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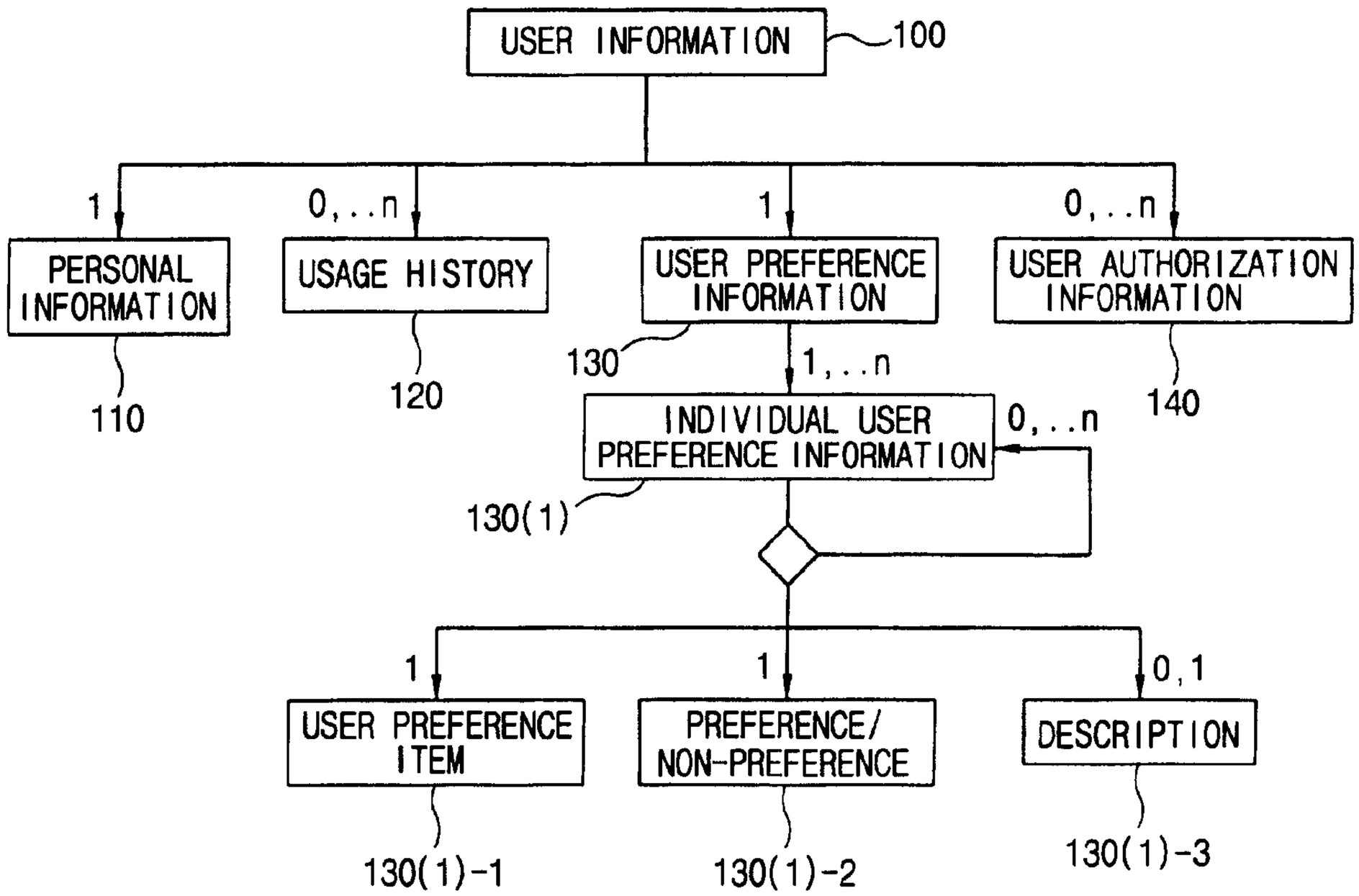
(72) Inventeurs/Inventors:
YOON, KYOUNG RO, KR;
SONG, JUNG MIN, KR;
JUN, SUNG BAE, KR

(73) Propriétaire/Owner:
LG ELECTRONICS INC., KR

(74) Agent: FETHERSTONHAUGH & CO.

(54) Titre : STRUCTURE DE DONNEES A HIERARCHIE MULTIPLE PORTANT SUR LES PREFERENCES DE L'UTILISATEUR, ET METHODE ET APPAREIL CONCUS POUR FOURNIR DES RENSEIGNEMENTS MULTIMEDIA A L'AIDE DE CELLES-CI

(54) Title: USER PREFERENCE INFORMATION DATA STRUCTURE HAVING A MULTIPLE HIERARCHICAL STRUCTURE AND A METHOD AND APPARATUS FOR PROVIDING MULTIMEDIA INFORMATION USING THE SAME



(57) Abrégé/Abstract:
A method, apparatus, and computer-readable medium encoded with a data structure, for providing multimedia information to a user in accordance with user preferences pertaining to consumption of multimedia content, including means for storing personal

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(57) Abrégé(suite)/Abstract(continued):
information to identify a user of multimedia content, and means for storing at least one set of user preference information associated with the identified user. The at least one set of user preference information includes a user preference description describing a condition under which the associated at least one set of user preference information is to be used to provide the multimedia information, a hierarchical structure of a plurality of user preference categories of multimedia content preferred by the user, and preference values defining relative user preferences for respective user preference categories. In one aspect, the invention may involve providing and/or using a user description including a user preference description having a hierarchical structure to describe preferences for filtering and searching, the hierarchical structure including a parent preference element and one or more child preference elements of the parent preference element, each of the parent and child preference elements including at least one preference description to identify preferred multimedia content, wherein the user description specifies a user identifier that includes a name.

USER PREFERENCE INFORMATION DATA STRUCTURE HAVING A MULTIPLE HIERARCHICAL STRUCTURE AND A METHOD AND APPARATUS FOR PROVIDING MULTIMEDIA INFORMATION USING THE SAME

ABSTRACT

A method, apparatus, and computer-readable medium encoded with a data structure, for providing multimedia information to a user in accordance with user preferences pertaining to consumption of multimedia content, including means for storing personal information to identify a user of multimedia content, and means for storing at least one set of user preference information associated with the identified user. The at least one set of user preference information includes a user preference description describing a condition under which the associated at least one set of user preference information is to be used to provide the multimedia information, a hierarchical structure of a plurality of user preference categories of multimedia content preferred by the user, and preference values defining relative user preferences for respective user preference categories. In one aspect, the invention may involve providing and/or using a user description including a user preference description having a hierarchical structure to describe preferences for filtering and searching, the hierarchical structure including a parent preference element and one or more child preference elements of the parent preference element, each of the parent and child preference elements including at least one preference description to identify preferred multimedia content, wherein the user description specifies a user identifier that includes a name.

USER PREFERENCE INFORMATION DATA STRUCTURE HAVING A MULTIPLE HIERARCHICAL STRUCTURE AND A METHOD AND APPARATUS FOR PROVIDING MULTIMEDIA INFORMATION USING THE SAME

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to communication and more particularly to a user preference information data structure having a multiple hierarchical structure and to a method, apparatus and system for providing multimedia information using the data structure to provide information desired by an information user in a multimedia server system environment including an information provider and an information user.

2. Description of the Background Art

In a multimedia server system environment which includes an information provider and an information user, the information user may find it difficult to absorb rapidly increasing amounts of information. The same phenomenon also occurs in the Internet environment, which offers huge amounts of information, as well as in a television broadcast environment offering entertainment and live information.

In addition, as communication techniques are improved, new information providers such as a cable TV begin to provide diverse types of information.

However, notably, as information providers increase in number, information users find it increasingly difficult to quickly and accurately search for desired information provided by the information providers.

Accordingly, in order to quickly and easily provide information users with desired information from the information providers, research has been conducted and methods have been sought and developed in which programs or information preferred by information users (hereinafter referred to as

'users') are recommended or automatically selected on the basis of a user preference value for information desired by the users.

In conventional methods of providing information user preference information representing items of information desired by users is constructed on the basis of a use record (that is, a user profile) representing information that has been used by a user by direct selection, so as to be provided to the user.

However, conventional methods of providing information are not able to adequately cope with situations in which user preference values are set differently for the same information according to the user's wish, or situations in which relationships between items of information are complicated and a user preference value for a single item has a different meaning according to an environment and a relationship with a different item or may be changed to a different user preference value.

For example, a user 'A', who likes a movie in which an actor 'B' played a role (a person>an actor>'B'), may dislike a movie directed by the actor 'B' (a person>a director>'B'). Besides, in some cases, though a user preference value of a higher level item may be low, a user preference value of a lower level item may be high, or the other way around: a user preference value of the upper level item may be high while the user preference value of the lower level item is low. For such situations, conventional information providing methods fail to provide the proper information adaptively.

As a different example, the user 'A' may want a movie with lots of violence scenes as he or she prefers a movie of violence, but, he or she may not want violence scenes with a news program or educational information that he or she watches on TV with children, sitting in front of a television set. In this case, conventional information providing methods fail to provide the proper information according to this situation, for example, where if a higher level item is set as a movie for a violence scene, its user preference value becomes high, while if the higher level item is set as a news program or an educational stuff, its user preference value becomes low.

Moreover, a user preference value on information can be different depending on changes in the user's situation. Conventional information providing methods are unable to properly cope with this.

For example, the user may prefer a melodrama or a family movie on a rainy day, and an action movie on a sunny day. That is, for the same movie item, user preference may be different according to the user's situation. Conventional information providing methods do not properly cope with such situations.

In addition, user preferences may be different depending on the receiving device used by the user. For example, if the user watches a movie on a TV with his or her family in a living room, the user may prefer a family-rated movie, while if the user watches a movie on a TV in his or her own room, he or she may prefer a movie that is not allowed for minors. Conventional information providing methods do not properly cope with this.

Figure **1** illustrates user preference values corresponding to respective items of information in accordance with the conventional art and method of providing the information, in which user preference category items (i.e., entertainment, music and pop music, etc) are allocated specific item identifiers (**1**, **17**, **181**,...) and corresponding independent user preference values (**86**, **43**, **27**,...). In this approach, relationships between items are not stored and the user preference value of each item is maintained constant even if the situation or an environment has changed. Thus, the proper information cannot be provided in accordance with the user's changing situation.

In addition, in order to update user preference information, each corresponding item should be included in the use information. That is, in case that classified information only includes a name of a singer 'C' and a genre of 'new age', not including 'entertainment' or 'music', only the 'C' item' and the 'new age' item are updated, while the user preference value for the relevant upper level item such as 'entertainment, 'music', 'pop music', 'person' and 'woman singer' is not updated.

SUMMARY OF THE INVENTION

In accordance with one aspect of the invention, there is provided a computer-implemented method of providing multimedia information to a user in accordance with user preferences pertaining to consumption of multimedia content, the method involving storing, in memory, personal information to identify a user of multimedia content, and at least one set of user preference information associated with the identified user, each of the at least one set of user preference information including: a hierarchical structure of a plurality of user preference categories of multimedia content preferred by the user; preference values defining relative user preferences for respective said user preference categories; and a condition description describing a condition that must be satisfied by a client device in order for the set of user preference information associated with the condition description, to be used to provide user-preferred multimedia content to the client device. The method further involves causing an information provider server to provide multimedia content to a first client device associated with the user, in accordance with a first set of user preference information from among the at least one set of user preference information, in response to the condition associated with the first set of preference information being satisfied by the first client device.

Storing the at least one set of user preference information may involve storing a plurality of sets of user preference information associated with the identified user.

Each of the plurality of sets of user preference information may have preference values associated with a respective user situation.

A condition description corresponding to the first set of user preferences, may specify that a user client device must be associated with a specific client device identifier as the condition associated with the first set of user

preferences, the first set of user preferences being associated with the specific client device identifier; and causing the information provider server to provide multimedia content may involve causing the information provider server to provide multimedia content in accordance with the first set of user preferences in response to the user client device having the specific client device identifier.

At least one of the plurality of sets of user preference information may have preference values associated with a location of a client device used by the user to receive multimedia information.

A particular one of the plurality of sets of user preference information may be used in response to a user selection made from a client device.

The method may further involve storing authorization information to identify multimedia information that the user is authorized to access.

Storing personal information may include storing a unique identifier to identify the user.

The hierarchical structure may further include a plurality of description fields, each associated with a respective user preference category, for holding information describing the respective user preference categories.

The method may further involve filtering multimedia content to be provided, in response to a set of preference values.

The method may further involve searching for multimedia content to be provided, in response to a set of preference values.

The hierarchical structure may include a hierarchical tree structure.

The hierarchical tree structure may include first and second sub-trees, the first sub-tree including a first root node and a first non-root node, the second sub-tree including a second root node and a second non-root node, the first root node representing a first type of multimedia, the second root node representing a second type of multimedia, the first non-root node representing a first user preference category and being associated with a first preference value, the second non-root node representing the first user preference category and being associated with a second preference value, different from the first preference value.

Causing the information provider server to provide multimedia content may involve causing the information provider server to recommend, provide or limit an item of multimedia content associated with the first user preference category, in accordance with the first preference value if the item of multimedia content corresponds to the first type of multimedia; and causing the information provider server to recommend, provide or limit the item of multimedia content in accordance with the second preference value if the item of multimedia content corresponds to the second type of multimedia.

The hierarchical structure may be represented by an external item dictionary.

The method may further involve extracting preference information located at non-leaf nodes of the at least one set of user preference information, according to relationships among leaf nodes and non-leaf nodes in the hierarchical tree structure.

Causing an information provider server to provide multimedia content may further involve causing the server to signal the user of new information retrieved.

Causing an information provider server to provide multimedia content may further involve causing the server to notify the user of information expected to be preferred by the user according to the at least one set of user preference information.

Causing an information provider server to provide multimedia content may further involve causing the server to limit access to information expected not to be preferred by the user according to the at least one set of user preference information.

The method may further involve registering a new user preference category in the hierarchical tree structure.

The method may further involve deleting an existing user preference category in the hierarchical tree structure.

The method may further involve changing the parent node of a sub-tree of the at least one set of user preference information.

The method may further involve storing multimedia content usage history information.

The method may further involve modifying at least some preference values in response to the multimedia content usage history information.

The method may further involve storing a timestamp representing a time at which a user caused multimedia content to be used.

The method may further involve storing information about a user action indicating how multimedia content is to be used.

The method may further involve changing the preference values according to the usage history information.

The method may further involve storing an updating type item for indicating whether or not the at least one set of user preference information is automatically updated.

The method may further involve changing the preference values in response to input received through a user interface of the first client device.

At least one condition description in the at least one set of user preference information, may specify a client device used by the user to receive multimedia content.

At least one condition description in the at least one set of user preference information, may specify a location of a client device used by the user to receive multimedia content.

In accordance with another aspect of the invention, there is provided an apparatus for providing multimedia information to a user in accordance with user preferences pertaining to consumption of multimedia content, comprising a processor and a memory having program instructions for configuring the processor to execute any of the aforesaid methods.

In accordance with another aspect of the invention, there is provided a computer-readable medium encoded with instructions for directing a processor to perform any of the aforesaid methods.

In accordance with another aspect of the invention, there is provided a computer-readable medium storing a data structure for use in providing multimedia information to a user, the data structure representing user

preferences pertaining to consumption of multimedia content, the data structure including: user preference data representing personal information to identify a user of multimedia information, and at least one set of user preference information associated with the identified user, each of the at least one set of user preference information including: a hierarchical structure of a plurality of user preference categories of multimedia content preferred by the user; preference values defining relative user preferences for respective user preference categories; and a condition description describing a condition that must be satisfied by a client device in order for the set of user preference information associated with the condition description, to be used to provide user-preferred multimedia content to the client device, the data structure being operable to be used to cause an information provider to provide user-preferred multimedia content to a first client device associated with the user, in accordance with a first set of user preference information from among the at least one set of user preference information, in response to the condition associated with the first set of preference information being satisfied by the first client device.

The data structure may include a plurality of sets of user preference information associated with the identified user.

The data structure may include a unique identifier to identify the user.

The hierarchical structure may further include a plurality of description fields, each associated with a respective user preference category, for holding information describing the respective user preference category.

The preference values may be used by a processor to filter multimedia content to be provided.

The preference values may be used by a processor to search for multimedia content to be provided.

The hierarchical structure may include a hierarchical tree structure.

The hierarchical tree structure may include at least one sub-tree and wherein, if a user preference category is located at locations in more than one sub-tree of the at least one set of user preference information, the corresponding preference values of the user preference category at the locations are not identical.

The data structure may further include multimedia content usage history information.

The data structure may include a time representing when a user indicated that multimedia content was to be used.

The data structure may include information about a user action indicating how the user has used multimedia content.

The data structure may include an updating type item for indicating whether or not the at least one set of user preference information is automatically updated.

The data structure may include preference values associated with a client device used by the user to receive multimedia information.

The data structure may include preference values associated with a location of a client device used by the user to receive multimedia information.

A particular one of the plurality of sets of user preference information may be used in response to a user selection made from a client device.

The data structure may further include authorization information to identify multimedia information that the user is authorized to access.

Any of the computer-readable media described above may include a memory for storing data for access by an application program being executed on a processor, the memory including the data structure.

In accordance with another aspect of the invention, there is provided a computer-implemented method of providing multimedia information to a user in accordance with user preferences pertaining to consumption of multimedia content, wherein the method involves causing an information provider server to provide multimedia content to a client device associated with the user in accordance with the plurality of preference categories represented in the data structure encoded in any of the computer-readable media described above.

In accordance with another aspect of the invention, there is provided a computer-implemented method for processing user preferences. The method involves processing a user description including a user preference description having a hierarchical structure to describe preferences for filtering and searching, the user preference description including a condition description describing a condition that must be satisfied by a client device to cause the user preference description to be used to provide user-preferred multimedia content to the client device, the hierarchical structure including a parent preference element and one or more child preference elements of the parent preference element, each of the parent and child preference elements including at least one preference description to identify preferred multimedia content, wherein the user description specifies a user identifier that includes a name, and wherein processing the user description includes causing user-

preferred information to be provided to the client device in accordance with the user preference description, in response to the condition being satisfied by the client device.

At least one of the parent and child preference elements may include the condition description to specify a context in which the respective preference description applies.

The context may include a location.

Each of the parent and child preference elements may have a preference value to characterize a relative desirability of multimedia content corresponding to the respective preference description.

Processing the user description may include receiving user input specifying information for at least one of the parent and child preference elements.

Processing the user description may include receiving information about consuming multimedia content, and using the information about consuming multimedia content to generate at least one of the parent and child preference elements.

Processing the user description may include generating a usage history based on the information about consuming multimedia content.

The usage history may specify a respective user action type for each event of using multimedia content.

At least one of the user action types may indicate a user action including play, review, pause, fast forward, and stop.

The usage history may identify consumed multimedia content.

Filtering multimedia content may include recommending multimedia content.

At least one of the parent and child preference elements may include a preference description specifying a classification attribute of multimedia content.

The classification attribute may include a genre of multimedia content.

At least one of the parent and child preference elements may include a preference description specifying an actor or a director.

The method may further involve updating the user description.

The method may further involve storing the user description.

The user identifier may include a name that identifies one or more users.

In accordance with another aspect of the invention, there is provided a system for processing user preferences, the system including a data storage device and data processing apparatus configured to perform operations including processing a user description. The user description includes a user preference description having a hierarchical structure to describe preferences for filtering and searching, the user preference description including a condition description describing a condition that must be satisfied by the data processing apparatus to cause the user preference description to be used to provide user-preferred multimedia content to the data processing apparatus. The hierarchical structure includes a parent preference element and one or more child preference elements of the parent preference element, each of the parent and child preference elements including at least one preference

description to identify preferred multimedia content. The user description specifies a user identifier that includes a name. The data processing apparatus is further configured to store the user description in the data storage device for use in causing an information provider to provide user-preferred content to the data processing apparatus in response to the condition being satisfied by the data processing apparatus.

At least one of the parent and child preference elements may include the condition description to specify a context in which the respective preference description applies.

Each of the parent and child preference elements may have a preference value to characterize a relative desirability of multimedia content corresponding to the respective preference description.

Processing the user description may include receiving user input specifying information for at least one of the parent and child preference elements.

Processing the user description including the preferences for filtering and searching of multimedia content, may involve receiving information about consuming multimedia content, and using the information about consuming multimedia content to generate at least one of the parent and child preference elements.

Processing the user description may include generating a usage history based on the information about consuming multimedia content.

The usage history may specify a respective user action type for each event of using multimedia content.

At least one of the parent and child preference elements may include a preference description specifying a classification attribute of multimedia content.

The data processing apparatus may be further configured to perform operations involving updating the user description.

In accordance with another aspect of the invention, there is provided a computer-readable medium for use in processing user preferences, the computer-readable medium enabling instructions to cause data processing apparatus to perform operations including processing a user description that includes a user preference description having a hierarchical structure to describe preferences for filtering and searching, the user preference description including a condition description describing a condition that must be satisfied by a client device to cause the user preference description to be used to provide user-preferred multimedia content to the client device. The hierarchical structure includes a parent preference element and one or more child preference elements of the parent preference element, each of the parent and child preference elements including at least one preference description to identify preferred multimedia content, and the user description specifies a user identifier that includes a name. Processing the user description further includes causing an information provider to provide user-preferred content to the client device, in response to the condition being satisfied by the client device.

At least one of the parent and child preference elements may include the condition description to specify a context in which the respective preference description applies.

Each of the parent and child preference elements may have a preference value to characterize a relative desirability of multimedia content corresponding to the respective preference description.

Processing information about preferences for filtering and searching of multimedia content may involve receiving information about consuming multimedia content and using the information about consuming multimedia content to provide at least one of the parent and child preference elements.

Processing the user description may involve generating a usage history based on the information about consuming multimedia content.

In accordance with another aspect of the invention, there is provided a computer-implemented method for processing user preferences. The method involves using a user preference description to search for or filter multimedia content, wherein the user preference description has a hierarchical structure to describe preferences for filtering and searching and includes a condition description describing a condition that must be satisfied by a client device to cause the user preference description to be used to provide preferred multimedia content to the client device. The hierarchical structure includes a parent preference element and one or more child preference elements of the parent preference element, each of the parent and child preference elements including at least one preference description to identify preferred multimedia content. The user preference description is associated with a user identifier that includes a name, and the user preference description is used to search for or filter multimedia content in response to the condition being satisfied.

At least one of the parent and child preference elements may include the condition description to specify a context in which the respective preference description applies.

The context may include a location.

Each of the parent and child preference elements may have a preference value to characterize a relative desirability of multimedia content corresponding to the respective preference description.

Filtering multimedia content may include recommending multimedia content.

At least one of the parent and child preference elements may include a preference description specifying a classification attribute of multimedia content.

The classification attribute may include a genre of multimedia content.

At least one of the parent and child preference elements may include a preference description specifying an actor or a director.

The method may further involve updating the user preference description.

The method may further involve storing the user preference description.

The user identifier may include a name that identifies one or more users.

In accordance with another aspect of the invention, there is provided a system for processing user preferences, the system including a data storage device to store a user preference description. The user preference description has a hierarchical structure to describe preferences for filtering and searching, the user preference description including a condition description describing a condition that must be satisfied by a client device to cause the user preference description to be used to provide preferred multimedia content to the client device. The hierarchical structure includes a parent preference

element and one or more child preference elements of the parent preference element, each of the parent and child preference elements including at least one preference description to identify preferred multimedia content, wherein the user preference description is associated with a user identifier that includes a name. The system further includes data processing apparatus configured to perform operations including using the user preference description to search for or filter multimedia content in response to the condition being satisfied.

At least one of the parent and child preference elements may include the condition description to specify a context in which the respective preference description applies.

Each of the parent and child preference elements may have a preference value to characterize a relative desirability of multimedia content corresponding to the respective preference description.

At least one of the parent and child preference elements may include a preference description specifying a classification attribute of multimedia content.

The data processing apparatus may be further configured to perform operations including updating the user preference description.

In accordance with another aspect of the invention, there is provided a computer-readable medium for use in processing user preferences, the computer-readable medium enabling instructions to cause data processing apparatus to perform operations including using a user preference description to search for or filter multimedia content, wherein the user preference description has a hierarchical structure to describe preferences for filtering and searching and wherein the user preference description includes a

condition description describing a condition that must be satisfied by a client device to cause the user preference description to be used to provide user-preferred multimedia content to the client device. The hierarchical structure includes a parent preference element and one or more child preference elements of the parent preference element, each of the parent and child preference elements including at least one preference description to identify preferred multimedia content, wherein the user preference description is associated with a user identifier that includes a name. The user preference description is used to search for or filter multimedia content in response to the condition being satisfied.

At least one of the parent and child preference elements may include the condition description to specify a context in which the respective preference description applies.

Each of the parent and child preference elements may have a corresponding preference value to characterize a relative desirability of multimedia content corresponding to the respective preference description.

In accordance with another aspect of the invention, there is provided a computer-implemented method of maintaining user preferences pertaining to consumption of multimedia content, for use in providing multimedia content to a user in accordance with the user's preferences. The method involves storing, in memory, personal information to identify the user, and user preference information associated with the user, wherein the user preference information includes at least one individual user preference information. Each individual user preference information includes a plurality of preference items and corresponding preference values for each preference item and being associated with a condition description describing a condition that must be satisfied by a client device to cause the associated user preference information to be used to provide user-preferred multimedia content to the

client device, each individual user preference information further including an updating type that indicates whether or not the user preference information is automatically updated. The method further involves using a particular individual user preference information to obtain user-preferred content in accordance with the particular individual user preference information, in response to the condition associated with the particular individual user preference information, being satisfied.

The method may further involve storing the preference items hierarchically.

Storing the preference items hierarchically may involve storing the preference items in a tree structure.

The above methods may further involve causing an information provider to provide user-preferred multimedia content to the user in accordance with the user preference information.

In accordance with another aspect of the invention, there is provided a computer-implemented method of processing user preferences, the method involving causing user-preferred information to be provided in response to a data structure representing a user description including a user preference description and a usage history, the user preference description having a hierarchical structure to describe preferences for filtering and searching, the hierarchical structure including a parent preference element and one or more child preference elements of the parent preference element, each of the parent and child preference elements including at least one multimedia preference description to identify preferred multimedia content, the usage history describing events of multimedia consumption and specifying a respective user action type for each of the described events of multimedia consumption.

In accordance with another aspect of the invention, there is provided a system for processing user preferences, the system including a data storage device and data processing apparatus configured to perform operations including causing user-preferred information to be provided in response to a user description including a user preference description and a usage history, the user preference description having a hierarchical structure to describe preferences for filtering and searching, the hierarchical structure including a parent preference element and one or more child preference elements of the parent preference element, each of the parent and child preference elements including at least one multimedia preference description to identify preferred multimedia content, the usage history describing events of multimedia consumption and specifying a respective user action type for each of the described events of multimedia consumption, the data processing apparatus being configured to store the user description in the data storage device.

In accordance with another aspect of the invention, there is provided a computer-readable medium encoded with codes for processing user preferences, the codes representing instructions operable to cause data processing apparatus to perform operations including causing user-preferred information to be provided in response to a user description including a user preference description and a usage history, the user preference description having a hierarchical structure to describe preferences for filtering and searching, the hierarchical structure including a parent preference element and one or more child preference elements of the parent preference element, each of the parent and child preference elements including at least one multimedia preference description to identify preferred multimedia content, the usage history describing events of multimedia consumption and specifying a respective user action type for each of the described events of multimedia consumption.

In some embodiments, one possible benefit of the present invention may be to provide a data structure having a multiple hierarchical structure to facilitate a method of providing information to an information user in accordance with the user's preferences.

Another possible benefit of the present invention may be to provide a method for editing a data structure having a multiple hierarchical structure, to facilitate providing information desired by an information user.

Still another possible benefit of the present invention may be to provide a method for providing information by users and by preferences, in which various independent individual user preference information data structures for holding respective sets of user preference information are defined and each user preference category item and user preference/non-preference value included in the individual user preference information data structure defines a relationship in a hierarchical structure, whereby user preference/non-preference is progressively defined from specific items to general items, and an adoption condition is defined for the set of user preference information in each individual user preference information data structure, so that specific information can be recommended, provided or limited according to user preferences that may differ depending on the situation/context, and information fitting various situations/contexts can thus be recommended, provided or limited based on the condition being satisfied.

In some embodiments, a user information data structure having a multiple multi-level hierarchical structure may be used in providing information to a user according to personal preferences, in a multi-media environment consisting of an information provider and an information users, the user information data structure including personal information to identify each user, user preference information of the identified user, and one or more individual user preference information, each of which can be set differently depending

on the user's situation (for example, different location), and which is located as a sub-tree of the user preference information.

Other aspects and features of the present invention will become apparent to those ordinarily skilled in the art upon review of the following description of specific embodiments of the invention in conjunction with the accompanying figures.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description serve to explain the principles of the invention. In the drawings:

Figure **1** illustrates a prior art user preference structure;

Figure **2** is a schematic view showing a multiple level hierarchical data structure in accordance with one embodiment of the present invention;

Figure **3** shows a multiple structures of the user preference category items of the individual user preference information data structures shown in Figure **2** in accordance with one embodiment of the present invention;

Figure **4** is a detailed view showing a hierarchical structure of user preference category items of Figure **2** in accordance with one embodiment of the present invention;

Figure **5** illustrates a hierarchical structure of a set of user preference information in an individual user preference information data structure which varies depending on the client device used by a user in accordance with one embodiment of the present invention;

Figure **6** is a table representing the hierarchical structure of Figure **2** by using a self-identifier of a user preference category item and an identifier of an higher level user preference category item in the hierarchical structure in accordance with one embodiment of the present invention;

Figure **7** is a table representing the hierarchical structure of Figure **2** by using a coding scheme of the item identifier of Figure **6** in accordance with one embodiment of the present invention;

Figure **8** is a table representing the hierarchical structure of Figure **2** by using the leaf nodes of the sets of user preference information of the hierarchical tree structure in accordance with one embodiment of the present invention;

Figure **9** is a table representing a hierarchical structure of Figure **1** by using an item dictionary of Figure **10** in accordance with one embodiment of the present invention;

Figure **10** is a table representing dictionary items for the user preference category items in accordance with one embodiment of the present invention;

Figure **11**A illustrates a schema showing the hierarchical data structure before it is edited in accordance with one embodiment of the present invention;

Figure **11**B illustrates a schema showing the hierarchical data structure after it is edited in accordance with one embodiment of the present invention;

Figure **12**A is a table showing an item dictionary before it is changed in accordance with one embodiment of the present invention; and

Figure **12**B is a table showing an item dictionary after it is changed in accordance with one embodiment of the present invention.

DETAILED DESCRIPTION

Reference will now be made in detail to exemplary embodiments of the present invention, some of which are illustrated in the accompanying drawings.

Figure **2** is a schematic view showing a multiple hierarchical data structure in accordance with an embodiment of the present invention.

As shown in the drawing, in this embodiment, user information **100** for a single user or single group of users includes personal information **110**, a plurality (**0**, **1**, ..., n) of usage history **120**, user preference information **130** and a plurality of user authorization information **140**.

In this embodiment, the user preference information **130** includes a plurality (**1**, **2**, ..., n) of individual sets of user preference information **130**(**1**) and the individualsets of user preference information **130**(**1**) include a user preference category item **130**(**1**)-**1**, a user preference/non-preference **130**(**1**)-**2** and possibly a description **130**(**1**)-**3**.

The personal information **110** may include a name, a sex, an age and date and year of birth of a user, in addition to a user identifier (ID) identifying the user, for example.

The usage history **120** may include information on when (e.g., year, month, data, time), where (e.g., a client system identifier (ID) identifying a client system or device used by the user, or a location thereof), how (e.g., information as to when a user-selected action such as play, review, pause, fast forward or stop has happened) and what information (e.g., an information ID) has been used by the user.

The usage history **120** may be classified by a condition of collecting the usage history, such as when the history is collected, therefore, there may be a plurality of usage history items included in the user information **100**.

The user authorization information **140** indicates information which a user is allowed to access. For example, it may include information on channels that are requested and not requested to view a TV broadcast or information on a basic channel and a pay-per-view channel.

The user preference information **130** may include a plurality of individual sets of user preference information **130**(**1**), **130**(**2**), ..., **130**(n).

Each individual set of user preference information **130**(**1**) may include a user preference category item **130**(**1**)-**1**, a user preference/non-preference **130**(**1**)-**2**, and a description **130**(**1**)-**3**, if any.

In this embodiment, in cases where the plurality of individual sets of user preference information **130**(**1**), **130**(**2**), ..., **130**(n) need to be identified, the description **130**(**1**)-**3** describes the application/adoption conditions associated with each user preference information **130** contained in the user preference information **130**. When a multiple user preference information set is constructed by using the description **130**(**1**)-**3**, the user may select a desired individual set of user preference information to use, or the desired set of user preference information may be selected automatically, based on the description.

In this embodiment, since each individual set of user preference information may include a plurality of categories of user preference information, a hierarchical tree structure is formed between the user preference category items and each user preference category item is associated with a user preference/non-preference value. In this embodiment, the user preference/non-preference value may be expressed by values representing steps between **1** (the maximum non-preference) and **10** (the maximum user preference) or may be expressed by a binary value, for example. The user preference/non-preference value may be expressed by a value that accumulates the number of uses of information corresponding to each item.

Figure **3** shows multiple structures of user preference category items of the individual user preference information structures shown in Figure **2** in accordance with one embodiment of the present invention, in which the user preference items are arranged in multiple structures respectively associated with an environment or a condition of a client system/device used by a user, for example.

For example, the embodiment may provide a user information preference for use at home (e.g., a set of user preference information **130**(1)), a user preference in use at a work place (e.g., a set of user preference information **130**(k)) and a user preference for information to use at a different environment or condition (e.g., 130(n)) may each be set differently. In addition, as shown in Figure **3**, under the individual set of user preference information **130**(1), a lower level of user preference category items (**1-1**, **1-2**, **1-3**,...) may be arranged, and under the user preference category items (**1-1**, **1-2**, **1-3**,...), a yet lower level of user preference category items (**2-1**, **2-2**, **2-3**, ...) may be arranged.

Figure **4** is a detailed view showing a hierarchical structure of the user preference category items shown in Figure **2** in accordance with one embodiment of the present invention.

An entertainment item **130(1)-11** may be classified into items of music **130(1)-111**, movie **130(1)-112**, drama, a game show, a talk show, sports, a variety show and a concert, for example.

The music item **130(1)-111** may be classified into items of classic **130(1)-1111** and pop music **130(1)-1112**, for example.

The movie item **130(1)-112** can be classified into items of an action **130(1)-1121**, an adventure **130(1)-1122**, a comedy **130(1)-1123**, a horror **130(1)-1124**, a documentary, a drama, a scientific fiction, and children's movie, for example.

The pop music item **130(1)-1112** can be classified into items of rock music, ballad, heavy metal, dance music, new age, rhythm & blues, jazz, trot, and country western, for example.

Like the classification of the entertainment item **130(1)-11**, a news item **130(1)-12** can be classified into items of politics **130(1)-121** and sports **130(1)-122**, etc.

Figure **5** illustrates a hierarchical structure of a user preference according to a client device used by a user to receive multimedia information, in accordance with an embodiment of the present invention.

As shown in the drawing, in an apparatus for providing only movie or for providing only music, an overall structure **200** can be divided into sub-structures (**200-1**, **200-2** and **200-3**), based on which each individual set of user preference information (item **1-1**, item **1-2**, item **1-3**) may be set and managed.

In this respect, the individual sets of user preference information (item **1-1**, item **1-2**, item **1-3**) can be classified and managed by using a description.

Figures **6** through **10** illustrate tables representing the individual sets of user preference information of Figure **2**. The hierarchical structure of Figure **2** can be represented in various ways.

Figure **6** is a table showing the hierarchical structure of Figure **2** being represented in a data structure by using a self-identifier of a user preference category item and an upper level item identifier of a higher level user preference category item in accordance with an embodiment of the present invention;

The structure shown in Figure **6** has an advantage in that a hierarchical structure can be expressed in a data structure having a predetermined format regardless of the levels/stages present in the hierarchical structure.

Figure **7** is a table showing the hierarchical structure of Figure **2** being represented in a data structure by using a coding scheme of the item identifier of Figure **6** in accordance with an embodiment of the present invention.

The method illustrated by Figure **7** is effective when the highest level number is predetermined in a multi-level hierarchical structure. Especially, in this method, the time to access the upper level items and the lower level items in the data structure is short and relatively less memory storage space is required for the data structure.

The item identifier can be divided into as many fields as the number of levels(e.g., **4** levels) in the hierarchical structure, each field having a certain number of bits and/or bytes (e.g., **2** bytes), and each field can represent item

identifiers (e.g., **1**st **2**bytes, **2**nd bytes, **3**rd bytes, **4**th bytes) corresponding to each level of the hierarchical structure.

For example, in a case in which **8** bytes of an item identifier are divided into **4** fields of **2** bytes each, the first field has the uppermost level item identifier and the next field has an item identifier of the next level or stage. In the **4**-stage hierarchical structure, a lowest-level item has an item identifier in which none of the **4** fields are '**0**'.

In this embodiment, in the case where the **4**th field is changed to '**0**', the next-higher level field becomes an item identifier, while in the case where the **3**rd and **4**th field are all changed to '**0**', the **2**nd field becomes an item identifier.

For example, in the user preference category item, the item identifier of the 'new age' item is **1-17-181-205**, and thus the 'new age' item identifier signifies that it belongs to the 'pop music' item having **1-17-181-0** as an item identifier.

To take another example, the user preference category item 'pop music', having the item identifier of **1-17-181-0**, belongs to the item 'music' having an item identifier of **1-17-0-0**, and the item 'music', having the item identifier of **1-17-0-0**, belongs to the item 'entertainment', having an item identifier of **1-0-0-0**.

Moreover, the item 'entertainment' having the identifier of **1-0-0-0** includes items of every item identifier having the form of **1-*-*-***. In particular, the item 'entertainment' includes every item having a form of **1-*-0-0** as items at the next lowest level of the hierarchical structure.

In this method, the identifier of each item is dependent on the identifier of an upper level item, and items are differentiated by changing an identifier belonging to a field.

In this embodiment, each field may start from '**0**' and a single field may be expressed by **2** bytes, so that a single item can be associated with **65,535** lower level items.

Figure **8** is a table showing the hierarchical structure of Figure **2** being represented in a data structure by using a lowermost user preference in accordance with an embodiment of the present invention.

The method as shown in the drawing is advantageous in that since upper level items of the hierarchical structure and the corresponding user preference values can all be extracted from the data structure by using only the related information of the lowermost level item in the hierarchical structure, the user preference value of the upper level items can be calculated by a computer processor on a real time basis, and even if the user preference values of the upper level items are not stored in memory, there is no information loss. In other words, this method does not require much memory.

In addition to the above-mentioned method for structuring the individual sets of user preference information by using the coding scheme mentioned above, the individual sets of user preference information can also be structured by using the alternative coding scheme illustrated in Figure **8** with the same effect.

Figure **9** is a table showing a hierarchical structure of Figure **1** being represented by using an item dictionary stored in memory in accordance with an embodiment of the present invention.

With reference to Figure **9**, in this embodiment, items are defined by item identifiers to thereby generate an item dictionary, and a structural relationship established between the upper level items and the lower level items of the hierarchical structure is searched by a computer processor by using the item identifiers defined in the item dictionary stored in memory.

Although the method in which the hierarchical structure is expressed by using the item dictionary requires that the item dictionary is to be always referred to in order to confirm that the hierarchical structural relationship between the user preference category items are defined in the item dictionary, the method is advantageous in that it needs the smallest memory storage space and, in addition, an item is easily added or deleted.

Meanwhile, with reference to Figures **6** through **9**, in association with the various methods for representing the user preference information, a method for editing the user preference information after inputting it may involve a user inputting type, an automatically updating type or a mixed type.

The user inputting type relates to a method for editing user preference information wherein as the user uses certain information, a user preference/non-preference for the information used by the user is received through a dialog box of the client device, thereby updating a user preference value.

The automatically updating type relates to a method for editing user preference information wherein as the user uses certain information, user preference values are automatically updated in relation to user preference category items corresponding to the information used by the user in accordance with a predetermined standard. Information about the user's use of the certain information may be stored in an information use record, associated with the user, in memory.

The mixed type relates to a method mixing the user inputting type and the automatically updating type in which the information inputted by the user has a certain weight value, based on which a user preference is updated.

After the user preference/non-preference is edited through the above methods, in order for the information provider's server system to search for information desired by the user, or recommend and provide information to the user, there are two methods used in this embodiment. One method is that each user preference/non-preference is directly compared by user preference category items to use. Another method is that a standardized user preference/non-preference is used.

In order to automatically edit the user preference/non-preference on the basis of the information use record of the user, there is a method of processing in which items from the uppermost level item to the lowermost level item are all increased by the computer processor according to the classification of each use recorded in the information use record.

Moreover, if the set of user preference information is edited in the user preference item dictionary, for example, the user preferences related to the upper level items, such as 'entertainment', 'music', 'pop music', 'person', 'woman singer', to which items such as a woman singer 'C' and 'new age' belong, can be also updated together by the processor by using only the user preference category item information associated with the woman singer 'C' item and the 'new age' item.

Figure **10** is a table showing dictionary items for the user preference category items in accordance with one embodiment of the present invention.

With reference to Figure **10**, each user preference information set is represented by a plurality of individual sets of user preference information having user preference/non-preference value by items and including a description representing an adoption condition associated with each individual set of user preference information, for the whole, or part of, the item dictionary. In this manner, the hierarchical structure of the plurality of user preference category items is constructed, edited and managed.

In this embodiment, the record of the item dictionary includes a user preference category item identifier, a user preference category item, a level and a higher level item identifier.

The user preference category item identifier identifies each user preference category item, and the user preference category item indicates the content of the information to be provided to the user.

The level indicates the position of each user preference category item in terms of levels down from the upper position in the hierarchical structure. The uppermost level is '**0**'.

The higher level item identifier indicates which higher level user preference category item each user preference category item belongs to. In a tree structure, the higher level item identifier identifies a higher level user preference category item to which its corresponding user preference category item belongs.

The item dictionary may be produced and managed by an information provider server system, and may be stored in a storage unit of the server system operated by the information provider and/or in a storage unit of the client device operated by the user. As is known in the art, these storage units may include a memory, hard drive or other analogous computer-readable medium, for example.

In this embodiment, if the storage unit of the user's client device includes the item dictionary, the item dictionary existing in the storage unit of the user includes the same content as that stored in the storage system of the information provider. If the content of the item dictionary of the information provider is changed, the item dictionary of the user is updated accordingly.

For example, if the user 'A' prefers a piece of music 'S' of a woman singer 'C' and the piece 'S' is included in the 'new age' category, the user 'A' preference information related to the woman singer 'C' can be constructed as shown in Figures **6** through **9**.

Figures **11**A and **11**B illustrate a configuration of user preferences in a case where the information of the hierarchical data structure is edited. Figure **11**A illustrates the configuration before the information of the hierarchical data structure is edited and Figure **11**B illustrates the configuration after the information of the hierarchical data structure is edited.

For example, when the piece 'S' was initially registered in the user preference information, there may not have been music genre category of 'new age', and so the piece 'S' may have been classified by the hierarchy structure 'music>pop music>ballad **130**(**1**)-**111**M'.

However, as pop music of the category 'new age' **130**(**1**)-**111**N appears as a new type of music genre in music circles, when the piece 'S' is removed from the 'ballad' category to be classified into the 'new age' category, the user preference can be automatically updated in the user's information use record.

In particular, when the piece 'S' is first classified, the user reduces the user preference value for the piece 'S' in proportion to the number of uses

associated with the item 'music>pop music>ballad' and correspondingly increases the user preference value of the item 'music>pop music>new age', as newly classified.

Similarly, when pieces of music for which classification has been changed are processed by the processor, a user preference associated with the item 'music>pop music>new age', when newly registered may be automatically created on the basis of the existing information use record, without the user's involvement. In this embodiment, the information use record includes information regarding the number of uses of the information or information making it possible to compute the number of uses.

Figures **12**A and **12**B show an example in one embodiment where the classification for certain items registered in the item dictionary is changed. Figure **12**A is a table showing an item dictionary before it is changed and Figure **12**B is a table showing the item dictionary after it is changed.

The lower level items belonging to the items of pop music and classical music are automatically changed under the direction of the processor from the lower level items of 'entertainment>music>pop music> and 'entertainment>music>classical' to the lower level items of 'art>auditory art>pop music' and 'art>auditory art>classical'.

The method of changing the item dictionary may involve the processor performing additional arithmetic operations. For example, in cases where each item includes all of the item identifiers of the upper level, the item identifiers can be changed.

As stated above, in the case where classification/categorization of these user preference category items is changed, the user preference corresponding to the entertainment item and the music item, (i.e., the higher level items of the pop music item and the classical item) in the preference information by users is reduced by the processor in proportion to the user preference generated due to the pop music item and the classical item, whereas the user preference of the newly classified items of 'art' and 'auditory art' is proportionally increased.

In addition, in the case where the user uses the client device to request the server of the information provider to recommend new information or is connected with the server of the information provider by using the user preference information and the use record, the information provider server can recommend information that may be highly preferred by the user.

In the method for changing or editing the multiple hierarchical data structure, the user preference/non-preference of items may be changed by using a user interface of the user's client computer system, for example.

As described above, in accordance with the user preference information data structure having a multiple hierarchical structure and a method of providing multi-media information using the same, the particular hierarchical data structure that stores user preferences for information desired by the user, is chosen depending on the environment, based on which information is then provided by the information provider's server to the user's client device.

The hierarchical data structure representing the user preferences makes it possible for the user to receive information fitting his or her situation by using the appropriate individual set of user preference information, automatically, or according to the user's selection through a user interface of the client device.

In addition, since the user preference category items have a hierarchical structure, various levels of user preference category items can be defined. And, in the case where the upper level of user preference category items, rather than the lowermost level of user preference category items, are selected by the user, detailed information can be provided to the user by using their lower level of user preference for the information belonging to the selected item classification. Also, the user preference of the upper level of user preference category items can be reconstructed by the processor by using the user preference of the lower level of user preference category items.

In connection with the foregoing, various embodiments of the invention will be apparent. Some embodiments may include a user information data structure having a multiple (multi-level) hierarchical structure to be used in providing multi-media information to a user according to user preferences, in a multi-media environment involving information providers and information users, the data structure comprising personal information to identify each user, user preference information of the identified user, and one or more sets of user preference information, each of which may be set differently depending on the user's situation such as different location, and which may be located as a sub-tree of the user preference information.

The personal information may include a unique identifier which can be used to identify the user.

The user information data structure may further include one or more history records recording multimedia information usage by the user.

The history record may include a list of information or information identifying when and how the multimedia information is used.

The history record may include a condition of history collection for each history record.

The condition of history collection may include a location of the history collection and/ or a time of the history collection.

The user information data structure may further include authorization information to identify information that the user can access.

A set of user preference information item may include a user preference category item and a value representing preference/non-preference information.

A set of user preference information may further include a description information item describing the user preference category item.

A user preference category item may include a description of the item that can be used as a condition of using the set of user preference information for searching or filtering of multi-media information.

A set of user preference information may have a hierarchical

relationship.

A user preference category item may have a hierarchical relationship.

The hierarchical relationships may comprise hierarchical tree structures.

A set of user preference information may be set differently depending on the user's selection or the user's client device.

A set of user preference information may have a hierarchical structure which is represented by the identifier of the user preference category item located in higher nodes of the tree structure.

A set of user preference information may have a hierarchical structure which is represented by the identifier of the user preference category item coded by a special coding scheme to represent a tree structure.

A set of user preference information may have a hierarchical structure which is represented by an external item dictionary.

The hierarchical structure may be represented by a coding scheme, wherein only the set of user preference information items located as the leaf nodes of the hierarchical tree structure are stored, and the set of user preference information items located at non-leaf nodes of the hierarchical tree structure are extracted based on the relationship among the leaf nodes and upper nodes items.

Embodiments of the invention may provide a method for providing multi-media information to the information consumer using a data structure containing user information with multiple hierarchical structure, in a multimedia information environment where information providers provide desired information to information consumers. The method may involve establishing multiple multi-level hierarchical structures of set of user preference information distinguished by each user and each search item, searching desired information based on the preference item with preference/non-preference information by each user and each search item, and providing retrieved information according to the user preference information.

When providing the retrieved information, retrieval of new information

may be notified to the user, or information expected to be preferred by the user may be recommended to the user, or information expected not to be preferred by the user may be limited in terms of its accessibility, in accordance with the set of user preference information.

Embodiments of the invention may also provide a method of providing desired multimedia information to a information user, involving establishing a multiple hierarchical structure having a set of user preference information for each user or each group of users, and changing the hierarchical structure of the set of user preference information.

Changing the hierarchical structure of the set of user preference information may include registration of new user preference category items, deletion of existing user preference category items, or changing the parent node of a sub-tree of a set of user preference information.

Changing the hierarchical structure may include changing the preference/non-preference value of a user preference category item and changing the preference/non-preference value of a user preference category item located in the ancestor nodes of the changed preference item, based on the usage history.

When changing the hierarchical structure of the set of user preference information, the preference/non-preference value may be changed using a user interface of a client device operated by the user.

In one embodiment, there is provided a user preference information data structure having a multiple level hierarchical structure by means of which information is provided to a user according to user preferences in a multi-media environment comprising an information provider server device and an information user client device, wherein the data structure may include user use information indicating information used by the user, user preference information indicating information desired by the user, and a set of user preference information that may be set differently depending on the situations in which the user is put, the set of user preference information being positioned in a sub-tree of the user preference information. The hierarchical

data structure may be used to provide information desired by the user depending on the user's environment or situation. The hierarchical data structure constructing the user preference may enable the user to receive information fitting his or her situation by using the appropriate set of user preference information, automatically, or according to the user's selection.

While specific embodiments of the invention have been described and illustrated, such embodiments should be considered illustrative of the invention only and not as limiting the invention as construed in accordance with the accompanying claims.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A computer-implemented method of providing multimedia information to a user in accordance with user preferences pertaining to consumption of multimedia content, the method comprising:

storing, in memory, personal information to identify a user of multimedia content, and at least one set of user preference information associated with the identified user, each of said at least one set of user preference information including:

a hierarchical structure of a plurality of user preference categories of multimedia content preferred by the user; preference values defining relative user preferences for respective said user preference categories; and a condition description describing a condition that must be satisfied by a client device in order for the set of user preference information associated with the condition description, to be used to provide user-preferred multimedia content to said client device; and

causing an information provider server to provide multimedia content to a first client device associated with the user, in accordance with a first set of user preference information from among said at least one set of user preference information, in response to the condition associated with said first set of preference information being satisfied by said first client device.

2. The method of claim **1** wherein storing the at least one set of user preference information comprises storing a plurality of sets of user preference information associated with the identified user.

3. The method of claim **2** wherein each of said plurality of sets of user preference information has preference values associated with a respective user situation.

4. The method of claim **2** wherein a condition description corresponding to said first set of user preferences, specifies that a user client device must be associated with a specific client device identifier as the condition associated with said first set of user preferences, said first set of user preferences being associated with said specific client device identifier;

wherein causing said information provider server to provide multimedia content comprises causing said information provider server to provide multimedia content in accordance with said first set of user preferences in response to said user client device having said specific client device identifier.

5. The method of claim **2** wherein at least one of said plurality of sets of user preference information has preference values associated with a location of a client device used by the user to receive multimedia information.

6. The method of claim **2** wherein a particular one of said plurality of sets of user preference information is used in response to a user selection made from a client device.

7. The method of claim **1** further comprising storing authorization information to identify multimedia information that the user is authorized to access.

8. The method of claim **1** wherein storing personal information includes storing a unique identifier to identify said user.

9. The method of claim **1** wherein said hierarchical structure further comprises a plurality of description fields, each associated with a respective

user preference category, for holding information describing said respective user preference categories.

10. The method of claim **1** further comprising filtering multimedia content to be provided, in response to a set of preference values.

11. The method of claim **1** further comprising searching for multimedia content to be provided, in response to a set of preference values.

12. The method of claim **1** wherein said hierarchical structure comprises a hierarchical tree structure.

13. The method of claim **12** wherein said hierarchical tree structure comprises first and second sub-trees, said first sub-tree comprising a first root node and a first non-root node, said second sub-tree comprising a second root node and a second non-root node, said first root node representing a first type of multimedia, said second root node representing a second type of multimedia, said first non-root node representing a first user preference category and being associated with a first preference value, said second non-root node representing said first user preference category and being associated with a second preference value, different from said first preference value.

14. The method of claim **13** wherein causing said information provider server to provide multimedia content comprises:

causing said information provider server to recommend, provide or limit an item of multimedia content associated with said first user preference category, in accordance with said first preference value if said item of multimedia content corresponds to said first type of multimedia; and

causing said information provider server to recommend, provide or limit said item of multimedia content in accordance with said second preference value if said item of multimedia content corresponds to said second type of multimedia.

15. The method of claim **12** wherein said hierarchical structure is represented by an external item dictionary.

16. The method of claim **12** further comprising extracting preference information located at non-leaf nodes of said at least one set of user preference information, according to relationships among leaf nodes and non-leaf nodes in said hierarchical tree structure.

17. The method of claim **1** wherein causing an information provider server to provide multimedia content further comprises causing said server to signal the user of new information retrieved.

18. The method of claim **1** wherein causing an information provider server to provide multimedia content further comprises causing said server to notify the user of information expected to be preferred by the user according to said at least one set of user preference information.

19. The method of claim **1** wherein causing an information provider server to provide multimedia content further comprises causing said server to limit access to information expected not to be preferred by the user according to said at least one set of user preference information.

20. The method of claim **12** further comprising registering a new user preference category in said hierarchical tree structure.

21. The method of claim **12** further comprising deleting an existing user preference category in said hierarchical tree structure.

22. The method of claim **1** further comprising storing multimedia content usage history information.

23. The method of claim **22** further comprising modifying at least some preference values in response to said multimedia content usage history information.

24. The method of claim **23** further comprising storing a timestamp representing a time at which a user caused multimedia content to be used.

25. The method of claim **23** further comprising storing information about a user action indicating how multimedia content is to be used.

26. The method of claim **23** further comprising changing said preference values according to said usage history information.

27. The method of claim **1** further comprising storing an updating type item for indicating whether or not said at least one set of user preference information is automatically updated.

28. The method of claim **1** further comprising changing said preference values in response to input received through a user interface of said first client device.

29. The method of claim **1** wherein at least one condition description in said at least one set of user preference information, specifies a client device used by the user to receive multimedia content.

30. The method of claim **1** wherein at least one condition description in said at least one set of user preference information, specifies a location of a client device used by the user to receive multimedia content.

31. An apparatus for providing multimedia information to a user in accordance with user preferences pertaining to consumption of multimedia content, comprising a processor and a memory having program instructions for configuring the processor to execute the method of any one of claims **1** to **30**.

32. A computer-readable medium encoded with instructions for directing a processor to perform the method of any one of claims **1** to **30**.

33. A computer-readable medium storing a data structure for use in providing multimedia information to a user, the data structure representing user preferences pertaining to consumption of multimedia content, the data structure comprising:

user preference data representing (i) personal information to identify a user of multimedia information, and (ii) at least one set of user preference information associated with the identified user, each of said at least one set of user preference information including: a hierarchical structure of a plurality of user preference categories of multimedia content preferred by the user; preference values defining relative user preferences for respective said user preference categories; and a condition description describing a condition that must be satisfied by a client device in order for the set of user preference information associated with the condition description, to be used to provide user-preferred multimedia content to said client device;

said data structure being operable to be used to cause an information provider to provide user-preferred multimedia content to a first client device associated with the user, in accordance with a first set of user preference information from among said at least one set of user preference information, in response to the condition associated with

said first set of preference information being satisfied by said first client device.

34. The computer-readable medium of claim **33** wherein said data structure comprises a plurality of sets of user preference information associated with the identified user.

35. The computer-readable medium of claim **33** wherein said data structure comprises a unique identifier to identify said user.

36. The computer-readable medium of claim **33** wherein said hierarchical structure further comprises a plurality of description fields, each associated with a respective user preference category, for holding information describing said respective user preference category.

37. The computer-readable medium of claim **33** wherein said preference values are used by a processor to filter multimedia content to be provided.

38. The computer-readable medium of claim **33** wherein said preference values are used by a processor to search for multimedia content to be provided.

39. The computer-readable medium of claim **33** wherein said hierarchical structure comprises a hierarchical tree structure.

40. The computer-readable medium of claim **39** wherein said hierarchical tree structure comprises at least one sub-tree and wherein, if a user preference category is located at locations in more than one sub-tree of said at least one set of user preference information, the corresponding preference values of the user preference category at said locations are not identical.

41. The computer-readable medium of claim **33** wherein said data structure further comprises multimedia content usage history information.

42. The computer-readable medium of claim **41** wherein said data structure comprises a time representing when a user indicated that multimedia content was to be used.

43. The computer-readable medium of claim **41** wherein said data structure comprises information about a user action indicating how the user has used multimedia content.

44. The computer-readable medium of claim **33** wherein said data structure comprises an updating type item for indicating whether or not said at least one set of user preference information is automatically updated.

45. The computer-readable medium of claim **34** wherein said data structure comprises preference values associated with a client device used by the user to receive multimedia information.

46. The computer-readable medium of claim **34** wherein said data structure comprises preference values associated with a location of a client device used by the user to receive multimedia information.

47. The computer-readable medium of claim **34** wherein a particular one of said plurality of sets of user preference information is used in response to a user selection made from a client device.

48. The computer-readable medium of claim **33** wherein said data structure further comprises authorization information to identify multimedia information that the user is authorized to access.

49. The computer-readable medium of any one of claims **33** to **48** wherein the computer-readable medium comprises a memory for storing data for access by an application program being executed on a processor, said memory comprising said data structure.

50. A computer-implemented method of providing multimedia information to a user in accordance with user preferences pertaining to consumption of multimedia content, comprising:

causing an information provider server to provide multimedia content to a client device associated with the user in accordance with the plurality of preference categories represented in the data structure encoded in the computer-readable medium of any one of claims **33** to **49**.

51. A computer-implemented method for processing user preferences, the method comprising:

processing a user description including a user preference description having a hierarchical structure to describe preferences for filtering and searching, said user preference description including a condition description describing a condition that must be satisfied by a client device to cause the user preference description to be used to provide user-preferred multimedia content to said client device, the hierarchical structure including a parent preference element and one or more child preference elements of the parent preference element, each of the parent and child preference elements including at least one preference description to identify preferred multimedia content, wherein the user description specifies a user identifier that includes a name; wherein processing said user description includes causing user-preferred information to be provided to said client device in accordance with the user preference description, in response to the condition being satisfied by said client device.

52. The method of claim **51**, wherein at least one of the parent and child preference elements includes said condition description to specify a context in which the respective preference description applies.

53. The method of claim **52**, wherein the context includes a location.

54. The method of claim **51**, wherein each of the parent and child preference elements has a preference value to characterize relative desirability of multimedia content corresponding to the respective preference description.

55. The method of claim **51**, wherein processing the user description includes receiving user input specifying information for at least one of the parent and child preference elements.

56. The method of claim **51**, wherein processing the user description includes:

receiving information about consuming multimedia content; and

using the information about consuming multimedia content to generate at least one of the parent and child preference elements.

57. The method of claim **56**, wherein processing the user description includes generating a usage history based on the information about consuming multimedia content.

58. The method of claim **57**, wherein the usage history specifies a respective user action type for each event of using multimedia content.

59. The method of claim **58**, wherein at least one of the user action types indicates a user action including play, review, pause, fast forward, and stop.

60. The method of claim **57**, wherein the usage history identifies consumed multimedia content.

61. The method of claim **51**, wherein filtering multimedia content includes recommending multimedia content.

62. The method of claim **51**, wherein at least one of the parent and child preference elements includes a preference description specifying a classification attribute of multimedia content.

63. The method of claim **62**, wherein the classification attribute includes a genre of multimedia content.

64. The method of claim **51**, wherein at least one of the parent and child preference elements includes a preference description specifying an actor or a director.

65. The method of claim **51**, further comprising:

updating the user description.

66. The method of claim **51**, further comprising:

storing the user description.

67. The method of claim **51**, wherein the user identifier includes a name that identifies one or more users.

68. A system for processing user preferences, the system comprising:

a data storage device; and

data processing apparatus configured to perform operations comprising:

processing a user description including a user preference description having a hierarchical structure to describe preferences for filtering and searching, said user preference description including a condition description describing a condition that must be satisfied by said data processing apparatus to cause the user preference description to be used to provide user-preferred multimedia content to said data processing apparatus, the hierarchical structure including a parent preference element and one or more child preference elements of the parent preference element, each of the parent and child preference elements including at least one preference description to identify preferred multimedia content, wherein the user description specifies a user identifier that includes a name; and

storing the user description in the data storage device for use in causing an information provider to provide user-preferred content to the data processing apparatus in response to the condition being satisfied by the data processing apparatus.

69. The system of claim **68**, wherein at least one of the parent and child preference elements includes said condition description to specify a context in which the respective preference description applies.

70. The system of claim **68**, wherein each of the parent and child preference elements has a preference value to characterize relative desirability of multimedia content corresponding to the respective preference description.

71. The system of claim **68**, wherein processing the user description includes receiving user input specifying information for at least one of the parent and child preference elements.

72. The system of claim **68**, wherein processing the user description including the preferences for filtering and searching of multimedia content, includes:

receiving information about consuming multimedia content; and

using the information about consuming multimedia content to generate at least one of the parent and child preference elements.

73. The system of claim **72**, wherein processing the user description includes generating a usage history based on the information about consuming multimedia content.

74. The system of claim **73**, wherein the usage history specifies a respective user action type for each event of using multimedia content.

75. The system of claim **68**, wherein at least one of the parent and child preference elements includes a preference description specifying a classification attribute of multimedia content.

76. The system of claim **68**, wherein the data processing apparatus is further configured to perform operations comprising:

updating the user description.

77. A computer-readable medium for use in processing user preferences, the computer-readable medium enabling instructions to cause data processing apparatus to perform operations comprising:

processing a user description including a user preference description having a hierarchical structure to describe preferences for filtering and searching, said user preference description including a condition description

describing a condition that must be satisfied by a client device to cause the user preference description to be used to provide user-preferred multimedia content to said client device, the hierarchical structure including a parent preference element and one or more child preference elements of the parent preference element, each of the parent and child preference elements including at least one preference description to identify preferred multimedia content, wherein the user description specifies a user identifier that includes a name; wherein processing the user description further includes causing an information provider to provide user-preferred content to said client device, in response to the condition being satisfied by said client device.

78. The computer-readable medium of claim **77**, wherein at least one of the parent and child preference elements includes said condition description to specify a context in which the respective preference description applies.

79. The computer-readable medium of claim **77**, wherein each of the parent and child preference elements has a preference value to characterize relative desirability of multimedia content corresponding to the respective preference description.

80. The computer-readable medium of claim **77**, wherein processing information about preferences for filtering and searching of multimedia content includes:

receiving information about consuming multimedia content; and

using the information about consuming multimedia content to provide at least one of the parent and child preference elements.

81. The computer-readable medium of claim **80**, wherein processing the user description includes generating a usage history based on the information about consuming multimedia content.

82. A computer-implemented method for processing user preferences, the method comprising:

using a user preference description to search for or filter multimedia content, wherein the user preference description has a hierarchical structure to describe preferences for filtering and searching and includes a condition description describing a condition that must be satisfied by a client device to cause the user preference description to be used to provide preferred multimedia content to the client device, the hierarchical structure including a parent preference element and one or more child preference elements of the parent preference element, each of the parent and child preference elements including at least one preference description to identify preferred multimedia content, wherein the user preference description is associated with a user identifier that includes a name, wherein the user preference description is used to search for or filter multimedia content in response to the condition being satisfied.

83. The method of claim **82**, wherein at least one of the parent and child preference elements includes said condition description to specify a context in which the respective preference description applies.

84. The method of claim **83**, wherein the context includes a location.

85. The method of claim **82**, wherein each of the parent and child preference elements has a preference value to characterize relative desirability of multimedia content corresponding to the respective preference description.

86. The method of claim **82**, wherein filtering multimedia content includes recommending multimedia content.

87. The method of claim **82**, wherein at least one of the parent and child preference elements includes a preference description specifying a classification attribute of multimedia content.

88. The method of claim **87**, wherein the classification attribute includes a genre of multimedia content.

89. The method of claim **82**, wherein at least one of the parent and child preference elements includes a preference description specifying an actor or a director.

90. The method of claim **82**, further comprising:
updating the user preference description.

91. The method of claim **82**, further comprising:
storing the user preference description.

92. The method of claim **82**, wherein the user identifier includes a name that identifies one or more users.

93. A system for processing user preferences, the system comprising:

a data storage device to store a user preference description having a hierarchical structure to describe preferences for filtering and searching, said user preference description including a condition description describing a condition that must be satisfied by a client device to cause the user preference description to be used to provide preferred multimedia content to said client device, the hierarchical structure including a parent preference element and one or more child preference elements of the parent preference element, each of the parent and child preference elements including at least one preference description to identify preferred multimedia content, wherein

the user preference description is associated with a user identifier that includes a name; and

data processing apparatus configured to perform operations comprising:

using the user preference description to search for or filter multimedia content in response to said condition being satisfied.

94. The system of claim **93**, wherein at least one of the parent and child preference elements includes said condition description to specify a context in which the respective preference description applies.

95. The system of claim **93**, wherein each of the parent and child preference elements has a preference value to characterize relative desirability of multimedia content corresponding to the respective preference description.

96. The system of claim **93**, wherein at least one of the parent and child preference elements includes a preference description specifying a classification attribute of multimedia content.

97. The system of claim **93**, wherein the data processing apparatus is further configured to perform operations comprising:

updating the user preference description.

98. A computer-readable medium for use in processing user preferences, the computer-readable medium enabling instructions to cause data processing apparatus to perform operations comprising:

using a user preference description to search for or filter multimedia content, wherein the user preference description has a hierarchical structure

to describe preferences for filtering and searching and wherein the user preference description includes a condition description describing a condition that must be satisfied by a client device to cause the user preference description to be used to provide user-preferred multimedia content to said client device, the hierarchical structure including a parent preference element and one or more child preference elements of the parent preference element, each of the parent and child preference elements including at least one preference description to identify preferred multimedia content, wherein the user preference description is associated with a user identifier that includes a name, and wherein the user preference description is used to search for or filter multimedia content in response to the condition being satisfied.

99. The computer-readable medium of claim **98**, wherein at least one of the parent and child preference elements includes said condition description to specify a context in which the respective preference description applies.

100. The computer-readable medium of claim **98**, wherein each of the parent and child preference elements has a corresponding preference value to characterize relative desirability of multimedia content corresponding to the respective preference description.

101. A computer-implemented method of maintaining user preferences pertaining to consumption of multimedia content, for use in providing multimedia content to a user in accordance with the user's preferences, the method comprising:

storing, in memory,

(i) personal information to identify said user, and

(ii) user preference information associated with said user,

wherein said user preference information includes at least one individual user preference information, each individual user preference information including a plurality of preference items and corresponding preference values for each preference item and being associated with a condition description describing a condition that must be satisfied by a client device to cause the associated user preference information to be used to provide user-preferred multimedia content to said client device, each individual user preference information further including an updating type that indicates whether or not the user preference information is automatically updated; and

using a particular individual user preference information to obtain user-preferred content in accordance with the particular individual user preference information, in response to the condition associated with the particular individual user preference information, being satisfied.

102. The method of claim **101**, further comprising storing said preference items hierarchically.

103. The method of claim **102** wherein storing said preference items hierarchically comprises storing said preference items in a tree structure.

104. The method of any one of claims **101**, **102** or **103** further comprising causing an information provider to provide user-preferred multimedia content to the user in accordance with said user preference information.

105. A computer-implemented method of processing user preferences, the method comprising:

causing user-preferred information to be provided in response to a data structure representing a user description including a user preference description and a usage history, the user preference description having a hierarchical structure to describe preferences for filtering and searching, the hierarchical structure including a parent preference element and one or more child preference elements of the parent preference element, each of the parent and child preference elements including at least one multimedia preference description to identify preferred multimedia content, the usage history describing events of multimedia consumption and specifying a respective user action type for each of the described events of multimedia consumption.

106. A system for processing user preferences, the system comprising:

a data storage device; and

data processing apparatus configured to perform operations comprising:

causing user-preferred information to be provided in response to a user description including a user preference description and a usage history, the user preference description having a hierarchical structure to describe preferences for filtering and searching, the hierarchical structure including a parent preference element and one or more child preference elements of the parent preference element, each of the parent and child preference elements including at least one multimedia preference description to identify preferred multimedia content, the usage history describing events of multimedia consumption and specifying a respective user action type for each of the described events of multimedia consumption; and

storing the user description in the data storage device.

107. A computer-readable medium encoded with codes for processing user preferences, said codes representing instructions to cause data processing apparatus to perform operations comprising:

causing user-preferred information to be provided in response to a user description including a user preference description and a usage history, the user preference description having a hierarchical structure to describe preferences for filtering and searching, the hierarchical structure including a parent preference element and one or more child preference elements of the parent preference element, each of the parent and child preference elements including at least one multimedia preference description to identify preferred multimedia content, the usage history describing events of multimedia consumption and specifying a respective user action type for each of the described events of multimedia consumption.

FIG.1

PRIOR ART

ITEM IDENTIFIERS	PREFERENCE ITEMS	PREFERENCE VALUES
1	ENTERTAINMENT	86
17	MUSIC	43
181	POP MUSIC	27
205	NEW AGE	12
6	PERSON	97
67	FEMALE SINGERS	60
197	FEMALE SINGER "C"	19
...	...	...

FIG.2

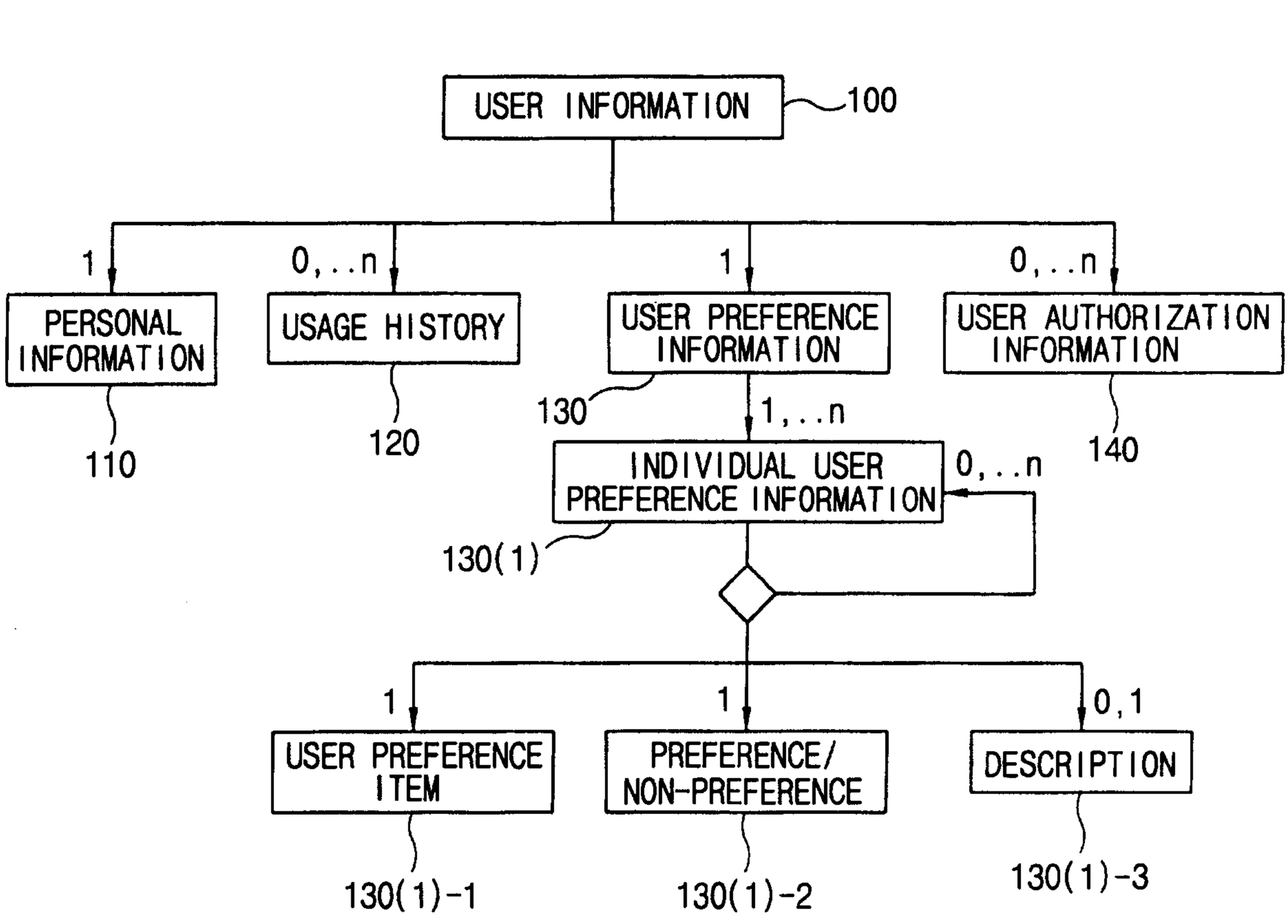


FIG.3

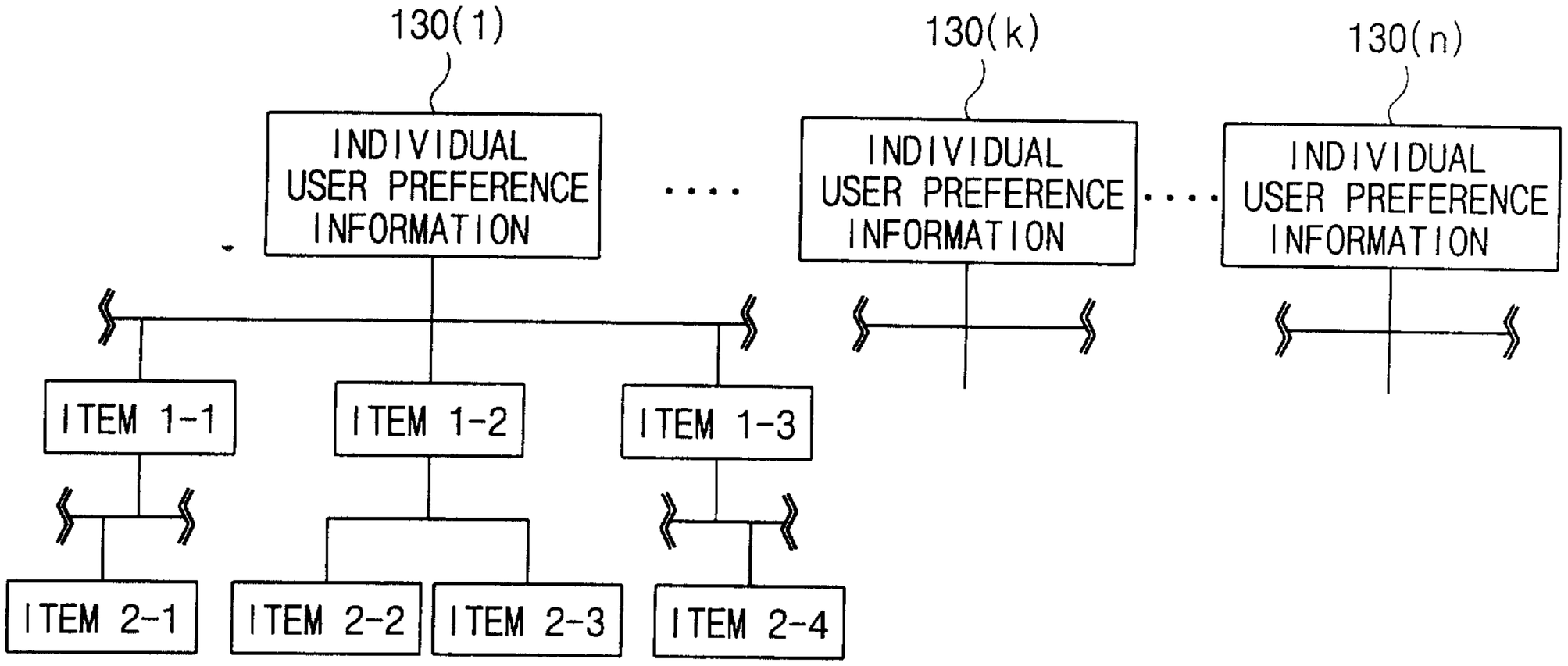

130(1)
130(k)
130(n)
INDIVIDUAL USER PREFERENCE INFORMATION
INDIVIDUAL USER PREFERENCE INFORMATION
INDIVIDUAL USER PREFERENCE INFORMATION
ITEM 1-1
ITEM 1-2
ITEM 1-3
ITEM 2-1
ITEM 2-2
ITEM 2-3
ITEM 2-4

FIG.4

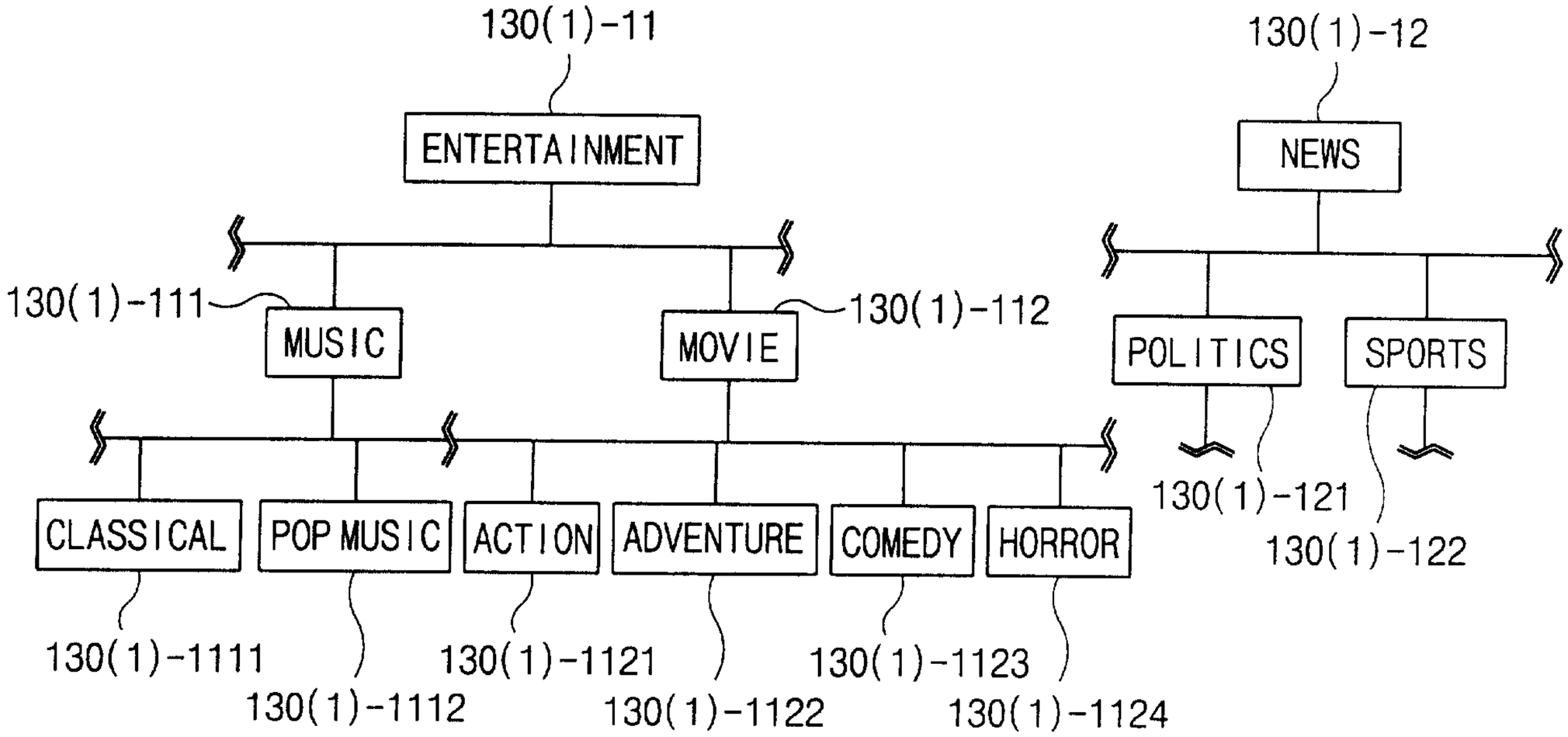

130(1)-11
ENTERTAINMENT
130(1)-12
NEWS
130(1)-111
MUSIC
MOVIE
130(1)-112
POLITICS
SPORTS
130(1)-121
130(1)-122
CLASSICAL
POP MUSIC
ACTION
ADVENTURE
COMEDY
HORROR
130(1)-1111
130(1)-1112
130(1)-1121
130(1)-1122
130(1)-1123
130(1)-1124

FIG.5

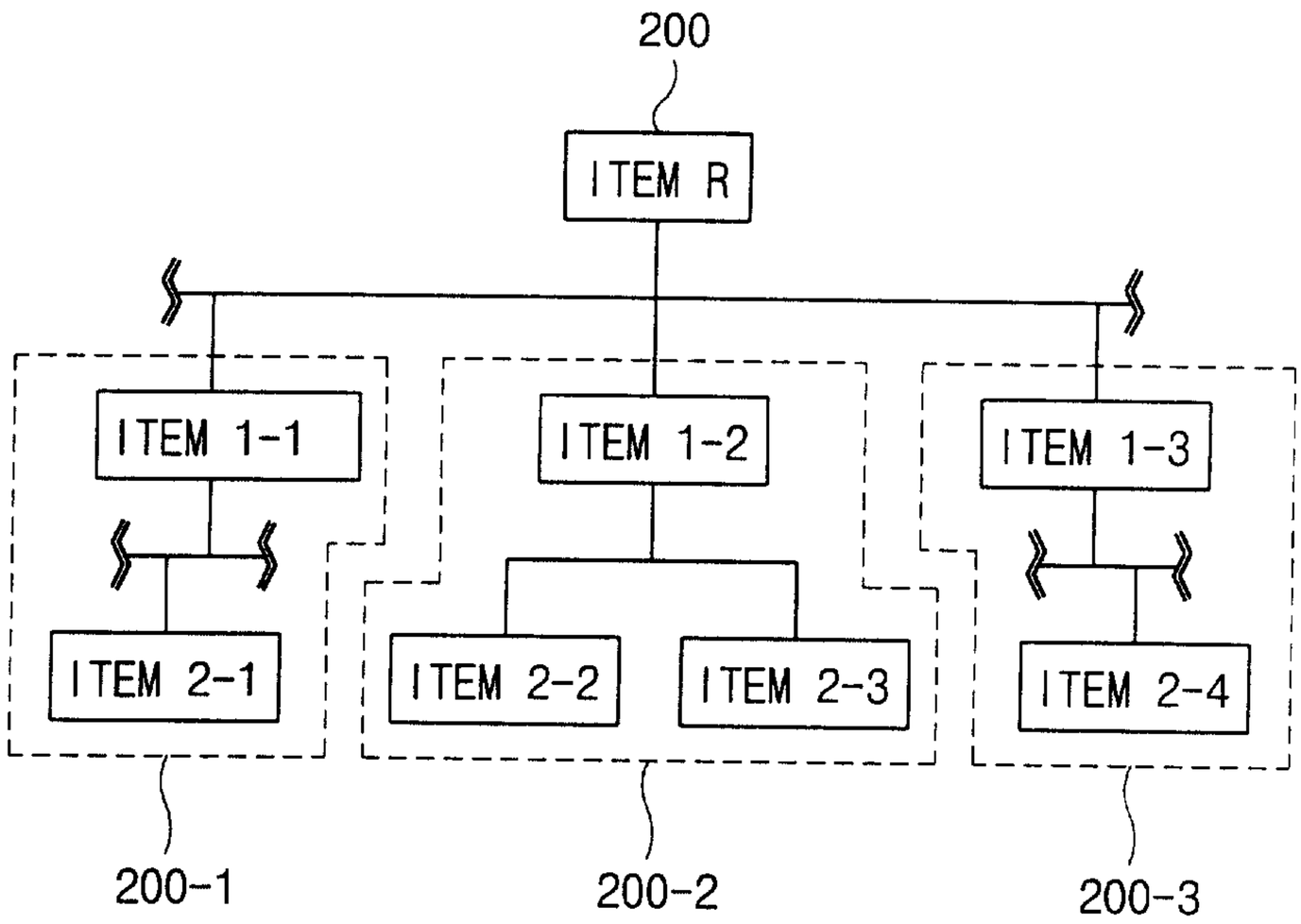


FIG.6

	SELF IDENTIFIERS	PREFERENCE ITEMS	PREFERENCE VALUES	DESCRIPTIONS
0	1	ENTERTAINMENT	86	GENERAL INFO.
1	17	MUSIC	43	GENERAL INFO.
17	181	POP MUSIC	27	GENERAL INFO.
181	205	NEW AGE	12	GENERAL INFO.
0	6	PERSON	97	GENERAL INFO.
6	67	FEMALE SINGERS	60	GENERAL INFO.
67	197	FEMALE SINGER "C"	19	GENERAL INFO.
...	...	...	...	...

FIG.7

ITEM IDENTIFIERS(8BYTES)					PREFERENCE ITEMS	PREFERENCE VALUES	DESCRIPTIONS
1ST 2BYTES	2ND 2BYTES	3RD 2BYTES	4TH 2BYTES				
1	0	0	0		ENTERTAINMENT	86	GENERAL INFO.
1	17	0	0		MUSIC	43	GENERAL INFO.
1	17	181	0		POP MUSIC	27	GENERAL INFO.
1	17	181	205		NEW AGE	12	GENERAL INFO.
6	0	0	0		PERSON	97	GENERAL INFO.
6	67	0	0		FEMALE SINGERS	60	GENERAL INFO.
6	67	197	0		FEMALE SINGER "C"	19	GENERAL INFO.
...	...	...	...		...	...	...

FIG.8

ITEM IDENTIFIERS(8BYTE)S					PREFERENCE ITEMS	PREFERENCE VALUES	DESCRIPTIONS
1ST 2BYTES	2ND 2BYTES	3RD 2BYTES	3TH 2BYTES				
1	17	181	205		NEW AGE	12	GENERAL INFO.
6	67	197	0		"C"	19	GENERAL INFO.
...	...	...	...		...	...	...

FIG.9

PREFERENCE ITEM IDENTIFIERS	PREFERENCE ITEMS	PREFERENCE VALUES	DESCRIPTIONS
1	ENTERTAINMENT	86	GENERAL INFO.
17	MUSIC	43	GENERAL INFO.
181	POP MUSIC	27	GENERAL INFO.
205	NEW AGE	12	GENERAL INFO.
6	PERSON	97	GENERAL INFO.
67	FEMALE SINGERS	60	GENERAL INFO.
197	FEMALE SINGER "C"	19	GENERAL INFO.
...	...	...	...

FIG.10

PREFERENCE ITEM IDENTIFIERS	PREFERENCE ITEMS	LEVELS	
1	ENTERTAINMENT	0	
2	INFORMATION	0	
3	NEWS	0	
4	EDUCATION	0	
5	ARTS	0	
6	PERSON	0	
...	...	...	...
11	DRAMA	1	1
12	CONCERT	1	1
13	GAME SHOW	1	1
14	VARIETY SHOW	1	1
15	TALK SHOW	1	1
16	MOVIE	1	1
17	MUSIC	1	1
18	SPORTS	1	1
19	ETC	1	1
21	SERVICE INFORMATION	1	2
22	PRODUCT INFORMATION	1	2
23	LOCAL INFORMATION	1	2
...	...	...	...
31	POLITICS	1	3
32	ECONOMICS	1	3
33	INTERNATIONAL	1	3
34	LOCAL	1	3
35	SOCIETY	1	3
36	SHOW BUSINESS/CULTURE	1	3
37	SCIENCE/TECHNOLOGY	1	3
...	...	...	...
41	VISUAL ARTS	1	5
42	AUDITORY ARTS	1	5
43	PERFORMANCE ARTS	1	5
...	...	...	...
61	ACTOR	1	6
62	ACTRESS	1	6
63	DIRECTOR	1	6
64	MALE ANCHOR	1	6
65	FEMALE ANCHOR	1	6
66	SINGER	1	6
...	...	...	...
161	ACTION	2	16

FIG.11A

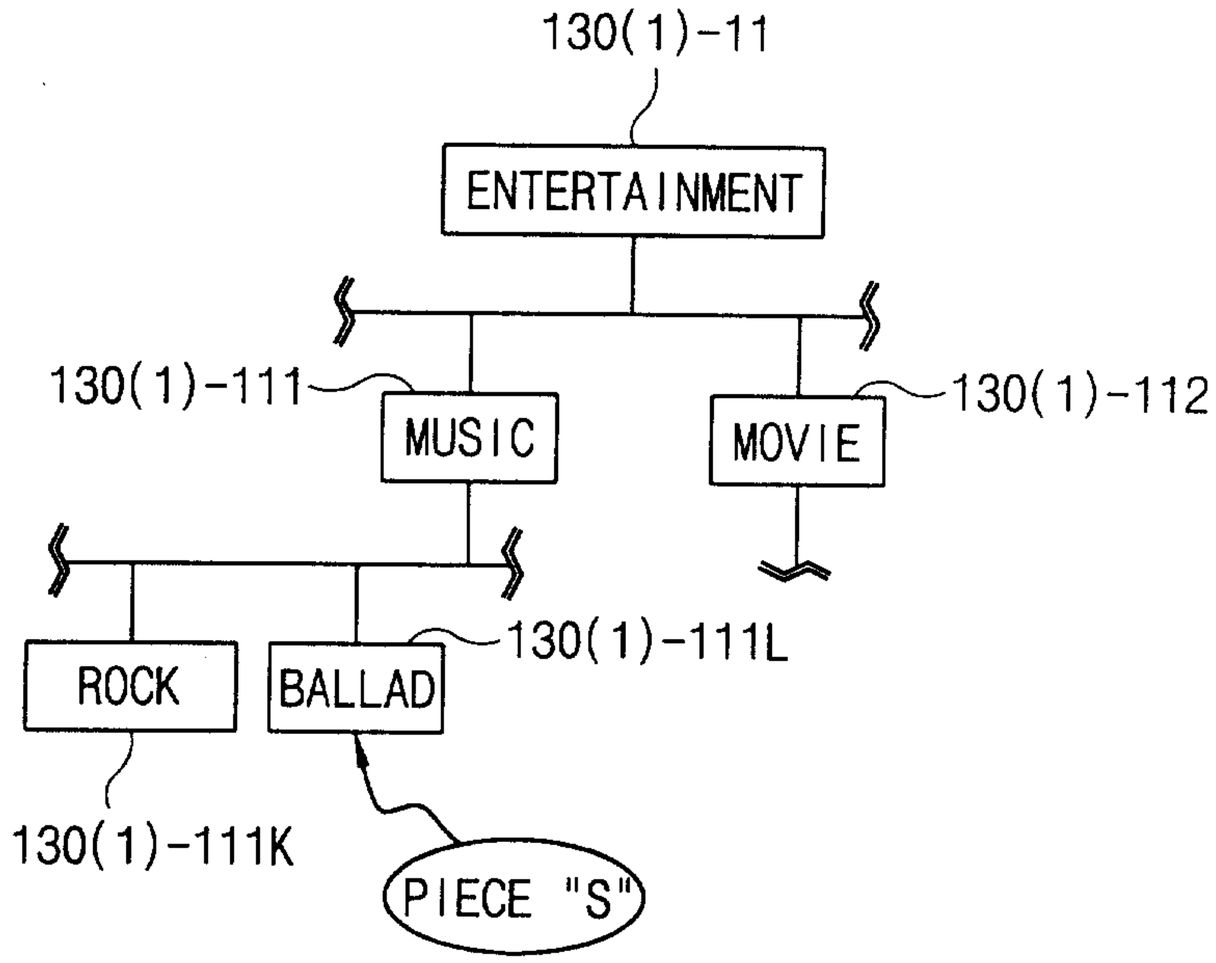


FIG.11B

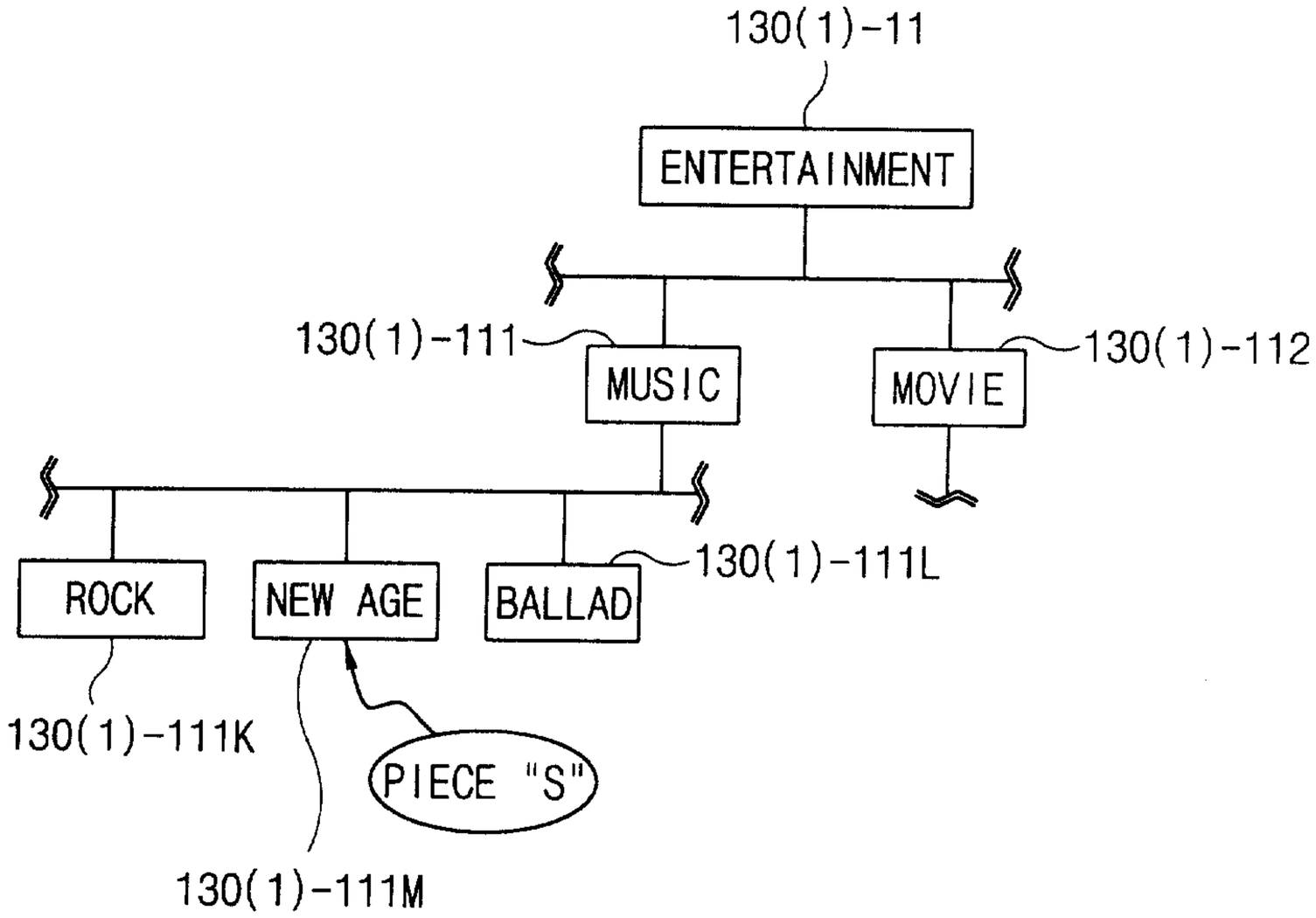
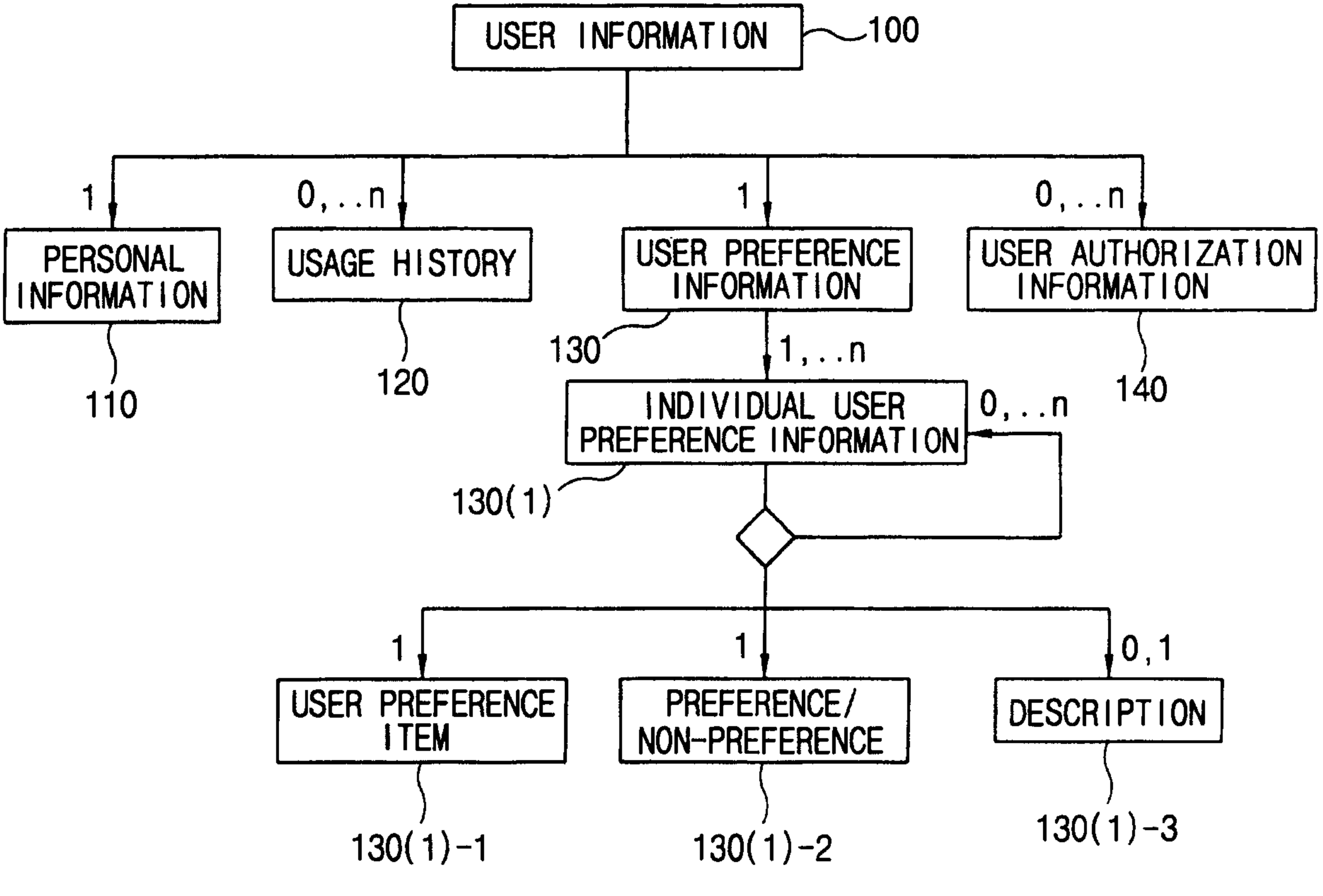


FIG.12A

PREFERENCE ITEM IDENTIFIERS	PREFERENCE ITEMS	LEVELS	
1	ENTERTAINMENT	0	
...	...	...	...
5	ARTS	0	
6	PERSON	0	
...	...	...	...
12	CONCERT	1	1
...	...	...	...
17	MUSIC	1	1
...	...	...	...
41	VISUAL ARTS	1	5
42	AUDITORY ARTS	1	5
43	PERFORMANCE ARTS	1	5
...	...	...	...
181	POP MUSIC	2	17
182	CLASSICAL	2	17
...	...	...	...
207	SAMULNORI	3	181
...	...	...	...

FIG.12B

PREFERENCE ITEM IDENTIFIERS	PREFERENCE ITEMS	LEVELS	
1	ENTERTAINMENT	0	
...	...	...	...
5	ARTS	0	
6	PERSON	0	
...	...	...	...
12	CONCERT	1	1
...	...	...	...
17	MUSIC	1	1
...	...	...	...
41	VISUAL ARTS	1	5
42	AUDITORY ARTS	1	5
43	PERFORMANCE ARTS	1	5
...	...	...	...
181	POP MUSIC	2	42
182	CLASSICAL	2	42
...	...	...	...
207	SAMULNORI	3	181
...	...	...	...


USER INFORMATION
100
1
PERSONAL INFORMATION
110
0,..n
USAGE HISTORY
120
1
USER PREFERENCE INFORMATION
130
1,..n
INDIVIDUAL USER PREFERENCE INFORMATION
0,..n
130(1)
1
USER PREFERENCE ITEM
130(1)-1
1
PREFERENCE/ NON-PREFERENCE
130(1)-2
0,1
DESCRIPTION
130(1)-3
0,..n
USER AUTHORIZATION INFORMATION
140