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Maskatia et al.

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(54) **SYSTEM AND METHOD FOR AGGREGATING RATINGS FOR MEDIA CONTENT**

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This patent is subject to a terminal disclaimer.

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H04N 21/258 (2011.01)
(Continued)

(52) **U.S. Cl.**
CPC ***G06Q 30/02*** (2013.01); ***H04N 21/25875*** (2013.01); ***H04N 21/25891*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC G06F 9/46; G06F 15/173; G06Q 99/00
(Continued)

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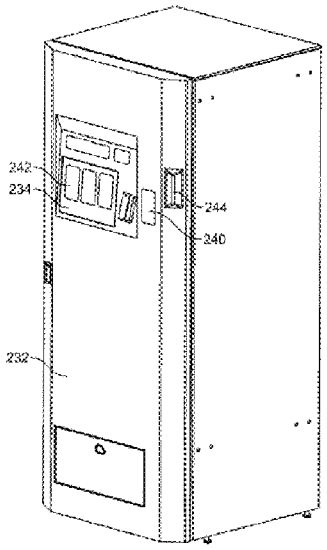
(57) **ABSTRACT**

Methods of aggregating and importing user-generated and/or professional ratings of media content are provided. User-generated ratings may have been previously created at a ratings source by a user associated with a customer profile. The method for aggregating ratings includes importing the ratings from the ratings source, storing the ratings in a customer profile, normalizing the ratings, and storing the normalized ratings. The normalized rating may be used to determine recommendations and preferences. The method for importing ratings includes receiving authentication information for a ratings source, authenticating to the ratings source, importing the ratings from the ratings source, and storing the ratings in a customer profile. Changes in the ratings may be detected and updated in the customer profile.

12 Claims, 13 Drawing Sheets



(51) **Int. Cl.**

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H04N 21/454	(2011.01)
H04N 21/462	(2011.01)
H04N 21/475	(2011.01)

(52) **U.S. Cl.**

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(58) **Field of Classification Search**

USPC 705/26.7, 347, 330; 709/224; 719/328; 714/47.1

See application file for complete search history.

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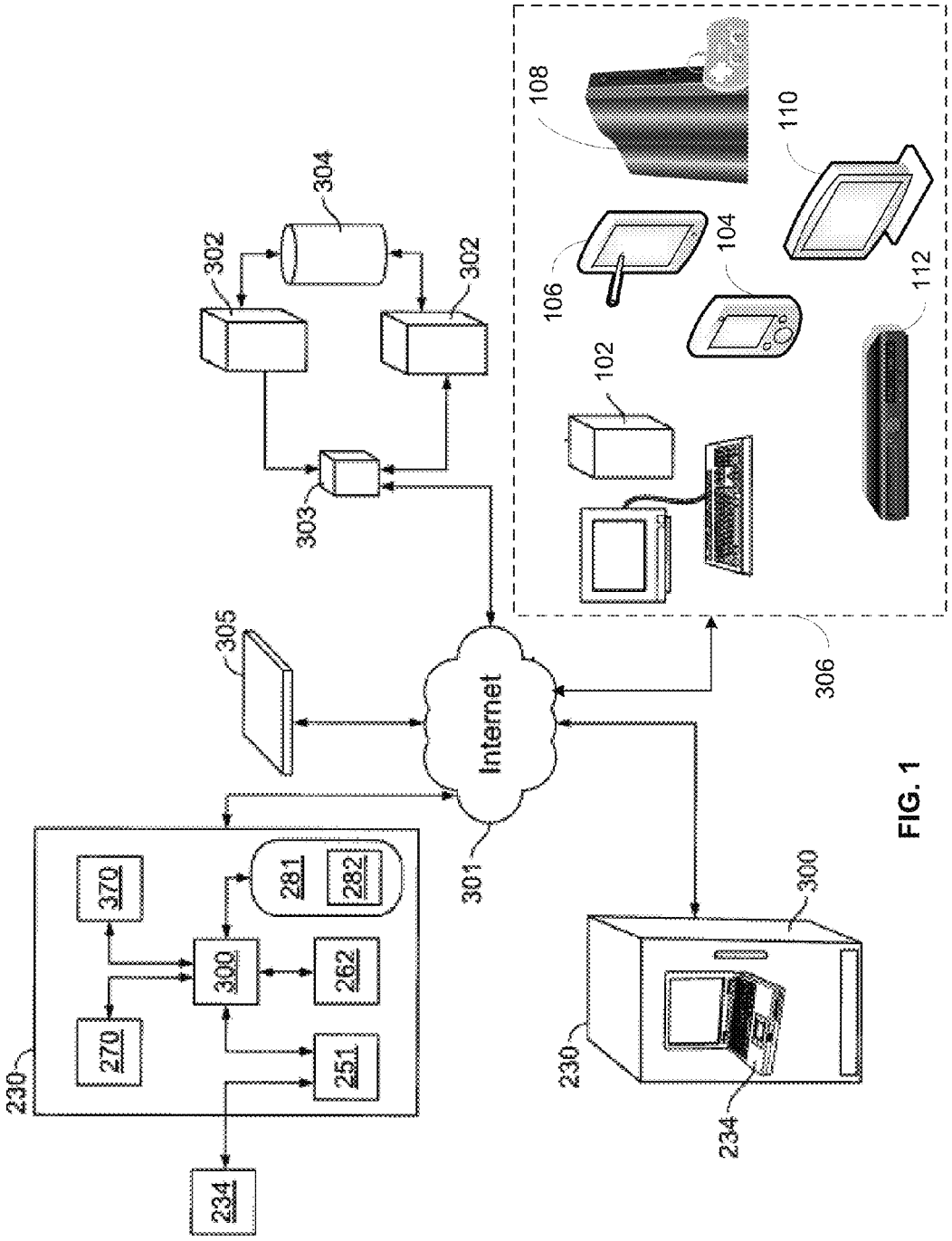
108
110
106
104
112
102
304
302
302
303
305
Internet
306
301
370
281
282
300
262
270
251
230
234
300
230
234

FIG. 1

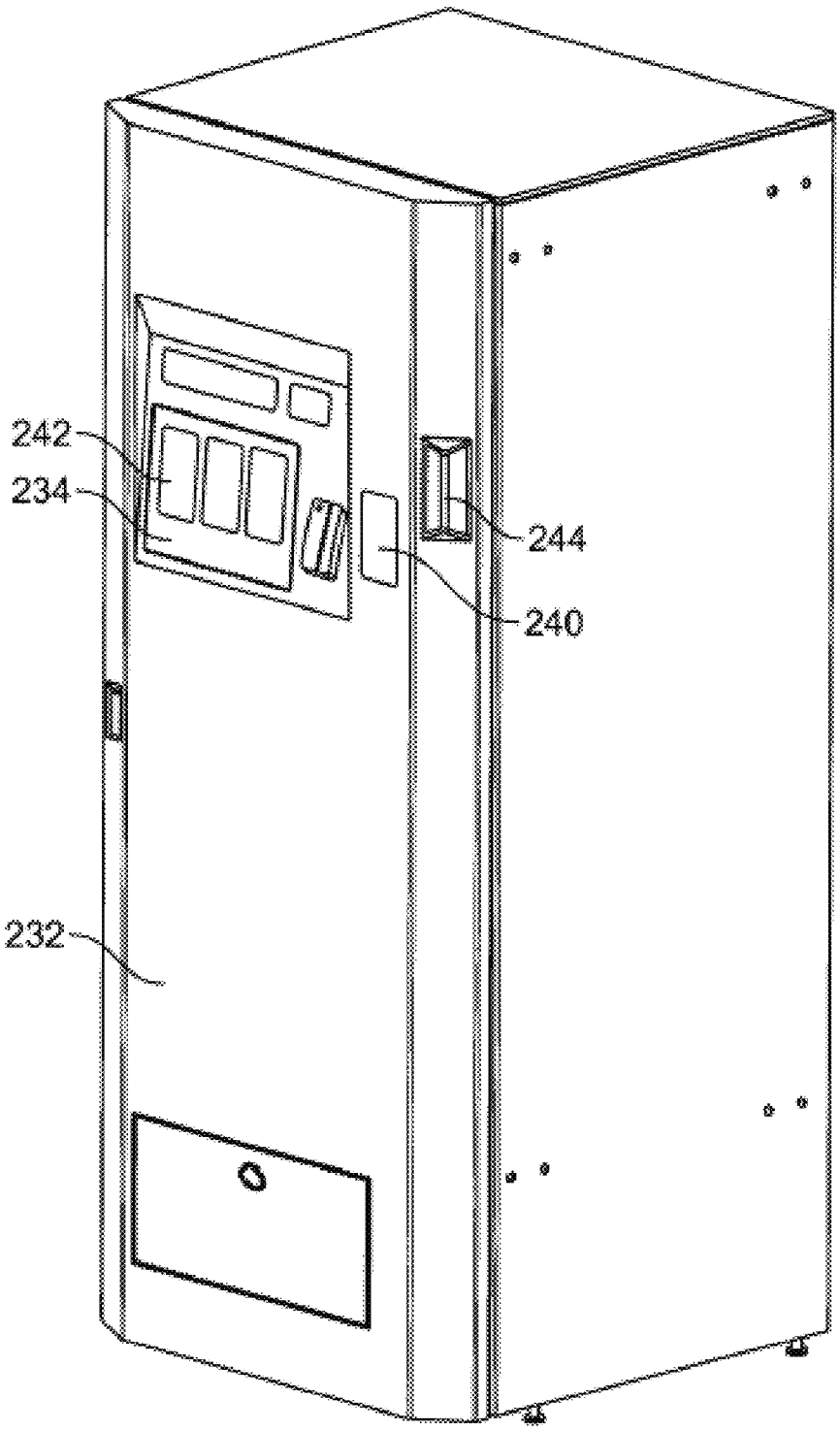

FIG. 2

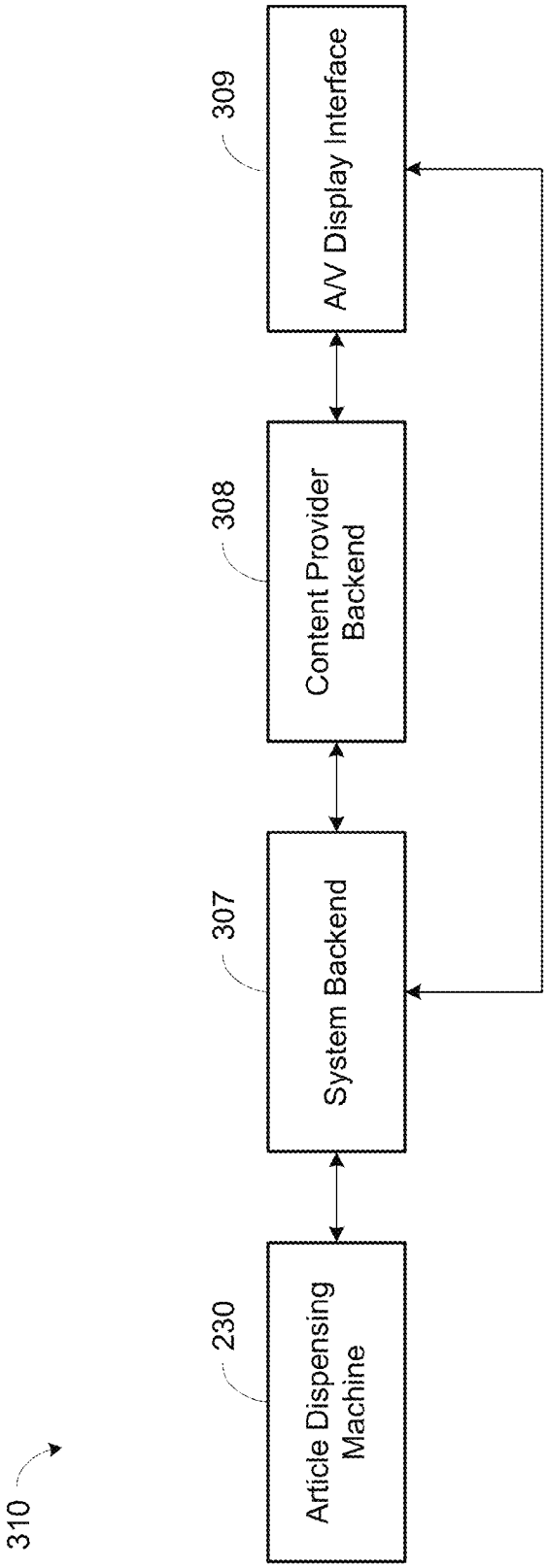
310
230
Article Dispensing Machine
307
System Backend
308
Content Provider Backend
309
A/V Display Interface

FIG. 3

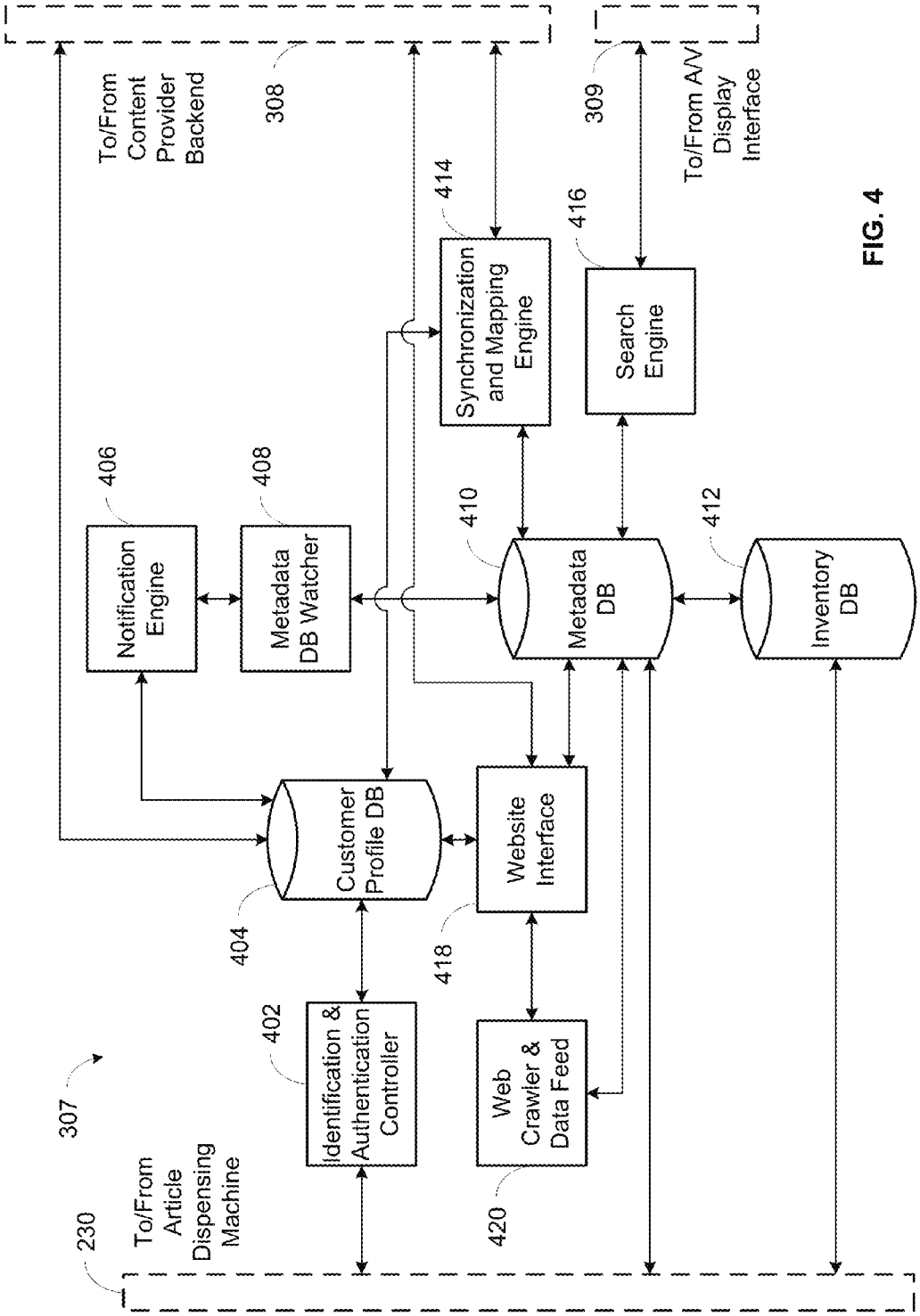
To/From Content Provider Backend
308
309
To/From A/V Display Interface
414
416
Synchronization and Mapping Engine
Search Engine
406
408
410
412
Notification Engine
Metadata DB Watcher
Metadata DB
Inventory DB
Customer Profile DB
Website Interface
404
418
402
Identification & Authentication Controller
Web Crawler & Data Feed
420
307
To/From Article Dispensing Machine
230

FIG. 4

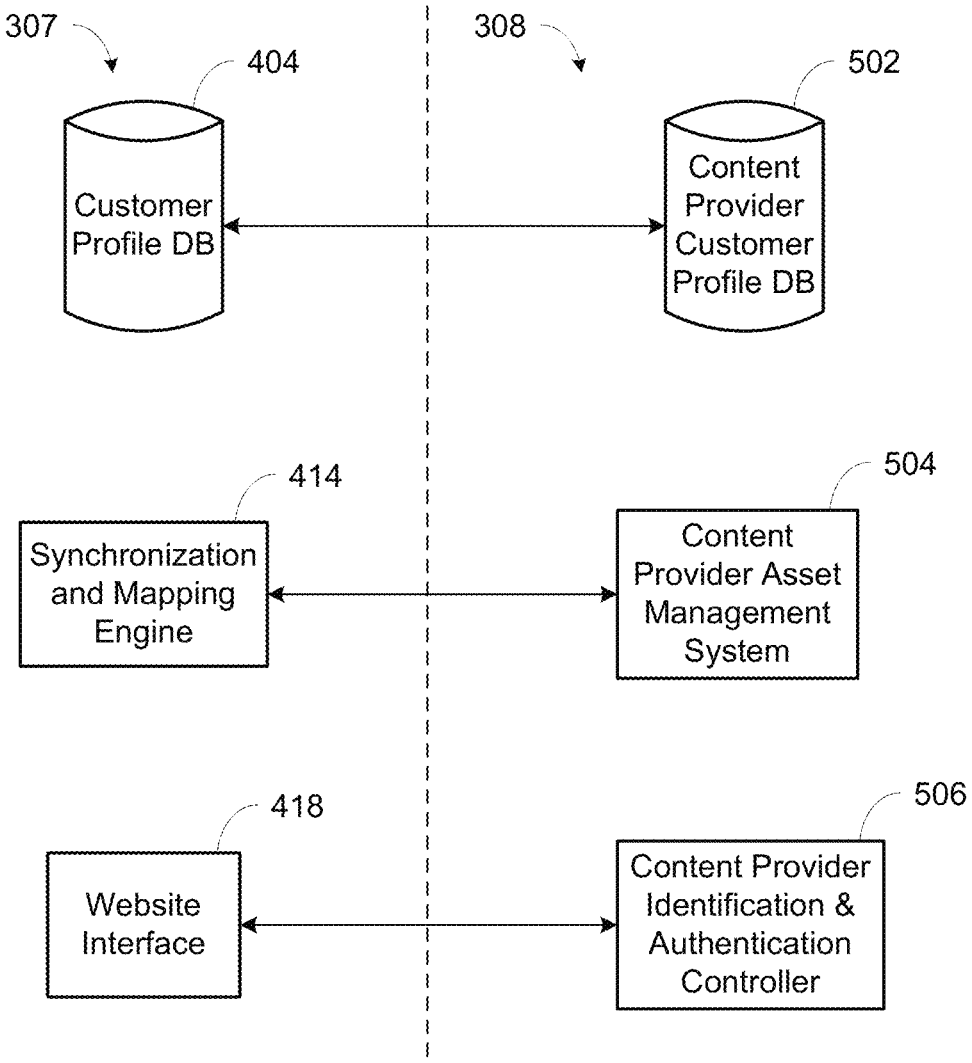
307
404
Customer Profile DB
308
502
Content Provider Customer Profile DB
414
Synchronization and Mapping Engine
504
Content Provider Asset Management System
418
Website Interface
506
Content Provider Identification & Authentication Controller

FIG. 5

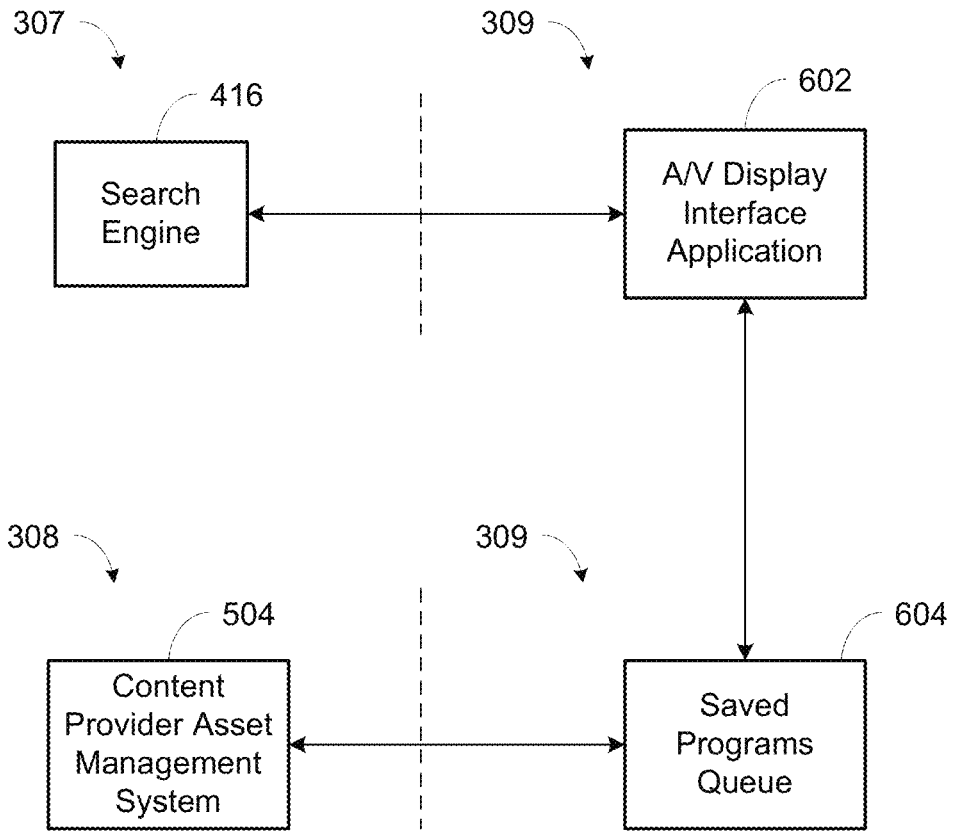
307
309
416
602
Search Engine
A/V Display Interface Application
308
309
504
604
Content Provider Asset Management System
Saved Programs Queue

FIG. 6

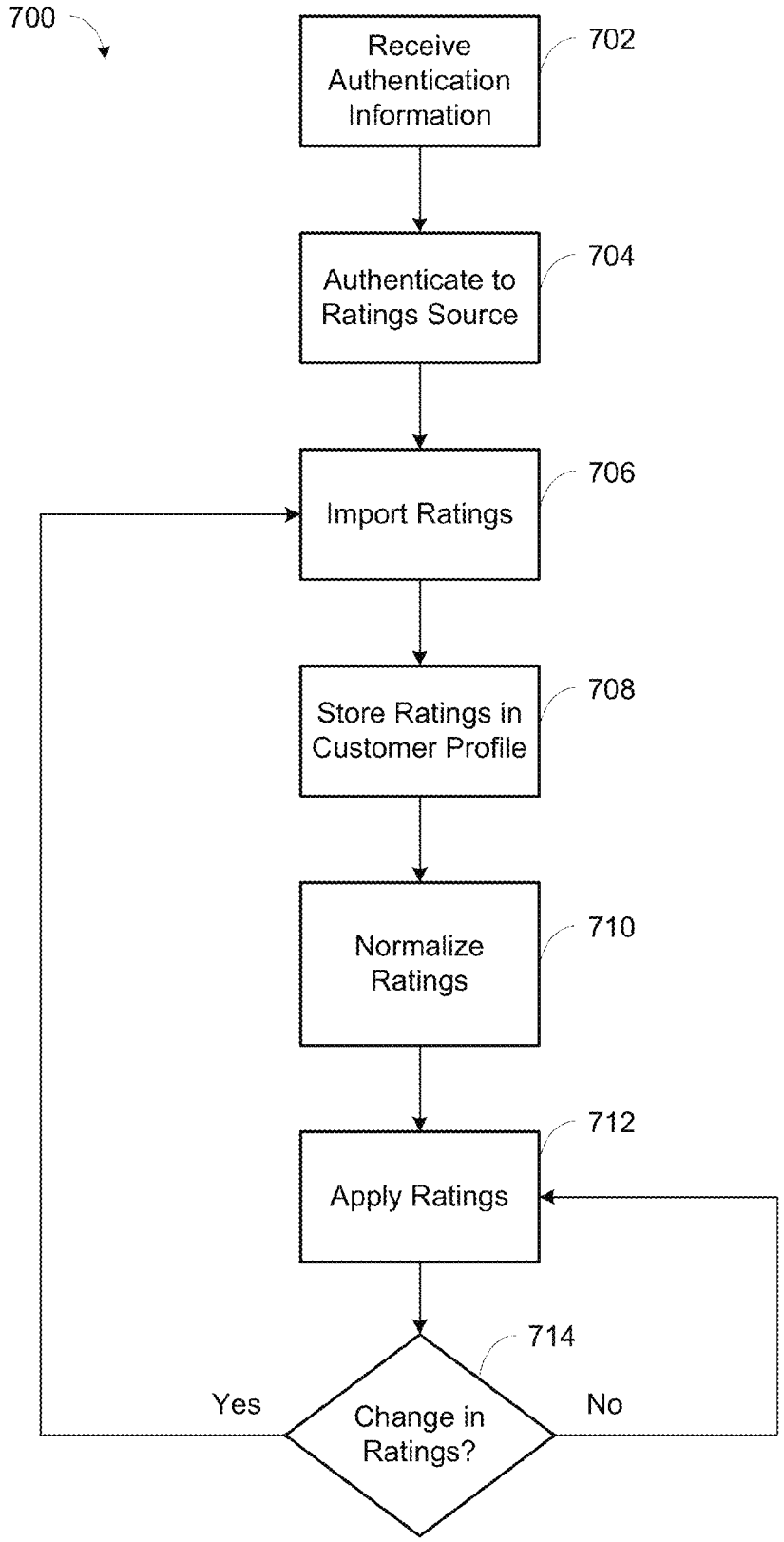
700
Receive Authentication Information
702
Authenticate to Ratings Source
704
Import Ratings
706
Store Ratings in Customer Profile
708
Normalize Ratings
710
Apply Ratings
712
Change in Ratings?
714
Yes
No

FIG. 7

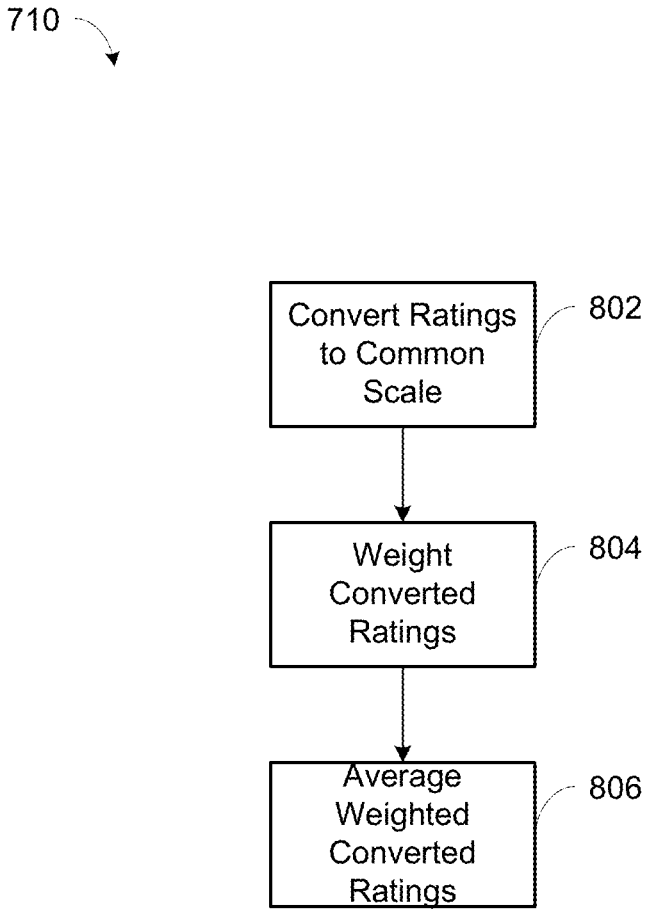
710
Convert Ratings to Common Scale
802
Weight Converted Ratings
804
Average Weighted Converted Ratings
806

FIG. 8

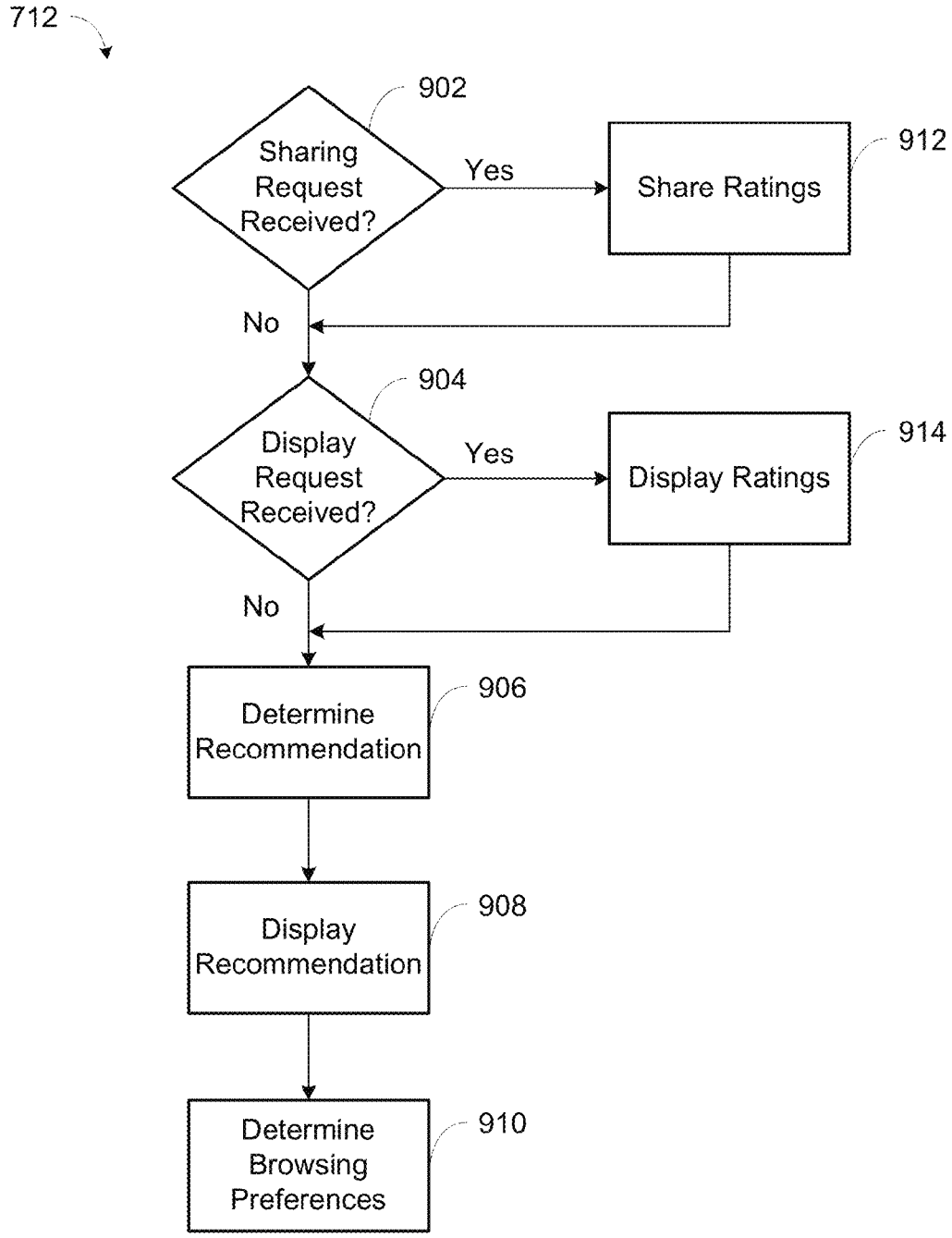
712
902
Sharing Request Received?
Yes
912
Share Ratings
No
904
Display Request Received?
Yes
914
Display Ratings
No
906
Determine Recommendation
908
Display Recommendation
910
Determine Browsing Preferences

FIG. 9

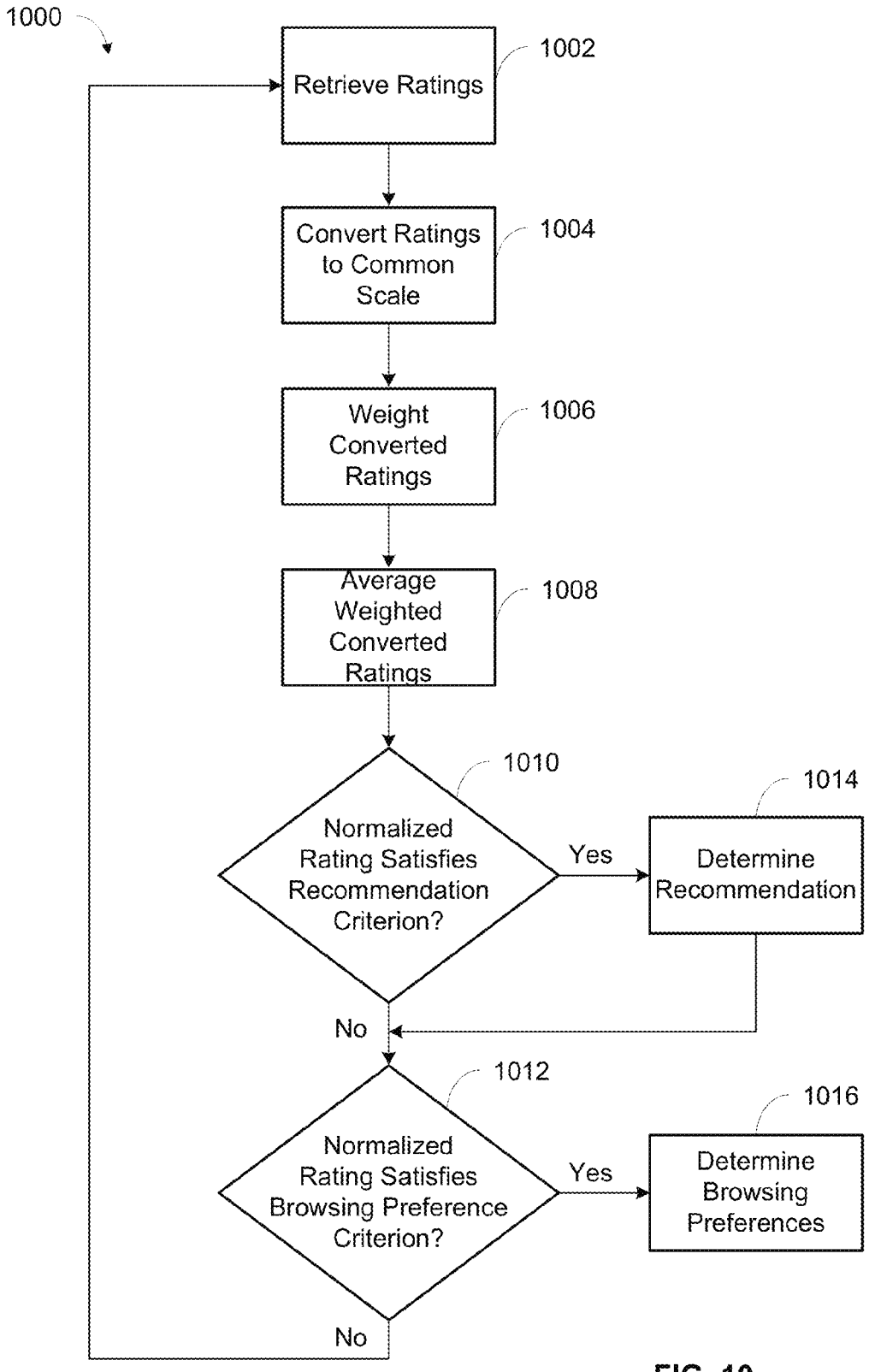
1000
Retrieve Ratings
1002
Convert Ratings to Common Scale
1004
Weight Converted Ratings
1006
Average Weighted Converted Ratings
1008
Normalized Rating Satisfies Recommendation Criterion?
1010
Yes
Determine Recommendation
1014
No
Normalized Rating Satisfies Browsing Preference Criterion?
1012
Yes
Determine Browsing Preferences
1016
No

FIG. 10

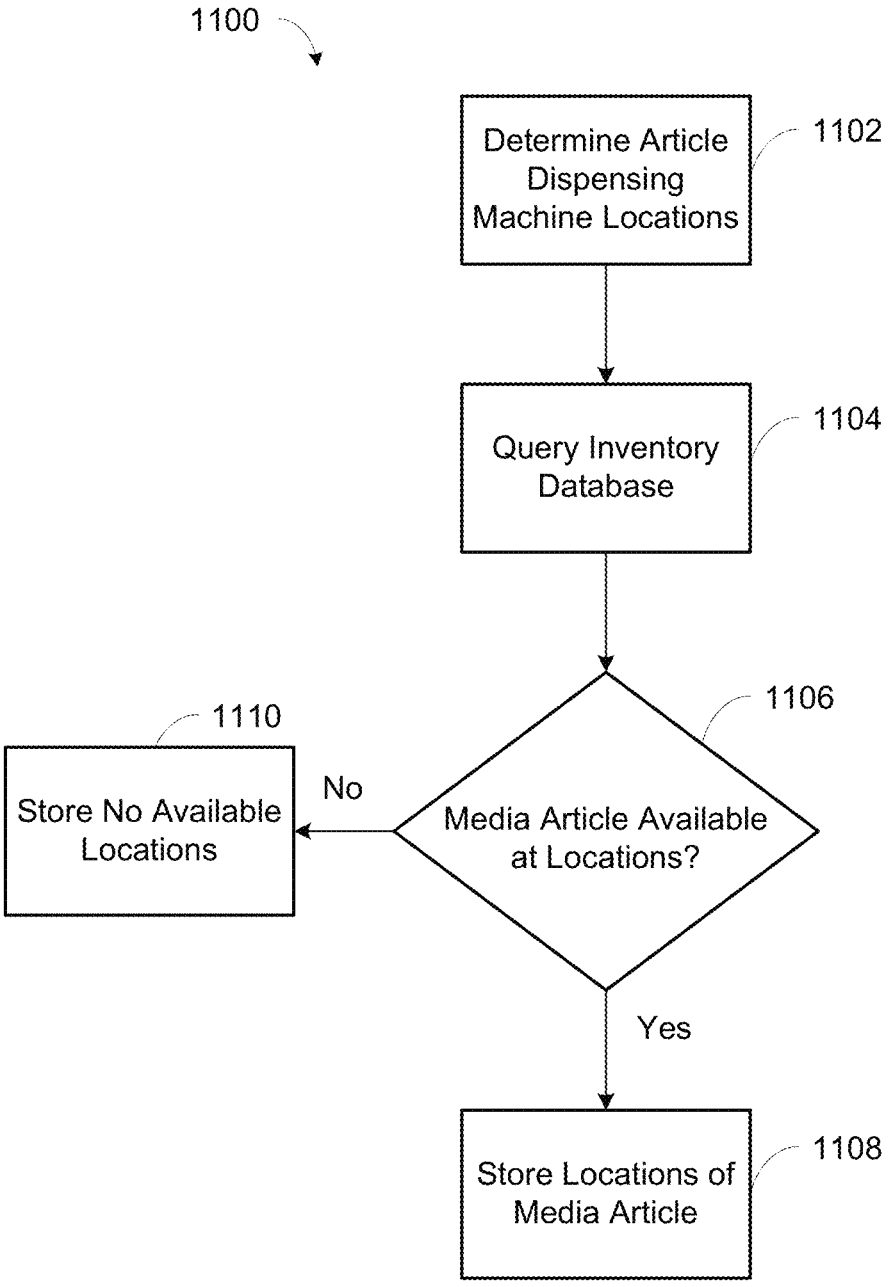
1100
Determine Article Dispensing Machine Locations
1102
Query Inventory Database
1104
Media Article Available at Locations?
1106
No
Store No Available Locations
1110
Yes
Store Locations of Media Article
1108

FIG. 11

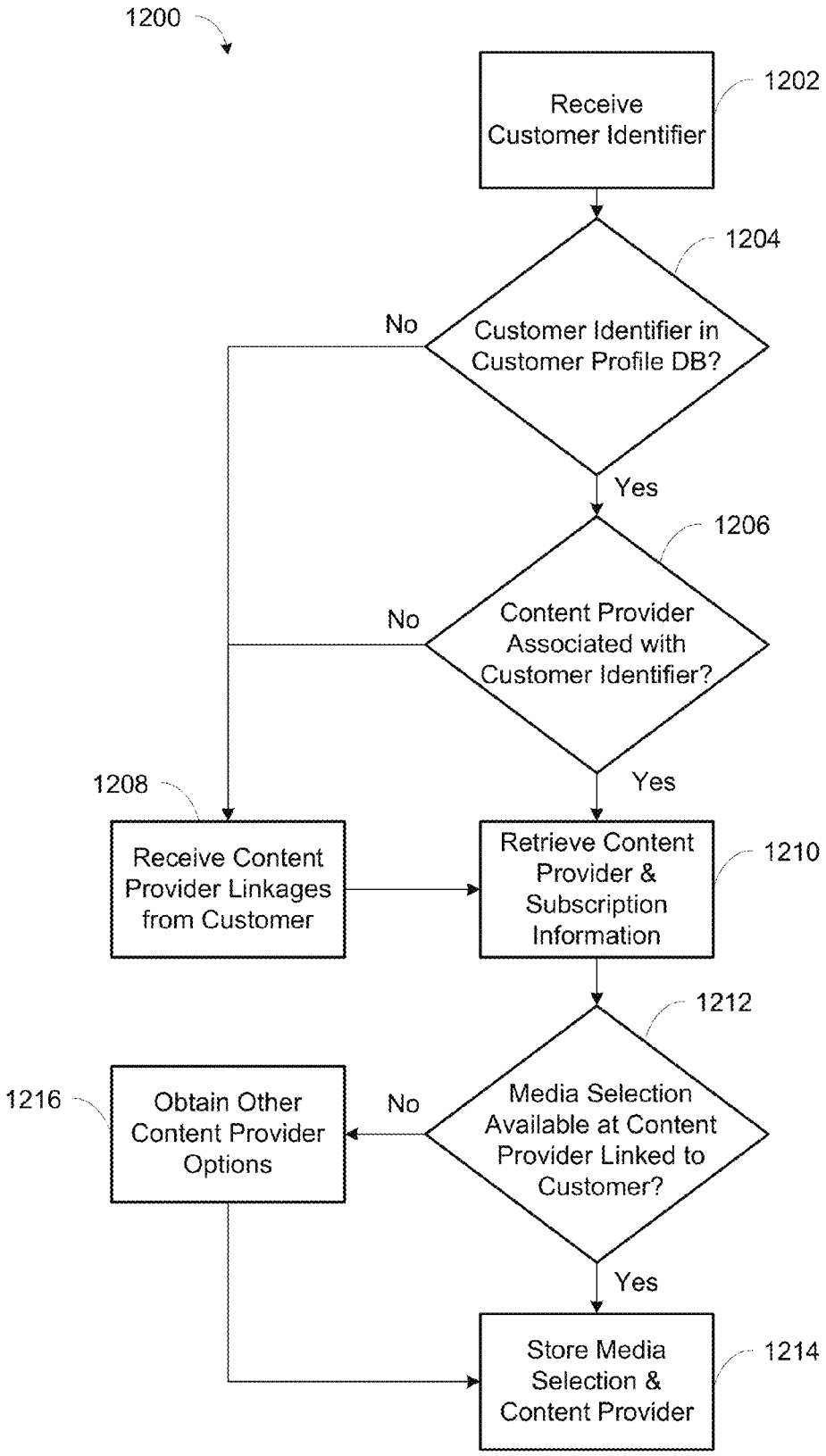
1200
Receive Customer Identifier
1202
Customer Identifier in Customer Profile DB?
1204
No
Yes
Content Provider Associated with Customer Identifier?
1206
No
Yes
1208
Receive Content Provider Linkages from Customer
Retrieve Content Provider & Subscription Information
1210
Media Selection Available at Content Provider Linked to Customer?
1212
No
1216
Obtain Other Content Provider Options
Yes
Store Media Selection & Content Provider
1214

FIG. 12

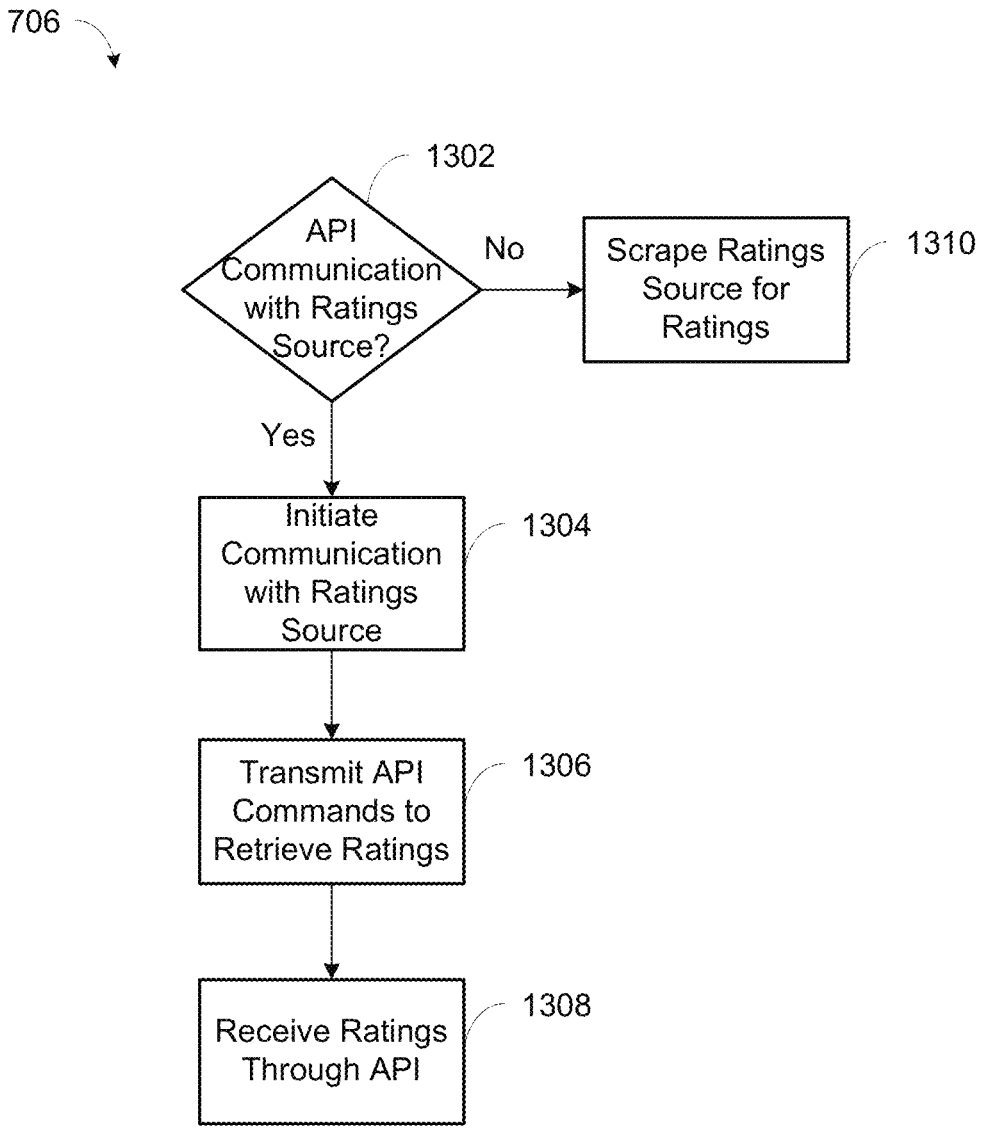
706
1302
API Communication with Ratings Source?
No
Scrape Ratings Source for Ratings
1310
Yes
Initiate Communication with Ratings Source
1304
Transmit API Commands to Retrieve Ratings
1306
Receive Ratings Through API
1308

FIG. 13

SYSTEM AND METHOD FOR AGGREGATING RATINGS FOR MEDIA CONTENT

CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority to U.S. Provisional Application No. 61/525,697, filed Aug. 19, 2011, entitled "SYSTEM AND METHOD FOR AGGREGATING RATINGS FOR MEDIA CONTENT", and is incorporated herein by reference in its entirety.

TECHNICAL FIELD

This invention relates to a system and method for aggregating and normalizing ratings for media content. More particularly, the present invention provides a system and method for the importation and aggregation of ratings, normalizing the ratings, and applying the ratings to affect recommendations and preferences related to media content.

BACKGROUND AND SUMMARY OF THE INVENTION

While the present invention is often described herein with reference to a digital video disc, Blu-Ray disc, and video game distribution system, an application to which the present invention is advantageously suited, it will be readily apparent that the present invention is not limited to that application and can be employed in article dispensing systems used to distribute a wide variety of dispensable articles.

The digital video disc (DVD) player has been one of the most successful consumer electronics product launches in history. The market for DVD movie video, Blu-Ray movie video, and video game rentals is enormous and growing. Millions of households have acquired DVDs since they were introduced in 1997. In the first quarter of 2003 alone, it was estimated that well over three million DVD players were shipped to U.S. retailers.

In 2003, brick-and-mortar stores dominated the movie video and video game rental landscape in the U.S. Statistics showed that two brick-and-mortar companies controlled nearly sixty-five percent of the home video rental business. One element repeatedly cited for success of certain brick-and mortar store video rental franchises was perceived high availability of new video releases. Consumers want entertainment on demand, and through stocking multiple units of each new release, successful brick-and-mortar companies meet this consumer demand.

The foregoing indicates that there is a significant market potential for aligning regular routines of consumers (e.g., shopping, getting coffee or gas or going to a convenience store) with their DVD, Blu-Ray, and video game rental activities.

One improved article dispensing machine is disclosed in commonly owned U.S. Pat. No. 7,234,609, which is herein incorporated by reference in its entirety. The invention of the U.S. Pat. No. 7,234,609 and the present invention can function as an article dispensing machine-based distribution system that will typically have multiple units of each new release per article dispensing machine. The dispensing machines of the U.S. Pat. No. 7,234,609 and the present invention can stock up to two thousand DVDs, Blu-Ray, video games, or other discs (movies, games or other entertainment content), making the system competitive with existing brick-and-mortar video rental superstores.

The dispensing machine and system of the U.S. Pat. No. 7,234,609 and the present invention distinguishes itself from such stores by offering major benefits not conventionally offered by such stores, including additional cross-marketing programs (e.g., promotional rentals for a certain amount of dollars spent at the retail location) and convenience (e.g., open always).

The dispensing machine of the U.S. Pat. No. 7,234,609 and the present invention yields a competitive advantage in the DVD, Blu-Ray disc, and video game rental marketplace by offering consumers cross-marketing/promotional programs, convenience of selection (e.g., computer-based searches for movies and recommendations based on consumer profiles), and potentially extended hours. The present invention employs a more cost-effective, convenient platform than brick-and-mortar stores. In addition, with the present invention, dispensing machines can be situated in retail locations having high foot traffic, such as at a popular grocery store, restaurant, drug store, and/or other popular retail location.

The dispensing machine of the U.S. Pat. No. 7,234,609 and the present invention can be operated at a substantial savings over the costs associated with traditional brick-and-mortar video rental stores. For example, the present invention does not require hourly employees manning the dispensing machines or restocking them with inventories, due to the ability of the article transport storage units to be delivered to/picked up from retail locations by third-party delivery services, such as traditional or contracted courier services.

Unlike brick-and-mortar stores, the dispensing machine of the U.S. Pat. No. 7,234,609 and the present invention does not require an on-site store manager because all operational decisions can be made at a centralized location by a management team officed remote from the retail locations. Unlike brick-and-mortar stores, the dispensing machine of the U.S. Pat. No. 7,234,609 and the present invention does not require significant physical space. Unlike brick-and-mortar stores, the dispensing machine of the U.S. Pat. No. 7,234,609 and the present invention has low operating costs because no heating or air conditioning is required for the dispensing machines and they consume a relatively low level of electrical energy. In addition, the dispensing machine of the U.S. Pat. No. 7,234,609 has low maintenance costs and downtime.

The dispensing machine of the U.S. Pat. No. 7,234,609 and the present invention addresses the shortcomings of traditional brick-and-mortar stores in a convenient and cost-effective delivery vehicle having the added bonus of serving as an effective promotional platform that drives incremental sales to retail locations. In addition, the dispensing machine of the U.S. Pat. No. 7,234,609 and the present invention overcomes these disadvantages by at least offering more new releases and older selections for any given time period, and lower cost per viewing with significantly more convenience than Internet-based and pay-per-view services.

The dispensing machine of the U.S. Pat. No. 7,234,609 and the present invention is a fully automated, integrated DVD, Blu-Ray, and video game rental and/or purchase systems. It preferably incorporates robust, secure, scalable software that provides a fully personalized user experience and real-time feedback to retail locations and advertisers, scalable hardware that leverages existing technologies such as touch screen, focused audio speakers and video monitors, technology utilizing the Internet through a system website or mobile/consumer electronics device application, and an article transport storage unit that facilitates the exchange of

new discs for old discs in each machine with virtually no need for human intervention. These technologies and others fill long-felt needs in the art and give advantages over conventional video distribution options. The dispensing machine of the U.S. Pat. No. 7,234,609 and the present invention functions as much as a promotional platform as it does a rental kiosk.

By utilizing the dispensing machines and the fully-interactive, real-time, linked Internet website or mobile/consumer electronics device applications, consumers can rent one or more DVDs, Blu-Ray discs, video games, or other entertainment content directly from dispensing machines as well as indirectly by making a rental reservation through the website or application for later pickup at a conveniently located machine. These dispensing machines are preferably networked with each other, with the inventory control and/or supply office and with the system website or application by phone-line, DSL, wireless network, or other Internet connection at each retail location. Through this linked network, the rental experience for each consumer can be customized based on a profile for each consumer, such as via personalized home pages and rental screens.

Existing ratings systems allow a user to create subjective ratings of pieces of media content. However, the ratings are generally confined to the system that the ratings were created on. For example, a user can rate pieces of media content at a digital media content provider but must separately rate the same pieces of media content at a movie ratings website. The user may become frustrated in having to enter their ratings in multiple systems. Moreover, different existing ratings systems may utilize the ratings in different ways. For example, systems may use different recommendation methodologies, resulting in conflicting recommendations. Furthermore, the recommendations generated on a first system where the user has entered a small number of ratings will likely be less useful and applicable than recommendations generated on a second system where the user has entered a larger number of ratings.

The present invention allows for aggregating ratings for media content from multiple ratings sources into a customer profile. The ratings from the ratings sources may also be normalized. Recommendations of media content and browsing preferences related to the listing of media content may be determined based on the aggregated and/or normalized ratings. The ratings may be displayed or shared with other users, either individually, aggregated together, and/or in a normalized format. The present invention overcomes disadvantages of existing ratings systems by aggregating and/or normalizing the ratings from multiple ratings sources in the customer profile, and by using the aggregated ratings to affect recommendations and preferences. Other features and advantages are provided by the following description and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an illustration of a system for communicating and processing information in a network of article dispensing machines and dispensing apparatus.

FIG. **2** is a perspective view of an article dispensing machine constructed in accordance with the principles of the present invention.

FIG. **3** is a high-level block diagram illustrating a networked media content system and connections including an article dispensing machine, a system backend, a content provider backend, and an A/V display interface.

FIG. **4** is a block diagram illustrating the system backend.

FIG. **5** is a block diagram illustrating connections between the system backend and the content provider backend.

FIG. **6** is a block diagram illustrating connections between the system backend, the content provider backend, and the A/V display interface.

FIG. **7** is a flowchart illustrating operations for importing ratings into a customer profile.

FIG. **8** is a flowchart illustrating operations for normalizing ratings.

FIG. **9** is a flowchart illustrating operations for applying the ratings in the customer profile.

FIG. **10** is a flowchart illustrating operations for normalizing ratings in a customer profile and applying the ratings.

FIG. **11** is a flowchart illustrating operations for determining availability of a media article.

FIG. **12** is a flowchart illustrating operations for determining availability of a media selection.

FIG. **13** is a flowchart illustrating operations for importing ratings from a ratings source.

DETAILED DESCRIPTION OF THE INVENTION

While this invention is susceptible of embodiments in many different forms, there is shown in the drawings and will herein be described in detail preferred embodiments of the invention with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the broad aspect of the invention to the embodiments illustrated.

FIGS. **1-2** illustrate an article dispensing machine designated **230**. Article dispensing machine **230** is one of a plurality of article dispensing machines included within an article distribution system having a plurality of such machines situated at a plurality of retail locations. The article dispensing machines of a particular article distribution system preferably form a network. As such, those machines are preferably in electrical communication with each other and with a central server or central controller.

As shown in FIG. **1**, each article dispensing machine **230** includes a dispensing machine processor **300**, also referred to herein as a vending controller, which is connected to a first sensor **270** and a second sensor **370**, a first motor **251** and a second motor **262** and a user interface control system **234**, collectively referred to as "the peripheral devices." The processor is capable of executing various programs to provide input to and/or receive outputs from the peripheral devices. Suitable processors for such use are known to those of skill in the art. In addition, the processor is operably connected to at least one memory storage device **281**, such as a hard-drive or flash-drive or other suitable memory storage device.

Article dispensing machine memory storage device **281** can include any one or a combination of volatile memory elements (e.g., random access memory (RAM, such as DRAM, SRAM, SDRAM, etc.)) and nonvolatile memory elements (e.g., ROM, hard drive, tape, CDROM, etc.). Moreover, article dispensing machine memory storage device **281** may incorporate electronic, magnetic, optical, and/or other types of storage media. Article dispensing machine memory storage device **281** can have a distributed architecture where various components are situated remote from one another, but are still accessed by processor. Article dispensing machine memory storage device includes an article dispensing machine database **282**.

The article dispensing machines **230** preferably comprise a network of machines in communication with one another. As shown in FIG. **1**, in the preferred configuration, the article dispensing machines **230** are networked with one another via a central server or central controller **302** in a hub-and-spoke system. However, optionally, the article dispensing machines may be connected and communicate directly with one another, and/or subsets of article dispensing machines may communicate with one another directly as well as with the central server **302**.

Generally, in terms of hardware architecture, the central server **302** and the content provider backend **308** shown in FIG. **3** include a central processor and/or controller, central memory, and one or more input and/or output (I/O) devices (or peripherals) that are communicatively coupled via a local interface. The architecture of the central server **302** is set forth in greater detail in U.S. Pat. No. 7,234,609, the contents of which are incorporated herein by reference. Numerous variations of the architecture of the central server **302** and the content provider backend **308** would be understood by one of skill in the art and are encompassed within the scope of the present invention.

The processor/controller is a hardware device for executing software, particularly software stored in memory. The processor can be any custom made or commercially available processor, a central processing unit (CPU), an auxiliary processor among several processors associated with the server **302**, a semiconductor based microprocessor (in the form of a microchip or chip set), a macroprocessor, or generally any device for executing software instructions. Examples of suitable commercially available microprocessors are as follows: a PA-RISC series microprocessor from Hewlett-Packard Company, an 80×86 or Pentium series microprocessor from Intel Corporation, a PowerPC microprocessor from IBM, a Sparc microprocessor from Sun Microsystems, Inc., or a 68xxx series microprocessor from Motorola Corporation. The processor may also represent a distributed processing architecture such as, but not limited to, SQL, Smalltalk, APL, KLisp, Snobol, Developer 200, MUMPS/Magic.

The software in memory may include one or more separate programs. The separate programs comprise ordered listings of executable instructions for implementing logical functions. The software in memory includes a suitable operating system (O/S). A non-exhaustive list of examples of suitable commercially available operating systems is as follows: (a) a Windows operating system available from Microsoft Corporation; (b) a Netware operating system available from Novell, Inc.; (c) a Macintosh operating system available from Apple Inc.; (d) a UNIX operating system, which is available for purchase from many vendors, such as the Hewlett-Packard Company, Sun Microsystems, Inc., and AT&T Corporation; (e) a LINUX operating system, which is freeware that is readily available on the Internet; (f) a run time Vxworks operating system from WindRiver Systems, Inc.; or (g) an appliance-based operating system, such as that implemented in handheld computers, smartphones, or personal digital assistants (PDAs) (e.g., PalmOS available from Palm Computing, Inc., Windows CE or Windows Phone available from Microsoft Corporation, iOS available from Apple Inc, Android available from Google Inc., BlackBerry OS available from Research in Motion Limited, Symbian available from Nokia Corp.). The operating system essentially controls the execution of other computer programs and provides scheduling, input-output control, file and data management, memory management, and communication control and related services.

Steps and/or elements, and/or portions thereof of the present invention may be implemented using a source program, executable program (object code), script, or any other entity comprising a set of instructions to be performed. When a source program, the program needs to be translated via a compiler, assembler, interpreter, or the like, which may or may not be included within the memory, so as to operate properly in connection with the operating system (O/S). Furthermore, the software embodying the present invention can be written as (a) an object oriented programming language, which has classes of data and methods, or (b) a procedural programming language, which has routines, subroutines, and/or functions, for example but not limited to, C, C++, Pascal, Basic, Fortran, Cobol, Perl, Java, Ada, and Lua.

When article dispensing machine **230** is in operation, the article dispensing machine processor is configured to execute software stored within article dispensing machine memory, to communicate data to and from the dispensing machine memory, and to generally control operations of article dispensing machine pursuant to the software. The software aspects of the present invention and the O/S, in whole or in part, but typically the latter, are read by processor, perhaps buffered within the processor, and then executed.

When the present invention or aspects thereof are implemented in software, it should be noted that the software can be stored on any computer readable medium for use by or in connection with any computer related system or method. In the context of this document, a computer readable medium is an electronic, magnetic, optical, or other physical device or means that can contain or store a computer program for use by or in connection with a computer related system or method. The present invention can be embodied in any computer-readable medium for use by or in connection with an instruction execution system, apparatus, or device, such as a computer-based system, processor-containing system, or other system that can fetch the instructions from the instruction execution system, apparatus, or device and execute the instructions. In the context of this document, a "computer-readable medium" can be any means that can store, communicate, propagate, or transport the program for use by or in connection with the instruction execution system, apparatus, or device. The computer readable medium can be for example, but not limited to, an electronic, magnetic, optical, electromagnetic, infrared, or semiconductor system, apparatus, device, or propagation medium. More specific examples (a non-exhaustive list) of the computer-readable medium would include the following: an electrical connection (electronic) having one or more wires, a portable computer diskette (magnetic), a random access memory (RAM) (electronic), a read-only memory (ROM) (electronic), an erasable programmable read-only memory (EPROM, EEPROM, or Flash memory) (electronic), an optical fiber (optical), and a portable compact disc read-only memory (CDROM) (optical). Note that the computer-readable medium could even be paper or another suitable medium upon which the program is printed, as the program can be electronically captured, via, for instance, optical scanning of the paper or other medium, then compiled, interpreted or otherwise processed in a suitable manner if necessary, and then stored in a computer memory.

For communication with the central server **302**, article dispensing machine **230** is equipped with network communication equipment and circuitry. In a preferred embodiment, the network communication equipment includes a network card such as an Ethernet card. In a preferred network environment, each of the plurality of article dis-

pensing machines **230** on the network is configured to use the TCP/IP protocol to communicate via the network **301**. It will be understood, however, that a variety of network protocols could also be employed, such as IPX/SPX, Netware, PPP and others. It will also be understood that while a preferred embodiment of the present invention is for article dispensing machine **230** to have a "broadband" connection to the network **301**, the principles of the present invention are also practicable with a dialup connection using a standard modem. Wireless network connections are also contemplated, such as wireless Ethernet, satellite, infrared, radio frequency, Bluetooth, near field communication, and cellular networks.

The central controller **302** communicates with the article dispensing machine controllers **300** via the network **301**. The central controller **302** is preferably located at a central station or office that is remote from the plurality of article dispensing machines **230**. The central controller **302** can operate as the server for communicating over the network **301** between the plurality of article dispensing machines **230**. The central controller **302** receives communications and information from the article dispensing machines **230**, and also transmits communications and information to the machines **230**. For example, when a rental transaction is performed at the article dispensing machine **230**, transaction data such as the rented title is then transmitted from the machine **230** to the central controller **302** via the network **301**. It will be understood that central servers in general, such as the central controller **302**, are often distributed. A plurality of central servers/controllers **302** may optionally be arranged in "load balanced" architecture to improve the speed and efficiency of the network. To accomplish the implementation of multiple controllers **302**, the controllers **302** may be in communication with a router/distributor **303**.

The central controller **302** is also in communication with a central database **304**. The central database **304** stores information regarding the transaction network. For example, the central database **304** stores data regarding the vending inventory at each of the plurality of article dispensing machines **230**. The central database **304** also stores sales information regarding the sales quantities of the vending merchandise stored in the machines **230**. For example, the central database **304** stores information regarding the sales totals for each title and for each machine **230** vending location. Central database **304** also stores user information and rental transaction information, such as user IDs, the date on which discs are due to be returned, the date on which discs were rented from the machines **230** and a list of valid coupon codes and restrictions associated with those codes. In certain embodiments, central database **304** also may be configured to store user PINs. Some of this information is also preferably stored in article dispensing machine database **282**.

Central database **304** and databases in the content provider backend **308**, such as the content provider customer profile database **502** and other databases, are preferably relational databases, although other types of database architectures may be used without departing from the principles of the present invention. For example, the databases **304** and **502** may be a SQL database, an Access database or an Oracle database, and in any such embodiment have the functionality stored herein. Central database **304** is also preferably capable of being shared, as illustrated, between a plurality of central controllers **302** and its information is also preferably capable of being transmitted via network **301**. It will be understood that a variety of methods exist for serving the information stored in central database **304** and database **502**. In one embodiment, .net and Microsoft Reporting Services are employed, however, other technologies such as ODBC, MySQL, CFML and the like may be used.

The central controller **302**, central database **304**, and components of the content provider backend **308** are also accessible by an electronic device **306**, which may include a personal computer **102**, mobile device **104** (e.g., smartphone, personal digital assistant, etc.), tablet computer **106**, video game console **108**, television **110**, and Blu-Ray player **112**. The electronic device **306** may be in direct or indirect communication with the central controller **302**, central database **304**, and/or the content provider backend **308** through a wired and/or wireless network connection, such as Ethernet, Wi-Fi, cellular (3G, 4G, etc.), or other type of connection. As a personal computer **102**, the electronic device **306** will be understood as comprising hardware and software consistent with marketable personal and laptop computers, such as a display monitor, a keyboard, and a microprocessor. The electronic device **306** may also comprise Internet browser software such as Firefox, Internet Explorer, Chrome, or Safari. Using the browser software, a user of the electronic device **306** can access a web interface through the central controller **302**. An application may also execute on the electronic device **306** that accesses the central controller **302**. To that end, central controller **302** preferably comprises web server software such as IIS or Apache. It will be understood that a variety of web server software and web browser software exists to implement the principles of the present invention without departing therefrom. Through the web browser software or application, the electronic device **306** communicates with the central controller **302** and allows the user to login to a central command functionality of the central controller **302** and to view and modify data stored in the central database **304**. The browser interface or application also allows the user to perform certain system functions, which will affect the inventory and behavior of the article dispensing machines **230**. The electronic device **306** may communicate with the central controller **302**, central database **304**, and components of the content provider backend **308** using rules and specifications of an application programming interface (API).

In a preferred embodiment, a financial server **305** is also in communication with the network **301**. It will be understood that a variety of financial services exist for processing financial information via the Internet and other networks **301**. Those services allow for the processing of credit card and debit card information, so that users of the services do not have to interface directly with credit and debit card companies. In FIG. **1**, the financial server **305** is illustrated as a single server, although the financial server **305** may comprise an entire sub-network of financial servers **305** responsible for processing financial information.

As shown in FIG. **2**, article dispensing machine **230** includes a machine housing **232** with front, rear, top, bottom and side panels. The machine housing **232** is preferably a combination molded fiberglass and sheet metal cabinet. However, those skilled in the art will appreciate that the housing can be constructed from a variety of other suitable materials and with a variety of other suitable manufacturing techniques.

As shown most clearly in FIG. **2**, a user interface portion **234** of housing **232** includes a card reader **240**, a keypad and/or touch screen **242** and an article transfer opening **244**. The card reader **240** is preferably designed in known fashion to read magnetically encoded membership and/or credit/debit cards for authorizing the distribution of articles of inventory through the article transfer opening **244**. Keypad

and/or touch screen **242** permits consumers and/or inventory stocking personnel to communicate with the dispensing machine **230** and/or a central office linked in electrical communication with the dispensing machine. Keypad and/or touch screen **242** also permits consumers and/or inventory stocking personnel to enter appropriate commands directed to carrying out specific machine tasks. It will be appreciated that the optional touch screen includes a monitor made with known technologies making it capable of being utilized as a user interface for entry of commands designed to carry out machine tasks. The touch screen **242** may also be capable of displaying a QR (Quick Response) code to a customer. The customer may read the QR code with a camera on a mobile device or with a dedicated QR code reader. The QR code can represent a universal resource locator (URL) to access a digital media selection, for example.

Furthermore, it will be appreciated that additional user interface portions having additional or even identical user interface components could be incorporated within article dispensing machine **230**. For example, these components could be incorporated on other panels of the housing **232** of machine **230** so that the machine can be used simultaneously by multiple consumers, translating into more efficient distribution of articles in high traffic areas. Dispensing machine **230** also preferably includes speaker units. Known audio technology may be incorporated within dispensing machine **230** to broadcast focused audio directed to relatively small (e.g., three square feet) locations in front of the machines from speaker units and/or in other designated locations at a retail site.

FIG. **3** illustrates a networked media content system **310** including an article dispensing machine **230**, a system backend **307**, a content provider backend **308**, and an audio/visual (A/V) display interface **309**. The networked media content system **310** provides for a variety of processes involving management, manipulation, searching, presentation, and notification related to digital media content and vendible physical media articles, including processes related to the present invention. The networked media content system **310** allows for direct and indirect communication between the components in the networked media content system **310** via one or more networks. The components in the networked media content system **310** may be operated by one or more entities. In one embodiment, the article dispensing machine(s) **230** and the system backend **307** are operated by a first entity, such as the operator of the article dispensing machines, while the content provider backend **308** and the A/V display interface **309** are operated by a second entity, such as a content provider. In another embodiment, all of the components shown in the networked media content system **310** of FIG. **3** are operated by the same entity. The physical media article may include at least a DVD, Blu-Ray disc, video game disc, or other media article including those that are out-of-stock or otherwise unavailable for rental. The digital media selections may include streaming video content, video-on-demand content, downloadable video content, streaming video games, downloadable video games, or other digital media content. Streaming or downloadable video games may include content related to video games, such as expansion packs and add-on packs. Although FIG. **3** shows a single content provider backend **308** and a single A/V display interface **309**, it is contemplated that more than one content provider backend and/or A/V display interfaces may be in communication with the system backend **307**.

The system backend **307** includes components that primarily communicate information, such as transaction and inventory data, to and from the article dispensing machines **230**. Components in the system backend **307** also communicate information to and from the content provider backend **308** and the A/V display interface **309**. The system backend **307** is detailed below with reference to FIG. **4**. The content provider backend **308** includes components that primarily communicate information to and from the A/V display interface **309**. Components in the content provider backend **308** also communicate information to and from the system backend **307**, as detailed further below. Data communicated between the article dispensing machines **230**, the system backend **307**, the content provider backend **308**, and/or the A/V display interface **309** may utilize the XML (Extensible Markup Language) format. The A/V display interface **309** may communicate with the system backend **307** and/or the content provider backend **308** using rules and specifications of an application programming interface (API).

The A/V display interface **309** can be a set-top box, a module of an internet-ready television, a Blu-Ray player with internet connectability, a software application executing on a mobile device, cable television converter box, satellite television set-top box, IPTV (Internet Protocol television) set-top box (including AT&T U-Verse), digital video recorder, tablet computer, video game console (including Microsoft Xbox family, Sony PlayStation family, Nintendo Wii, and similar devices), handheld gaming device (including Sony PlayStation Portable, Nintendo DS, and similar devices), laptop computer, desktop computer, streaming media box (including Apple TV, Google TV, Roku, Boxee, and similar devices), or any other device capable of receiving and displaying streaming, on-demand, and/or downloadable electronic media from a content provider. Moreover, applications may be installed and executed on the A/V display interface **309** that communicate with the system backend **307** and/or the content provider backend **308** to provide media content and other information to a user of the A/V display interface **309**.

The article dispensing machines **230** can communicate with the system backend **307**, including the central server and controller **302**, via network communication equipment and circuitry, as detailed above. Furthermore, the system backend **307** can communicate with the content provider backend **308** and the A/V display interface **309** via the same or different network communication equipment and circuitry. In particular, the system backend **307** can directly communicate with the content provider backend **308** and the A/V display interface **309**, or in one embodiment, the system backend **307** can communicate with the A/V display interface **309** through the content provider backend **308**. It will also be understood that while a preferred embodiment of the present invention is for the components of the system **310** to have a "broadband" connection with one another, the principles of the present invention are also practicable with a dialup connection using a standard modem. Wireless network connections are also contemplated, such as wireless Ethernet, satellite, infrared, radio frequency, Bluetooth, near field communication, and cellular networks.

Each of the article dispensing machines **230** may operate without requiring continuous connectivity and communication with the central controller **302**. In one embodiment, the central controller **302** only transmits data in response to communication from an article dispensing machine **230**. For example, an article dispensing machine **230** may attempt to communicate with the central controller **302** following completion of one or more rental transactions or one or more media article return transactions. In another embodiment, the article dispensing machine **230** continues normal opera-

tions and transactions even if communication is interrupted or cannot be established with the central controller **302**. In these cases, transaction data can be stored locally in the article dispensing machine **230**, such as in the article dispensing machine memory storage device **281**, until a predetermined time interval elapses, when a predetermined number of transactions is reached, or until communication with the central controller **302** can be reestablished. Once communication is established with the central controller **302**, financial and inventory information can be uploaded and the appropriate servers and databases can be updated.

In one embodiment, the article dispensing machine **230** can display only media articles which are physically located at the article dispensing machine **230**. In this way, a customer may browse on the user interface **234** only the media articles which are in-stock and available to rent at that article dispensing machine **230**. Typically, the article dispensing machine **230** possesses media information for the media articles that are currently located in the article dispensing machine **230**. The media information for a media article includes title, actor, director, studio, publisher, plot synopsis, format, description, parental rating, individualized ratings and reviews, popularity, article type, running time, genre, cover artwork, or other information. The article dispensing machine **230** can also store in memory the media information for recently-rented media articles that are no longer physically stored in the article dispensing machine **230**. The article dispensing machine **230** can communicate with the central controller **302** when media information about a particular media article is needed. For example, when a particular media article is returned to an article dispensing machine **230** that does not have the corresponding media information for that particular media article, the article dispensing machine **230** can query the central controller **302**, metadata database **410**, and/or inventory database **412** for the media information. Once the media information is obtained, the article dispensing machine **230** may display that particular media article on the user interface **234** as in-stock and available to rent.

In another embodiment, the article dispensing machine **230** can display media articles that are both physically located and not physically located at the article dispensing machine **230**. In this embodiment, media articles which are both available and unavailable to rent can be displayed. A media article may be unavailable to rent if it is not in-stock or is in-stock but has been reserved for rental. In one example, the entire catalog of media articles stored in the inventory database **412** can be displayed on the article dispensing machine **230**. In another example, a subset of the entire catalog of media articles can be displayed on the article dispensing machine **230**. The subset of media articles that can be displayed on the article dispensing machine **230** may be determined, for example, based on geographic location, retailer agreements, contractual obligations, customer rental habits, and other criteria. The media articles that can be displayed on the article dispensing machine **230** may include recently-rented media articles that are no longer physically stored in the article dispensing machine **230** or media articles that have never been physically in the article dispensing machine **230**. For example, media articles that have never been physically in the article dispensing machine **230** may be displayed because those media articles may be available at a nearby article dispensing machine. In this case, those media articles may be displayed to the customer so that the customer has an option to obtain those media articles from the nearby article dispensing machine **230**. In this embodiment, if a customer attempts to rent a media article that is out-of-stock, reserved for another customer, or otherwise cannot be vended at the particular article dispensing machine **230**, then that media article can be deemed an unavailable media article. Although a physical unavailable media article cannot be rented from the particular article dispensing machine **230**, a digital alternative media selection may be available and substituted for the unavailable media article.

FIG. **4** is a block diagram illustrating the system backend **307** and connections to and from the system backend **307** to the article dispensing machines **230**, the content provider backend **308**, and the A/V display interface **309**. The system backend **307** includes components that provide and receive data to and from the article dispensing machines **230** during DVD, Blu-Ray disc, and video game rental transactions and other transactions. Components in the system backend **307** are utilized in relation to the present invention, as described below. It will be understood that components **402**, **404**, **406**, **408**, **414**, **416**, **418**, and **420** in the system backend **307** may be implemented, for example, by the central controller **302** using instructions stored in a memory connected to the central controller **302**. It will be further understood that the databases **404**, **410**, and **412** may be implemented as part of the central database **304** or as separate databases.

The identification and authentication controller **402** can receive a unique customer identifier that a customer provides to the article dispensing machines **230** during a rental transaction. The unique customer identifier can be a credit or debit card number, a hashed version of a credit or debit card number, or other unique identifier used for payment and/or identification purposes. In the case of hashing of the credit or debit card number, the hash function applied to the credit or debit card number is preferably implemented on the article dispensing machines **230** and may be, for example, a SHA-256 hashing algorithm. The identification and authentication controller **402** can validate the payment capability of a credit or debit card by communicating with the financial server **305**.

A customer may be authenticated to multiple customer profiles and accounts by the identification and authentication controller **402**. The unique customer identifier provided by the customer can authenticate the customer to an existing customer profile and account for the article dispensing machines **230**. The existing customer profile and account can be stored and looked up using the unique customer identifier in the customer profile database **404** that is connected to the identification and authentication controller **402**. The unique customer identifier can also link the existing customer account to a content provider customer account via a connection from the customer profile database **404** to the content provider customer profile database **502** in the content provider backend **308**, as shown in FIG. **5**. Zero, one, or more content provider customer accounts may be linked in the customer profile database **404** to the existing customer account for the article dispensing machines **230**. A content provider may include, but is not limited to, a cable television operator, a satellite television service provider, an IPTV (Internet Protocol television) provider, an online gaming and digital media delivery service (Xbox Live, PlayStation Network, OnLive, etc.), a website (YouTube, Hulu, etc.), a movie studio, a television network, a game publisher, or a retailer (Best Buy, Walmart, etc.). Media selections available from a content provider may include videos on demand, streaming videos, downloadable videos, streaming video games, or downloadable video games. The media

selections may be available through the A/V display interface **309** that is in communication with the content provider backend **308**.

The customer profile database **404** can contain information related to customers of the article dispensing machines **230**, including name, mailing and billing addresses, email addresses, phone and mobile numbers, username, password, payment methods, rental history, purchase history, preferred article dispensing machines, movie and video game genre preferences, customizations, subscriptions, parental controls, linked content provider accounts, content provider subscriptions and entitlements, and other data. A rental transaction can be personalized using information from the customer profile database **404** at the article dispensing machines **230** and a website interface **418**. For example, only certain genres and titles of DVDs, Blu-Ray discs, or video games could be shown if a customer sets particular preferences that are then stored in the customer profile database **404**. Some of the information stored in the customer profile database **404** may also be stored in the article dispensing machine database **282**. The customer profile database **404** may include a service which facilitates interfacing and communicating with a notification engine **406** and other components of the system backend **307**, for example.

The website interface **418** can be interactive and accessible to a customer using web browser software at an electronic device **306**. The website interface **418** may also include a mobile application or consumer electronics device application. Rentable media articles may be searched, browsed, and reserved on the website interface **418** for receipt at the article dispensing machines **230**. The location of and the inventory at article dispensing machines **230** can be viewed at the website interface **418**. Digital media selections from content providers, such as streaming, downloadable, and on-demand media, may also be searched, browsed, and accessed on the website interface **418**. A customer can access their customer profile on the website interface **418** for purposes of verifying and updating their personal information in the customer profile database **404**. For example, a customer can link an account they have with a content provider on the website interface **418** by specifying their username, password, account number, and/or other identifying information for the content provider account. The system backend **307** can utilize SAML (Security Assertion Markup Language), OAuth (Open Authentication), or other protocols to authenticate the identity of the customer at the content provider via a connection from the website interface **418** to the content provider identification and authentication controller **506** in the content provider backend **308**, as shown in FIG. **5**. If the identifying information matches the content provider account, the linkage to the content provider account can be stored in the customer profile database **404**.

An inventory database **412** may contain a catalog of physical media articles that may be rented at the article dispensing machines **230** and reserved at the website interface **418** for later receipt at the article dispensing machines **230**. A catalog of digital media selections available at the content provider can be contained in the metadata database **410**. Metadata for the media articles and media selections are stored in the metadata database **410**, including title, release date, running time, chapter information, technical details (resolution, audio options, languages, etc.), format, peripheral device requirements, number of players, online capability, actors, voice actors, director, studio, publisher, developer, platform, availability of downloadable content, episode information, genre, critic ratings, individualized ratings (reviews, recommendations, likes, etc.), parental ratings (MPAA, ESRB, TV Parental Guidelines, etc.), description, related content, media artwork, media stills, and other information.

Physical media articles that may be rented at the article dispensing machines **230** and digital media selections available at the content provider may be synchronized and mapped to one another by matching their respective metadata. As seen in FIG. **5**, a synchronization and mapping engine **414** connected to the customer profile database **404**, the metadata database **410**, and the content provider asset management system **504** in the content provider backend **308** may compare the metadata for the media articles and media selections to determine matches. Metadata in the content provider asset management system **504** for media selections can be compared to metadata in the metadata database **410** to perform the matching. For example, a combination of a title, release date, running time, and/or actor information can be used to map a media article to a corresponding media selection. In one embodiment, proprietary identification codes unique to a media article and a media selection can be used to map the media article to the corresponding media selection. The proprietary identification codes for the media article and the media selection can be stored in the metadata database **410** and the content provider asset management system **504**, respectively. Such proprietary identification codes can be assigned to media articles and media selections by third party providers such as Rovi, Baseline, and AMG.

A media selection at a content provider can be placed in the saved programs queue **604** on the A/V display interface **309**, as shown in FIG. **6**, by providing the appropriate instructions to the content provider asset management system **504** in the content provider backend **308**. Queuing a media selection may occur, for example, when a customer decides to purchase the digital media selection from the content provider in place of a physical media article at an article dispensing machine **230**.

An inventory database **412** can be connected to the article dispensing machine **230** and the metadata database **410** to provide information regarding the availability of media articles in the article dispensing machines **230**. In conjunction with a search engine **416**, the inventory database **412** and the metadata database **410** can provide inventory results for media articles and media selections to an A/V display interface application **602** on an A/V display interface **309**, as shown in FIG. **6**. Such results may include the availability of physical media articles at the article dispensing machines **230** as well as digital media selections available at a content provider. The results may also be provided to the website interface **418** or other websites operated by a content provider, for example. The synchronization and mapping engine **414** can store the information from the content provider asset management system **504** regarding media selections at the content provider in the metadata database **410**. The inventory database **412** can also supply the availability of media articles in the article dispensing machines **230** to the website interface **418** or to other portals, such as an application on a mobile device, when queried.

A metadata database watcher **408** can monitor the metadata database **410** for changes in metadata related to media articles and media selections. The metadata database watcher **408** can use customer watchlist subscriptions from a customer profile in the customer profile database **404** to determine what changes to monitor. The changes to the metadata can include inventory availability, content provider

availability, release schedules, and other information related to a particular title. The customer watchlist subscriptions can be used by the metadata database watcher **408** to monitor these changes in combination with information regarding particular actors, directors, and/or other metadata. When a change corresponding to a customer watchlist subscription is found by the metadata database watcher **408**, a notification engine **406** can transmit notifications and details of the change to the customer. The notifications may be sent via email, SMS, mobile application alerts, A/V display interface alerts, or other electronic channels.

A customer may also subscribe to be notified about new information and new media content related to their favorite actors, directors, titles, studios, and/or other parameters using customer notification subscriptions. Such information may include information related to live performances, television appearances, newspaper and magazine articles, blogs, and other content. A web crawler and data feed **420** can obtain this information by searching pertinent websites and through use of a public API connection to update the metadata database **410**. The customer can subscribe to this information about their favorites at the website interface **418**, for example. The metadata database watcher **408** monitoring the metadata database **410** can detect when there is a new piece of information about a favorite and transmit the desired notifications using the notification engine **406**.

An embodiment of a process **700** for importing ratings of media content is shown in FIG. **7**. The process **700** can result in the storage of the ratings of media content in a customer profile. The ratings may also be normalized and applied as a result of the process **700**. Media content may include, for example, physical media articles and digital media selections. A user may have generated user-generated ratings at one or more ratings sources, and the user-generated ratings may be imported and aggregated in the customer profile with user-generated ratings that have been set at other ratings sources. The customer profile may be stored in the customer profile database **404**.

In some embodiments, professional ratings from established critics, such as from ratings sources like newspapers, magazines, television shows, websites, and the like, may also be imported and aggregated with the user-generated ratings. The professional ratings may utilize the same or similar types of ratings systems as the user-generated ratings described below, e.g., a star rating, a numerical rating, a grade rating, a like/dislike rating, a thumbs up/thumbs down rating, a passive rating, or an age appropriateness rating. The professional ratings and user-generated ratings may be normalized separately or together in any combination, which may then be used to affect recommendations, browsing preferences, and/or sharing and display of the user-generated ratings, as described further below. The user may select which professional ratings, if any, will be imported, normalized, and/or aggregated.

The type of ratings may include, but are not limited to, a star rating, a numerical rating, a grade rating, a like/dislike rating, a thumbs up/thumbs down rating, a passive rating, or an age appropriateness rating. A user-generated rating can be a subjective assessment by a user indicating the user's satisfaction, enjoyment, and/or perception of the quality of a piece of media content. The user-generated rating may also be influenced by whether the user would recommend the piece of media content to others. For example, a user that enjoyed a particular movie because of the actors and the plot may rate that movie more highly than another movie with different actors and plot that the user did not enjoy watching. As another example, a user may give a lower rating to a particular video game that is difficult to play. The user-generated ratings may have been previously created by the user at a ratings source.

In particular, a user may generate a star rating by specifying a particular number of stars on a scale of one to five stars or some other minimum or maximum number of stars. Similarly, a user may generate a numerical rating by specifying a particular number on a scale of 1 to 5, 0 to 10, 0 to 100, or some other minimum or maximum number. A user may generate a grade rating by specifying a particular grade on a scale of A+ to F or some other minimum or maximum grade. The like/dislike rating and thumbs up/thumbs down rating can include ratings that specify a positive or negative assessment. The like/dislike rating and thumbs up/thumbs down rating may include multiple positive and negative levels or degrees to allow a user to more accurately specify the rating. The passive rating may include an action by a user that is implicitly taken as a sign of interest, such as viewing details of a piece of media content; watching, renting, or purchasing a piece of media content; or adding a piece of media content to a viewing or rental queue. The age appropriateness rating may include a binary rating or specification of an age threshold related to whether a piece of media content is appropriate for children of a certain age.

While the ratings are described above as on a linear scale along a single dimension, multi-dimensional ratings are also contemplated. Multi-dimensional ratings may include ratings of different aspects of a piece of media content along different dimensions, which can also be combined into an overall rating. For example, the plot of a piece of media content may be rated along one dimension, the acting of the piece of media content may be rated along a second dimension, and the cinematography of the piece of media content may be rated along a third dimension.

At step **702**, authentication information may be received at the central controller **302**. The authentication information may allow access to an account at a ratings source that supports the creation of user-generated ratings of media content, and/or access to a ratings source containing professional ratings. The ratings source may include a content provider (e.g., Redbox, Netflix, Hulu, Xbox Live, OnLive, etc.); a website, blog, or mobile application related to a website or blog (Flixster, Rotten Tomatoes, IMDb, Facebook, Metacritic, Amazon, Yahoo! Movies, Fandango, etc.); an A/V display interface **309** (e.g., TiVo digital video recorder (DVR), cable television set-top box, streaming media box, etc.); a content marketplace (e.g., iTunes Store, Android Market, Zune Marketplace, etc.); a trending topics source (e.g., Twitter Trending Topics, etc.); a most popular topics source (e.g., Wall Street Journal Most Popular, Yahoo! Most Popular, etc.); and/or other service, entity, application, or device that allows users to create ratings of media content. The authentication information may include a username and/or a password, for example. The central controller **302** may authenticate to the ratings source at step **704**, based on the authentication information received at step **702**. Authentication to the ratings source may be through a login to the website of the ratings source, through an application programming interface (API) associated with the ratings source, or through other methods. In the case of professional ratings, authentication to the ratings source may not be necessary using steps **702** and **704**, such as when the professional ratings are publically available.

The user-generated ratings that have been created at the ratings source may be imported at step **706**. Professional ratings may also be imported at step **706**. An embodiment of step **706** in the process **700** is shown in FIG. **13**. At step

1302, it is determined whether importation of the user-generated ratings and/or professional ratings is through an API associated with the ratings source or through data scraping techniques. If the communication with the ratings source is through an API, then the process **706** continues to step **1304** to initiate communication with the ratings source through the API. At step **1306**, commands conforming to the API of the ratings source are transmitted to the ratings source for retrieval of the ratings. The ratings are received from the ratings source through the API at step **1308**.

If the communication with the ratings source is not through an API at step **1302**, then data scraping of the ratings source can be performed at step **1310**. For example, the central controller **302** may first authenticate to the website of a ratings source at step **704** of the process **700**. Once authenticated, the central controller may gather the ratings from the website of the ratings source at step **1310** through one or more data scraping techniques. While there is not explicit permission from the ratings source to obtain these ratings, as opposed to the case of using an API, there is permission from the user to access the user's user-generated ratings from the ratings source. Various known data scraping techniques may be utilized at step **1310** to import the ratings.

Returning to FIG. **7**, the imported ratings may be stored at step **708** in the customer profile that is maintained in the customer profile database **404**. User-generated or professional ratings that already exist in the customer profile may be aggregated with the imported ratings at step **708**. The existing ratings and the imported ratings from step **706** may include the same or different types of ratings. The ratings in the customer profile may differ because the ratings sources from which the ratings came from utilize different types. For example, a TiVo DVR uses a thumbs up/thumbs down rating on a scale from three thumbs up to three thumbs down, the Flixster website utilizes a star rating with a scale from one to five stars, the Metacritic website uses a numerical rating on a scale from 0 to 10, and the IMDb website utilizes a star rating with a scale from one to ten stars.

At step **710**, the ratings may be normalized to produce a normalized rating for a piece of media content. The ratings may be normalized so that differing types of ratings are converted into a single consolidated rating for the piece of media content. An embodiment of step **710** in the process **700** is shown in FIG. **8**. At step **802**, the different types of ratings may be converted to a common numerical format. Converting the ratings to a common numerical format is useful because of the potential for the stored sets of ratings to be on different scales, e.g., 1 to 10, one to five stars, etc. For example, the common numerical format may be on a scale of 1 to 10. A thumbs up rating may be equal to 8 while a thumbs down rating may be equal to 3. Each star of a five star rating could be equal to 2, e.g., 3 stars=6, 5 stars=10, etc. Other conversions from a particular scale to a common numerical format are possible and contemplated.

The converted ratings may be weighted at step **804** so that a particular set of ratings from one ratings source is emphasized more than another set of ratings from another ratings source. The user may select particular sets of user-generated or professional ratings to weight or the weighting may be automatically selected according to predetermined settings. For example, a user may decide to weight a particular set of user-generated ratings if the user knows that he or she was more thoughtful or spent more time when creating that set of ratings. The ratings may also be weighted equally or not weighted. Finally, at step **806**, the converted weighted ratings may be averaged to produce a normalized rating for the piece of media content. The normalized rating may be stored for later use in the process **700**.

In some embodiments, ratings by a user for different formats of a particular piece of media content may be imported, stored, and normalized in the customer profile at steps **706**, **708**, and **710**. For example, the DVD version of a piece of media content may have been available prior to the streaming version of the same piece of media content. Accordingly, a user may have rated the DVD version at the ratings source with a first rating at the time of the DVD's availability, and then later rated the streaming version at the same or a different ratings source with a second rating at the time of the streaming version's availability. At steps **706** and **708**, the first and second ratings for this piece of media content may be imported and stored into the customer profile. The first and second ratings may be normalized at step **710**, such as by averaging the ratings, so that separate ratings for the same piece of media content are not stored.

Returning to FIG. **7**, the process **700** continues to step **712** where the user-generated and/or professional ratings may be applied to affect recommendations, browsing preferences, and/or sharing and display of the ratings. The ratings that are applied at step **712** may include the individually stored ratings from the ratings sources and/or the normalized rating produced at step **806**. An embodiment of step **712** in the process **700** is shown in FIG. **9**. At step **902**, it is determined whether a sharing request has been received from one or more users. A sharing request may be received from a user to request sharing of their user-generated ratings that are stored in their customer profile with other users. For example, a user may wish to share their individually stored user-generated ratings or their normalized rating with users that are friends. If a sharing request has been received at step **902**, then the ratings may be shared at step **912**. If a sharing request was not received at step **902**, or following step **912**, it is determined whether a display request has been received at step **904**. A display request may be received from a user to request the display of their ratings that are stored in their customer profile. The ratings may be displayed publically, to the user, or to other users, for example.

If a display request has been received at step **904**, then the ratings may be displayed at step **914**. The ratings can be displayed, for example, on an article dispensing machine **230**, a website interface **418**, an electronic device **306**, or an A/V display interface **309**. When ratings are displayed at step **914**, the ratings may be converted to an appropriate format for the display and system on which the ratings are being viewed on. For example, if the article dispensing machine **230** displays a five star rating and the normalized rating is on a scale of 1 to 10, then a rating between 5.0 and 6.9 may be displayed as three stars, a rating between 6.0 and 8.8 may be displayed as 4 stars, a rating of 8.9 and above may be displayed as 5 stars, etc. As another example, if the website interface **418** displays a like/dislike rating and the normalized rating is on a scale of 1 to 10, then a rating of 5.0 and above may be displayed as a like rating and a rating of 4.9 and below may be displayed as a dislike rating. Other conversions to an appropriate display format from the normalized rating are possible and contemplated. Following step **914**, or if a display request was not received at step **904**, the process **712** continues to step **906**.

One or more recommendations related to media content may be determined at step **906**, based on the user-generated and/or professional ratings. The recommendations may be based on the individually stored ratings and/or the normalized rating. In some embodiments, a user can subscribe or follow the user-generated ratings of other users and/or the

professional ratings from critics. The subscribed or followed ratings may be viewed by the user, or may be used as the basis for the recommendations.

One or more specific pieces of media content, including physical media articles and digital media selections, may be recommended based on the ratings. Recommendations may be determined using a k-nearest neighbor approach, collaborative filtering, a genome approach, or other methodologies, such as with systems including Jinni, Gravity R&D, IntroAnalytics, Adobe Recommendations (powered by Omniture), The Filter, and other systems. A genome approach, such as the approach used by Pandora Radio and the Music Genome Project, includes analyzing an entire library of content based on one or more objective measures, creating archetypes of users based on the analyzed content, assuming that a user is a particular archetype, and making recommendations that match that particular archetype. A transaction history of the user may also be utilized to determine recommendations of media content at step **906**. The transaction history may include, for example, the metadata related to media content that the user has rented, purchased, downloaded, or streamed. The transaction history may be retrieved from the customer profile in the customer profile database **404**, for example.

The determined recommendations may be displayed to the user at step **908**. The recommendations may be displayed on an article dispensing machine **230**, a website interface **418**, an electronic device **306**, or an A/V display interface **309**, for example. The recommendations may be additionally filtered so that only available media articles and available media selections are displayed. Determining a list of available media articles that are distributable from an article dispensing machine **230** is discussed in more detail below with reference to FIG. **11**. Determining a list of available media selections is discussed in more detail below with reference to FIG. **12**.

Following step **908**, browsing preferences may be determined at step **910**, based on the user-generated and/or professional ratings. The browsing preferences may be based on the individually stored ratings and/or the normalized rating. The determined browsing preferences may be stored in the customer profile, and can affect how a user browses through listings of media content. For example, if the user-generated ratings indicate that a user prefers a certain genre, then the user's browsing preferences may be set so that genre is only shown or is shown first. The browsing preferences may applied to listings of media content on article dispensing machine **230**, a website interface **418**, an electronic device **306**, or an A/V display interface **309**, for example.

Returning to FIG. **7**, the process **700** continues to step **714** where it is detected whether there has been a change in the ratings at a ratings source. The change in the ratings may include the addition, deletion, or modification of the ratings. If a change in the ratings is detected at step **714**, then the process **700** may return to step **706** to import the changed ratings, store the changed ratings in the customer profile at step **708**, normalize the ratings at step **710**, and apply the ratings at step **712**. If no change in the ratings is detected at step **714**, then the process **700** may return to step **712** to apply the existing ratings, as described above. In one embodiment, to detect a change in the ratings, the central controller **302** can periodically access the ratings source using the authentication information to retrieve the ratings and compare them to the existing ratings in the customer profile. In another embodiment, the central controller **302** can utilize the API associated with the ratings source to retrieve the ratings and compare them to the existing ratings in the customer profile to detect a change in the ratings. In a further embodiment, to detect a change in the ratings, the ratings source can transmit a signal to the central controller **302** signifying that a change in the ratings has occurred. The central controller **302** may then retrieve or receive the change(s) in the ratings.

In the case where the central controller **302** compares ratings to existing ratings to determine a change in the ratings at step **714**, the entire set or a subset of ratings may be compared. In one embodiment, a last modified timestamp may be associated with each of the ratings at the ratings sources such that it could be determined which of the ratings have changed rather than examining all of the ratings. In another embodiment, the central controller **302** could also create and store a hash table of the existing ratings and compare the hash table with a newly created ratings hash table upon accessing a ratings source to determine if there are any changes. If the hash tables match, then there is no change in the ratings, but if the hash tables differ, then there is a change in the ratings that can be subsequently retrieved.

An embodiment of a process **1000** for normalizing ratings of media content is shown in FIG. **10**. The process **1000** can result in the normalization of multiple user-generated and/or professional ratings of a piece of media content from multiple ratings sources. Media content may include, for example, physical media articles and digital media selections. The ratings may have been previously generated at one or more ratings sources, and the ratings may have been previously imported and stored in the customer profile. The customer profile may be stored in the customer profile database **404**. As described above, the type of ratings may include a star rating, a numerical rating, a grade rating, a like/dislike rating, a thumbs up/thumbs down rating, a passive rating, or an age appropriateness rating.

At step **1002**, the ratings can be retrieved from the customer profile. The ratings may have been previously imported and stored in the customer profile, such as through steps of the process **700** described above. The retrieved ratings may be converted to a common numerical format at step **1004**. At step **1006**, the converted ratings may be weighted so that a particular subset of ratings from one ratings source is emphasized more than another subset of ratings from another ratings source. The weighting may be automatically selected according to predetermined settings or the user may select particular sets of ratings to weight. Ratings may also be weighted equally or not weighted. Then, the converted weighted ratings can be averaged at step **1008** to produce a normalized rating for the piece of media content.

At step **1010**, it may be determined whether the normalized rating satisfies a predetermined criterion related to recommendations of media content. Normalized ratings for one or more pieces of media content may be utilized at step **1010**. The predetermined criterion may include a numerical threshold that the normalized rating must meet or exceed to result determining recommendations related to media content. If the normalized rating satisfies the predetermined criterion at step **1010**, then the recommendations of media content may be determined at step **1014**. Recommendations may be determined using a k-nearest neighbor approach, collaborative filtering, a genome approach, or other methodologies. For example, if the normalized rating for the movie Raiders of the Lost Ark meets or exceeds the predetermined criterion at step **1010**, then recommendations of media content based on that movie may be determined at step **1014**, such as the movies Romancing the Stone and

Indiana Jones and the Last Crusade, or the video game Lego Indiana Jones: The Original Adventures.

The determined recommendations may also be displayed at step **1014**, such as on an article dispensing machine **230**, a website interface **418**, an electronic device **306**, or an A/V display interface **309**. The recommendations may be additionally filtered so that only available media articles and available media selections are displayed. Determining a list of available media articles that are distributable from an article dispensing machine **230** is discussed in more detail below with reference to FIG. **11**. Determining a list of available media selections is discussed in more detail below with reference to FIG. **12**.

If the normalized rating does not satisfy the predetermined criterion at step **1010**, or following step **1014**, the process **1000** continues to step **1012**. At step **1012**, it may be determined whether the normalized rating satisfies a predetermined criterion related to browsing preferences. Normalized ratings for one or more pieces of media content may be utilized at step **1012**. The predetermined criterion may include a numerical threshold that the normalized rating must meet or exceed to result in a change to the browsing preferences of a user. The browsing preferences may be stored in the customer profile, and can affect how a user browses through listings of media content. If the normalized rating satisfies the predetermined criterion at step **1012**, then the browsing preferences may be determined at step **1016**. The browsing preferences may applied to listings of media content on article dispensing machine **230**, a website interface **418**, an electronic device **306**, or an A/V display interface **309**. For example, if the normalized ratings for the television show The A-Team and the movie Rocky III meet or exceed the predetermined criterion at step **1012**, then browsing preferences for the action genre and/or the actor Mr. T may be determined at step **1014**.

An embodiment of determining availability of physical media articles is shown in the process **1100** of FIG. **11**. The process **1100** may be implemented as part of step **906** of FIG. **9** or step **1014** of FIG. **10** if the recommended media content is a physical media article that may be available at an article dispensing machine **230**. The process **1100** may be performed alone or in addition to the process **1200** described below. At step **1102**, the location of one or more article dispensing machines **230** can be determined. The location(s) of the article dispensing machines **230** can be determined based on geographic proximity to the location where the customer or user is located, such as based on the address of the customer in the customer profile database **404**. The article dispensing machine **230** locations could also be determined based on a location that is manually entered by a user. The locations of the article dispensing machines **230** that are closest to the originating location may then be determined. The locations may be limited by a radius, city, town, zip code, or other limitation. The location of one or more specific article dispensing machines **230** may also be input by a user at step **1102**.

At step **1104**, the inventory database **412** can be queried to determine whether the media article is available at the locations of the article dispensing machines **230** determined at step **1102**. If the media article is available at one or more article dispensing machines **230** at step **1106**, then at step **1108**, the locations of those article dispensing machines **230** can be stored for use in determining the recommendations at step **906** in the process **712** or at step **1014** in the process **1000**. However, if the media articles are not available at any article dispensing machine **230** at step **1106**, then no available locations can be stored at step **1110**.

An embodiment of determining availability of digital media selections is shown in the process **1200** of FIG. **12**, including determination of an associated content provider and the availability of the media selections at the associated content provider. The process **1200** may be implemented as part of step **906** of FIG. **9** or step **1014** of FIG. **10** if the recommended media content is a digital media selection that may be available at a content provider. The process **1200** may be performed alone or in addition to the process **1100** described above. At step **1202**, a unique customer identifier may be received by the central controller **302**. The central controller **302** can match the unique customer identifier to a particular customer profile in the customer profile database **404**. The unique customer identifier could be a credit or debit card number processed through a hash function. The hashed credit or debit card number can be used to look up a customer profile in the customer profile database **404**. The unique customer identifier may also include a customer-provided identification of the associated content provider. The customer could also provide what content providers they are associated with, and optionally provide the specific subscription package they subscribe to, instead of providing a credit card number or account number. The unique customer identifier could also be a username and/or password to access the customer profile in the customer profile database **404**. The unique customer identifier may be received from an article dispensing machine **230** or an application running on an electronic device **306** or A/V display interface **309**.

At step **1206**, the central controller **302** can determine whether there is an associated content provider linked to the customer profile found at step **1204**. The customer profile in the customer profile database **404** may contain a linkage to an associated content provider. If there is not a content provider associated with the customer profile at step **1206** or if no unique customer identifier is found in the customer profile database **404** at step **1204**, the customer may provide the linkages of content providers at step **1208**. The customer profile in the customer profile database **404** can include information obtained from the content provider customer profile database **502** in the content provider backend **308**, such as an account number, email address, subscription information, and other information related to the customer's content provider customer profile.

If there is a content provider associated with the customer identifier at step **1206**, the process continues to step **1210** where subscription information at the content provider for the customer is retrieved from the customer profile database **404**. The customer profile database **404** may contain subscription and entitlement information that was previously received from the content provider customer profile database **502** in the content provider backend **308**. Subscription information at the content provider can include the customer's subscribed service package, premium channel content the customer entitled to access, zip code and address for possible geographical content restrictions, parental authorization and controls for age authentication, and other subscriber information. The subscription information may be used by the central controller **302** at step **1212** when determining the availability of media selections for the customer at particular content providers. Step **1210** is also performed following step **1208** when a customer has entered a linkage to a content provider.

At step **1212**, the central controller **302** determines whether the media selections are available at a content provider that is linked to the customer. In addition to determining whether the media selections are available at a linked content provider, the central controller **302** can deter-

mine at step **1212** whether the customer has permission to access the media selection based on the subscription information in the customer profile database **404** that was previously obtained at step **1210**.

A customer may be entitled to access a digital media selection for free, such as when the media selection is already available within the customer's subscription package, or when the media selection is publicly available. In other cases, a customer may only have access to a media selection by providing additional payment, such as when the customer's subscription package does not allow access to the media selection or when the media selection is only available at an a la carte content provider. For example, if the customer's subscription package allows access to Home Box Office (HBO) content and the media selection is available through HBO, then the customer will have access to the media selection without additional payment. As another example, if the customer's subscription package only allows access to Showtime content and the media selection is only available through HBO, then the customer will not have access to the media selection. In this case, the customer may have the option to upgrade their subscription package to include HBO or utilize an a la carte content provider for an additional payment. As a further example, if the customer is a Comcast subscriber and the media selection is available as a free video-on-demand selection on Comcast, then the customer will have access to the media selection without additional payment. However, if the media selection is only available through Hulu Plus, then the customer will not have access to the media selection unless the customer provides additional payment.

Therefore, if the media selection is available at a linked content provider at step **1212**, then at step **1214**, the media selections and associated content providers can be stored for use in determining recommendations at step **906** in the process **712** or at step **1014** in the process **1000**. If the media selection is not available at a linked content provider at step **1212**, then the central controller **302** can obtain other content provider options, if any, at step **1216**. Other content provider options may include a la carte content providers such as Amazon Instant Video, iTunes Store, YouTube, VUDU, and other services that allow a user to individually purchase media without requiring a subscription. Further content provider options that may be obtained at step **1216** include retailers that grant rights to a digital media selection in conjunction with the purchase of a physical item (e.g., Best Buy, Walmart, etc.), movie studios, television networks, video game developers, and online gaming delivery services (Xbox Live, PlayStation Network, OnLive, etc.). For example, a video game may be available from an online gaming delivery service for download, such as from Xbox Live or the PlayStation Network, or for streaming, such as from OnLive. If other content providers are available for the media selection, the media selection and the associated a la carte content provider(s) may be stored at step **1214**.

Any process descriptions or blocks in figures should be understood as representing modules, segments, or portions of code which include one or more executable instructions for implementing specific logical functions or steps in the process, and alternate implementations are included within the scope of the embodiments of the present invention in which functions may be executed out of order from that shown or discussed, including substantially concurrently or in reverse order, depending on the functionality involved, as would be understood by those having ordinary skill in the art.

It should be emphasized that the above-described embodiments of the present invention, particularly, any "preferred" embodiments, are possible examples of implementations, merely set forth for a clear understanding of the principles of the invention. Many variations and modifications may be made to the above-described embodiment(s) of the invention without substantially departing from the spirit and principles of the invention. All such modifications are intended to be included herein within the scope of this disclosure and the present invention and protected by the following claims.

The invention claimed is:

1. A method of aggregating ratings with computer(s) having processor(s) and memory, the method comprising, with the processor(s):

accessing a source of ratings;

determining whether the accessed source of ratings has authorized importation of the ratings by the processor(s) via an API;

(1) when the source of ratings has authorized importation of the ratings by the processor(s) via the API: importing the ratings from the source of ratings via the API,

(2) when the source of ratings has not authorized importation of the ratings by the processor(s) via the API: importing the ratings from the source of ratings via one or more data scraping techniques;

saving the imported ratings in a database;

hashing the imported ratings to generate one or more first hashes;

re-accessing the source of ratings;

hashing the re-accessed ratings to generate one or more second hashes;

comparing the first hashes to the second hashes, and when the first hashes differ from the second hashes: updating the saved imported ratings in the database with the re-accessed ratings.

2. The method of claim **1**, wherein the source of ratings includes multi-dimensional ratings for a single title.

3. The method of claim **1**, including, with the processor(s):

accessing multiple sources of ratings;

importing ratings from multiple sources of ratings;

saving the ratings from the multiple sources of ratings in the database;

normalizing the saved ratings to a common scale.

4. The method of claim **3**, including, with the processor(s):

associating each of the normalized ratings with a particular title;

for each particular title: averaging the associated normalized ratings to generate a single normalized rating.

5. The method of claim **4**, wherein the averaging is performed according to a formula that gives more weight to normalized ratings from a first source of ratings and less weight to normalized ratings from a second source of ratings.

6. The method of claim **4**, including, with the processor(s):

receiving a ratings display request;

accessing one or more normalized ratings;

formatting the one or more normalized ratings based on the ratings display request.

7. The method of claim **1**, including, with the processor(s):

retrieving credentials from a database;

accessing a content source with the retrieved credentials;

determining titles available on the content source;

storing a list of the available titles on the database.

8. The method of claim 7, including, with the processor(s):

generating a list of recommended titles based on: (a) the updated saved imported ratings and (b) the list of the available titles stored in the database.

9. The method of claim 1, including, with the processor(s):

comparing the first hashes to the second hashes, and when the first hashes match the second hashes: discarding and deleting the re-accessed ratings.

10. The method of claim 1, including, with the processor(s):

prior to saving the imported ratings in the database, determining whether the ratings from the source of ratings include a plurality of ratings for a single title, and if the determination is positive, combining the plurality of ratings for the single title into a combined rating; and

wherein the step of saving the imported ratings in the database includes, for each title with a plurality of ratings from the source of ratings, saving the combined rating in the database and discarding the plurality of ratings.

11. The method of claim 1, wherein at least one of the imported ratings includes a user transaction history.

12. A system comprising:

a central server with a first processor and a first memory, the first processor to cause the central server to:

access a plurality of sources of ratings of media content;

for each one of the plurality of sources of ratings, determine whether the central server is authorized to import the ratings via an API;

when the central server is authorized to import the ratings via an API, import the ratings from the source of ratings via the API, and when the central server is not authorized to import the ratings via the API, import the ratings from the source of ratings via one or more data scraping techniques;

save the imported ratings in a database;

hash the imported ratings to generate a first hash;

calculate combined ratings for the media content based on the imported ratings in the database;

re-access the source of ratings;

hash the re-accessed ratings to generate a second hash;

compare the first hashes to the second hash;

in response to the first hash differing from the second hash: updating the saved imported ratings in the database with the re-accessed ratings and recalculating the combined ratings; and

an article dispensing machine with a second processor and second memory, the second processor to cause the article dispensing machine to:

receiving the combined ratings for the media content from the central server;

display a selection of the media content based on the combined ratings and which media articles corresponding to the media content are located within the article dispensing machine; and

in response to receiving a selection of one of the displayed media content, dispense the corresponding media article.

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