(19) **United States**

(12) **Patent Application Publication** (10) Pub. No.: **US 2010/0104258 A1**

Amsterdam et al. (43) **Pub. Date:** **Apr. 29, 2010**

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(21) Appl. No.: **12/259,906**
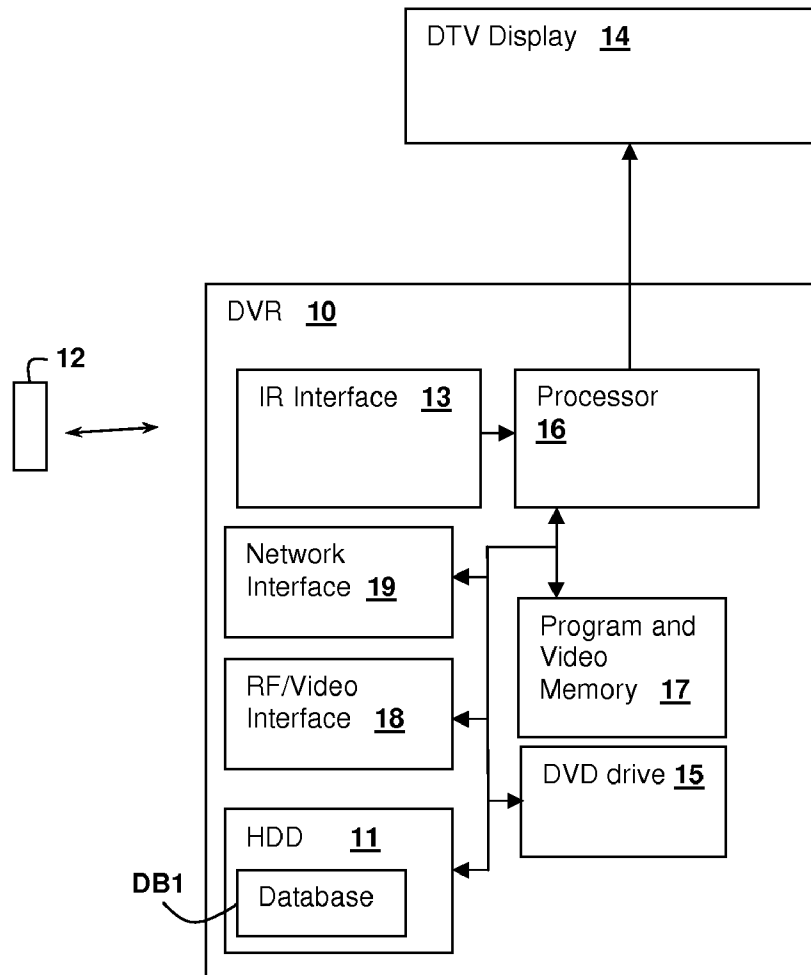
(57) **ABSTRACT**

A method, digital video recording (DVR) device/system and computer program provide a mechanism for recording video content associated with unpredictable events. A user specifies particular event classifications, keywords, or other control parameters from which the occurrence of an event can be determined, and when such event is detected, the DVR is triggered to record content from a specified channel/location. The events can be detected from feeds such as RSS feeds, websites, video content scans or other mechanisms. The event detection may be provided by a remote service that is accessible for user-configuration via a network, or the event detection may be performed in a DVR device or local computer system.

DTV Display   **14**

DVR   **10**

12

IR Interface   **13**

Processor **16**

Network Interface **19**

Program and Video Memory   **17**

RF/Video Interface **18**

DVD drive **15**

HDD   **11**

DB1

Database

Fig. 1

Fig. 2

Web/event
service   **32**

DB3

Database

DVR **36**

Internet
connection
30

Broadcast
Provider

34

Fig. 3

Start

User specifies location (feed, web page, etc.) of event data and event or event type indicators. Store location and event indicators in database.   **40**

User specifies channel and optionally duration to record in response to event detection. Store channel and duration in database   **41**

Event detected?
42   N

Y

Retrieve channel and optionally duration for recording associated with event in database   **43**

Send command to DVR to record channel for duration   **44**

End

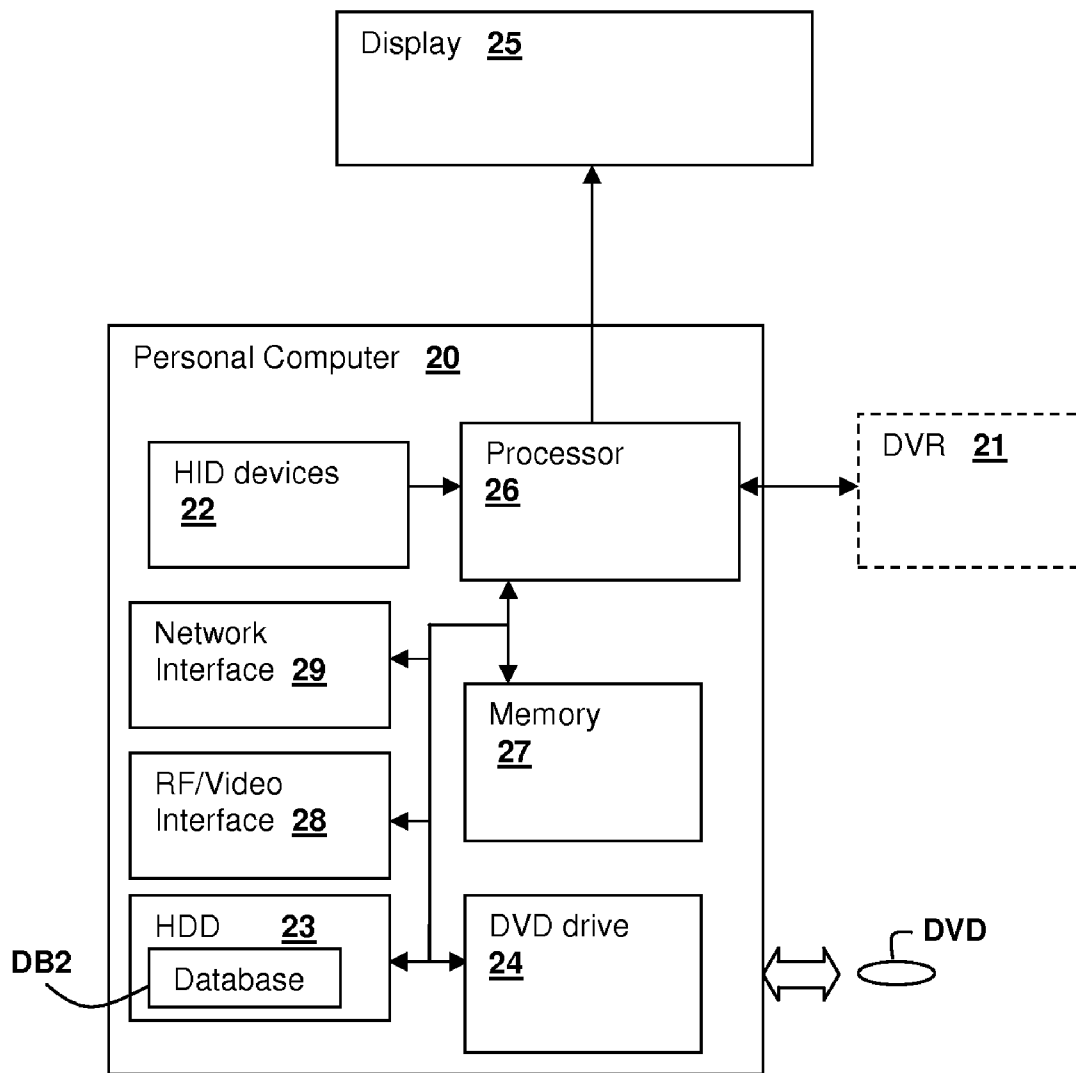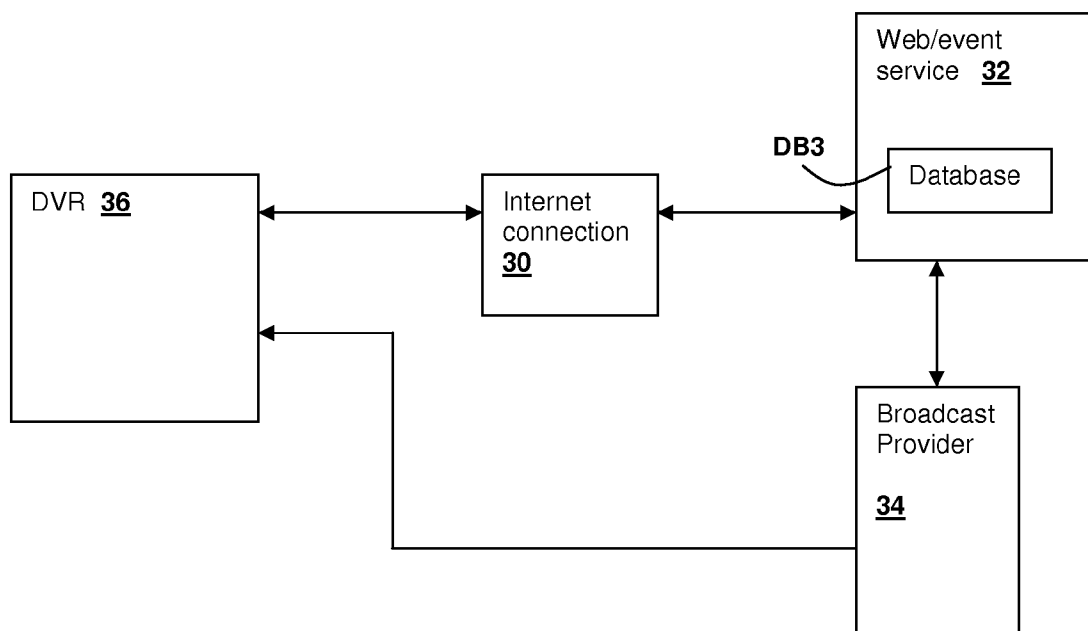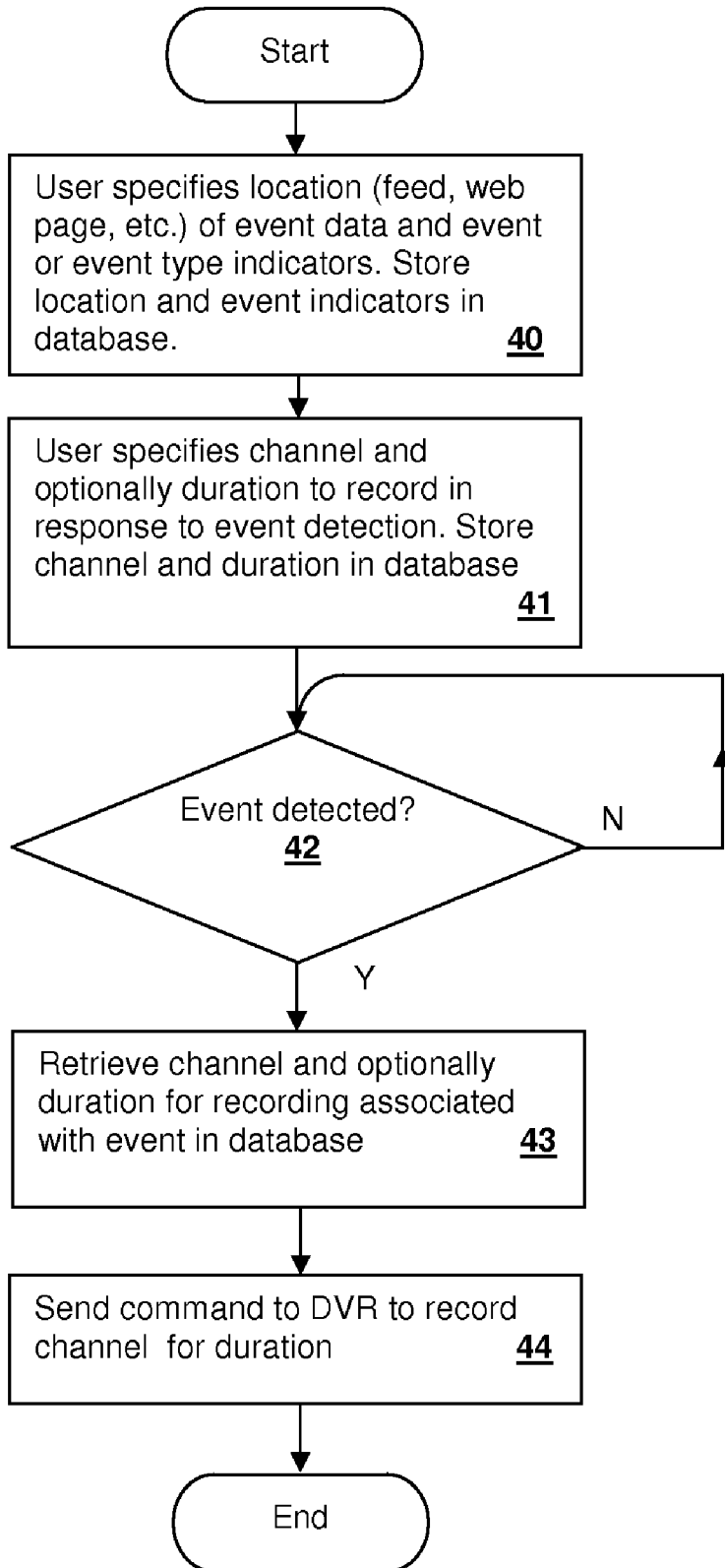**Fig. 4**

USER-SPECIFIED EVENT-BASED REMOTE TRIGGERING OF A CONSUMER DIGITAL VIDEO RECORDING DEVICE

BACKGROUND OF THE INVENTION

[0001]   1. Field of the Invention

[0002]   The present invention is related to consumer digital video recording devices (DVRs), and more particularly to a method, system and DVR that trigger recording in response to user-specified events.

[0003]   2. Description of Related Art

[0004]   Digital video recorder (DVRs), which may be in the form of a portable device such as a personal video recorder (PVR), a set-top box or a computer having a video interface and/or video capability provided from a digital or analog network source are becoming ubiquitous in households and other locations.

[0005]   Remotely controlled recording and DVR management on both local area networks and via the Internet have been proposed for web-based and application-based program guide software and the like. However, there are conditions under which a DVR/PVR user might want to record a particular broadcast program or capture other video sources having content that is of interest, but the timing and/or occurrence of which are unpredictable. For example, the DVR/PVR user might be viewing another program and therefore is unable to notice the availability of interesting content on another channel, or the user may be away from their DVR/PVR when an event and/or sporadic content transmission occurs.

[0006]   The only presently known alternative to recording the above-described content is to consistently record particular programs or to record a large amount of video data and search through the recorded content to find the content of interest. Since most systems designed for time-shifting or pre-programmed recording only capture a single channel at a time, content of particular interest can be easily missed by such systems. Further, a large amount of re-writable storage or a large number of non-rewritable media can be consumed by such recording.

[0007]   Therefore, it would be desirable to provide a method and system that can trigger a DVR/PVR to record content of interest without requiring pre-programming of channels and recording times and without relying on a time-shifting type recorder that may only record a single channel.

BRIEF SUMMARY OF THE INVENTION

[0008]   The invention is embodied in a method, a digital video recording device (DVR), and a computer program product. The computer program product may be a server application, an application executing within a DVR, or an application executed by a general-purpose computer such as a personal computer. The digital video recording device may be a personal video recorder (PVR), set-top box, personal computer, or any other device that provides recording of video content.

[0009]   A user specifies event detection control parameters that select particular event types that are associated with content of interest. The control parameters may be keywords, numerical criteria such as stock or index prices/volume, uniform resource locators (URLs) and associated specifiers that permit detection of content changes at a specified URL, content embedded within a feed such as a Really Simple Syndication (RSS) feed, or any other event-specifying object or data that will permit a software application to determine whether or not an event of interest has occurred. In response to detection of an event, the DVR is directed to record content from a particular channel, URL, or other selectable video source. The video source for recording may be specified by an event type classifier, may be a fixed pre-specified source, or may be determined from the detected content. The end time for recording may be pre-specified, determined from the type of event and/or selected video source, may be determined from the video source itself, or from the detected content.

[0010]   The event detection may be performed locally, within the DVR device or a system such as a personal computer, or the event detection may be performed by a service configurable via a network that delivers trigger information to a local system or DVR device.

[0011]   The foregoing and other objectives, features, and advantages of the invention will be apparent from the following, more particular, description of the preferred embodiment of the invention, as illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

[0012]   The novel features believed characteristic of the invention are set forth in the appended claims. The invention itself, however, as well as a preferred mode of use, further objectives, and advantages thereof, will best be understood by reference to the following detailed description of the invention when read in conjunction with the accompanying Figures, wherein like reference numerals indicate like components, and:

[0013]   FIG. 1 is a block diagram illustrating a digital video recorder (DVR) in accordance with an embodiment of the present invention.

[0014]   FIG. 2 is a block diagram illustrating a digital video recorder (DVR) in accordance with another embodiment of the present invention.

[0015]   FIG. 3 is a block diagram illustrating a system in accordance with an embodiment of the present invention.

[0016]   FIG. 4 is a flowchart of a method in accordance with an embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0017]   The present invention relates to systems that trigger recording in digital video recorders (DVRs). In order to provide the capability to capture information (e.g., news programs) relevant to unpredictable/sporadic events, a user selects events or event types and a data source. The user further specifies a channel and/or program for recording in response to detection of the event, and optionally a start/stop time or duration. A program detects the events or events matching an event type in the data source and triggers the DVR to record the specified program/channel. The events may be specified by keywords or other data matching criteria such as a numeric range, e.g., for matching stock/index prices, weather temperature, etc. The matching and configuration can be performed in a web service that triggers one or more enrolled DVRs, or can be performed locally in the DVR or a connected computer system. The events can be detected in a variety of network data sources, e.g., in response to an RSS feed or timed "scraping" of a web page to detect changes corresponding to the event or event types.

[0018]   Referring now to FIG. 1, a digital video recorder (DVR) 10, in accordance with an embodiment of the inven-

tion, is shown. DVR **10** is connected to an external digital television (DTV) display **14**, but DVR **10** may alternatively be a portable device having an integral display. A remote control **12** is used to control operation of DVR **10**, in the exemplary embodiment according to methods of the present invention, in order to provide user input. However, it is understood that other user input methodologies can be employed, such as buttons and other controls integral to DVR **10**. DVR **10** includes an infrared (IR) interface **13** for receiving commands from remote control **12**, a processor **16** for executing program instructions that trigger recording in response to detected events in accordance with methodologies described in further detail below, and also provides control and other functionality as generally associated with DVR operations. A program and video memory **17** is coupled to processor **16** for storing data and program instructions, including program instructions in accordance with a computer program product embodiment of the present invention. A radio-frequency (RF)/video interface **18** receives video signals or RF signals from broadcast, closed-circuit or other video streaming sources and provides them for selection by processor **16** for ultimate display by DTV display **14**. A network interface **19** provides connection to public or private networks such as the Internet, for receiving information such as RSS feeds or other feeds associated with programs received from RF/Video interface **18**. DVR **10** can also be configured to detect keywords or other indicators, such as numeric values located in data sources such as web pages or other files specified by Uniform Resource Locators (URLs). Network interface **19** may also be specified as a video source, receiving video streams (e.g., MPEG streams) at the specified URLs or other URLs. A digital versatile disc (DVD) drive **15** and hard disk drive (HDD) **11** are also included in DVR **10** both for recording video program and other information. A database DB1 within HDD **11** stores user specified event indicators and data sources, so that DVR **10** can, for example, automatically enroll in and examine feeds or periodically check for keywords or other indicators within data at specified URLs.

[0019] Referring now to FIG. **2**, a DVR in accordance with another embodiment of the invention is illustrated, in the form of a personal computer system **20**. The DVR is implemented by personal computer **20**, which includes a processor **26** coupled to a memory **27** for storing program instructions including program instructions for implementing a DVR, for example by executing a third-party DVR program. Memory **27** further includes program instructions for carrying out techniques in accordance with the present invention, which may be integrated in such DVR program, or may be provided by a stand-alone application or plug-in that triggers video recording. In an alternative embodiment, a stand-alone DVR **21**, may be interfaced to personal computer **20**, with an application or service within personal computer **20** providing detection of events from specified data sources and triggering recording by DVR **21** in response to the detection of the events. The application or service program may be loaded into memory **27** or HDD **23** from a DVD drive **24** from a media forming a computer program product in accordance with an embodiment of the present invention, such as DVD disc DVD. In order to receive video information from closed-circuit or broadcast sources, personal computer **20** includes an RF/Video interface **28**. However, techniques in accordance with an embodiment of the present invention can be performed with respect to video received from a network interface **29** and RF/Video interface **28** is not required in such

embodiments. Personal computer **20** also includes a human interface device (HID) interface **22** for connection of HIDs, such as keyboards and pointing devices. Personal computer **20** is also illustrated as connected to an external display **25**. However, if personal computer **20** is a laptop, tablet or other integrated device, display **25** will generally be internal to personal computer **20**. An application or service executing within personal computer **20** provides the configuration of event/event type indicators and channels as described above with respect to FIG. **1** and can trigger recording of video information received at RF/Video interface **18** or network interface **19** to HDD **23** or DVD drive **24** in response to detection of an event of interest. A database DB2 within HDD **23** stores the user-specified event indicators and data sources, so that personal computer **20** can, for example, automatically enroll in and examine feeds or periodically check for keywords or other indicators within data at specified URLs. Alternatively, as mentioned above personal computer **20** may trigger an external DVR device to record specific channels in response to detecting an event.

[0020] Referring now to FIG. **3**, a networked system in accordance with an embodiment of the present invention is shown. A DVR, such as DVR **36**, as illustrated in FIG. **1**, receives signals from one or more broadcast providers **34**, through one or more channels as mentioned above, e.g., RF broadcast, satellite broadcast and/or closed-circuit cable. DVR **36** may also receive video information from a generic network data source, such as an Internet connection **30** or other network connection, which may also carry video data from broadcast provider **34**, obviating any need for an RF/Video connection. The above-described data sources from which events are detected can be provided from broadcast provider **34** or any other Internet data source via Internet connection **30** or may be encoded along with video/RF information received directly from broadcast provider **34**. For example, broadcast provider **34** may provide RSS feeds available through Internet connection **30** directly, or may encode them in out-of-video-band information, for example, an informational or news video channel. If broadcast provider **34** provides feeds from which events can be detected, generally the channel of interest with respect to those events will be specified. When the data source is an arbitrary Internet data source, then the user will generally specify a channel associated with an event or event type, unless the data source also includes channel/program information. A web/event service **32** may provide all of the event detection/user configuration described above with reference to FIGS. **1** and **2** and direct DVR **31** to record particular video program channels when specified events are detected at web/event service **32**. Web/event service **32** accesses a database DB3 to store and retrieve event indicators, data sources, specified channels for each of multiple users having accounts on the system. DVR **10** is identified, e.g., by a network address specific to DVR **10**, which is also stored in database DB3, and record or schedule-record commands are transmitted to DVR **10** from web/event service **32**. The depicted system is only exemplary and is intended to illustrate various locations for providing event data and video programs. However, it is understood that other techniques and system configurations may be applied in accordance with other embodiments of the present invention and the particular system configuration should not be construed as limiting the possible system configurations, data sources and end-user appliances that implement techniques in accordance with the present invention.

[0021] Referring now to FIG. 4, a method according to an embodiment of the present invention is illustrated in a flowchart. First, a user specifies a data source as a location for event data and an event or event type (e.g., particular keywords) and the location and event information are stored in a database (step 40). The user also specifies a channel and optionally a duration to record in response to detection of the event specified in step 40 and the channel and duration are stored in the database (step 41). When the event is detected in the data source (decision 42), the channel and optional duration are retrieved from the database (step 43) and a command is sent to the DVR to record the channel for the specified duration (step 44). As an example, the user may specify one data source as an RSS XML feed that encodes stock price information as textual and numeric information including stock prices, volumes and stock identifier. The user may specify, in step 40, that the DVR should record a financial news channel for 30 minutes upon detecting that the price of XYZ corporation (symbol "XYZC") stock reaches $100. The local event detecting program (e.g., in DVR 10 of FIG. 1 or personal computer 20 of FIG. 2) or service provider server program (e.g., at web/event service 32 of FIG. 3) receives the RSS feed, detects symbol "XYZC" and extracts current stock price information. If the current stock price is greater than or equal to $100, then the DVR is programmed to record the financial news channel for 30 minutes.

[0022] While the invention has been particularly shown and described with reference to the preferred embodiments thereof, it will be understood by those skilled in the art that the foregoing and other changes in form, and details may be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. A method of triggering a digital video recording device, comprising:

receiving user input specifying event types or unscheduled events of interest to a user of the digital video recording device;

detecting particular data provided from a remote dynamic data source indicating that a detected event matching one of the specified event types or unscheduled events has occurred or will occur in a time substantially proximate to a time of the detecting; and

in response to detecting the particular data, triggering the digital video recording device to record video from a specified video source.

2. The method of claim 1, wherein the remote dynamic data source provides data encoding textual information, and wherein the user input specifies keywords for matching the textual formation to detect mentions of the event types or unscheduled events of interest.

3. The method of claim 2, wherein the remote dynamic data source is a feed from a remote network.

4. The method of claim 1, wherein the remote dynamic data source provides data encoding numeric information, and wherein the user input specifies at least one numeric threshold for a value within the numeric information, and wherein the detecting particular data comprises detecting that the value has crossed the at least one numeric threshold.

5. The method of claim 1, wherein the detected particular data further includes information indicating a particular video source, and wherein the method further comprises selecting the particular video source prior to the triggering.

6. The method of claim 1, further comprising selecting the particular video source in conformity with a classification of the one of the event types or unscheduled events matching the detected event.

7. A system for recording digital video, comprising a processor for executing program instructions and a memory for storing the program instructions, wherein the program instructions comprise program instructions for:

receiving user input specifying event types or unscheduled events of interest to a user of the digital video recording device;

detecting particular data provided from a remote dynamic data source indicating that a detected event matching one of the event types or unscheduled events has or will occur in a time substantially proximate to a time of the detecting; and

in response to detecting the particular data, triggering the digital video recording device to record video from a specified video source.

8. The system of claim 7, wherein the remote dynamic data source provides data encoding textual information, and wherein the user input specifies keywords for matching the textual formation to detect mentions of the event types or unscheduled events of interest.

9. The system of claim 8, wherein the remote dynamic data source is a feed from a network, and wherein the system further comprises an interface for coupling the processor to the network.

10. The system of claim 7, wherein the remote dynamic data source provides data encoding numeric information, and wherein the user input specifies at least one numeric threshold for a value within the numeric information, and wherein the program instructions for detecting particular data comprise program instructions for detecting that the value has crossed the at least one numeric threshold.

11. The system of claim 7, wherein the detected particular data further includes information indicating a particular video source, and wherein the program instructions further comprise program instructions for selecting the particular video source prior executing the program instructions for triggering.

12. The system of claim 7, further comprising program instructions for selecting the particular video source in conformity with a classification of the one of the specified events or event types matching the detected event.

13. The system of claim 7, wherein the processor and memory are a server processor and a server memory coupled to multiple digital video recording devices via a wide-area network, wherein the program instructions for receiving user input receive the user input from a network portal, and wherein the program instructions for triggering comprise program instructions for:

determining a particular one of the multiple digital video recording devices for which the event types or unscheduled events of interest were specified; and

transmitting a message to the particular digital video recording device to commence recording.

14. The system of claim 7, wherein the processor and memory are a processor and memory within a consumer digital video recorder, and wherein the consumer digital video recorder includes an interface for coupling the digital video recorder to the remote data source.

15. A computer program product comprising a computer-readable storage media system encoding program instruc-

tions for execution by a processor, wherein the program instructions comprise program instructions for triggering digital video recording, wherein the program instructions comprise program instructions for:

    receiving user input specifying event types or unscheduled events of interest to a user of the digital video recording device;

    detecting particular data provided from a remote dynamic data source indicating that a detected event matching one of the event types or unscheduled events has or will occur in a time substantially proximate to a time of the detecting; and

    in response to detecting the particular data, triggering the digital video recording device to record video from a specified video source.

16. The computer program product of claim 15, wherein the remote dynamic data source provides data encoding textual information, and wherein the user input specifies keywords for matching the textual formation to detect mentions of the event types or unscheduled events of interest.

17. The computer program product of claim 16, wherein the remote dynamic data source is a feed from a network, and wherein the system further comprises an interface for coupling the processor to the network.

18. The computer program product of claim 15, wherein the remote dynamic data source provides data encoding numeric information, and wherein the user input specifies at least one numeric threshold for a value within the numeric information, and wherein the program instructions for detecting particular data comprise program instructions for detecting that the value has crossed the at least one numeric threshold.

19. The computer program product of claim 15, wherein the detected particular data further includes information indicating a particular video source, and wherein the program instructions further comprise program instructions for selecting the particular video source prior executing the program instructions for triggering.

20. The computer program product of claim 15, further comprising program instructions for selecting the particular video source in conformity with a classification of the one of the specified events or event types matching the detected event.

*   *   *   *   *