storage device 240. Processing logic 230 executes an operation of TDO 300 with a TDO engine 310. For example, processing logic 230 executes a script of Detailed Product Info TDO to display the option to visit websites in which further information about a product or service may be found.

Storage device 240 also includes one or more PDI questionnaires 250 and PDI answers 260. PDI answers 260 contain answers to the questions in PDI questionnaire(s) 250 such as, for this example, the viewer’s zip code. PDI questionnaire(s) 250 and answers 260 may be in a standardized data structure format common to various service providers.

According to one embodiment of the invention, when executed by TDO engine 310, TDO 300 accesses PDI answers 260 through an Application Programming Interface (API) and exhibits actions and behaviors conditionally based on responses recorded in PDI answers 260. A script in TDO 300 could, for example, create one user experience if the age of the oldest TV-watching member of the household is 35 or less and a different experience otherwise. Different user experiences can include display of different text or graphics, branching to different audio/video content, and including different choices in a list.

In another embodiment of the invention, selected content 320 from the TDO 300 in response to PDI answers 260 may be stored within storage device 240.

FIG. 3B is an exemplary block diagram illustrating one embodiment of receiver 150 receiving non-real time (NRT) triggered declarative objects (TDOs). Similarly, processing logic 230 executes a script from NRT TDO 350 with a NRT TDO engine 360. For example, NRT TDO 350 includes all the functionality of a regular TDO 300 of FIG. 3A, and in addition may include references to NRT content and scripted control objects that, if activated, cause receiver 150 to set up a future download of an NRT content item, and/or hyperlinks that allow playback of previously downloaded content.

In one embodiment, when executed in engine 360, the script in NRT TDO 350 accesses PDI questionnaire 250 and PDI answers 260 through an API and behaves based on PDI answers 260. For example, a script in a NRT TDO 350 could offer the user with a choice to select and purchase a baseball game program for a particular team based the user’s interest in sports and baseball as captured in PDI answers 260 (assuming questions in these categories are included in the questionnaire).

FIG. 4 is a block diagram illustrating another embodiment of receiver 150 that is adapted to receive non-real time (NRT) content. Processing logic 230 filters content according to PDI answers 260 to PDI questionnaire 250 using a content filter/matching engine 400 in lieu of TDOs. For example, processing logic 230 matches a local advertisement based on a geographic region of the user as specified in his/her PDI answers 260. Metadata received at processing logic 230 is tied to questions within PDI questionnaire 250 that are assigned an ID value. As such, filter engine 400 is able to know which PDI answer relates to the PDI question directed to the geographic location of the user.

In one embodiment, processing logic 230 filters and stores NRT content of interest 410 based on the interest of the user. For example, movie previews or trailers matching the
preference (e.g., action, drama, comedy, etc.) of the user as set forth in PDI answers 260 are stored in storage device 240.

[0054] FIG. 5 is a block diagram illustrating one embodiment of a system for storing and manipulating PDI questionnaires in a receiver. A service provider 120 generates a PDI questionnaire 250 that is transmitted to digital receiver 150. An API for PDI manipulation 500 allows for receiver 150 to store PDI questionnaire 250 in storage device 240. A user (e.g., viewer) is able to generate, update, and delete PDI answers 260 to questions within PDI questionnaire 250 via PDI manipulation application 510. In one example, PDI manipulation application 510 takes the form of a set-up screen on a display device coupled to receiver 150.

[0055] In another embodiment, a web browser 520 of receiver 150 includes a script 530 configured to write and generate PDI answers 260 to PDI questionnaire 250.

[0056] FIG. 6 is a block diagram illustrating one embodiment of a system for altering content based on answers to a PDI questionnaire in a receiver. At block 600, the PDI questionnaire is displayed via the user's interaction with one or more set-up screens to solicit answers pertaining to preferences, demographics and interests of one or more users of the electronic device.

[0057] Thereafter, when in operation, the digital receiver within the electronic device receives content from a service provider (block 610). The receiver captures, matches, or filters such content based on PDI answers (block 620). The content of interest (e.g. content that matches the preferences of the user as specified in the PDI answers) can be stored in the storage device 240 (block 630).

[0058] It is contemplated that these PDI questions and corresponding answers may be collected as the user interacts with the receiver via a set-up menu, and may be stored in the receiver for use by provider-supplied applications, including the TDOs (block 640). This collection (and subsequent registration) of PDI questions/answers provide a platform to avoid duplicate query questions from multiple service providers.

[0059] One technique for avoiding question duplication is to utilize a registration entity and registration process for questions (and the associated answer format). Once registered, a question is assigned a question identifier. As a result, service providers can use the same question identifier to solicit the desired information in lieu of issuing substantially similar questions. This avoids the need for the digital receiver to recognize and handle duplicate questions, and eliminates the possibility that a user would be asked multiple times essentially the same question in different ways (or in exactly the same way).

[0060] FIG. 7A is an exemplary diagram illustrating a first embodiment directed to the registration of questions within a PDI questionnaire. Herein, according to one embodiment of the invention, in efforts to develop a question registry 700, service provider 120 transmits a question inquiry request 710 to a registration entity 720. The “registration entity” may be a governmental agency, a third-party entity (e.g., Advanced Television Systems Committee “ATSC” or other standards body, bank or trusted institution, etc.) or any entity assigned the responsibility of receiving questions that are to be used for a PDI questionnaire, checking for duplicates, and (assuming the request is accepted) assigning question identifiers for each of these questions.

[0061] Question inquiry request 710 is information that identifies a proposed question for registration and subsequent inclusion in the PDI questionnaire downloaded to (or stored by manufacturer within) receivers. As an example, question inquiry request 710 comprises (i) information 730 that identifies a reply format to the question (e.g., Boolean, integer type, single/multiple selection, variable text, etc.), and (ii) the proposed question 735.

[0062] In response to question inquiry request 710, service provider 120 receives a returned response 740 that identifies whether the question inquiry request 710 has been granted or denied. In particular, upon granting the request, response 740 includes (i) information 750 to identify whether the request has been granted, and (ii) a question identifier 755 that uniquely identifies the registered question. For instance, question identifier 755 may include a registration number for question 735.

[0063] Alternatively, upon denying the request, response 740 includes (i) information 760 to identify whether the request has been denied, and (ii) information 765 to identify the reason(s) for the denial. For instance, information 765 may be a code value that indicates that the question has already been registered, and perhaps the unique question identifier of the pre-existing item may be provided. Alternatively, information 765 may be a code value that indicates that the question contains inappropriate language or subject matter and is denied registration for this reason.

[0064] It is contemplated that, as an optional feature, registration entity 720 may be adapted to receive an appeal inquiry 770 that includes information within inquiry request 710 (e.g., reply format information 730 and proposed question 735), information 765 to identify the reason(s) for the denial, and information 775 provided by service provider as to the errors associated with the denial. Information may be a code value (e.g., mistaken relatedness with proposed question, etc.) or may include a textual description of the registration error. Appeal inquiry 770 can be evaluated separately (and in more detail) than inquiry requests.

[0065] Referring now to FIG. 7B, an exemplary diagram illustrating a second embodiment directed to the registration of questions within the PDI questionnaire is shown. Herein, question registry 700 is developed similar to the operations set forth in FIG. 7A. However, question inquiry request 780 features a different format. More specifically, question inquiry request 780 comprises (i) optional information 730 that identifies a reply format to the question (e.g., Boolean, integer type, single/multiple selection, variable text, etc.), (ii) the proposed question 735, and (iii) information 785 to identify particulars (e.g. question types and sub-types) of question 735 such as the following: type of question (e.g. what preference, demographic or interest), or question sub-type (e.g., is question directed to racial inquiries with respect to demographics, is question directed to financial means with respect to demographics, is question directed to preference such as sports one likes to watch, etc.). These particulars 785 are used to categorize the question inquiry requests received from the receiver to assist in producing more timely (and accurate) responses to these requests.

[0066] Referring now to FIG. 8A, an exemplary diagram illustrating one embodiment of a portion of a system and method for receiving a PDI questionnaire at a receiver is shown. At decision block 810, the receiver checks to see if any PDI questionnaire is present in storage in the receiving device. If not, the questionnaire is retrieved and the process
completes (block 820). If a PDI questionnaire was downloaded previously, the receiver checks to see if a newer version is available (block 830). If not, the process completes, otherwise the existing stored questionnaire is updated to overwrite it with the new version (block 840).

[0067] Referring now to FIG. 8B, an exemplary diagram illustrating one embodiment of processing of the PDI questionnaire in the receiver is shown. Herein, at block 850, a receiver accesses and sends a signal for displaying a set-up or preference screen. The receiver determines whether a PDI questionnaire is available at block 860. If the receiver does not currently have a PDI questionnaire in storage, the receiver displays a screen indicating that personalization cannot occur until a later time, and the process ends.

[0068] At block 870, questions from the PDI questionnaire are displayed to the user. At block 880, the user inputs answers in response to the PDI questions. At block 890, the PDI answers are stored in a storage device of the receiver.

[0069] Herein, according to this embodiment of the invention, the registration entity provides unique identifiers for each submitted question/answer format. For this embodiment of the invention, the registration entity is publicly accessible so that if another provider wishes to ask the same question, the question identifier associated with the desired question can be used as a reference. The registration process also allows service providers to use common wording for a given question.

[0070] FIG. 9 is an illustration of an example of a data structure in XML format for representation of PDI questionnaires. As illustrated, standardization of preferences, demographics, and interests (PDIs) involves definition of a standard format for a downloadable questionnaire. The format of the questionnaire may include, but are not limited or restricted to question type identifier 900, question identifier 910, and question 920, and candidate answer(s) 930 for the question.

[0071] Question type identifier 900 identifies possible reply formats such as yes/no or true/false (QBA—Question Boolean Answer), text string (with maximum length (QTA—Question Text Answer), multiple choice (QSA—Question Selection Answer), integer (with range limits) (QIA—Question Integer Answer), checklist, etc. Moreover, each question type identifier may further include an optional lifetime parameter to denote a lifetime of the answer to the question (or perhaps the question itself).

[0072] For instance, as shown in FIG. 9, QIA 940 concerning the oldest member of the household includes a lifetime attribute 950 that may be used to identify the number of time units (e.g., minutes, hours, days, weeks, months, years, etc.) before the applicability of the answer expires. Of course, lifetime attribute 950 alternatively may be used to identify the duration of the question. Upon expiration of the question, the PDI questionnaire may be updated to seek alternative questions for use in subsequent filtering of content.

[0073] The checklist reply format allows a user to provide a yes/no response to a number of different small items. For example, as shown in FIG. 9, the query string might be “in which of the following sports are you interested in viewing?” The checklist might include baseball, basketball, soccer, and hockey. Each of the items in the checklist may be selected or not selected. As previously discussed, access by receiver applications and TDOs to the PDI answers are made available via an API.

[0074] Question identifier 910 allows the receiver to identify the question. For example, a question common to all service provider may feature a predetermined range (e.g., identification value=255). Furthermore, question identifier 910 allows a question to be associated with a particular service provider. For example, a service provider may be interested in asking if the user has any ideas to make interactive TV services more valuable or attractive. Likewise, question identifier 910 (id value=256) allows the service provider to uniquely identify and associate the question with one or more service provider.

[0075] Question element “a” 920 includes the actual question (e.g., “are you currently employed?”).

[0076] Candidate answers 930 associated with question 920 are listed. For instance, a multiple choice reply format would allow the user to select from among a fixed number of identified choices or a single choice. As an example, a query string could be “Do you enjoy camping and outdoor recreation?” The corresponding multiple choice answer might include the possibilities “Never,” “Occasionally,” or “Frequently.”

[0077] It is noted that, for questions having multiple sections or checklist formats, each answer may be associated with an identifier as well. For instance, the sport “hockey” may be identified by an answer value “143” while “baseball” may be identified by an answer value “411” These values may be used to produce an answer compilation for the question. Alternatively, in lieu of the specific answers themselves, the collection of answers (e.g. candidate answers 930) may be assigned an answer value.

[0078] FIG. 10 is a block diagram illustrating one embodiment of a structure of a PDI container 1000. Generated and manipulated through an API implemented on the receiver, PDI container 1000 comprises a plurality of PDI data structures 1010, 1010,1010,1010,1010 (M≥2). More specifically, according to this embodiment of the invention, each PDI data structure 1010, 1010,1010,1010,1010 includes defined syntax, representation and matching schema utilized by one or more service providers. For instance, PDI data structure 1010,1010 comprises a question identifier value 1010,1010 that is used to identify the particular question registered with registration entity 920 of FIG. 9. It is further contemplated that PDI data structure 1010,1010 may further comprise at least q-element 920,1010 that identifies the question per se, and question type identifier 900,1010 that identifies possible reply formats such as Boolean answers (QBA), text string (QTA), multiple choice (QSA), integer (QIA), checklist, etc.

[0079] It is contemplated that PDI container 1000 may be configured with a format for the storage of PDI answers. As an example, each of the PDI data structures (e.g., data structure 1010,1010) may include, but are not limited or restricted to question type identifier 900,1010, question identifier 910,1010, and an answer value (not shown). The answer value represents those items selected by the user at the receiver.

[0080] It is to be understood that the above description is intended to be illustrative, and not restrictive. Many other embodiments will be apparent to those of skill in the art upon reading and understanding the above description. The scope of the invention should, therefore, be determined with reference to the appended claims, along with the full scope of equivalents to which such claims are entitled.

What is claimed is:

1. A computer-implemented method for a digital broadcast system, the method comprising:

receiving an electronic questionnaire by a digital receiver of the digital broadcast system, the electronic questionnaires...
naire includes a plurality of questions that are registered to avoid duplication of any one of the plurality of questions; processing the electronic questionnaire to generate for display a plurality of questions; and acquiring answers to the electronic questionnaire by the receiver, the answers being used in adjusting content subsequently downloaded to the receiver.

2. The computer-implemented method of claim 1, wherein the electronic questionnaire comprises a plurality of questions targeted to solicit information from a viewer and a unique question identifier for each of the plurality of registered questions.

3. The computer-implemented method of claim 2, wherein the electronic questionnaire further comprises a reply format identifier that identifies an answer format that comprises at least one of a Boolean type answer, a variable integer type answer, a multiple selection type answer, a single selection type answer, and a variable text type answer.

4. The computer-implemented method of claim 1 wherein the plurality of questions are registered to formulate the electronic questionnaire by submitting a question inquiry request and receiving a response that identifies whether the question inquiry request either has been granted or has been denied, the question inquiry request comprises (i) a proposed question and (ii) information that identifies a reply format to the proposed question.

5. The computer-implemented method of claim 4 wherein the response comprises information to identify whether the request has been granted or denied, and either (i) a question identifier that uniquely identifies a registered question identical or similar to the proposed question when the request has been granted so as to avoid registration of duplicate questions from different service providers, or (ii) information to identify one or more reasons for a denial of the request.

6. A digital receiver comprising:

a storage device configured to store (i) an electronic questionnaire received from at least one service provider of a digital broadcast system and (ii) answers directed to questions within the electronic questionnaire; and

a processing logic coupled to the storage device, the processing logic configured to process information within the electronic questionnaire to generate one or more displayable images including a plurality of questions that are unique and registered for universal access by multiple service providers including the at least one service provider, the plurality of questions being adapted to prompt the answers to the displayed question for use in altering content received by the receiver.

7. The digital receiver of claim 6, wherein each question for the electronic questionnaire comprises a question identifier and a question associated with the question identifier.

8. The digital receiver of claim 7 wherein the electronic questionnaire further comprises a reply format identifier that comprises at least one of a Boolean type answer, a variable integer type answer, a multiple selection type answer, a single selection type answer, and a variable text type answer.

9. The digital receiver of claim 6 wherein the plurality of questions are registered to formulate the electronic questionnaire by submitting a question inquiry request and receiving a response that identifies whether the question inquiry request either has been granted or has been denied, the question inquiry request comprises (i) a proposed question and (ii) information that identifies a reply format to the proposed question.

10. The digital receiver of claim 9 wherein the response comprises information to identify whether the request has been granted or denied, and either (i) a question identifier that uniquely identifies a registered question identical or similar to the proposed question when the request has been granted so as to avoid registration of duplicate questions from different service providers, or (ii) information to identify one or more reasons for a denial of the request.

11. A broadcast system comprising:

a digital receiver; and

a registration entity in communication with a digital receiver, the registration entity adapted to receive a question inquiry request being information that identifies a proposed question for registration and subsequent inclusion in an electronic questionnaire, the electronic questionnaire being downloaded to the digital receiver for subsequent display so that information pertaining to answers to the displayed questions within the electronic questionnaire is routed to the service provider in order to tailor content transmitted to the digital receiver.

12. The broadcast system of claim 11, wherein the question inquiry request received by the registration entity comprises (i) information that identifies a reply format to the proposed question and (ii) the proposed question.

13. The broadcast system of claim 12, wherein the reply format to the proposed question includes at least one of a Boolean and an integer type.

14. The broadcast system of claim 11, wherein the electronic questionnaire comprises a question identifier and a question associated with the question identifier.

15. The broadcast system of claim 14 wherein the electronic questionnaire further comprises a type of answer identifier that comprises at least one of a Boolean type answer, a variable integer type answer, a multiple selection type answer, a single selection type answer, and a variable text type answer.

16. The broadcast system of claim 11, wherein the response comprises information to identify whether the request has been granted or denied, and either (i) a question identifier that uniquely identifies a registered question identical or similar to the proposed question when the request has been granted so as to avoid registration of duplicate questions from different service providers, or (ii) information to identify one or more reasons for a denial of the request.

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