developed for transmitting collected user data to the data collection facility.

If desired, the gathered information on the user may be reported to the data collection facility using communications functions that are part of an existing web browser implemented on user equipment 18. For example, the gathered information may be sent to the data collection facility using the forms capabilities of a web browser. If desired, such capabilities may be accessed directly by the reporting application (e.g., the program guide) without displaying forms on the display of the user equipment. Alternatively, keystrokes or a clickstream or other inputs for the browser's forms may be generated by the program guide automatically to emulate the commands that would be provided by the user should the user need to use such capabilities.

Another way in which the user information may be transmitted to the data collection facility is using the existing communications capabilities of the operating system installed on user equipment 18. If a web browser or stand-alone file transfer protocol (FTP) application is provided on user equipment 18, the user information may be transmitted to the data collection facility using FTP techniques.

At step 132, after the data collection facility has received the information on the user, the data collection facility may analyze the information on the user and other users. This analysis may be used to determine the rates to charge for interactive advertising in the interactive television program guide, which types of advertisements should be

displayed, whether certain types of interactions with the interactive television program guide are correlated with certain user interests in television programming, or for other marketing or business purposes.

If desired, the user may be notified before information on the user is transmitted to the data collection facility. This is shown in FIG. 10. At step 134, the user's interactions with the interactive television program guide and other activities (e.g., television watching activities) may be monitored.

At step 136, the user may be provided with an opportunity to authorize the submission of a report containing information on the user's interactions with the interactive television program guide an other user activities. If the user does not authorize submission of the report, the report may not be submitted for processing. If, however, the user authorizes submission of the report at step 136, the report may be provided to the data collection facility at step 138 using e-mail protocols, browser communications protocols, FTP protocols, etc.

At step 140, the data collection facility may analyze the information that has been gathered on the user.

One way in which the user may be provided with an opportunity to authorize the release of the information gathered on the user is shown in FIG. 11. In the screen 142 of FIG. 11, the user has been sent an e-mail 144 with an attachment 146. The attachment 146 may be automatically generated and may be a report containing information on the user's monitored interactions with the program guide and other

activities. The e-mail may be generated by the program guide or other application used for monitoring the user (e.g., an application that is installed on the user's set-top box). The reply address in the e-mail may be automatically set to that of the data collection facility. Accordingly, when the user responds to the e-mail on the screen of the user equipment the response may be automatically routed to the data collection facility. The user need not memorize the correct e-mail address for the data collection facility. The ability to place the correct address in the reply address field may be supported by standard e-mail applications. If desired, e-mail 144 may contain text 148 that asks the user to reply.

Illustrative steps involved in sending a report to the data collection device using an arrangement such as shown in FIG. 11 are shown in FIG. 12. At step 150, the program guide may generate an e-mail. Information that has been collected on the user may be embedded into the e-mail or may be attached to the e-mail in the form of a report.

At step 152, the e-mail may be sent to the user using the program guide to access e-mail functions of an e-mail application installed on the user equipment 18 or using the program guide to perform e-mail functions. The reply e-mail address for the e-mail may be automatically set to the e-mail address of the data collection facility.

At step 152, the user may be allowed to reply to the e-mail. For example, a reply button may be provided. The user may select the reply button, which directs an e-mail application on the user equipment or

the program guide to send the e-mail to the data collection facility at step 156. The approach of FIGS. 11 and 12 in which the user is provided with an opportunity to authorize the transmission of the report to the data collection facility may be used, for example, in situations in which the user has agreed with a data collection agency to allow their households data to be monitored (e.g., in return for a fee).

If desired, the program guide may provide the user with a screen 158 containing a notification 160 of the type shown in FIG. 13. If the user responds by selecting yes option 162, the program guide may submit the report to the data collection facility. If the user responds by selecting no option 164, the program guide will not submit the report.

If desired, the user may be provided with an opportunity to adjust data reporting settings using program guide setup screens or the like. For example, if the user selects set up option 120 of FIG. 7, the program guide may display a screen such as program guide settings screen 166 of FIG. 14. Screen 166 may include audio settings option 168 and video settings option 170 that allow the user to adjust the audio and video settings of the program guide or the user's set-top box or other user equipment. Language settings option 172 may be used to change the default language used for program guide text or audio tracks for programs that have multiple audio tracks. The user may select parental control settings option 174 to adjust settings related to program blocking (e.g., based on rating, keyword, etc.) or title blocking (e.g., in the program guide listings grids).

The program guide may also provide an option such as personalization settings 176. If the user selects option 176, the program guide may provide the user with a screen such as screen 178 of FIG. 15. Screen 178 may contain options related to the collection and transmission of data on the user's activities in the program guide. The user may use right and left remote control keys or other suitable user interface arrangement to select between various entries for each option (e.g., the user may press a right remote control arrow key to select an on option and may press a left remote control arrow key to select an off option). The user may use up and down remote control arrow keys or any other suitable user interface to select between various options. A highlight region may be used to indicate the user's current position in the options of screen 178 and other program guide screens.

The user may toggle option 180 to turn the reports collection feature on or off. For example, if the user desires to have information on the user's television viewing activities and other information on the user's activities reported to a data collection facility, the user may turn option 180 on. If the user desires not to have information on the user's television viewing activities and other user activities collected or reported to the data collection facility, the user may turn option 180 off.

If the reports function is turned on, the user may be provided with an opportunity to adjust the frequency with which reports are transmitted to the data collection facility using option 182. The user

may, for example, select between available transmission frequencies of continuously, once per hour, once per day, once per week, etc.

The user may desire to be notified before reports are sent. If the user wishes to receive notifications, the user may use option 184 to turn the program guide's notification capabilities. If the user does not wish to receive notifications, option 184 may be used to turn notification off.

When the user has finished making the selections available on screen 178, the user may select done option 186 (e.g., by navigating a highlight region to done option 186 and pressing a remote control OK key or the like).

Although described primarily in the context of interactive television program guides, the user's interactions with any suitable interactive television applications may be monitored. For example, the user's interactions with a video-on-demand application may be monitored, etc. Moreover, any suitable application (e.g., a program guide, an interactive television application, or a stand-alone monitoring application may be used to provide the monitoring functions of the present invention).

The foregoing is merely illustrative of the principles of this invention and various modifications can be made by those skilled in the art without departing from the scope and spirit of the invention.

What is Claimed is:

1. A method for collecting information on the television viewing activities of a user at user equipment and providing that information to a data collection facility, comprising:

collecting information on the television viewing activities of the user by monitoring which television channels the user tunes to with the user equipment; and

transmitting the collected information on the viewing activities of the user to the data collection facility using e-mail protocols.

2. The method defined in claim 1 further comprising using an e-mail application to transmit the collected information.

3. The method defined in claim 1 further comprising using the post office protocol to transmit the collected information.

4. The method defined in claim 1 further comprising using the Simple Mail Transport Protocol to transmit the information.

5. The method defined in claim 1 further comprising collecting the information on the television viewing habits of the user with an interactive television program guide.

6. The method defined in claim 1 further comprising:

collecting the information on the television viewing habits of the user with an interactive television program guide; and

transmitting the information on the television viewing habits of the user that were collected with the interactive television program guide to the data collection facility.

7. The method defined in claim 1 further comprising collecting the information on the television viewing habits of the user with an interactive television application.

8. The method defined in claim 1 further comprising:

collecting the information on the television viewing habits of the user with an interactive television application; and

transmitting the information on the television viewing habits of the user that were collected with the interactive television application to the data collection facility.

9. The method defined in claim 1 further comprising collecting information on interactions of the user with an interactive television program guide.

10. The method defined in claim 1 further comprising using an interactive television program guide to collect information on interactions of the user with the interactive television program guide.

11. The method defined in claim 1 further comprising:

collecting information on interactions of the user with an interactive television program guide; and

transmitting the information collected on the interactions of the user with the interactive television program guide to the data collection facility.

12. The method defined in claim 1 further comprising collecting information on interactions of the user with an interactive television application.

13. The method defined in claim 1 further comprising using an interactive television application to collect information on interactions of the user with the interactive television application.

14. The method defined in claim 1 further comprising:

collecting information on interactions of the user with an interactive television application; and

transmitting the information collected on the interactions of the user with the interactive television application to the data collection facility.

15. The method defined in claim 1 further comprising collecting information on what times the user tunes to the television channels.

16. The method defined in claim 1, wherein the user equipment includes a set-top box, the method further comprising allowing the user to use an interactive television program guide to tune the set-top box to a given television channel.

17. The method defined in claim 1, wherein the user equipment includes a digital video recorder, the method further comprising allowing the user to use an interactive television program guide to tune the digital video recorder to a given television channel.

18. The method defined in claim 1, wherein the user equipment includes a personal computer, the method further comprising allowing the user to use an interactive television program guide to tune the personal computer to a given television channel.

19. The method defined in claim 1 further comprising using an interactive television program guide to display program listings on the user equipment for the user.

20. The method defined in claim 1 further comprising displaying an interactive menu on the user equipment that includes options that allow the user to invoke at least an interactive television program guide and a video-on-demand application.

21. The method defined in claim 1 wherein collecting information on the television viewing habits of the user comprises collecting information on the

television viewing habits of the user by monitoring the time and by monitoring the channels tuned to by the user with an interactive television program guide.

22. The method defined in claim 1 wherein collecting information on the television viewing habits of the user comprises storing information on the television viewing habits of the user in storage on the user equipment.

23. The method defined in claim 1, wherein an interactive television program guide is implemented on the user equipment, the user equipment is connected to a television distribution facility by a communications path, and program listings data is provided from a program listings source, the method further comprising:

receiving the program listings data at the television distribution facility from the program listings source; and

providing the program listings data from the television distribution facility to the interactive television program guide on the user equipment over the communications path.

24. The method defined in claim 1, wherein transmitting the collected information comprises transmitting the collected information using paging frequencies.

25. The method defined in claim 1, wherein transmitting the collected information comprises

transmitting the collected information using digital subscriber line communications.

26. The method defined in claim 1, wherein transmitting the collected information comprises transmitting the collected information using cable communications.

27. The method defined in claim 1, wherein transmitting the collected information comprises transmitting the collected information using communications over telephone lines.

28. The method defined in claim 1, wherein transmitting the collected information comprises transmitting the collected information to a server.

29. The method defined in claim 1 further comprising transmitting the collected information to the data collection facility over a wireless path.

30. The method defined in claim 1 further comprising notifying the user before transmitting the collected information to the data collection facility.

31. The method defined in claim 1 further comprising:

notifying the user before transmitting the collected information to the data collection facility; and

providing the user with an opportunity to choose whether to send the collected information to the data collection facility.

32. The method defined in claim 1 further comprising transmitting the collected information in an e-mail attachment.

33. The method defined in claim 1 further comprising transmitting the collected information in the body of an e-mail message.

34. The method defined in claim 1 further comprising:

using a program guide to generate an e-mail message with which to provide the collected information to the data collection facility as a report; and

automatically setting the reply address in the e-mail message to the e-mail address of the data collection facility.

35. The method defined in claim 1 further comprising sending an e-mail message to an in-box associated with the user equipment before transmitting the collected information to the data collection facility.

36. The method defined in claim 1 further comprising providing the user with an opportunity to authorize submission of the collected information

before transmitting the collected information to the data collection facility.

37. The method defined in claim 1 further comprising analyzing the collected information at the data collection facility.

38. The method defined in claim 1 wherein the data collection facility is in communication with a television distribution facility.

39. The method defined in claim 1 wherein the data collection facility is in communication with a cable system headend.

40. The method defined in claim 1 wherein the data collection facility is in communication with a television distribution facility and wherein the user equipment is in communication with the television distribution facility, the method further comprising transmitting the collected information to the data collection facility through the television distribution facility.

41. The method defined in claim 1 further comprising transmitting the collected information to the data collection facility over the Internet.

42. The method defined in claim 1 further comprising allowing the user to authorize transmission of the collected information using a setup option.

43. The method defined in claim 1 further comprising allowing the user to select a desired frequency for transmitting the collected information.

44. The method defined in claim 1 further comprising providing the user with a setup option that allows the user to choose whether to notify the user prior to transmitting the collected information to the data collection facility.

45. A system including user equipment in which information on the television viewing activities of a user at the user equipment is provided to a data collection facility, comprising:

control circuitry;

a display; and

a user input interface, wherein the control circuitry, display, and user interface are configured to:

collect information on the television viewing activities of the user by monitoring which television channels the user tunes to with the control circuitry; and

transmit the collected information on the viewing activities of the user to the data collection facility using e-mail protocols.

46. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to use an e-mail application to transmit the collected information.

47. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to use the post office protocol to transmit the collected information.

48. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to use the Simple Mail Transport Protocol to transmit the information.

49. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to collect the information on the television viewing habits of the user with an interactive television program guide.

50. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to:

collect the information on the television viewing habits of the user with an interactive television program guide; and

transmit the information on the television viewing habits of the user that were collected with the interactive television program guide to the data collection facility.

51. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to collect the information on the television viewing habits of the user with an interactive television application.

52. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to:

collect the information on the television viewing habits of the user with an interactive television application; and

transmit the information on the television viewing habits of the user that were collected with the interactive television application to the data collection facility.

53. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to collect information on interactions of the user with an interactive television program guide.

54. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to use an interactive television program guide to collect information on interactions of the user with the interactive television program guide.

55. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to:

collect information on interactions of the user with an interactive television program guide; and

transmit the information collected on the interactions of the user with the interactive

television program guide to the data collection facility.

56. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to collect information on interactions of the user with an interactive television application.

57. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to use an interactive television application to collect information on interactions of the user with the interactive television application.

58. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to:

collect information on interactions of the user with an interactive television application; and

transmit the information collected on the interactions of the user with the interactive television application to the data collection facility.

59. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to collect information on what times the user tunes to the television channels.

60. The system defined in claim 45, wherein the user equipment includes a set-top box, and wherein

the control circuitry, display, and user interface are further configured to allow the user to use an interactive television program guide to tune the set-top box to a given television channel.

61. The system defined in claim 45, wherein the user equipment includes a digital video recorder, and wherein the control circuitry, display, and user interface are further configured to allow the user to use an interactive television program guide to tune the digital video recorder to a given television channel.

62. The system defined in claim 45, wherein the user equipment includes a personal computer, and wherein the control circuitry, display, and user interface are further configured to allow the user to use an interactive television program guide to tune the personal computer to a given television channel.

63. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to use an interactive television program guide to display program listings on the user equipment for the user.

64. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to display an interactive menu on the user equipment that includes options that allow the user to invoke at least an interactive television program guide and a video-on-demand application.

65. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to collect information on the television viewing habits of the user by monitoring the time and by monitoring the channels tuned to by the user with an interactive television program guide.

66. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to store the collected information on the television viewing habits of the user in storage on the user equipment.

67. The system defined in claim 45, wherein an interactive television program guide is implemented on the user equipment, the user equipment is connected to a television distribution facility by a communications path, and program listings data is provided from a program listings source, and the television distribution facility is configured to receive the program listings data at the television distribution facility from the program listings source and provide the program listings data from the television distribution facility to the interactive television program guide on the user equipment over the communications path.

68. The system defined in claim 45, wherein the control circuitry, display, and user interface are further configured to transmit the collected information using paging frequencies.

69. The system defined in claim 45, wherein the control circuitry, display, and user interface are further configured to transmit the collected information using digital subscriber line communications.

70. The system defined in claim 45, wherein the control circuitry, display, and user interface are further configured to transmit the collected information using cable communications.

71. The system defined in claim 45, wherein the control circuitry, display, and user interface are further configured to transmit the collected information using communications over telephone lines.

72. The system defined in claim 45, wherein the control circuitry, display, and user interface are further configured to transmit the collected information to a server.

73. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to transmit the collected information to the data collection facility over a wireless path.

74. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to notify the user before transmitting the collected information to the data collection facility.

75. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to:

notify the user before transmitting the collected information to the data collection facility; and

provide the user with an opportunity to choose whether to send the collected information to the data collection facility.

76. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to transmit the collected information in an e-mail attachment.

77. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to transmit the collected information in the body of an e-mail message.

78. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to:

use a program guide to generate an e-mail message with which to provide the collected information to the data collection facility as a report; and

automatically set the reply address in the e-mail message to the e-mail address of the data collection facility.

79. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to send an e-mail message to an in-box associated with the user equipment before transmitting the collected information to the data collection facility.

80. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to provide the user with an opportunity to authorize submission of the collected information before transmitting the collected information to the data collection facility.

81. The system defined in claim 45 further comprising means for analyzing the collected information at the data collection facility.

82. The system defined in claim 45 wherein the data collection facility is in communication with a television distribution facility.

83. The system defined in claim 45 wherein the data collection facility is in communication with a cable system headend.

84. The system defined in claim 45 wherein the data collection facility is in communication with a television distribution facility, wherein the user equipment is in communication with the television distribution facility, and wherein the control circuitry, display, and user interface are further

configured to transmit the collected information to the data collection facility through the television distribution facility.

85. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to transmit the collected information to the data collection facility over the Internet.

86. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to allow the user to authorize transmission of the collected information using a setup option.

87. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to allow the user to select a desired frequency for transmitting the collected information.

88. The system defined in claim 45 wherein the control circuitry, display, and user interface are further configured to provide the user with a setup option that allows the user to choose whether to notify the user prior to transmitting the collected information to the data collection facility.

89. A method for collecting information on interactions of a user at user equipment with an interactive television application implemented on the

user equipment and providing that information to a data collection facility, comprising:

collecting information on the interactions of the user with the interactive television application; and

transmitting the collected information on interactions of the user with the interactive television application to the data collection facility using e-mail protocols.

90. The method defined in claim 89 further comprising using an e-mail application to transmit the collected information.

91. The method defined in claim 89 further comprising using the post office protocol to transmit the collected information.

92. The method defined in claim 89 further comprising using the Simple Mail Transport Protocol to transmit the information.

93. The method defined in claim 89 further comprising collecting the information with an interactive television program guide.

94. The method defined in claim 89 further comprising collecting information on the television viewing habits of the user with an interactive television program guide and collecting the information on the user's interactions with the interactive

television application using the interactive television program guide.

95. The method defined in claim 89 further comprising:

collecting information on the television viewing activities of the user with an interactive television program guide; and

transmitting the information collected on the television viewing activities of the user to the data collection facility.

96. The method defined in claim 89 further comprising collecting information on the television viewing activities of the user with the interactive television application.

97. The method defined in claim 89 further comprising using an interactive television program guide to collect information on the television viewing habits of the user.

98. The method defined in claim 89 further comprising collecting information on what times the user tunes to television channels.

99. The method defined in claim 89, wherein the user equipment includes a set-top box, the method further comprising allowing the user to use an interactive television program guide to tune the set-top box to a given television channel.

100. The method defined in claim 89, wherein the user equipment includes a digital video recorder, the method further comprising allowing the user to use an interactive television program guide to tune the digital video recorder to a given television channel.

101. The method defined in claim 89, wherein the user equipment includes a personal computer, the method further comprising allowing the user to use an interactive television program guide to tune the personal computer to a given television channel.

102. The method defined in claim 89 further comprising using an interactive television program guide to display program listings on the user equipment for the user.

103. The method defined in claim 89 further comprising displaying an interactive menu on the user equipment that includes options that allow the user to invoke at least an interactive television program guide and a video-on-demand application.

104. The method defined in claim 89 further comprising collecting information on the television viewing habits of the user comprises by monitoring the time and by monitoring the channels tuned to by the user with an interactive television program guide.

105. The method defined in claim 89 wherein collecting the information comprises storing the information in storage on the user equipment.

106. The method defined in claim 89, wherein an interactive television program guide is implemented on the user equipment, the user equipment is connected to a television distribution facility by a communications path, and program listings data is provided from a program listings source, the method further comprising:

receiving the program listings data at the television distribution facility from the program listings source; and

providing the program listings data from the television distribution facility to the interactive television program guide on the user equipment over the communications path.

107. The method defined in claim 89, wherein transmitting the collected information comprises transmitting the collected information using paging frequencies.

108. The method defined in claim 89, wherein transmitting the collected information comprises transmitting the collected information using digital subscriber line communications.

109. The method defined in claim 89, wherein transmitting the collected information comprises transmitting the collected information using cable communications.

110. The method defined in claim 89, wherein transmitting the collected information comprises

transmitting the collected information using communications over telephone lines.

111. The method defined in claim 89, wherein transmitting the collected information comprises transmitting the collected information to a server.

112. The method defined in claim 89 further comprising transmitting the collected information to the data collection facility over a wireless path.

113. The method defined in claim 89 further comprising notifying the user before transmitting the collected information to the data collection facility.

114. The method defined in claim 89 further comprising:

notifying the user before transmitting the collected information to the data collection facility; and

providing the user with an opportunity to choose whether to send the collected information to the data collection facility.

115. The method defined in claim 89 further comprising transmitting the collected information in an e-mail attachment.

116. The method defined in claim 89 further comprising transmitting the collected information in the body of an e-mail message.

117. The method defined in claim 89 further comprising:

using a program guide to generate an e-mail message with which to provide the collected information to the data collection facility as a report; and

automatically setting the reply address in the e-mail message to the e-mail address of the data collection facility.

118. The method defined in claim 89 further comprising sending an e-mail message to an in-box associated with the user equipment before transmitting the collected information to the data collection facility.

119. The method defined in claim 89 further comprising providing the user with an opportunity to authorize submission of the collected information before transmitting the collected information to the data collection facility.

120. The method defined in claim 89 further comprising analyzing the collected information at the data collection facility.

121. The method defined in claim 89 wherein the data collection facility is in communication with a television distribution facility.

122. The method defined in claim 89 wherein the data collection facility is in communication with a cable system headend.

123. The method defined in claim 89 wherein the data collection facility is in communication with a television distribution facility and wherein the user equipment is in communication with the television distribution facility, the method further comprising transmitting the collected information to the data collection facility through the television distribution facility.

124. The method defined in claim 89 further comprising transmitting the collected information to the data collection facility over the Internet.

125. The method defined in claim 89 further comprising allowing the user to authorize transmission of the collected information using a setup option.

126. The method defined in claim 89 further comprising allowing the user to select a desired frequency for transmitting the collected information.

127. The method defined in claim 89 further comprising providing the user with a setup option that allows the user to choose whether to notify the user prior to transmitting the collected information to the data collection facility.

128. A system including user equipment on which an interactive television application is implemented in which information on the interactions of a user at the user equipment with the interactive television application is provided to a data collection facility, comprising:

control circuitry;

a display; and

a user input interface, wherein the control circuitry, display, and user interface are configured to:

collect information on the interactions of the user with the interactive television application; and

transmit the collected information on interactions of the user with the interactive television application to the data collection facility using e-mail protocols.

129. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to use an e-mail application to transmit the collected information.

130. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to use the post office protocol to transmit the collected information.

131. The system defined in claim 128 wherein the control circuitry, display, and user interface are

further configured to use the Simple Mail Transport Protocol to transmit the information.

132. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to collect the information with an interactive television program guide.

133. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to collect information on the television viewing habits of the user with an interactive television program guide and collecting the information on the user's interactions with the interactive television application using the interactive television program guide.

134. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to:

collect information on the television viewing activities of the user with an interactive television program guide; and

transmit the information collected on the television viewing activities of the user to the data collection facility.

135. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to collect information on the television viewing activities of the user with the interactive television application.

136. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to collect information on the television viewing habits of the user.

137. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to collect information on what times the user tunes to television channels.

138. The system defined in claim 128, wherein the user equipment includes a set-top box, and wherein the control circuitry, display, and user interface are further configured to allow the user to use an interactive television program guide to tune the set-top box to a given television channel.

139. The system defined in claim 128, wherein the user equipment includes a digital video recorder, and wherein the control circuitry, display, and user interface are further configured to allow the user to use an interactive television program guide to tune the digital video recorder to a given television channel.

140. The system defined in claim 128, wherein the user equipment includes a personal computer, and wherein the control circuitry, display, and user interface are further configured to allow the user to use an interactive television program guide to tune the personal computer to a given television channel.

141. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to use an interactive television program guide to display program listings on the user equipment for the user.

142. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to display an interactive menu on the user equipment that includes options that allow the user to invoke at least an interactive television program guide and a video-on-demand application.

143. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to collect information on the television viewing habits of the user comprises by monitoring the time and by monitoring the channels tuned to by the user with an interactive television program guide.

144. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to store the information in storage on the user equipment.

145. The system defined in claim 128, wherein an interactive television program guide is implemented on the user equipment, the user equipment is connected to a television distribution facility by a communications path, and program listings data is provided from a program listings source, and wherein

the television distribution facility is configured to receive the program listings data at the television distribution facility from the program listings source and provide the program listings data from the television distribution facility to the interactive television program guide on the user equipment over the communications path.

146. The system defined in claim 128, wherein the control circuitry, display, and user interface are further configured to transmit the collected information using paging frequencies.

147. The system defined in claim 128, wherein the control circuitry, display, and user interface are further configured to transmit the collected information using digital subscriber line communications.

148. The system defined in claim 128, wherein the control circuitry, display, and user interface are further configured to transmit the collected information using cable communications.

149. The system defined in claim 128, wherein the control circuitry, display, and user interface are further configured to transmit the collected information using communications over telephone lines.

150. The system defined in claim 128,wherein the control circuitry, display, and user interface are

further configured to transmit the collected information to a server.

151. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to transmit the collected information to the data collection facility over a wireless path.

152. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to notify the user before transmitting the collected information to the data collection facility.

153. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to:

notify the user before transmitting the collected information to the data collection facility; and

provide the user with an opportunity to choose whether to send the collected information to the data collection facility.

154. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to transmit the collected information in an e-mail attachment.

155. The system defined in claim 128 wherein the control circuitry, display, and user interface are

further configured to transmit the collected information in the body of an e-mail message.

156. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to:

use a program guide to generate an e-mail message with which to provide the collected information to the data collection facility as a report; and

automatically set the reply address in the e-mail message to the e-mail address of the data collection facility.

157. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to send an e-mail message to an in-box associated with the user equipment before transmitting the collected information to the data collection facility.

158. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to provide the user with an opportunity to authorize submission of the collected information before transmitting the collected information to the data collection facility.

159. The system defined in claim 128 further comprising means for analyzing the collected information at the data collection facility.

160. The system defined in claim 128 wherein the data collection facility is in communication with a television distribution facility.

161. The system defined in claim 128 wherein the data collection facility is in communication with a cable system headend.

162. The system defined in claim 128 wherein the data collection facility is in communication with a television distribution facility and wherein the user equipment is in communication with the television distribution facility, and wherein the control circuitry, display, and user interface are further configured to transmit the collected information to the data collection facility through the television distribution facility.

163. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to transmit the collected information to the data collection facility over the Internet.

164. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to allow the user to authorize transmission of the collected information using a setup option.

165. The system defined in claim 128 wherein the control circuitry, display, and user interface are

further configured to allow the user to select a desired frequency for transmitting the collected information.

166. The system defined in claim 128 wherein the control circuitry, display, and user interface are further configured to provide the user with a setup option that allows the user to choose whether to notify the user prior to transmitting the collected information to the data collection facility.

167. A method for collecting information on the television viewing activities of a user at user equipment and providing that information to a data collection facility, comprising:

collecting information on the television viewing activities of the user by monitoring which television channels the user tunes to with the user equipment; and

transmitting the collected information on the viewing activities of the user to the data collection facility using a web browser's communications capabilities.

168. The method defined in claim 167 further comprising using the browser's forms capabilities to transmit the collected information.

169. The method defined in claim 167 further comprising transmitting the collected information using the File Transfer Protocol (FTP).

170. The method defined in claim 167 further comprising using an interactive television program guide to access the web browser's communications capabilities.

171. The method defined in claim 167 further comprising using an interactive television program guide to generate inputs for the web browser to emulate user commands.

172. A system including user equipment in which information on the television viewing activities of a user at the user equipment is provided to a data collection facility, comprising:

control circuitry;

a display; and

a user input interface, wherein the control circuitry, display, and user interface are configured to:

collect information on the television viewing activities of the user by monitoring which television channels the user tunes to with the control circuitry; and

transmit the collected information on the viewing activities of the user to the data collection facility using a web browser's communications capabilities.

173. The system defined in claim 172 wherein the control circuitry, display, and user interface are further configured to use the browser's forms capabilities to transmit the collected information.

174. The system defined in claim 172 wherein the control circuitry, display, and user interface are further configured to transmit the collected information using the File Transfer Protocol (FTP).

175. The system defined in claim 172 wherein the control circuitry, display, and user interface are further configured to use an interactive television program guide to access the web browser's communications capabilities.

176. The system defined in claim 172 wherein the control circuitry, display, and user interface are further configured to use an interactive television program guide to generate inputs for the web browser to emulate user commands.

177. A method for collecting information on the interactions of a user at user equipment with an interactive television application implemented on the user equipment and providing that information to a data collection facility, comprising:

collecting information on the interactions of the user with the interactive television application implemented on the user equipment; and

transmitting the collected information to the data collection facility using a web browser's communications capabilities.

178. The method defined in claim 177 further comprising using the browser's forms capabilities to transmit the collected information.

179. The method defined in claim 177 further comprising transmitting the collected information using the File Transfer Protocol (FTP).

180. The method defined in claim 177 further comprising using an interactive television program guide to access the web browser's communications capabilities.

181. The method defined in claim 177 further comprising using an interactive television program guide to generate inputs for the web browser to emulate user commands.

182. A system including user equipment in which information is collected on the interactions of a user with an interactive television program guide implemented on the user equipment is provided to a data collection facility, comprising:

control circuitry;

a display; and

a user input interface, wherein the control circuitry, display, and user interface are configured to:

collect information on the interactions of the user with the interactive television application implemented on the user equipment; and

transmit the collected information to the data collection facility using a web browser's communications capabilities.

183. The system defined in claim 182 wherein the control circuitry, display, and user interface are further configured to use the browser's forms capabilities to transmit the collected information.

184. The system defined in claim 182 wherein the control circuitry, display, and user interface are further configured to transmit the collected information using the File Transfer Protocol (FTP).

185. The system defined in claim 182 wherein the control circuitry, display, and user interface are further configured to use an interactive television program guide to access the web browser's communications capabilities.

186. The system defined in claim 182 wherein the control circuitry, display, and user interface are further configured to use an interactive television program guide to generate inputs for the web browser to emulate user commands.

187. A method for collecting information on the television viewing activities of a user at user equipment and providing that information to a data collection facility, comprising:

collecting information on the television viewing activities of the user by monitoring which

television channels the user tunes to with the user equipment; and

transmitting the collected information on the viewing activities of the user to the data collection facility using a stand-alone FTP application.

188. A system including user equipment in which information on the television viewing activities of a user at the user equipment is provided to a data collection facility, comprising:

control circuitry;

a display; and

a user input interface, wherein the control circuitry, display, and user interface are configured to:

collect information on the television viewing activities of the user by monitoring which television channels the user tunes to with the control circuitry; and

transmit the collected information on the viewing activities of the user to the data collection facility using a stand-alone FTP application.

189. A method for collecting information on the interactions of a user at user equipment with an interactive television application implemented on the user equipment and providing that information to a data collection facility, comprising:

collecting information on the interactions of the user with the interactive

television application implemented on the user equipment; and

transmitting the collected information to the data collection facility using a stand-alone FTP application.

190. A system including user equipment in which information is collected on the interactions of a user with an interactive television program guide implemented on the user equipment is provided to a data collection facility, comprising:

control circuitry;

a display; and

a user input interface, wherein the control circuitry, display, and user interface are configured to:

collect information on the interactions of the user with the interactive television application implemented on the user equipment; and

transmit the collected information to the data collection facility using a stand-alone FTP application.

191. A method for collecting information on the television viewing activities of a user at user equipment and providing that information to a data collection facility, comprising:

collecting information on the television viewing activities of the user by monitoring which television channels the user tunes to with the user equipment; and

transmitting the collected information on the viewing activities of the user to the data collection facility using the communications capabilities of an operating system installed on the user equipment.

192. A system including user equipment in which information on the television viewing activities of a user at the user equipment is provided to a data collection facility, comprising:

control circuitry;

a display; and

a user input interface, wherein the control circuitry, display, and user interface are configured to:

collect information on the television viewing activities of the user by monitoring which television channels the user tunes to with the control circuitry; and

transmit the collected information on the viewing activities of the user to the data collection facility using the communications capabilities of an operating system installed on the user equipment.

193. A method for collecting information on the interactions of a user at user equipment with an interactive television application implemented on the user equipment and providing that information to a data collection facility, comprising:

collecting information on the interactions of the user with the interactive

television application implemented on the user equipment; and

transmitting the collected information to the data collection facility using the communications capabilities of an operating system installed on the user equipment.

194. A system including user equipment in which information is collected on the interactions of a user with an interactive television program guide implemented on the user equipment is provided to a data collection facility, comprising:

control circuitry;

a display; and

a user input interface, wherein the control circuitry, display, and user interface are configured to:

collect information on the interactions of the user with the interactive television application implemented on the user equipment; and

transmit the collected information to the data collection facility using the communications capabilities of an operating system installed on the user equipment.

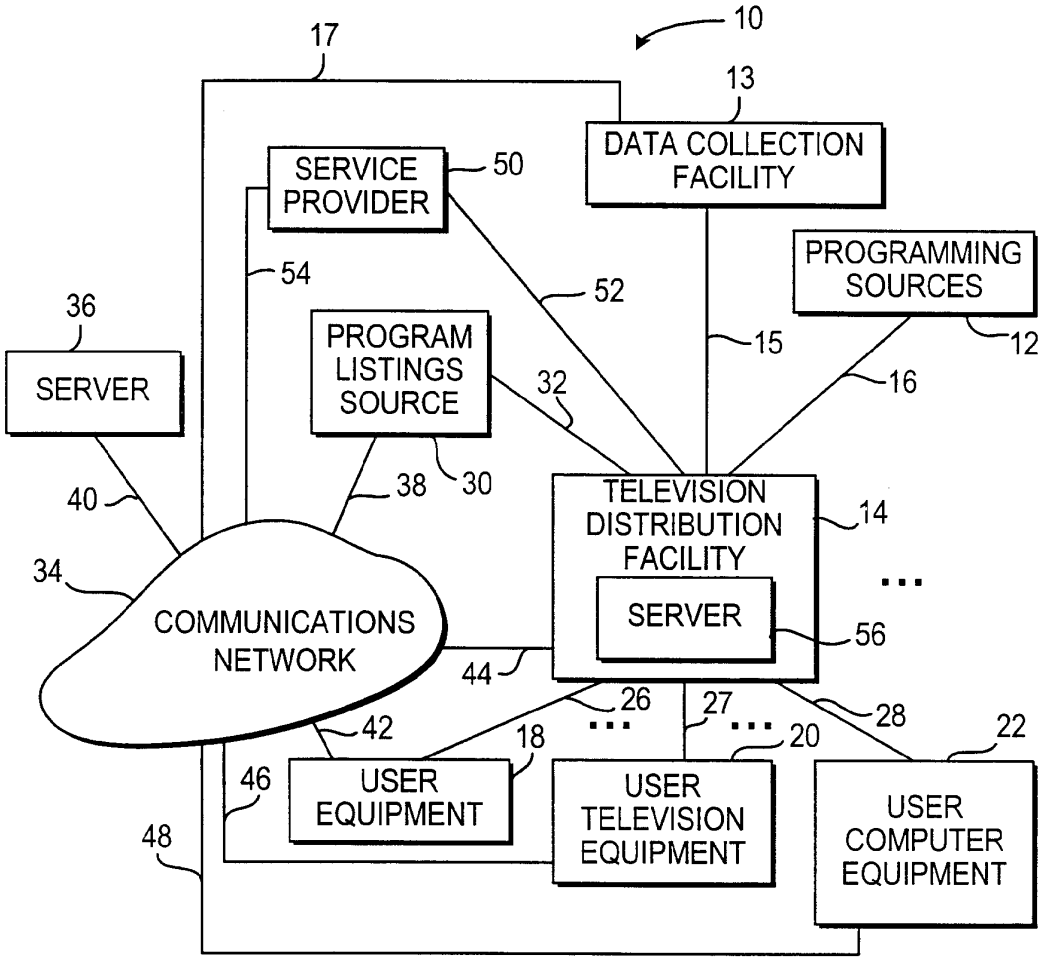


FIG. 1

EX. 1002
LG Electronics, Inc. / Page 1249 of 3394

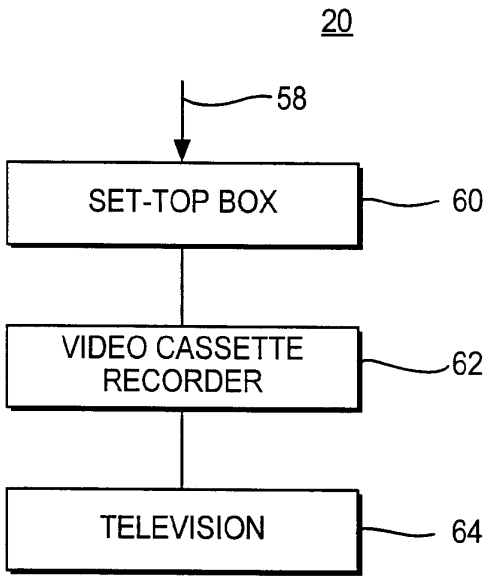

20
58
SET-TOP BOX
60
VIDEO CASSETTE RECORDER
62
TELEVISION
64

FIG. 2

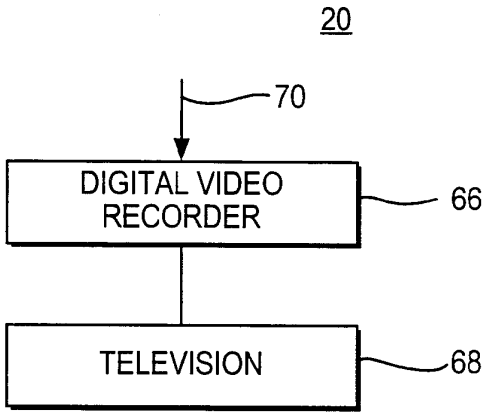


FIG. 3

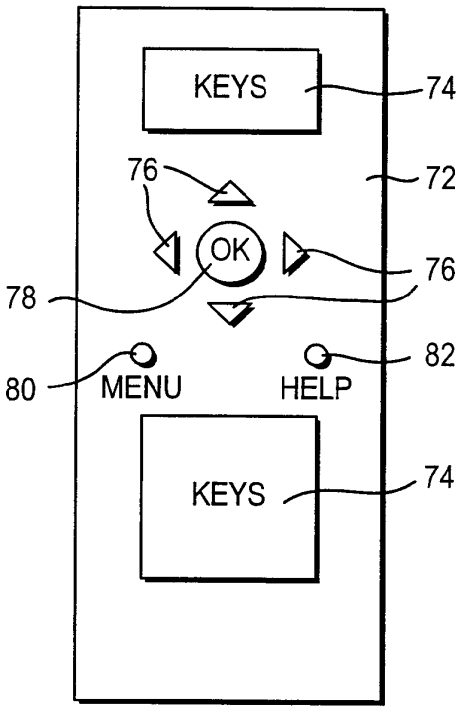


FIG. 4

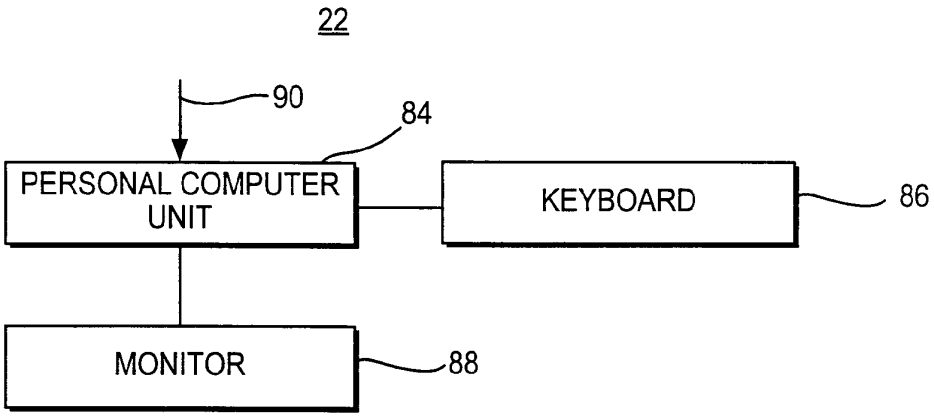


FIG. 5

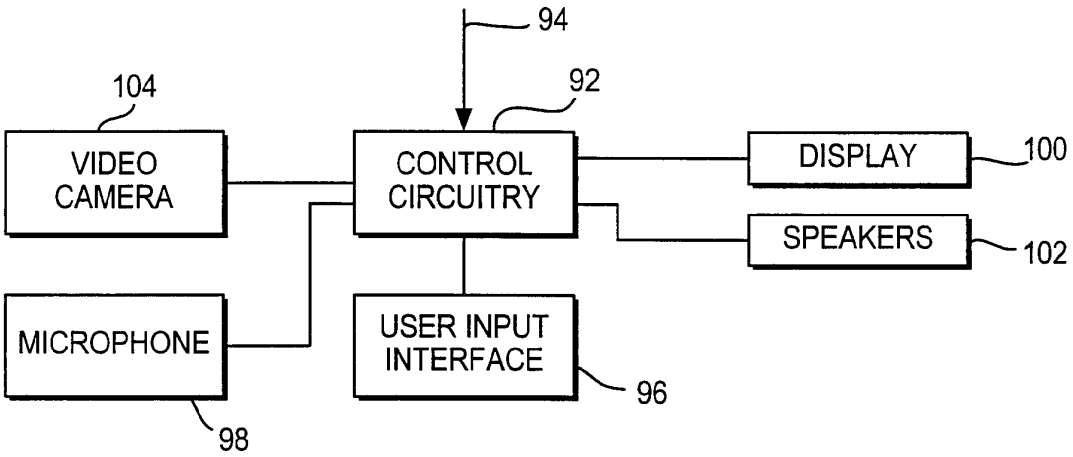

94
104
92
VIDEO CAMERA
CONTROL CIRCUITRY
DISPLAY
100
SPEAKERS
102
MICROPHONE
USER INPUT INTERFACE
96
98

FIG. 6

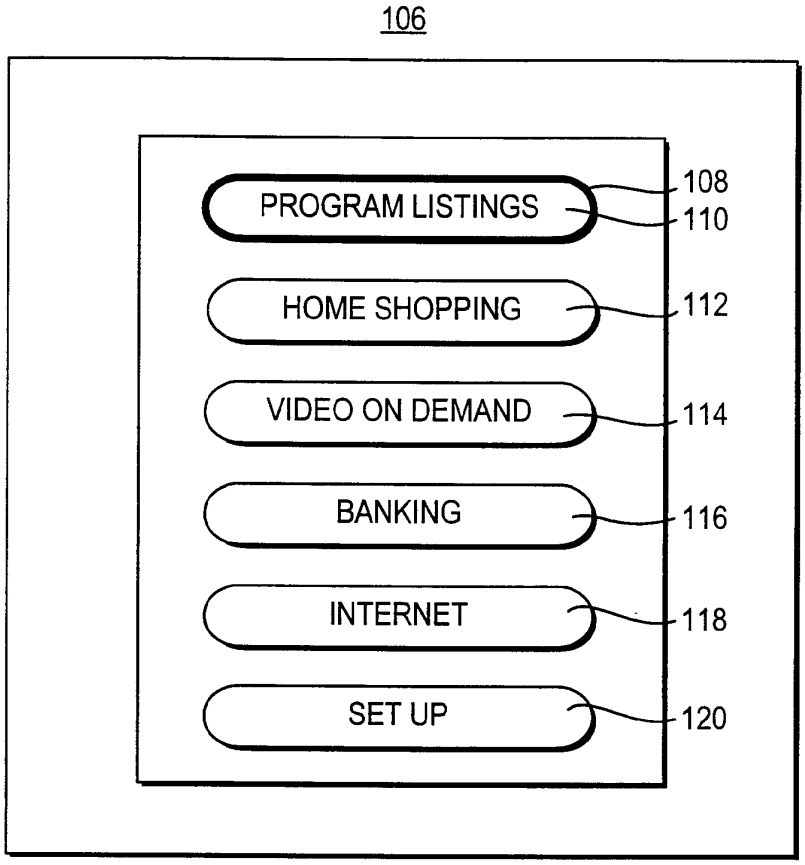

106
PROGRAM LISTINGS
108
110
HOME SHOPPING
112
VIDEO ON DEMAND
114
BANKING
116
INTERNET
118
SET UP
120

FIG. 7

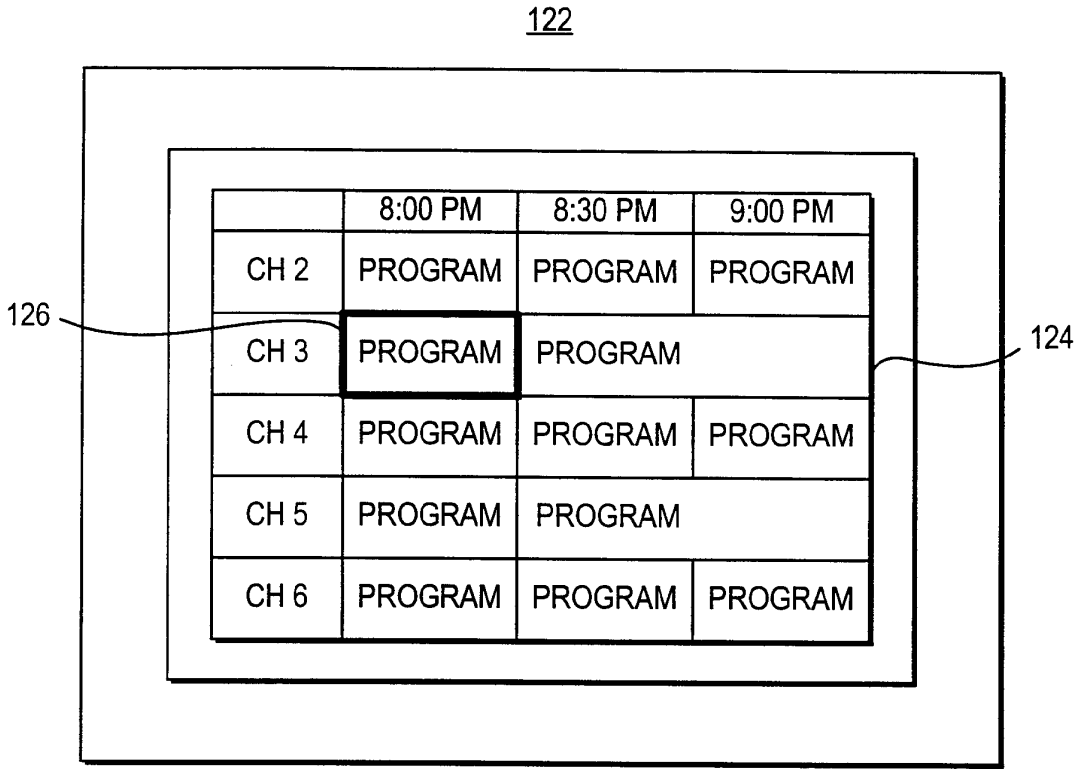

122
126
124
8:00 PM
8:30 PM
9:00 PM
CH 2
PROGRAM
PROGRAM
PROGRAM
CH 3
PROGRAM
PROGRAM
CH 4
PROGRAM
PROGRAM
PROGRAM
CH 5
PROGRAM
PROGRAM
CH 6
PROGRAM
PROGRAM
PROGRAM

FIG. 8

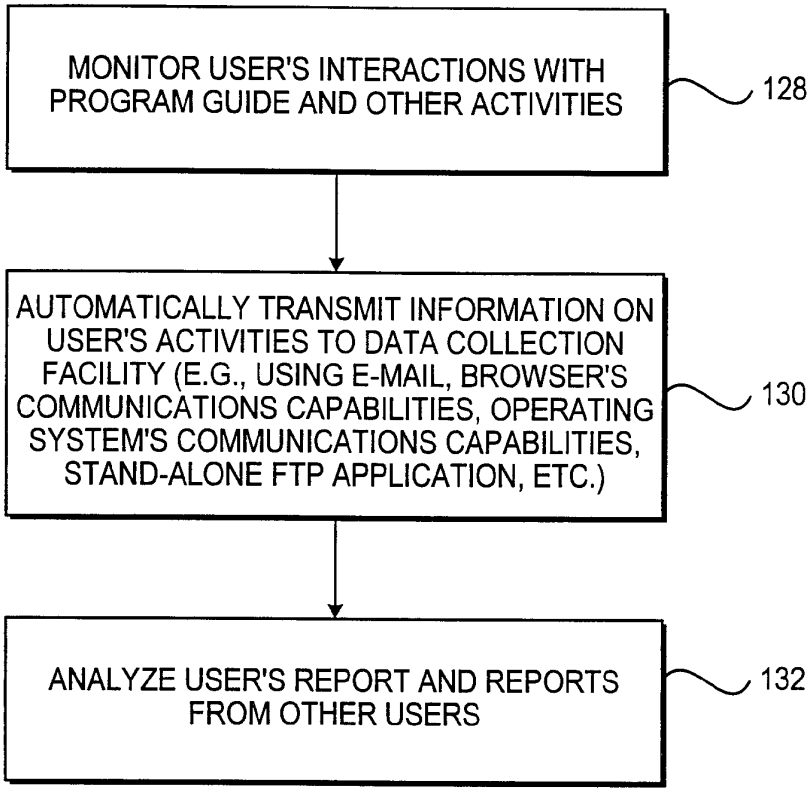

MONITOR USER'S INTERACTIONS WITH PROGRAM GUIDE AND OTHER ACTIVITIES
128
AUTOMATICALLY TRANSMIT INFORMATION ON USER'S ACTIVITIES TO DATA COLLECTION FACILITY (E.G., USING E-MAIL, BROWSER'S COMMUNICATIONS CAPABILITIES, OPERATING SYSTEM'S COMMUNICATIONS CAPABILITIES, STAND-ALONE FTP APPLICATION, ETC.)
130
ANALYZE USER'S REPORT AND REPORTS FROM OTHER USERS
132

FIG. 9

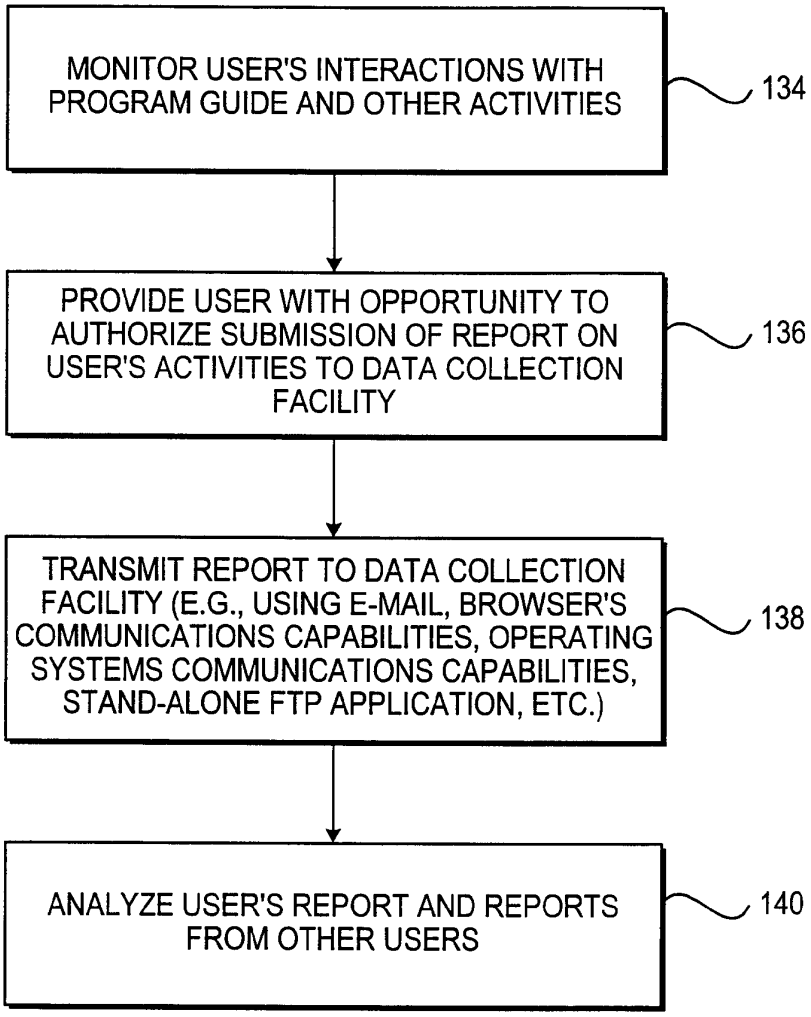

MONITOR USER'S INTERACTIONS WITH PROGRAM GUIDE AND OTHER ACTIVITIES
134
PROVIDE USER WITH OPPORTUNITY TO AUTHORIZE SUBMISSION OF REPORT ON USER'S ACTIVITIES TO DATA COLLECTION FACILITY
136
TRANSMIT REPORT TO DATA COLLECTION FACILITY (E.G., USING E-MAIL, BROWSER'S COMMUNICATIONS CAPABILITIES, OPERATING SYSTEMS COMMUNICATIONS CAPABILITIES, STAND-ALONE FTP APPLICATION, ETC.)
138
ANALYZE USER'S REPORT AND REPORTS FROM OTHER USERS
140

FIG. 10

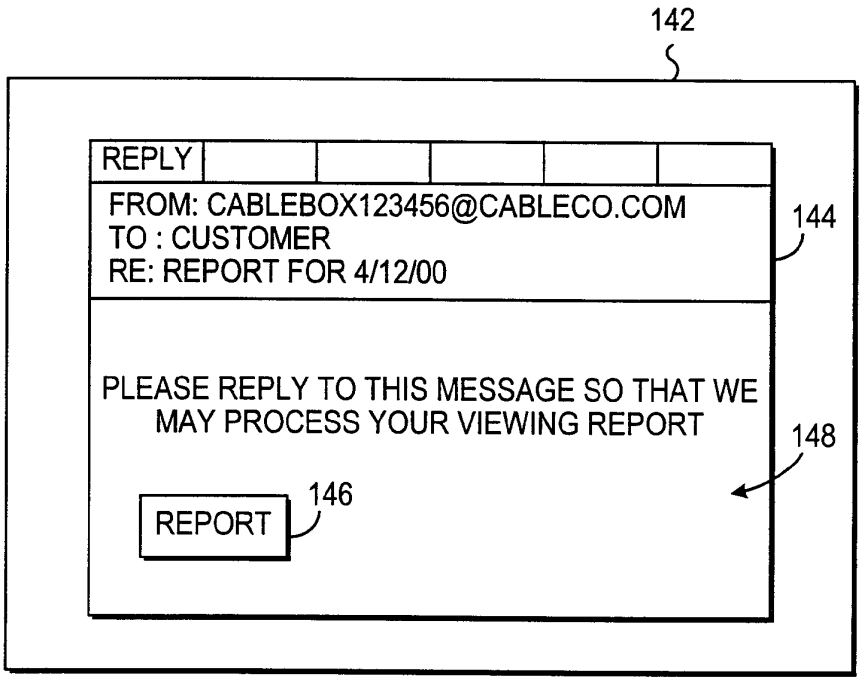

142
REPLY
FROM: CABLEBOX123456@CABLECO.COM
TO : CUSTOMER
RE: REPORT FOR 4/12/00
144
PLEASE REPLY TO THIS MESSAGE SO THAT WE MAY PROCESS YOUR VIEWING REPORT
148
146
REPORT

FIG. 11

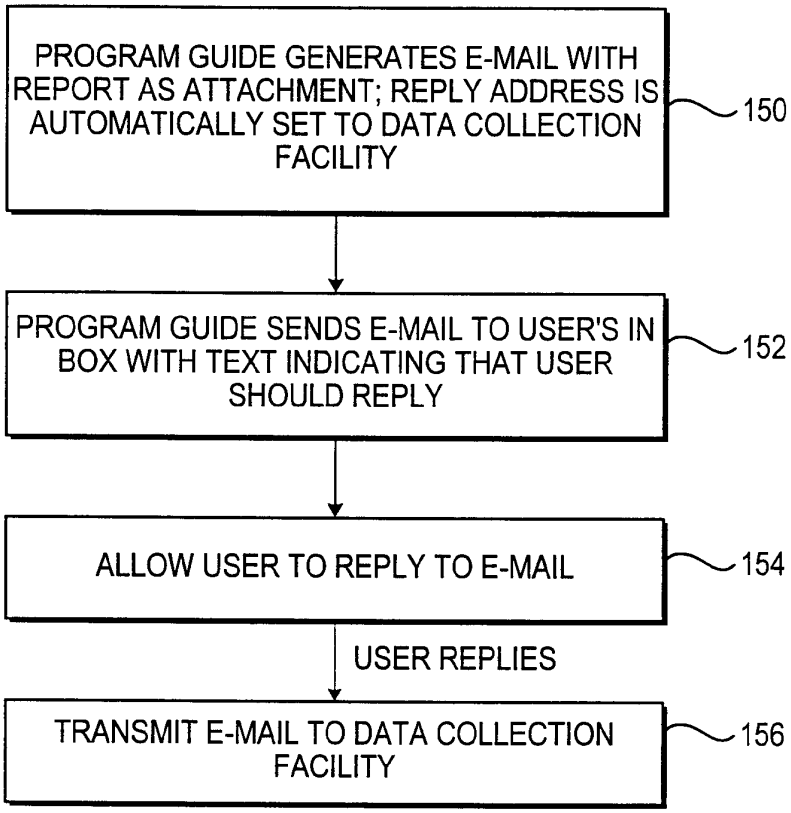

PROGRAM GUIDE GENERATES E-MAIL WITH REPORT AS ATTACHMENT; REPLY ADDRESS IS AUTOMATICALLY SET TO DATA COLLECTION FACILITY
150
PROGRAM GUIDE SENDS E-MAIL TO USER'S IN BOX WITH TEXT INDICATING THAT USER SHOULD REPLY
152
ALLOW USER TO REPLY TO E-MAIL
154
USER REPLIES
TRANSMIT E-MAIL TO DATA COLLECTION FACILITY
156

FIG. 12

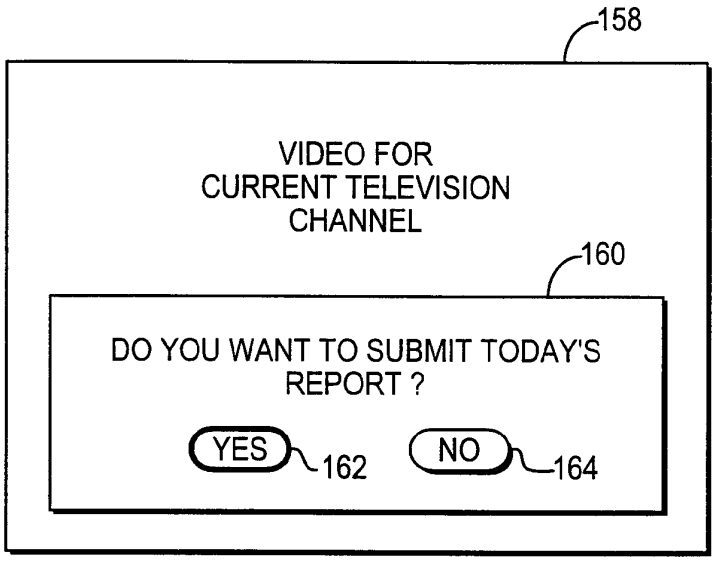

158
VIDEO FOR
CURRENT TELEVISION
CHANNEL
160
DO YOU WANT TO SUBMIT TODAY'S
REPORT ?
YES
162
NO
164

FIG. 13

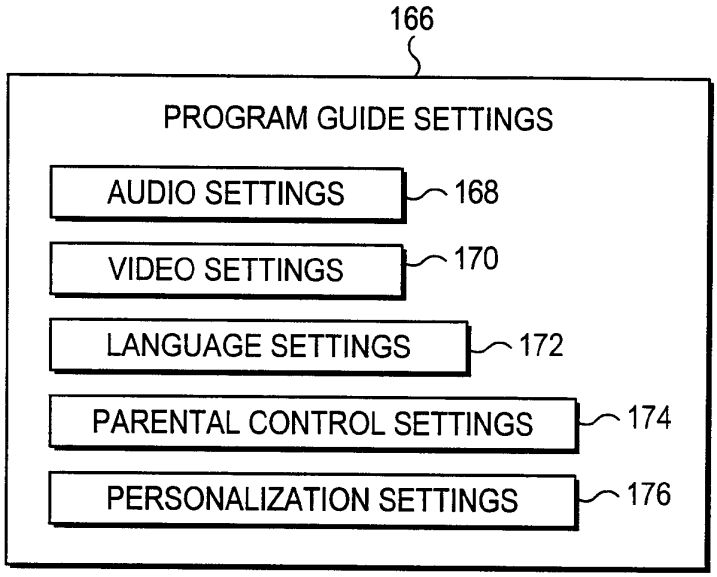

166
PROGRAM GUIDE SETTINGS
AUDIO SETTINGS
168
VIDEO SETTINGS
170
LANGUAGE SETTINGS
172
PARENTAL CONTROL SETTINGS
174
PERSONALIZATION SETTINGS
176

FIG. 14

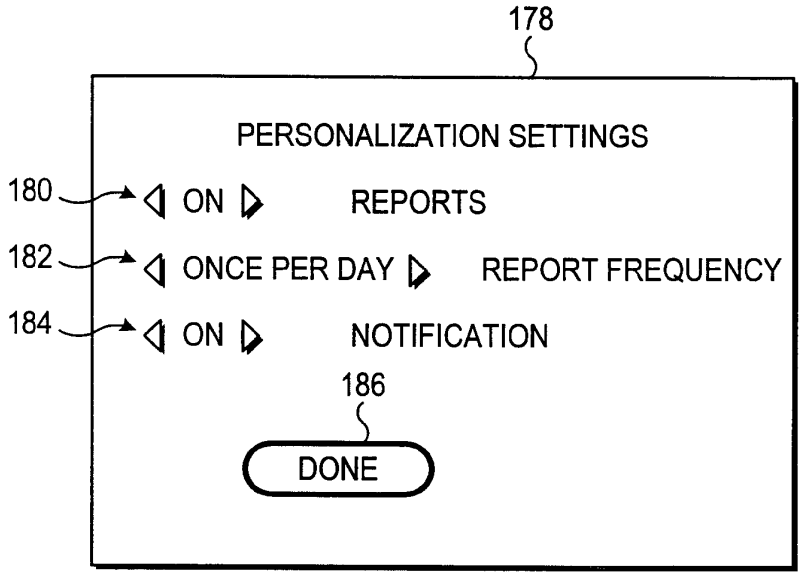

178
PERSONALIZATION SETTINGS
180
ON
REPORTS
182
ONCE PER DAY
REPORT FREQUENCY
184
ON
NOTIFICATION
186
DONE

FIG. 15

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
25 January 2001 (25.01.2001)

PCT

(10) International Publication Number
WO 01/06788 A1

(51) International Patent Classification[7]: H04N 7/173

(21) International Application Number: PCT/US00/16878

(22) International Filing Date: 19 June 2000 (19.06.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/354,602 16 July 1999 (16.07.1999) US

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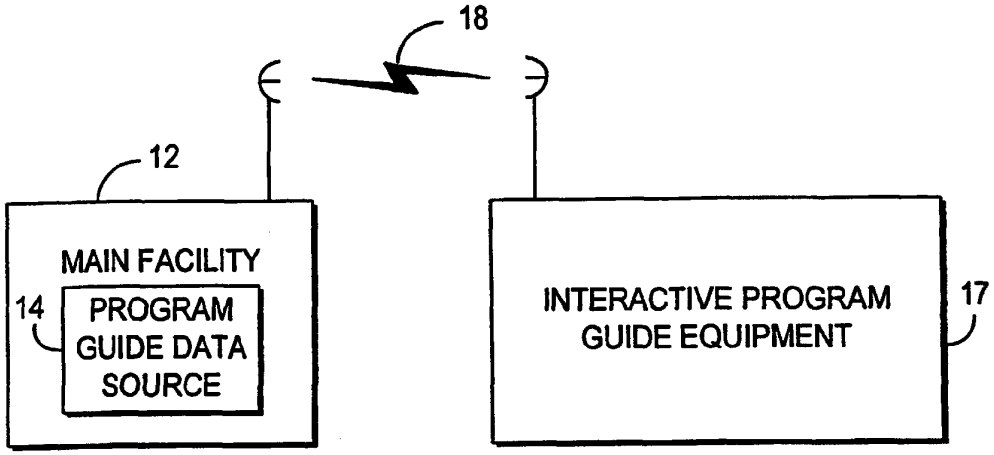
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *With international search report.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: INTERACTIVE TELEVISION PROGRAM GUIDE WITH SELECTABLE LANGUAGES



(57) Abstract: An interactive television program guide is provided. The interactive television program guide provides a user with the opportunity to select a language for playing television programming and displaying program guide text. Television program audio in the desired language may be obtained from a SAP or digital audio tract and played in the selected language. Television related information in the desired language may be obtained from a digital tract. If television program audio or related information is not provided in the selected language, the program guide may use a default language. The program guide may coordinate program guide display screen text with languages available for television programs when the programs are broadcast to users.

WO 01/06788 A1

INTERACTIVE TELEVISION PROGRAM GUIDE WITH SELECTABLE LANGUAGES

Background of the Invention

This invention relates to interactive television program guide systems, and more particularly, to interactive television program guide systems in which users may select a desired language for playing television programming and displaying program guide display screen text.

Cable, satellite, and broadcast television systems provide viewers with a large number of television channels. Users have traditionally consulted printed television program schedules to determine the programs being broadcast at a particular time. More recently, interactive television program guides have been developed that allow television program information to be displayed on a user's television.

Interactive television program guides allow the user to navigate through television program listings using a remote control. In a typical program guide, various groups of television program listings

are displayed in predefined or user-defined categories. Listings are typically displayed in a list, grid, or table. Interactive television program guides are typically implemented on set-top boxes located in the homes of users. A typical set-top box is connected to the user's television and videocassette recorder. Program guides that run on personal computers or that allow program guide information to be obtained using the Internet are also available.

Current television programming service providers typically provide television programing to customers that may live across a wide geographical area. It is not uncommon for a television programming service provider to provide television programming to a number of viewers who may not speak the same language, or who prefer speaking in a language different from the primary language of the geographical area in which the viewers live.

Some current interactive television program guides provide users with the ability to select languages for television programming from digital audio tracks on a digital channel. These interactive television program guides provide the user with the opportunity to select a language. The interactive program guide informs firmware in the user's set-top box of the selected language. A digital component selector in the set-top box then instructs a packet filter to filter out unwanted digital audio tracks based on unique packet identifiers ("PIDs") that identify each of the tracks. The audio track with the PID that corresponds to the selected language is played by the set-top box on the user's television.

Current program guides do not provide for activation and deactivation of a secondary audio

program (SAP) based on the language of the audio carried on the SAP. Current program guides also do not allow user to designate a single language for both displaying program guide display screen text (e.g., help text, program listings grid text, button labels, etc.), and for playing audio.

It would therefore be desirable to provide an interactive television program guide that allows a user to select a language for playing analog program audio and for displaying program guide display screen text. It would also be desirable to provide a program guide that allows a user to select a language in which both audio is played and program guide text is displayed. It would also be desirable to coordinate the language in which program guide display screen text is displayed with languages that are available to the user for playing television programming. For example, it would be desirable to have television program listings for a particular program displayed in a user selected language if the program, when actually broadcasted, has audio available in the selected language. Otherwise, the program listing for that program may be displayed and the program played in a default language.

It is therefore an object of the present invention to provide an interactive television program guide system that allows a user to select a language in which both programming audio is played and program guide display screen text is displayed.

It is another object of the present invention to provide an interactive television program guide that allows a user to select languages for playing television program audio provided on analog tracks.

It is another object of the present invention to provide an interactive television program guide that

coordinates the language in which program guide display screen text is displayed with languages available for television programming when the television programming is broadcasted.

It is another object of the present invention to provide an interactive television program guide system in which program guide display screen text in a selected language is downloadable by the program guide.

Summary of the Invention

These and other objects of the present invention are accomplished in accordance with the principles of the present invention by providing an interactive television program guide system having a main facility (e.g., a satellite uplink facility) that provides program guide data from a data source to a number of television distribution facilities (e.g., cable system headends, broadcast distribution facilities, satellite television distribution facilities, or any other suitable television distribution facilities). The program guide data transmitted by the main facility to the television distribution facilities includes television programming data (e.g., titles, channels, descriptions and content information, rating information, or any other information associated with television programming), and additional data for services other than television program listings (e.g., help text, weather information, sports information, associated Internet web links, etc.). The television distribution facilities distribute the program guide data to the interactive television program guides of a number of users.

The interactive television program guide of the present invention is implemented on interactive

program guide equipment that may include user television equipment (e.g., a set-top box and television combination) located at the user's home. The interactive program guide equipment may also include program guide distribution equipment located at a television distribution facility.

Program guide display screens may be used to provide a user with the opportunity to select the language in which television programming is played by the user's television equipment and in which program guide display screen text is displayed using the interactive television program guide. Displaying program guide display screen text in a selected language may also include displaying text in a date format, time format, currency format, parental rating format or other format particular to a selected language or country that uses a selected language. The interactive television program guide may store a language attribute identifying the selected language. A default program guide language attribute may also be stored by the program guide. The default program guide language attribute may, for example, be preprogrammed into the program guide or supplied as program guide data. Default program languages for individual programs may also be supplied as program guide data.

The program guide may also provide users with an opportunity to select an alternate language in which program guide display screen text is displayed and programming audio played. For example, the user may select Spanish as a primary language and English as an alternate language. In another suitable approach, the program guide may pick an alternate language based on the primary language selected by the user. If the user selects Canadian English for the primary language, for

example, the program guide may select U.S. English as an alternate language. As used herein, "selected language" is intended to include a primary language selected by the user, a secondary language selected by the user or the program guide, or any suitable combination thereof.

In practice, the languages available for playing programming audio may not be the same as the languages available for displaying program guide display screen text. When programming audio is not available in the selected language but program guide display screen text is, the program guide may play programming audio in a related language. For example, if a user selects Canadian English as the user's primary language, the program guide may display program guide display screen text in Canadian English and play programming audio in U.S. English when there is nc Canadian English audio track available for the program.

The interactive program guide informs hardware in the user's television equipment of the selected language or languages. The user's television equipment plays television programs with audio from digital or analog audio tracks that contain audio in the selected languages. If audio in the primary or alternate language is not available on any provided digital or analog audio track, the user television equipment plays the television programs in the default program guide language or, if applicable, the default program languages. Data or other information that is provided, for example subtitles, may also be displayed in the selected language.

The interactive television program guide of the present invention may provide a user with the opportunity to request television programs such as in,

for example, a video-on-demand (VOD) system. The interactive television program guide may inform equipment at the television distribution facility of the primary, alternate and default languages (or any suitable combination thereof) when, for example, a request is made by the program guide to the television distribution facility for a program. The television distribution facility may respond by providing the requested television program to the user's television equipment with only a single audio track containing audio in the selected language. Eliminating unnecessary audio tracks may lessen the bandwidth requirements for transmitting programming signals from the television distribution facility to a user's television equipment.

The interactive television program guide of the present invention may also provide program guide display screen text to the user in the selected language. As used herein, interactive program guide display screen text may include help text, program guide data text, program guide text, or any suitable combination thereof. Help text is displayed in response to the user selection of a help feature. Help text may be downloaded as part of the program guide data provided by the main facility or may be part of the program guide.

Program guide data text is text included in the downloaded program guide data and included in program guide display screens. Program guide data text may include, for example, programming information (e.g., titles, channels, descriptions and content information, rating information, or any other text based information associated with television

programming), text for advertisements, or any other suitable text-based information.

Program guide text is text that is programmed into the program guide and that is generally not provided as part of the program guide data. Program guide text may be downloaded when, for example, changing languages of the program guide. Program guide text may include, for example, screen titles, screen element labels (e.g., button labels, program list labels, program grid labels, etc.), text that indicates or otherwise describes program guide functionality, or any other text that may be considered part of the program guide itself and displayed in program guide display screens.

The interactive program guide may filter help text and program guide data text from the program guide data based on the language attributes. Help text and program guide data text in the selected and default program guide languages may be provided to the interactive television program guide by the television distribution facilities using any suitable approach. The text may, for example, be provided continuously by the television distribution facilities in different languages and filtered by the program guide, may be downloaded by the program guide on request (e.g., in a suitable client-server approach), or may be obtained using any other suitable approach.

Program guide text may be changed in any suitable fashion. Program guide text for all available languages may, for example, be compressed using any suitable compression method and stored as part of the program guide application. When a different language is selected by the user, the program guide may, for example, decompress the appropriate program guide text

and display it accordingly. Alternatively, the program guide may, for example, download program guide text on demand from the television distribution facility (e.g., as in a suitable client-server approach) using the stored language attribute. Program guide text may also be provided as part of a continuous data stream and filtered locally. Any suitable combination of these methods may also be used. For example, the program guide may store program guide text in popular languages and may download program guide text when a less popular language is selected. For similar languages, (e.g., Canadian English and U.S. English), the program guide may download program guide text in one language as a reference, and the differences in the second language. Making program guide text downloadable via a continuous data stream, periodic stream, server, or any other source, may allow a single version of the program guide to be distributed over a wide geographical area (e.g., nationally) and the language of the guide to be localized (e.g., apropos to the languages of local residents).

If desired, only portions of the program guide display screen text may be changed by coordinating the language in which program guide display screen text is displayed with the languages available for television programming available to the user. For example, a particular program may not have an audio data track for the selected language. The program may be played and its associated program listings may be displayed, for example, in a default program guide language or default program language, while programs and associated program listings that have audio or data tracks with content in the selected language may be played and displayed in the selected

language. The same may be true for subtitles, music information, programming information, other information included in a digital track, or any other program guide data text or program guide text that may be played by the user's television equipment. The same may be true for television program audio. Programs, their audio, and any associated program data or programming guide data may be recorded in a selected or default language.

Further features of the invention, its nature and various advantages will be more apparent from the accompanying drawings and the following detailed description of the preferred embodiments.

Brief Description of the Drawings

FIG. 1 is a schematic block diagram of an illustrative system in accordance with the present invention.

FIGS. 2a and 2b show illustrative arrangements for the interactive program guide equipment of FIG. 1 in accordance with the principles of the present invention.

FIG. 3 is an illustrative schematic block diagram of the user television equipment of FIGS. 2a and 2b in accordance with the principles of the present invention.

FIG. 4 is a generalized schematic block diagram of portions of the illustrative user television equipment of FIG. 3 in accordance with the principles of the present invention.

FIGS. 5-11 are illustrative program guide display screens in accordance with the principles of the present invention.

FIG. 12 shows an illustrative hierarchy that may be used by the program guide to determine the

language in which program guide display screen text is displayed and audio played.

FIGS. 13-16 are flowcharts of illustrative steps involved in providing an interactive program guide with selectable languages in accordance with the principles of the present invention.

Detailed Description of the Preferred Embodiments

An illustrative system 10 in accordance with the present invention is shown in FIG. 1. Main facility 12 provides program guide data from program guide data source 14 to interactive program guide equipment 17 via communications link 18. There are preferably numerous pieces or installations of interactive program guide equipment 17, although only one is shown in FIG. 1 to avoid over-complicating the drawing.

Link 18 may be a satellite link, a telephone network link, a cable or fiber optic link, a microwave link, an Internet link, a combination of such links, or any other suitable communications link. If it is desired to transmit video signals over link 18 in addition to data signals, a relatively high bandwidth link such as a satellite link may generally be preferred to a relatively low bandwidth link such as a telephone line.

The program guide data transmitted by main facility 12 to interactive program guide equipment 17 may include television programming data (e.g., program times, channels, titles, and descriptions) and other data for services other than television program listings (e.g., help text, pay-per-view information, weather information, sports information, associated

Internet web links, etc.). The program guide data may be compressed if desired.

An interactive television program guide is implemented on interactive program guide equipment 17. Two illustrative arrangements for interactive program guide equipment 17 are shown in FIGS. 2a and 2b. Interactive program guide equipment 17 may include program guide distribution equipment 21 located at television distribution facility 16, and user television equipment 22.

The interactive television program guide may run totally on user television equipment 22 as shown in FIG. 2a, or may run partially on user television equipment 22 and partially on program guide distribution equipment 17 using a suitable client-server or distributed processing approach as shown in FIG. 2b. Television distribution facility 16 may be any suitable distribution facility (e.g., a cable system headend, a broadcast distribution facility, a satellite television distribution facility, or any other suitable type of television distribution facility). Television distribution facility 16 may have program guide distribution equipment 21. Program guide distribution equipment 21 may distribute program guide data that television distribution facility 16 received from main facility 12 to multiple users via communications paths 20.

Program guide distribution equipment 21 of FIGS. 2a and 2b may be any equipment suitable for providing program guide data to user television equipment 22. Program guide distribution equipment 21 may include, for example, suitable transmission hardware for distributing program guide data on a television channel sideband, in the vertical blanking

interval of a television channel, using an in-band digital channel, using an out-of-band digital signal, or by any other suitable data transmission technique. Analog or digital video signals (e.g., television programs) may also be provided by program guide distribution equipment 21 to user television equipment 22 over communications paths 20 on multiple television channels.

Communications path 20 preferably has sufficient bandwidth to allow television distribution facility 16 to distribute television programming to user television equipment 22. There are typically multiple pieces of user television equipment 22 and multiple associated communications paths 20, although only one piece of user television equipment 22 and communications path 20 are shown in FIGS. 2a and 2b to avoid over complicating the drawing. If desired, television programming may be provided over separate communications paths (not shown).

FIG. 2b shows an illustrative arrangement for interactive program guide equipment 17 in a client-server based or distributed interactive program guide system. As shown in FIG. 2b, program guide distribution equipment 21 may include program guide server 25. Program guide server 25 may be any suitable software, hardware, or combination thereof for providing a client-server based program guide. Program guide server 25 may, for example, generate requested program guide display screens as digital frames and distribute the frames to user television equipment 22 for display by an interactive program guide client implemented on user television equipment 22. Program guide systems in which digital frames are distributed to users are described, for example, in Marshall et al.

U.S. patent application Serial No. 09/330,501, filed June 11, 1999, which is hereby incorporated by reference herein in its entirety. Alternatively, program guide server 25 may run a suitable database engine (e.g., SQL Server by Microsoft) and provide program guide data in response to queries generated by a program guide client implemented on user television equipment 22. If desired, program guide server 25 may be located at main facility 12 (not shown).

In still another embodiment, program guide distribution equipment 21 may include suitable hardware (not shown) on which a first portion or version of the interactive television program guide is implemented. A second portion or version of the program guide may be implemented on user television equipment 22. The two versions or portions of the interactive program guide may communicate using any suitable peer-to-peer communications scheme (e.g., messaging, remote procedure calls, etc.) and perform interactive program guide functions distributively between television distribution facility 16 and user television equipment 22.

Television distribution facility 16 may supply programs to user television equipment 22 in response to demands made by the user using user television equipment 22. Any suitable video-on-demand (VOD) approach may be used. Program guide server 25 may receive, along with video demands from user television equipment 22, identifiers that identify the selected language and the default program guide language of the interactive television program guide.

Program guide distribution equipment 21 of FIG. 2b may include digital component selector 61 and

analog audio selector 63. Digital component selector 61 may be any hardware, software, or combination thereof suitable for determining which digital audio, data, or other tracks contain audio, data, or other information in the language selected by the user or, alternatively, in the default language of the interactive program guide. Analog audio selector 63 may be any hardware, software, or combination thereof suitable for determining which analog audio track contains audio in the selected language or, alternatively, in the default program guide language.

Program guide distribution equipment 21 may distribute programs to user television equipment 22 with only an analog audio track (if distributed on an analog channel), or with only digital audio, data, or other information tracks (if distributed on a digital channel), that have audio, data, or other information in the selected or default languages as determined by analog audio selector 63 or digital component selector 61, respectively. Sending audio, data, or other information in only one language requires less bandwidth than would sending the audio, data, or other information in multiple languages and having unwanted languages filtered at user television equipment 22. This approach is especially useful in systems, such as VOD systems, where many users request video over multiple communication paths 20.

Each user has user television equipment 22 for displaying, for example, television programming and program guide display screens using the interactive television program guide. Program guide data may be distributed by program guide distribution equipment 21 to user television equipment 22 using any suitable

scheme. For example, program guide data may be provided in a continuous stream, or may be transmitted periodically at a suitable time interval (e.g., once per hour). If transmitted continuously, it may not be necessary to store the data locally at user television equipment 22. Rather, user television equipment 22 may extract data "on the fly" as it is needed. If desired, television distribution facility 16 may poll user television equipment 22 periodically for certain information (e.g., pay program account information or information regarding programs that have been purchased and viewed using locally-generated authorization techniques). Program guide data provided by program guide server 25 may also be distributed to user television equipment 22 by program guide distribution equipment 21. If desired, the program guide data may be compressed by main facility 12 or television distribution or facility 16, and uncompressed by the program guide.

For clarity, the present invention will be illustrated in connection with a system arrangement in which program guide data is distributed from a main facility to an interactive television program guide implemented on user television equipment via a television distribution facility. Other suitable systems involve arrangements in which data is distributed to a program guide on user television equipment using other suitable distribution schemes, such as schemes involving data transmission over the Internet or the like. If desired, the interactive television program guide application may be implemented using a client-server architecture in which the primary processing power for the application is provided by a server located at, for example, the television

distribution facility or the main facility (e.g., program guide server 25), and user television equipment 22 acts as a client processor, as in, for example, the system shown in FIG. 2b. A suitable distributed approach may also be used.

An illustrative arrangement for user television equipment 22 is shown in FIG. 3. User television equipment 22 of FIG. 3 receives video, audio and data from television distribution facility 16 (FIG. 1) at input 26. During normal television viewing, tuner 51 of set-top box 28 tunes to a desired television channel based on inputs from the user on remote control 40. The signal for that television channel is then provided at video output 30. The signal supplied at output 30 is typically either a radio-frequency (RF) signal on a predefined channel (e.g., channel 3 or 4), or a analog demodulated video signal, but may also be a digital signal provided to television 36 on an appropriate digital bus (e.g., a bus using the Institute of Electrical and Electronics Engineers (IEEE) 1394 standard, (not shown)). The video signal at output 30 is received by optional secondary storage device 32. Set-top box 28 may also have digital component selector 53, packet filter 55, MPEG-2 decoder 57, and analog audio selector 59 (or any suitable combination thereof) for obtaining digital or analog audio from the signal received at input 26.

Secondary storage device 32 can be any suitable type of analog or digital program storage device or player (e.g., a videocassette recorder, a digital versatile disc (DVD) player, etc.). Program recording and other functions may be controlled by set-top box 28 using control path 34. If secondary storage device 32 is a videocassette recorder, for

example, a typical control path 34 involves the use of an infrared transmitter coupled to the infrared receiver in the videocassette recorder that normally accepts commands from a remote control such as remote control 40. Remote control 40 may be used to control set-top box 28, secondary storage device 32, and television 36. Programs and their associated audio may be stored in a selected or default language if desired.

The interactive television program guide may run on set-top box 28, on television 36 (if television 36 has suitable processing circuitry and memory), or on a suitable analog or digital receiver connected to television 36. The interactive television program guide may also run cooperatively on both television 36 and set-top box 28. Interactive television application systems in which a cooperative interactive television program guide application runs on multiple devices are described, for example, in Ellis U.S. patent application Serial No. 09/186,598, filed November 5, 1998, which is hereby incorporated by reference herein in its entirety.

If desired, the user may record programs, associated program data, program guide data, or any suitable combination thereof in digital form on optional digital storage device 31. The programs, audio, associated program data, or program guide data may be stored in a selected or default language. Digital storage device 31 may be a writable optical storage device (such as a DVD player capable of handling recordable DVD discs), a magnetic storage device (such as a disk drive or digital tape), or any other digital storage device. Interactive television program guide systems that have digital storage devices are described, for example, in Hassell et al. U.S.

patent application Serial No. 09/157,256, filed September 17, 1998, which is hereby incorporated by reference herein in its entirety.

Digital storage device 31 can be contained in set-top box 28 or it can be an external device connected to set-top box 28 via an output port and appropriate interface. If necessary, processing circuitry in set-top box 28 formats the received video, audio, and data signals into a digital file format. Preferably, the file format is an open file format such as the Motion Pictures Expert Group (MPEG) MPEG-2 standard. The resulting data is streamed to digital storage device 31 via an appropriate bus (e.g., a bus using the Institute Electrical and Electronics Engineers (IEEE) 1394 standard), and is stored on digital storage device 31.

Television 36 receives video and audio signals from secondary storage device 32 via communications path 38. The signals on communications path 38 may either be generated by secondary storage device 32 when playing back a prerecorded storage medium (e.g., a videocassette or a recordable digital versatile disc), by digital storage device 31 when playing back a pre-recorded digital medium, may be passed through from set-top box 28, may be provided directly to television 36 from set-top box 28 if secondary storage device 32 is not included in user television equipment 22, or may be received directly by television 36. During normal television viewing, the signals provided to television 36 correspond to the desired channel to which the user has tuned with set-top box 28. The signals may also be provided to television 36 by set-top box 28 when set-top box 28 is

used to play back information stored on digital storage device 31.

A more generalized embodiment of user television equipment 22 of FIG. 3 is shown in FIG. 4. As shown in FIG. 4, program guide data from television distribution facility 16 (FIG. 1) is received by control circuitry 42 of user television equipment 22. Control circuitry 42 may include circuitry suitable for tuning to digital or analog television signals as indicated by tuner 51. Control circuitry 42 may also include circuitry suitable for selecting different audio tracks from digital audio television channels, as is indicated by digital component selector 53, packet filter 55, and analog audio selector 59. Decoding circuitry for generating digital video may also be included, as is indicated by MPEG-2 decoder 57. The functions of control circuitry 42 may be provided using the set-top box arrangement of FIG. 3. Alternatively, these functions may be integrated into an advanced television receiver, personal computer television (PC/TV), or any other suitable arrangement. If desired, a combination of such arrangements may be used.

User television equipment 22 may also have secondary storage device 47 and digital storage device 49 for recording programming. Secondary storage device 47 can be any suitable type of analog or digital program storage device (e.g., a videocassette recorder, a digital versatile disc (DVD), etc.). Program recording and other functions may be controlled by control circuitry 42. Digital storage device 49 can be, for example, a writable optical storage device (such as a DVD player capable of handling recordable DVD discs), a magnetic storage device (such as a disk

drive or digital tape), or any other digital storage device. If desired, programs may be recorded remotely at television distribution facility 16 or some other facility, making secondary storage device 47 and digital storage device 49 unnecessary. Systems in which programs are remotely recorded and played back are described, for example, in Ellis et al. U.S. patent application Serial No. 09/332,244, filed June 11, 1999, which is hereby incorporated by reference herein in its entirety. Programs, audio, associated program data, program guide data, or any suitable combination thereof, may be recorded by secondary storage device 47, digital storage device 49, or a remote server in a selected or default language if desired.

The user controls the operation of user television equipment 22 with user interface 46. User interface 46 may be a pointing device, wireless remote control, keyboard, touch-pad, voice recognition system, or any other suitable user input device. To watch television, the user instructs control circuitry 42 to display a desired television channel on display device 45. To access the functions of the program guide, the user instructs the program guide implemented on interactive program guide equipment 17 to generate a main menu or other desired program guide display screen for display on display device 45.

When a user indicates a desire to access the interactive television program guide implemented on interactive program guide equipment 17 (e.g., by using a "menu" key on remote control 40), the program guide generates an appropriate program guide display screen for display on monitor 45. A main menu screen, for example, such as illustrative main menu screen 100 of

FIG. 5, may be generated that provides the user with access to various program guide functions. Main menu screens may also display any suitable graphic or other display screen entity.

Illustrative main menu screen 100 of FIG. 5, for example, may include menu 102 of selectable program guide features 106. If desired, the program guide features 106 may be organized according to feature type. Menu 102, for example, organizes program guide features 106 into three columns wherein the column labeled "TV GUIDE" is for listings related features, the column labeled "MSO SHOWCASE" is for multiple system operator (MSO) related features, and the column labeled "VIEWER SERVICE" is for viewer related features. The interactive television program guide may generate a suitable display screen for a particular program guide feature in response to the user selection of any selectable program guide feature 106.

Main menu screen 100 may also include one or more selectable advertisement graphics 108. Selectable advertisement graphics 108 may, for example, advertise pay-per-view programs. In response to the user selection of a selectable advertisement graphic 108, the program guide may display information (e.g., pay-per-view information) for what is advertised by the graphic. Pure text advertisements may be presented using selectable advertisement graphics 108 if desired, or may be more suitably presented using selectable advertisement banner 110.

Main menu screen 100 may also include other graphics. The brand of the program guide product may be indicated, for example, using a product brand logo graphic such as product brand logo graphic 112. The service provider may be indicated, for example, using a

service provider logo graphic such as service provider logo graphic 114. The current time may be displayed using clock 116. In addition, a suitable indicator such as indicator graphic 118 may be used to indicate to the user that a message is waiting for the user if the program guide provides messaging or a TV-Mail feature.

The interactive program guide may provide the user with the opportunity to view television program listings. A user may indicate a desire to view program listings by, for example, positioning highlight region 120 over a desired program guide feature. Alternatively, the program guide may present program listing in response to the user pressing a key (e.g., a "guide" key) on remote control 40. In response to the user indicating a desire to view television programming information, the program guide may generate an appropriate program listings screen for display on monitor 45. A program listings screen may contain one or more lists of programs organized according to multiple organization criteria and sorted in various ways.

The program listings screen may be overlaid over a program being viewed by the user or overlaid over a portion of the program in a "browse" mode. The program guide may, for example, provide the user with the opportunity to view listings by time, by channel, according to a number of themes (e.g., movies, sports, children, etc.), or may allow the user to search for a listing by title. Program listings may be displayed using any suitable list, table, grid, or other suitable display construct. If desired, program listings display screens may also include selectable advertisement graphics, selectable advertisement

banners, product brand logo graphics, service provider brand graphics, clocks, or any other suitable indicator or graphic.

FIGS. 6a and 6b illustrate the display of program listings by time and by channel, respectively. The program listings display screens 130 and 135 of FIGS. 5a and 5b may include highlight region 151, which highlights the current listing 150. The user may position highlight region 151 by entering appropriate commands with user interface device 52. For example, if user input interface device 52 has a keypad, the user can position highlight region 151 using "up" and "down" keys. Alternatively, a touch sensitive screen, trackball, voice commands, or other suitable device may be used to move highlight region 151 or to select program listings without the use of highlight region 151. In still another approach, the user may speak a television program listing into a voice request recognition system. Any other suitable approach may be used.

The program guide may also provide the user with the opportunity to view listings for other times or channels. The user may indicate a desire to access listings for other times or channels by, for example, pressing "left" and "right" arrows on remote control 40 to change time slots (when listings are presented by time as shown in FIG. 6a), or to change channels (when listings are presented by channel as shown in FIG. 6b). In response to such an indication, the program guide may display listings for a different time slot or channel. The user may also indicate a desire to see additional program listings for a particular time slot (when listings are presented by time as shown in FIG. 6a) or for a particular channel (when listings are

displayed by channel as shown in FIG. 6b) by, for example, pressing "up" and "down" arrow keys on remote control 40. In response to such an indication, the program guide may, for example, scroll or page the program listings to display additional program listings.

After a user selects a program listing (e.g., by position highlight region 151 and pressing an "OK" key on remote control 40), the interactive program guide may provide the user with the opportunity to access a number of program guide functions associated with the listing. For example, the user may access additional information (typically text or graphics, but possibly video and other information) about the listing, set a reminder, schedule an associated program for recording, set parental control features, set and navigate through favorite channels, or any access other suitable program guide function.

FIG. 7a shows an illustrative full information screen 161 that may be displayed when a user indicates a desire to view information for a program. Full information screen 161 may be displayed, for example, when the user presses an "info" key on remote control 40 after highlighting a program listing in a program listings display screen (e.g., program listings display screens 130 and 135 of FIGS. 5a and 5b), while watching a program, or at any other suitable time. Information screens that provide users with an opportunity to access various program guide functions are described, for example, in concurrently filed Rudnick et al. U.S. patent application Serial No. 09/356,268 filed July 16, 1999, which is hereby incorporated by reference herein in its entirety.

Full information screen 161 may include information window 162 in which a brief description of a program may be displayed. Information window 162 may also list the languages available for a program in response to a user indicating a desire to see such a list (e.g., by selecting language option 157). FIG. 7b, for example, shows information window 162 with available languages for "Mad About You." Alternatively, the available languages may be displayed as part of an information window without requiring a user to indicate a desire to access them.

Users may be unfamiliar with some of the functions of the program guide. The interactive program guide may, for example, provide the user with the opportunity to access help information for a function by, for example, pressing a "help" key on remote control 40 while in the display screen of a particular function. FIG. 8 shows illustrative help display screen 200 that may be generated by the program guide in response to a user indication to do so. Help display screen 200 may contain selectable advertisement graphics, advertisement banners, product brand logo graphics, service provider logo graphics, clocks, or any other suitable indicator or graphic. Help display screen 200 may also contain help text panel 202 in which help text 205 is displayed. Help text panel 202 may include other non-help text, such as text 204 that indicates to the user to press HELP to exit.

The program guide of the present invention may provide a user with the opportunity to select a language from a list of languages. The user may, for example, access a list of languages initially by indicating a desire to access a setup function of the program guide by selecting "SETUP" from main menu 102

of FIG. 5. In response to such an indication, the program guide may display a setup display screen, such as illustrative setup display screen 300 of FIG. 9. The setup display screen of FIG. 9 may, for example, provide a user with the opportunity to select a "language" setup option from a list of on-screen features.

In response to the user selection of the "language" setup option the program guide may display, for example, illustrative language setup display screen 310 of FIG. 10. Language setup display screen 310 of FIG. 10 may, for example, display a list of selectable languages that the program guide may use for playing television programming and displaying program guide display screen text. The language listings may be displayed in their respective languages if desired. The program guide may provide the user with an opportunity to select a language and in response to such a selection, the program guide may display illustrative language confirmation screen 320 shown in FIG. 11. Language confirmation screen 320 of FIG. 11 may provide a user with an opportunity to confirm the selected language. If desired, language confirmation screen 320 may be displayed in the selected language before the language is set.

Illustrative language confirmation screen 320 of FIG. 11 indicates to users that there may be a delay of a few minutes to update the guide. Whether or not there is any delay may depend on the chosen approach for providing program guide display screen text in different languages. The message displayed in language confirmation screen 320 may be changed accordingly.

Language setup display screen 310 of FIG. 10 and language confirmation screen 320 of FIG. 11 may

also be displayed by the program guide to provide the user with an opportunity to select an alternate language. The program guide may display program guide display screen text and play audio in the alternate language when text or audio in the primary language (i.e., the language first selected by the user) is not available. In another suitable approach, the program guide may pick an alternate language based on the primary language selected by the user. If the user selects Canadian English, for example, the program guide may select U.S. English as an alternate language. As used herein, "selected language" is intended to include a primary language selected by the user, a secondary language selected by the user or the program guide, or any suitable combination thereof.

In practice, the languages available for playing programming audio may not be the same as the languages available for displaying program guide display screen text. When programming audio is not available in the selected language but program guide display screen text is, the program guide may play programming audio in a related language. For example, if a user selects Canadian English as the user's primary language, the program guide may display program guide display screen text in Canadian English and play programming audio in U.S. English when there is no Canadian English audio track available.

The program guide may store a language attribute identifying the selected language. The program guide may also store a default program guide language attribute identifying a default program guide language. The default program guide language attribute may, for example, be preprogrammed into the program guide or supplied as part of the program guide data,

and may be customized based on a user's location. For example, users in the United States may have their default program guide language set to U.S. English, and users in Mexico may have their default program guide language set to Spanish.

Program guide display screen text may be displayed using the interactive television program guide according to the language attributes. If program guide display screen text in the selected language is not available, text in the default program guide language may be used to display program guide display screen text in the default program guide language. The display of program guide display screen text may include displaying times, dates, currencies, or parental ratings in formats particular to a selected language or country that uses a selected language. Program guide display screen text may include help text, program guide data text, and program guide text, or any suitable combination thereof. Help text is displayed in response to the user selection of a help feature such as text 205 of FIG. 8. Help text may be provided as part of the program guide data provided by the main facility, as part of the application, or using a suitable combination of approaches. Help text may, for example, be initially provided as part of the program guide and later downloaded when the user selects a language.

Program guide data text is text included in the program guide data that is read by the program guide and included in program guide display screens. Program guide data text may include, for example, programming information (e.g., titles, channels, descriptions and content information, rating information, or any other text based information

associated with television programming), text for advertisements, or any other suitable text based information. An example of program guide data text may be the program listings of listings 150 shown in FIGS. 6a and 6b, and the program information displayed on information window 162 of FIG. 7a.

Program guide text is text that is programmed into the program guide and that is generally not provided as part of the program guide data. Program guide text may be downloaded, however, when the user changes languages. Program guide text may include, for example, screen titles, screen element labels (e.g., button labels, program list labels, program grid labels, etc.), text that indicates or otherwise describes program guide functionality, or any other text that may be considered part of the program guide itself for display in program guide display screens. An example of program guide text may be the text of selectable features 106 of main menu 102 (FIG. 5).

The interactive program guide may obtain program guide data containing text that is in the selected or default program guide languages. In one suitable approach, program guide help and data text may be provided continuously by television distribution facility 16 to user television equipment 22 in different languages and filtered by the interactive program guide. The program guide may, for example, filter out data in the data stream containing text that is not in a desired language (e.g., undesirable help or program guide data text) by, for example, comparing a stored language attribute with language attributes contained in a program guide data stream. This comparison and filtering may also be performed by suitable circuitry in control circuitry 42 without

requiring the program guide to do the comparison. In another suitable approach, program guide data in the desired language (e.g., help text and programming video data text) may be downloaded by the program guide by a specific request (e.g., in a suitable client-server approach).

In still another suitable approach, the interactive program guide may indicate the selected and default program guide languages to television distribution facility 16 using any suitable approach. Television distribution facility 16, in turn, may provide program guide data only in the indicated languages. In this approach, television distribution facility 16 may have suitable memory and processing circuitry to store language attributes for a large number of users. Alternatively, the program guide may indicate the selected and default languages with every request.

Program guide text may be changed by the interactive program guide using any suitable approach. Program guide text for all available languages may, for example, be compressed using any suitable compression method, and stored as part of the program guide application. When a user selects a different language, the program guide may, for example, decompress program guide text in the selected language and display it accordingly. Alternatively, the program guide may, for example, download program guide text on demand from the television distribution facility (e.g., as in a suitable client-server approach), or download program guide text from a periodic or continuous data stream.

Television program audio may be provided to user television equipment 22 by television distribution facility 16 on analog audio tracks of analog television

channels. Different audio tracks may be used to provide different languages for television program audio. One suitable analog approach involves using a secondary audio program ("SAP"). SAP track identification may be provided to the interactive television program guide as part of the program guide data stream by main facility 12 or television distribution facility 16. The program guide data stream may, for example, contain a SAP track map database that maps or defines the primary and secondary language types of the SAP for a particular programming entity (e.g., by using a unique source identifier ("ID") to identify NBC, ABC, FOX, etc.), for each channel, or for each program. The SAP track map database may be generated by main facility 12 or television distribution facility 16 and transmitted to user television equipment 22 using any suitable analog or digital in-band or out-of-band approach. The SAP track map database may be included in the program guide data if desired.

The SAP track map database may be stored by the interactive program guide, downloaded on demand, periodically, continuously or using any other suitable approach. When necessary, the interactive program guide may pass track identifiers to analog audio selector 59 (FIG. 4). The program guide may, for example, pass track identifiers to analog audio selector 59 each time the user changes channels, each time a new program is broadcast, or after any other suitable event that may require analog audio selector 59 to select a different audio track. Alternatively, the program guide may pass the SAP track map database and track identifiers to analog audio selector 59. Analog audio selector 59 may in turn dynamically choose

between the SAP audio tracks based on the language identifiers and the SAP map, without requiring activity by the program guide.

Television program audio, data, and other information may be provided to user television equipment 22 on digital tracks that are provided as part of digital television channels. A digital channel may include, for example, a video track, a number of audio tracks, and a number of data or other suitable text tracks (e.g., a subtitle track, digital music information track (e.g., title, artist, and track information), etc.). If desired, data may be transmitted out-of-band and not included as an additional track. Digital video, audio, and data are transmitted in packets on the digital television channel. The packets also contain packet identifiers ("PIDs") identifying the track that each packet belongs to.

A PID map database may be provided by main facility 12 to television distribution facility 16 as part of the program guide data. Alternatively, television distribution facility 16 may insert a PID map database into the program guide data that was generated by television distribution facility 16 or another source. If desired, the PID map database may be distributed by television distribution facility 16 to user television equipment 22 separate from the program guide data. The PID map database defines which languages correspond to the digital tracks of the digital channels. The PID map database may define, for example, which languages correspond to which tracks for each television program, for each channel, or for each television distribution facility 16.

The interactive television program guide implemented on interactive program guide equipment 17 may receive the PID map database. The PID map database may be used by the interactive program guide to determine which audio, data, or other track has audio, data, or other information in the selected, default program guide, and default program languages. This may be determined, for example, each time the user changes the selected language, each time new television programming is broadcasted, each time the channel is changed, in any suitable combination thereof, or after any other event that may require selecting different digital tracks to obtain audio, data, or other information in the applicable languages. The PIDs for the tracks on which the selected or default language audio, data, or other information is provided are passed by the interactive program guide to packet filter 55 located in user television equipment 22. Packets without the passed IDs are filtered out by packet filter 55. The remaining packets, along with the digital video signal of the channel, may be passed from tuner 51 to decoder 57 for decoding, and all are played for the user by user television equipment 22.

The PID map database may also be forwarded to digital component selector 53. The interactive television program guide may pass the stored language attributes to digital component selector each time the user selects a different language using the program guide. Digital component selector 55 may in turn pass PIDs to the packet filter for audio, data, and other tracks that contain audio, data, and other information in the selected or default languages, based on the PID map. Packets without the indicated IDs are filtered out by packet filter. The remaining audio and data

packets, along with the digital video signal on the channel, may be passed from tuner 51 to decoder 57 for decoding, and are all played for the user by user television equipment 22. In this approach, the interactive program guide may "sleep" and allow digital component selector 53 to detect events which would require sending different PIDs to packet filter 55 (e.g., the user flipping a channel).

If desired, only portions of the program guide display screen text may change by coordinating the language in which program guide display screen text is displayed with the languages available for television programming available to the user. A particular program may, for example, not have an audio track (digital or analog) for a primary selected language (e.g., U.S. English). The program may be played and its associated program listings and other information may be displayed, for example, in any other applicable language (e.g., an alternate, the default program language, or the default program guide language), while programs and associated program listings that have the desired audio track may be displayed in the primary selected language. The same may be true for subtitles, music information, programming information, other data or information included in digital tracks, or any other program guide display screen text that is presented to the user by the program guide.

A particular program may not, for example, have an audio track in the selected language. When the user indicates to the interactive program guide a desire to access a program guide function that involves, for example, displaying program guide data text (e.g., previewing program listings, program

information, ordering pay-per-view programs, etc.), the program guide determines if the program guide data text displayed as part of the function includes television programming information (e.g., titles, broadcast times, descriptions and content information, rating information, etc.). As the program guide generates program guide display screens containing the television program information, the program guide determines if the television program associated with the television program information has audio, data, or other information in the selected language, based on the PID map database or the SAP map database. If so, the program guide displays program guide display screen text associated with the program in the selected language. If, however, the television program audio, data, or other information is not available in the selected language, the program guide may display the program guide display screen text in the default language.

In still another suitable approach, main facility 12 may provide program guide display screen text in those languages in which audio for related programming is available. If a program has audio in only one language, main facility 12 may only provide program guide display screen text in that language. This may simplify the selection process that may take place at television distribution facility 12 when, for example, the program guide requests program guide data text.

One example of when the program guide may coordinate the language in which program guide display screen text is displayed with languages available for television programming is when a user indicates a desire to view program listings. The program guide may

also coordinate languages, for example, when a user indicates a desire to access other program information, pay-per-view ordering information, or any other information related to television programs.

An illustrative hierarchy of the language in which program guide display screen text is displayed and audio played is shown in FIG. 12. Preferably, the program guide uses the primary language selected by the user. Program guide text and help text may normally be displayed in the primary language unless, for example, the text cannot be downloaded by the program guide after a user changes the primary language. If audio is not available, it may be played in an alternate language selected either by the user or by the program guide. If program guide data text is not available in the primary selected language, the program guide may obtain program guide data text in an alternate language selected by the user or by the program guide. Program guide data text for particular programs may be coordinated with the language in which audio will be played according, for example, to the hierarchy of FIG. 12.

Programs may have default program languages. A default program language may be set by, for example, main facility 12 or television distribution facility 16, and distributed to user television equipment 22 as part of the program guide data. If programming audio is not available in the primary or alternate language, it may be played in the default program language. Program guide data text for programs may be coordinated accordingly and displayed in the default program language. If none of the above languages are available, programming audio may be played and related

program guide data text displayed in the default program guide language.

FIGS. 13-16 are flowcharts of illustrative steps involved in providing a program guide with selectable languages in accordance with the principles of the present invention. The steps illustrated in the flowcharts are illustrative and may be performed in any suitable order. FIG. 13 shows illustrative steps involved in operating an interactive television program guide system that provides a user with the opportunity to select languages in which program guide display screen text is displayed.

At step 400, the interactive program guide implemented on interactive program guide equipment 17 may provide the user with the opportunity to select a language. Step 400 may include substeps 405, 410, and 415 as shown. At substep 405, a setup screen, such as illustrative setup display screen 300 of FIG. 8, may be provided to the user to provide the user with the opportunity to access the language selection feature of the program guide. At substep 410, the program guide may provide the user with a language setup display screen, such as illustrative language setup display screen 410 of FIG. 10, to provide the user with the opportunity to select a language from a list of languages. At substep 415, the program guide may provide the user with the opportunity to confirm the language selection by, for example, providing the user with language confirmation screen 320 of FIG. 11. Step 400 may be repeated to provide the user with an opportunity to select an alternate language. Alternately, the program guide may select an alternate language according to the primary language (step 417).

The program guide may store language attributes for the selected languages at step 420. A language attribute for the default program guide language may have been pre-programmed into the program guide, or may also be stored at step 420 (e.g., by downloading it from a data stream or server). At step 430, the program guide may ready program guide display screen text for display in the selected or default languages. More specifically, help text, program guide data text, and program guide text may be readied by the program guide at steps 440, 450, and 460, respectively.

Program guide display screen text may be readied by the program guide using any suitable approach. In practice, however, the way in which program guide display screen text is readied by the program guide may depend on the type of text and how the text is provided to the program guide. Help text and program guide data text may, for example, be continuously provided in multiple languages by television distribution facility 16 to user television equipment 22. Alternatively, help text and program guide data text in different languages may be provided on demand. In either of these approaches, the program guide may filter out unwanted help text or program guide data text at steps 442 and 452, respectively. Help text and program guide data text may also be downloaded in only the selected, default program guide, or default program languages by the program guide, as indicated by steps 444 and 454. In still another approach, the program guide may indicate the selected or default program guide language to television distribution facility 16. Television distribution facility 16 may in turn provide help text or program guide data text or any suitable combination of these

approaches, continuously in the indicated language (steps 446 and 456). Help text and program guide text may, for example, be stored initially as part of the program guide and updated using a suitable client-server based approach.

In still another suitable approach, main facility 12 may provide program guide data text in those languages in which audio for related programming is available. If a program has audio in only one language, main facility 12 may only provide program guide data text in that language. This may simplify the selection process that may take place at television distribution facility 12 when, for example, the program guide requests program guide data text. Any other suitable approach for readying help text or program guide data text or any suitable combination of these approaches, may be used.

The program guide may ready program guide text at step 460. On suitable approach may involve extracting program guide text in the selected or default program guide language that is normally stored by the program guide (step 462). Another suitable approach may involve downloading program guide text from television distribution facility 16 on demand at step 460 using, for example, any suitable client-server or peer-to-peer approach (step 464). Any other suitable approach for readying program guide text may be used. At step 468, the display screen text may be

decompressed. Providing display screen text in compressed form may tend to minimize the bandwidth requirements of link and 20 and the memory requirements of user television equipment 22.

At step 470, the program guide displays the program guide display screen text in the selected, the default program guide, or the default program language using user television equipment 22. Displaying program guide display screen text in a selected language may also include displaying text in a date format, time format, currency format, parental rating format or other format particular to a selected language or country that uses a selected language.

FIG. 14 is a flowchart of illustrative steps involved in providing analog audio on different analog audio tracks using the program guide of the present invention. Initially, the program guide may provide the user with an opportunity to select a language in which the user would like television program audio played by user television equipment 22. This opportunity may be provided to the user by the program guide at 400-415. At step 420, the program guide may store language attributes for the selected or default languages. Steps 400-420 were discussed with respect to FIG. 13 and for brevity will not be re-explained here.

An analog audio track is selected using the program guide (step 500). At step 502, the program guide may determine which analog track carries audio in a desirable language (e.g., the primary, alternate, default program guide, or default program language) using, for example, an analog audio track map such as a SAP map. At step 510, the program guide may pass an analog track identifier for the desired track to analog

audio selector 59 (FIG. 4). This step may occur with any suitable frequency. The program guide may pass an analog track identifier to analog audio selector 59, for example, each time the user changes channels, each time a programming change occurs, or with any other suitable frequency. At step 512, the identified audio track is selected by analog audio selector 59. The selected audio track is played for the user by user television equipment 22 at step 515.

It may be desirable, however, to select analog audio tracks without activity from the program guide, as performed at step 505. This may involve, for example, passing an analog track map and language identifiers for the selected and default languages to analog audio selector 59 using the program guide (step 507). Analog audio selector 59 may determine which analog track is desirable based on the analog track map and the language identifiers. In a system in which SAP is used, for example, only one language identifier need be included in the SAP map sent to analog audio selector because there are only two available tracks. If audio in the selected language is not available on the indicated track, then the other track may automatically be used. Alternatively, the SAP map may include the languages of both tracks.

At step 509, analog audio selector 59 selects the desirable analog audio track without any further activity by the program guide directed towards selecting analog audio. Step 509 may be performed, for example, each time the user changes channels, each time programming changes on a channel, or with any other suitable frequency. Analog audio from the selected track is played by user television equipment 22 at step 515.

FIG. 15 is a flowchart of illustrative steps involved in providing digital audio, data, or other information using the program guide of the present invention. Initially, the program guide may provide the user with an opportunity to select a language. This opportunity may be provided to the user by the program guide at steps 400-415. At step 417, the program guide may select an alternate language based on the primary language. At step 420, the program guide may store language attributes for the selected and default program guide languages. Steps 400-420 were discussed with respect to FIG. 13 and for brevity will not be re-explained here.

A digital audio, data, or other information track is selected using the program guide at step 550. At step 552, the program guide determines which digital tracks carry audio, data, or other information in a desirable (the selected or default) language using, for example, a PID map. At step 555, PIDs for the desirable tracks may be passed to packet filter 55 (FIG. 4) using the program guide. This step may be performed with any suitable frequency. The program guide may pass PIDs to packet filter 55, for example, each time the user changes channels, each time a programming change occurs, or with any other suitable frequency. At step 557, packet filter 55 filters out unwanted packets and the contents of the selected tracks are played by user television equipment 22 at step 560.

It may be desirable, however, to select digital tracks without activity from the program guide directed towards digital track selection, as performed at step 540. This may involve, for example, passing a PID map and language identifiers for the selected and

default languages to digital component selector 53 (FIG. 4) using the program guide (step 545). Digital component selector 53 may determine which tracks are desirable based on the PID map and the language identifiers, and may select the desirable tracks at step 547. Selecting desirable tracks may involve, for example, passing PIDs to packet filter 55 which, in turn, filters out undesirable packets. The contents of the selected digital tracks are played by user television equipment 22 at step 560.

FIG. 16 is a flowchart of illustrative steps involved in coordinating the language in which program guide display screen text is displayed with languages available for television programming when the television programming is broadcasted. Initially, the program guide may provide the user with an opportunity to select a language. This opportunity may be provided to the user by the program guide at steps 400-415. At step 417, the program guide may select an alternate language based on the primary language. At step 420, the program guide may store language attributes for the selected and default languages. Steps 400-420 were discussed with respect to FIG. 13 and for brevity will not be re-explained here.

Coordinating display screen text with available languages may involve any suitable scheme for providing display screen text in one or more languages (step 603). Main facility 12 may only provide program guide display screen text in languages in which audio is available for programs (step 605). For example, main facility 12 may only provide program listings in the languages in which their associated programs have audio. Alternatively, distribution equipment 21 or program guide server 25 of television distribution

facility 16 may only store program guide display screen text in languages available for programs (step 607). In still another approach, user television equipment 22 may only store program guide display screen text in languages available for programs (step 609).

At step 600, the program guide provides the user with an opportunity to access a program guide function. This may involve, for example, displaying main menu screen 100 of FIG. 5 and providing the user with the opportunity to select one of selectable features 106 (FIG. 5). Once the user indicates a desire to access a particular function (by, for example, selecting a feature 106), the program guide determines if providing the function to the user involves displaying program guide display screen text that is related to a television program (step 610). This may be accomplished, for example, by programming the program guide to recognize that certain fields in which program guide data text is displayed involve displaying television program related information, such as by examining an attribute associated with each field. Television program related information may include, for example, program listing information, additional program information, music information, pay-per-view ordering information, or any other information related to basic, premium, pay-per-view, music, or other types of programs. If the program guide function does not involve displaying program guide display screen text that is related to a television program, the program guide may display the program guide display screen text in the selected language at step 620. If program guide display screen text is not available in the selected language, then the program guide may

display the text, for example, in accordance with the illustrative hierarchy shown in FIG. 13.

If the program guide determines at step 610 that the program guide function does involve displaying program guide display screen text that is related to a television program, the program guide may then determine if a selected (primary or alternate) language is a language that is associated with the television program; that is, the program guide determines if the selected language is one of the languages that the audio, data, or other information for a television program will be broadcasted in. This may be accomplished, for example, by examining a track map database that is provided as part of the program guide data stream (e.g., a SAP track map database, a PID map database, etc.).

How the program guide determines whether a television program will be broadcasted with audio, data, or other information in a selected language may depend on how the track map database is structured. If, for example, the track map database associates available languages with channel numbers, the program guide may cross-reference the channel number for the television program as indicated in the program guide data stream with the channel numbers in the track map database. Alternatively, if the track map database associates available languages with individual programs, the program guide may cross-reference the program name (or other program identifier) with the program names (or identifiers) in the track map database.

A particular program guide function may include displaying program guide display screen text that relates to a number of television programs.

Providing the user with program listings information, such as is displayed in program listings screens 130 and 135 of FIGS. 6a and 6b, is an example of such a function. When generating screens 130 or 135, for example, the program guide may perform step 615 for each listing and determine that each listing 150 is a field in which program guide display screen text is displayed that relates to a television program. The program guide may determine if each program that is associated with each listing 150 will be broadcasted with audio, data, or other information in the selected language by, for example, cross referencing each listing with the contents of the track map database.

If the program guide determines that a television program will be broadcasted with audio, data, or other information in a selected language, the program guide may display the program guide display screen text that is related to that television program in the selected language, as indicated by step 620. If, however, the program guide determines that the television program will not be broadcasted with audio, data, or other information in one of the selected languages, the program guide will display the program guide display screen text related to the television program in the default program language, or the default program guide language as indicated by step 625.

Steps 620 and 625 may be performed for each program guide display screen display element such as, for example, each listing 150 of program listings screens 130 and 135 of FIGS. 6a and 6b. It should be further noted that displaying program guide display screen text in the selected or the default languages may require first readying the program guide display screen text, as discussed with respect to FIG. 13.

The foregoing is merely illustrative of the principles of this invention and various modifications can be made by those skilled in the art without departing from the scope and spirit of the present invention.

What is claimed is:

1. A system in which a television program having a plurality of associated tracks having content is distributed to a plurality of users, and wherein the content of each track is in a language and the content of at least two different tracks are in different languages, the system comprising:

an interactive television program guide having various functions and implemented on interactive television program guide equipment having user television equipment, wherein:

the interactive television program guide displays program guide display screen text for each of the various functions in at least one program guide display screen on the user television equipment; and

the user television equipment plays the television program and one or more of the plurality of associated tracks;

means for providing program guide display screen text in one or more languages to the interactive television program guide;

means for providing a user with an opportunity to select a language using the interactive television program guide;

means for displaying program guide display screen text on the user television equipment using the interactive television program guide in the language selected by the user; and

means for selecting one or more tracks having content in the language selected by the user for playing by the user television equipment.

2. The system defined in claim 1 wherein:

the means for providing program guide display screen text in one or more languages to the interactive television program guide comprises means for providing program guide display screen text to the interactive television program guide in a continuous data stream having program guide display screen text in the language selected by the user and program guide display screen text in a language other than the language selected by the user; and

the system further comprises means for filtering the program guide display screen text in a language other than the language selected by the user out of the continuous data stream.

3. The system defined in claim 1 wherein:

the means for providing program guide display screen text in one or more languages to the interactive television program guide comprises means for providing program guide display screen text to the interactive television program guide in response to a demand generated by the interactive television program guide, the program guide display screen text having program guide display screen text in the language selected by the user and program guide display screen text in a language other than the language selected by the user; and

the system further comprises means for filtering the program guide display screen text in a language other than the language selected by the user out of the program guide display screen text provided to the interactive television program guide by the means for providing program guide display screen text.

4. The system defined in claim 1 wherein the means for providing program guide display screen text in one or more languages to the interactive television program guide comprises means for providing program guide display screen text only in the language selected by the user to the interactive television program guide in response to a demand generated by the interactive television program guide.

5. The system defined in claim 1 wherein:

the system further comprises means for indicating a language to the means for providing program guide display screen text using the interactive television program guide; and

the means for providing program guide display screen text in one or more languages to the interactive television program guide comprises means for providing program guide display screen text to the interactive television program guide only in the language indicated to the means for providing program guide display screen text.

6. The system defined in claim 5 wherein the language indicated to the means for providing program guide display screen text is the language selected by the user.

7. The system defined in claim 5 wherein the language indicated to the means for providing program guide display screen text is a default program guide language.

8. The system defined in claim 1 wherein:

the interactive television program guide is programmed with program guide display screen text in one or more languages of which at least one of the one or more languages is the language selected by the user; and

the system further comprises means for extracting the program guide display screen text that is programmed into the interactive program guide in the language selected by the user.

9. The system defined in claim 1 wherein:

the interactive television program guide is programmed with compressed program guide display screen text in one or more languages of which at least one of the one or more languages is the language selected by the user; and

the system further comprises means for decompressing the compressed program guide display screen text that is programmed into the interactive program guide in the language selected by the user.

10. The system defined in claim 1 wherein:

the system further comprises means for providing a user with the opportunity to access a program guide function; and

the means for displaying program guide display screen text using the interactive television program guide in the language selected by the user comprises means for displaying program guide display screen text that is not related to the television program in the language selected by the user.

11. The system defined in claim 10 wherein:

the system further comprises means for providing a television program having a plurality of associated languages to the user television equipment; and

the means for displaying program guide display screen text using the interactive television program guide in the language selected by the user comprises means for displaying program guide display screen text that is related to the television program in one of the associated languages when the language selected by the user is not one of the languages associated with the television program.

12. The system defined in claim 11 wherein the means for displaying program guide display screen text using the interactive television program guide in the language selected by the user further comprises means for displaying program guide display screen text that is related to the television program in the language selected by the user when the language selected by the user is also one of the languages associated with the television program.

13. The system defined in claim 1 wherein the means for providing a user with an opportunity to select a language comprises means for providing the user with the opportunity to confirm the user's selection of a language.

14. The system defined in claim 1 wherein:

each track associated with the television program is an analog audio track carrying analog audio; and

the means for selecting one or more tracks having content in the language selected by the user for playing by the user television equipment comprises means for selecting one or more analog tracks having content in the language selected by the user using the interactive television program guide.

15. The system defined in claim 14 further comprising:

means for determining which of the one or more analog audio tracks carry analog audio in the language selected by the user using the interactive television program guide; and

means for indicating to the means for selecting one or more analog tracks having content in the language selected by the user using the interactive television program guide which of the one or more analog audio tracks carry analog audio in the language selected by the user using the interactive television program guide.

16. The system defined in claim 1 wherein:

each track associated with the television program is an analog audio track carrying analog audio; and

the means for selecting one or more tracks having content in the language selected by the user for playing by the user television equipment comprises means for selecting one or more analog tracks having content in the language selected by the user without activity from the interactive television program guide.

17. The system defined in claim 16 further comprising means for passing a track map and a language identifier using the interactive television program guide to the means for selecting one or more analog tracks having content in the language selected by the user without activity from the interactive television program guide that are used by the means for selecting one or more analog tracks having content in the language selected by the user without activity from the interactive television program guide in selecting one or more analog tracks having content in the language selected by the user.

18. The system defined in claim 1 wherein:

each track associated with the television program is a digital audio track carrying digital audio; and

the means for selecting one or more tracks having content in the language selected by the user for playing by the user television equipment comprises means for selecting one or more digital tracks having content in the language selected by the user using the interactive television program guide.

19. The system defined in claim 18 further comprising:

means for determining which of the one or more digital audio tracks carry digital audio in the language selected by the user using the interactive television program guide; and

means for indicating to the means for selecting one or more digital tracks having content in the language selected by the user using the interactive television program guide which of the one or more

digital audio tracks carry digital audio in the language selected by the user using the interactive television program guide.

20. The system defined in claim 1 wherein:

each track associated with the television program is an digital audio track carrying digital audio; and

the means for selecting one or more tracks having content in the language selected by the user for playing by the user television equipment comprises means for selecting one or more digital tracks having content in the language selected by the user without activity from the interactive television program guide.

21. The system defined in claim 20 further comprising means for passing a track map and a language identifier using the interactive television program guide to the means for selecting one or more digital tracks having content in the language selected by the user without activity from the interactive television program guide that are used by the means for selecting one or more digital tracks having content in the language selected by the user without activity from the interactive television program guide in selecting one or more digital tracks having content in the language selected by the user.

22. The system defined in claim 1 wherein the means for displaying program guide display screen text using the interactive television program guide in the language selected by the user comprises means for

displaying currency in a currency format associated with the language selected by the user.

23. The system defined in claim 1 wherein the means for displaying program guide display screen text using the interactive television program guide in the language selected by the user comprises means for displaying time in a time format associated with the language selected by the user.

24. The system defined in claim 1 wherein the means for displaying program guide display screen text using the interactive television program guide in the language selected by the user comprises means for displaying dates in a date format associated with the language selected by the user.

25. The system defined in claim 1 wherein the means for displaying program guide display screen text using the interactive television program guide in the language selected by the user comprises means for displaying parental ratings in a parental rating format associated with the language selected by the user.

26. The system defined in claim 1 further comprising:

means for displaying program information for a program with the interactive television program guide on the user television equipment when the user indicates a desire to view information about the program; and

means for displaying languages in which audio for the program is available with the interactive

television program guide on the user television equipment.

27. The system defined in claim 1 wherein the means for providing a user with an opportunity to select a language using the interactive television program guide comprises means for providing a user with an opportunity to select an alternate language using the interactive television program guide; and

the means for displaying program guide display screen text on the user television equipment using the interactive television program guide in the language selected by the user comprises means for displaying program guide display screen text on the user television equipment using the interactive television program guide in the alternate language selected by the user.

28. The system defined in claim 1 further comprising:

means for selecting an alternate language using the interactive television program guide based on the language selected by the user; and

means for displaying program guide display screen text on the user television equipment using the interactive television program guide in the alternate language.

29. The system defined in claim 1 wherein:

the means for providing a user with an opportunity to select a language using the interactive television program guide comprises means for providing a user with an opportunity to select an alternate

language using the interactive television program guide; and

the means for selecting one or more tracks having content in the language selected by the user for playing by the user television equipment comprises means for selecting one or more tracks having content in the alternate language selected by the user for playing by the user television equipment.

30. The system defined in claim 1 further comprising:

means for selecting an alternate language using the interactive television program guide based on the language selected by the user; and

means for selecting one or more tracks having content in the alternate language for playing by the user television equipment.

31. The system defined in claim 1 wherein the means for selecting one or more tracks having content in the language selected by the user for playing by the user television equipment comprises means for selecting a subtitle track having subtitles in the language selected by the user for playing by the user television equipment.

32. The system defined in claim 1 wherein:

the means for providing program guide display screen text in one or more languages to the interactive television program guide comprises means for providing program guide display screen text in a first language and program guide display screen text in a second language;

at least a first portion of the program guide display screen text in the first language is similar to a first portion of the program guide display screen text in the second language;

at least a second portion of the program guide display screen text in the first language is different from a second portion of the program guide display screen text in the second language; and

the means for providing program guide display screen text in the first language and the program guide display screen text in the second language provides the first and second portions of the program guide display screen text in the first language, and the second portion of the program guide display screen text in the second language.

33. A method in a system in which an interactive television program guide is implemented on interactive television program guide equipment having user television equipment, and in which a television program having a plurality of associated tracks having content is distributed to a plurality of users, and wherein the content of each track is in a language and the content of at least two different tracks are in different languages, the method comprising the steps of:

providing program guide display screen text in one or more languages to the interactive television program guide;

providing a user with an opportunity to select a language using the interactive television program guide;

selecting one or more tracks having content in the language selected by the user for playing by user television equipment;

displaying program guide display screen text on the user television equipment using the interactive television program guide in the language selected by the user; and

playing one or more of the selected one or more tracks having content in the language selected by the user on the user television equipment.

34. The method defined in claim 33 wherein:

the step of providing program guide display screen text in one or more languages to the interactive television program guide comprises providing program guide display screen text to the interactive television program guide in a continuous data stream having program guide display screen text in the language selected by the user and program guide display screen text in a language other than the language selected by the user; and

the method further comprises the step of filtering the program guide display screen text in a language other than the language selected by the user out of the continuous data stream.

35. The method defined in claim 33 wherein:

the step of providing program guide display screen text in one or more languages to the interactive television program guide comprises providing program guide display screen text to the interactive television program guide in response to a demand generated by the interactive television program guide, the program guide display screen text having

program guide display screen text in the language selected by the user and program guide display screen text in a language other than the language selected by the user; and

the method further comprises the step of filtering the program guide display screen text in a language other than the language selected by the user out of the program guide display screen text provided to the interactive television program guide.

36. The method defined in claim 33 wherein the step of providing program guide display screen text in one or more languages to the interactive television program guide comprises providing program guide display screen text only in the language selected by the user to the interactive television program guide in response to a demand generated by the interactive television program guide.

37. The method defined in claim 33 wherein:

the method further comprises the step of indicating a language for providing program guide display screen text using the interactive television program guide; and

the step of providing program guide display screen text in one or more languages to the interactive television program guide comprises providing program guide display screen text to the interactive television program guide only in the indicated language.

38. The method defined in claim 37 wherein:

the indicated language for providing program guide display screen text is the language selected by the user; and

the step of providing program guide display screen text in one or more languages to the interactive television program guide comprises providing program guide display screen text to the interactive television program guide only in the language selected by the user.

39. The method defined in claim 37 wherein:

the indicated language for providing program guide display screen text is a default program guide language; and

the step of providing program guide display screen text in one or more languages to the interactive television program guide comprises providing program guide display screen text to the interactive television program guide only in the default program guide language.

40. The method defined in claim 33 further comprising the steps of:

programming the interactive television program guide with program guide display screen text in one or more languages of which at least one of the one or more languages is the language selected by the user; and

extracting the program guide display screen text that is programmed into the interactive program guide in the language selected by the user.

41. The method defined in claim 33 further comprising the steps of:

programming the interactive television program guide with compressed program guide display screen text in one or more languages of which at least one of the one or more languages is the language selected by the user; and

decompressing the compressed program guide display screen text that is programmed into the interactive program guide in the language selected by the user.

42. The method defined in claim 33 wherein:

the method further comprises the step of providing a user with the opportunity to access a program guide function; and

the step of displaying program guide display screen text using the interactive television program guide in the language selected by the user comprises displaying program guide display screen text that is not related to the television program in the language selected by the user.

43. The method defined in claim 42 wherein:

the method further comprises the step of providing a television program having a plurality of associated languages to the user television equipment; and

the step of displaying program guide display screen text using the interactive television program guide in the language selected by the user comprises displaying program guide display screen text that is related to the television program in one of the associated languages when the language selected by the user is not one of the languages associated with the television program.

44. The method defined in claim 43 wherein the step of displaying program guide display screen text using the interactive television program guide in the language selected by the user further comprises displaying program guide display screen text that is related to the television program in the language selected by the user when the language selected by the user is also one of the languages associated with the television program.

45. The method defined in claim 33 wherein the step of providing a user with an opportunity to select a language comprises providing the user with the opportunity to confirm the user's selection of a language.

46. The method defined in claim 33 wherein:

each track associated with the television program is an analog audio track carrying analog audio; and

the step of selecting one or more tracks having content in the language selected by the user for playing by the user television equipment comprises selecting one or more analog tracks having content in the language selected by the user using the interactive television program guide.

47. The method defined in claim 46 further comprising the steps of:

determining which of the one or more analog audio tracks carry analog audio in the language selected by the user using the interactive television program guide;

indicating which of the one or more analog audio tracks carry analog audio in the language selected by the user using the interactive television program guide, and wherein:

the step of selecting one or more tracks having content in the language selected by the user for playing by the user television equipment comprises selecting each analog track having content in the indicated language using the interactive television program guide.

48. The method defined in claim 33 wherein

each track associated with the television program is an analog audio track carrying analog audio; and

the step of selecting one or more tracks having content in the language selected by the user for playing by the user television equipment comprises selecting one or more analog tracks having content in the language selected by the user without activity from the interactive television program guide.

49. The method defined in claim 48 wherein the step of selecting one or more analog tracks having content in the language selected by the user without activity from the interactive television program guide comprises selecting one or more analog tracks having content in the language selected by the user without activity from the interactive television program guide according to a track map and a language identifier.

50. The method defined in claim 33 wherein:

each track associated with the television program is a digital audio track carrying digital audio; and

the step of selecting one or more tracks having content in the language selected by the user for playing by the user television equipment comprises selecting one or more digital tracks having content in the language selected by the user using the interactive television program guide.

51. The method defined in claim 50 further comprising the steps of:

determining which of the one or more digital audio tracks carry digital audio in the language selected by the user using the interactive television program guide;

indicating which of the one or more digital audio tracks carry digital audio in the language selected by the user using the interactive television program guide, and wherein:

the step of selecting one or more tracks having content in the language selected by the user for playing by the user television equipment comprises selecting each digital track having content in the indicated language using the interactive television program guide.

52. The method defined in claim 33 wherein

each track associated with the television program is an digital audio track carrying digital audio; and

the step of selecting one or more tracks having content in the language selected by the user for playing by the user television equipment comprises

selecting one or more digital tracks having content in the language selected by the user without activity from the interactive television program guide.

53. The method defined in claim 52 wherein the step of selecting one or more digital tracks having content in the language selected by the user without activity from the interactive television program guide comprises selecting one or more digital tracks having content in the language selected by the user without activity from the interactive television program guide according to a track map and a language identifier.

54. The method defined in claim 33 wherein the step of displaying program guide display screen text using the interactive television program guide in the language selected by the user comprises displaying currency in a currency format associated with the language selected by the user.

55. The method defined in claim 33 wherein the step of displaying program guide display screen text using the interactive television program guide in the language selected by the user comprises displaying time in a time format associated with the language selected by the user.

56. The system defined in claim 33 wherein the step of displaying program guide display screen text using the interactive television program guide in the language selected by the user comprises displaying dates in a date format associated with the language selected by the user.

57. The method defined in claim 33 wherein the step of displaying program guide display screen text using the interactive television program guide in the language selected by the user comprises displaying parental ratings in a parental rating format associated with the language selected by the user.

58. The method defined in claim 33 further comprising the steps of:

displaying program information for a program with the interactive television program guide on the user television equipment when the user indicates a desire to view information about the program; and

displaying languages in which audio for the program is available with the interactive television program guide on the user television equipment.

59. The method defined in claim 33 wherein:

the step of providing a user with an opportunity to select a language using the interactive television program guide comprises providing a user with an opportunity to select an alternate language using the interactive television program guide; and

the step of displaying program guide display screen text on the user television equipment using the interactive television program guide in the language selected by the user comprises displaying program guide display screen text on the user television equipment using the interactive television program guide in the alternate language selected by the user.

60. The method defined in claim 33 further comprising the steps of:

selecting an alternate language based on the language selected by the user using the interactive television program guide; and

displaying program guide display screen text on the user television equipment using the interactive television program guide in the alternate language for playing by the user television equipment.

61. The method defined in claim 33 wherein:

the step of providing a user with an opportunity to select a language using the interactive television program guide comprises providing a user with an opportunity to select an alternate language using the interactive television program guide; and

the step of selecting one or more tracks having content in the language selected by the user for playing by the user television equipment comprises selecting one or more tracks having content in the alternate language selected by the user for playing by the user television equipment.

62. The method defined in claim 33 further comprising the steps of:

selecting an alternate language using the interactive television program guide; and

selecting one or more tracks having content in the alternate language for playing by the user television equipment.

63. The method defined in claim 33 wherein the step of selecting one or more tracks having content in the language selected by the user for playing by the

user television equipment comprises selecting a subtitle track having subtitles in the language selected by the user for playing by the user television equipment.

64. The method defined in claim 33 wherein:

the step of providing program guide display screen text in one or more languages to the interactive television program guide comprises providing program guide display screen text in a first language and program guide display screen text in a second language;

at least a first portion of the program guide display screen text in the first language is similar to a first portion of the program guide display screen text in a second language;

at least a second portion of the program guide display screen text in the first language is different from a second portion of the program guide display screen text in the second language; and

the step of providing program guide display screen text in the first language and the program guide display screen text in a second language comprises providing the first and second portions of the program guide display screen text in the first language, and providing the second portion of the program guide display screen text in the second language.

65. A system in which a television program having a plurality of associated tracks having content is distributed by a television distribution facility for display by the user television equipment of a plurality of users, and wherein the content of each

track is in a language and the content of at least two different tracks are in different languages, the system comprising:

interactive program guide equipment having user television equipment;

an interactive television program guide implemented on the interactive program guide equipment having user television equipment, wherein the interactive television program guide is configured to:

provide a user with an opportunity to select a language using the interactive television program guide;

display program guide display screen text on the user television equipment using the interactive television program guide in the language selected by the user; and

a main facility configured to provide program guide display screen text in one or more languages to the interactive program guide equipment, wherein:

the user television equipment comprises an audio selector configured to select one or more tracks having content in the language selected by the user for playing by the user television equipment.

66. The system defined in claim 65 wherein:

the interactive program guide equipment comprises a television distribution facility configured to provide program guide display screen text to the user television equipment in a continuous data stream having program guide display screen text in the language selected by the user and program guide display screen text not in the language selected by the user; and

the interactive televison program guide is further configured to filter the program guide display screen text not in the language selected by the user out of the continuous data stream.

67. The system defined in claim 65 wherein:

the interactive program guide equipment comprises a television distribution facility configured to provide program guide display screen text to the user television equipment in response to a demand generated by the interactive television program guide, the program guide display screen text having program guide display screen text in the language selected by the user and program guide display screen text not in the language selected by the user; and

the interactive television program guide is further configured to filter the program guide display screen text not in the language selected by the user out of the program guide display screen text provided to the interactive television program guide.

68. The system defined in claim 65 wherein the interactive program guide equipment further comprises a television distribution facility configured to provide program guide display screen text only in the language selected by the user to the user television equipment in response to a demand generated by the interactive television program guide.

69. The system defined in claim 65 wherein:

the interactive television program guide is configured to indicate a language to the television distribution facility; and

the interactive program guide equipment further comprises a television distribution facility configured to provide program guide display screen text to the user television equipment only in the language indicated to the means for providing program guide display screen text.

70. The system defined in claim 69 wherein the language indicated to the television distribution facility by the interactive television program guide is the language selected by the user.

71. The system defined in claim 69 wherein the language indicated to the television distribution facility by the interactive television program guide is a default program guide language.

72. The system defined in claim 65 wherein:

the interactive television program guide is programmed with program guide display screen text in one or more languages wherein at least one of the one or more languages is the language selected by the user; and

the interactive television program guide is further configured to extract the program guide display screen text in the language selected by the user.

73. The system defined in claim 65 wherein:

the interactive television program guide is programmed with compressed program guide display screen text in one or more languages of which at least one of the one or more languages is the language selected by the user; and

the interactive television program guide is further configured to decompress the compressed program guide display screen text in the language selected by the user.

74. The system defined in claim 65 wherein:

the interactive program guide equipment comprises a television distribution facility configured to provide a television program having a plurality of associated languages to the user television equipment; and

the interactive television program guide is configured to provide a user with the opportunity to access a program guide function and to display program guide display screen text that is not related to the television program in the language selected by the user.

75. The system defined in claim 74 wherein the interactive television program guide is further configured to display program guide display screen text that is related to the television program in one of the one or more languages when the language selected by the user is not one of the one or more languages.

76. The system defined in claim 75 wherein the interactive television program guide is further configured to display program guide display screen text that is related to the television program in the language selected by the user when the language selected by the user is also one of the languages associated with the television program.

77. The system defined in claim 65 wherein the interactive television program guide is further configured to provide a user with the opportunity to select a language from a list of languages and to confirm the user's selection of a language from the list of languages.

78. The system defined in claim 65 wherein:

each track associated with the television program is an analog audio track carrying analog audio;

the audio selector is an analog audio selector; and

the interactive television program guide is further configured to determine which of the one or more analog audio tracks carry analog audio in the language selected by the user according to a track map and to indicate to the analog audio selector which of the one or more analog audio tracks carry analog audio in the language selected by the user.

79. The system defined in claim 65 wherein:

the audio selector is an analog audio selector;

each track associated with the television program is an analog audio track carrying analog audio; and

the analog audio selector is configured to select one or more analog tracks having content in the language selected by the user without activity from the interactive television program guide.

80. The system defined in claim 79 wherein the interactive television program guide is configured

to pass a track map and a language identifier to the analog audio selector that are used by the analog audio selector to select one or more analog tracks having content in the language selected by the user without activity from the interactive television program guide.

81. The system defined in claim 65 wherein:

at least one track associated with the television program is a digital track carrying digital audio;

the audio selector is a digital audio selector; and

the interactive television program guide is further configured to determine which of the one or more digital audio tracks carry digital audio in the language selected by the user according to a track map and to indicate to the digital audio selector which of the one or more digital audio tracks carry digital audio in the language selected by the user.

82. The system defined in claim 81 wherein:

each track associated with the television program is an digital audio track carrying digital audio;

the audio selector is a digital audio selector; and

the digital audio selector is configured to select one or more digital tracks having content in the language selected by the user without activity from the interactive television program guide.

83. The system defined in claim 65 wherein the interactive television program guide is configured to pass a track map and a language identifier to the

digital audio selector that are used by the digital audio selector to select one or more digital tracks having content in the language selected by the user without activity from the interactive television program guide.

84. The system defined in claim 83 wherein the interactive television program guide is further configured to display currency in a currency format associated with the language selected by the user.

85. The system defined in claim 65 wherein the interactive television program guide is further configured to display time in a time format associated with the language selected by the user.

86. The system defined in claim 65 wherein the interactive television program guide is further configured to display dates in a time format associated with the language selected by the user.

87. The system defined in claim 65 wherein the interactive television program guide is further configured to display parental ratings in a parental rating format associated with the language selected by the user.

88. The system defined in claim 65 wherein:

the interactive television program guide is further configured to display program information for a program on the user television equipment when the user indicates a desire to view information about the program; and

the interactive television program guide is further configured to display languages in which audio for the program is available on the user television equipment.

89. The system defined in claim 65 wherein the interactive television program guide is further configured to display program information for a program and languages in which audio for a program is available on the user television equipment when the user indicates a desire to view information about the program.

90. The system defined in claim 65 wherein the interactive television program guide is further configured to:

provide a user with an opportunity to select an alternate language; and

display program guide display screen text on the user television equipment in the alternate language selected by the user.

91. The system defined in claim 65 wherein the interactive television program guide is further configured to:

select an alternate language based on the language selected by the user; and

display program guide display screen text on the user television equipment in the alternate language.

92. The system defined in claim 65 wherein:

the interactive television program guide

is further configured to provide a user with an opportunity to select an alternate language; and

the audio selector is further configured to select one or more tracks having content in the alternate language selected by the user for playing by the user television equipment.

93. The system defined in claim 65 wherein:

the interactive television program guide is further configured to select an alternate language using the interactive television program guide; and

the audio selector is further configured to select one or more tracks having content in the alternate language for playing by the user television equipment.

94. The system defined in claim 65 wherein:

at least one of the one or more tracks is a subtitle track; and

the audio selector is further configured to select the subtitle track having subtitles in the language selected by the user for playing by the user television equipment.

95. The system defined in claim 65 wherein:

the main facility is further configured to provide program guide display screen text in a first language and program guide display screen text in a second language;

at least a first portion of the program guide display screen text in the first language is similar to a first portion of the program guide display screen text in a second language;

at least a second portion of the program guide display screen text in the first language is different from a second portion of the program guide display screen text in the second language; and

the main facility provides the first and second portions of the program guide display screen text in the first language, and the second portion of the program guide display screen text in the second language.

96. A system in which a television program having a plurality of associated analog tracks carrying analog audio is distributed to a plurality of users, and wherein the analog audio carried on each analog track is in a language and the audio of at least two different analog tracks are in different languages, the system comprising:

means for providing a user with an opportunity to select a language;

means for selecting at least one analog track having audio in the language selected by the user; and

means for playing the television program and audio from the selected audio track.

97. A method for use in a system in which a television program having a plurality of associated analog tracks carrying analog audio is distributed to a plurality of users, and wherein the analog audio carried on each analog track is in a language and the audio of at least two different analog tracks are in different languages, the method comprising the steps of:

providing a user with an opportunity to select a language;

selecting at least one analog track having audio in the language selected by the user; and

playing the television program and audio from the selected audio track on user television equipment.

98. A system in which a television program having a plurality of associated analog tracks carrying analog audio is distributed to a plurality of users, and wherein the analog audio carried on each analog track is in a language and the audio of at least two different analog tracks are in different languages, the system comprising:

an interactive television program guide configured to provide a user with an opportunity to select a language;

an analog audio selector configured to select at least one analog track having audio in the language selected by the user; and

user television equipment configured to play the television program and audio from the selected audio track.

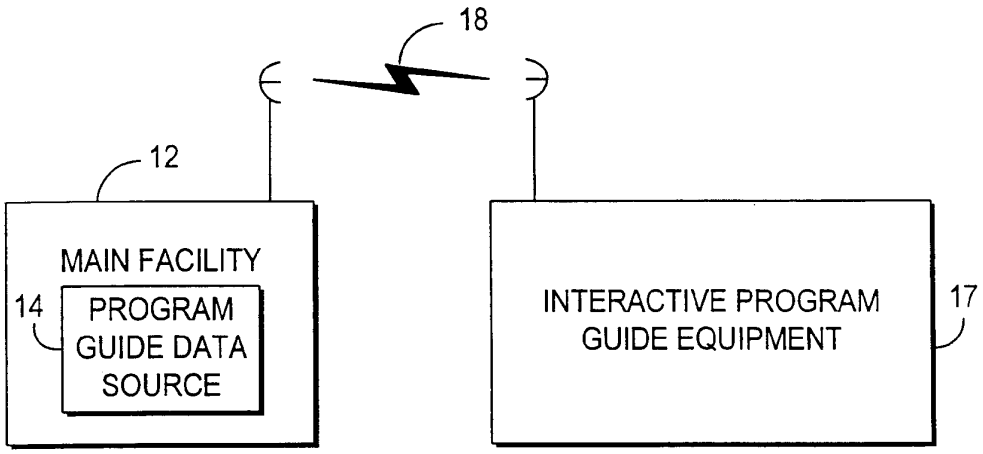

10
18
12
MAIN FACILITY
14
PROGRAM GUIDE DATA SOURCE
INTERACTIVE PROGRAM GUIDE EQUIPMENT
17

FIG. 1

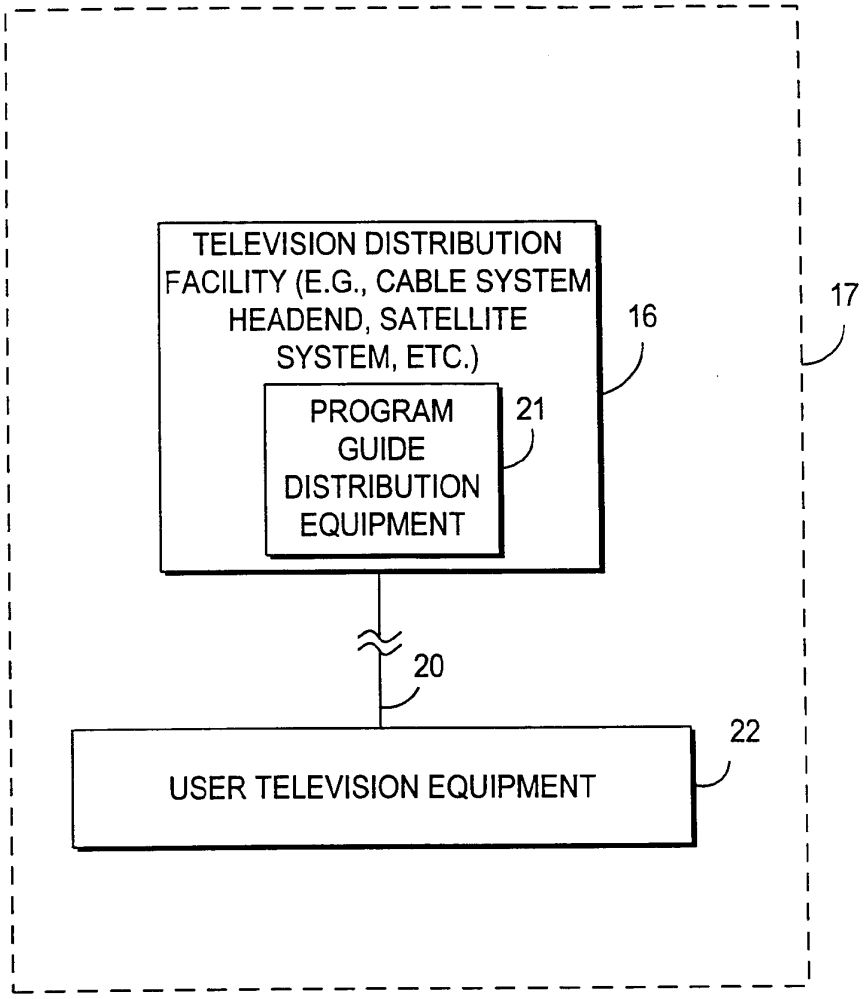

TELEVISION DISTRIBUTION FACILITY (E.G., CABLE SYSTEM HEADEND, SATELLITE SYSTEM, ETC.)
16
17
PROGRAM GUIDE DISTRIBUTION EQUIPMENT
21
20
22
USER TELEVISION EQUIPMENT

FIG. 2a

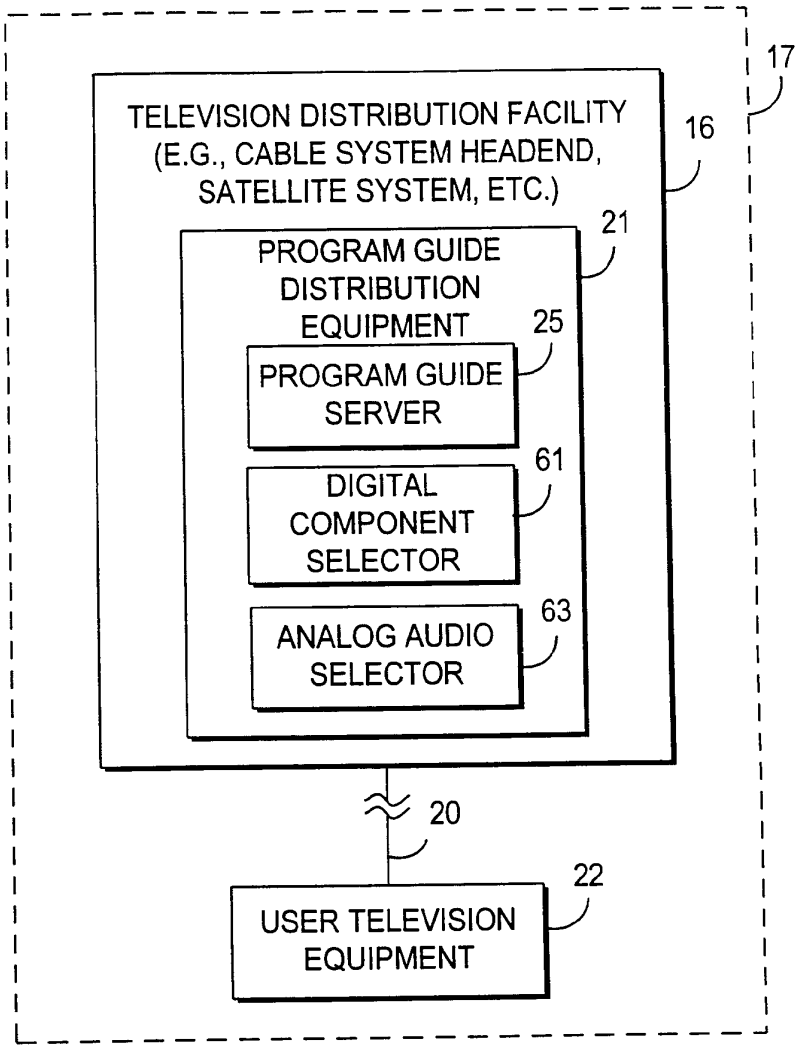

17
TELEVISION DISTRIBUTION FACILITY
(E.G., CABLE SYSTEM HEADEND,
SATELLITE SYSTEM, ETC.)
16
21
PROGRAM GUIDE
DISTRIBUTION
EQUIPMENT
25
PROGRAM GUIDE
SERVER
61
DIGITAL
COMPONENT
SELECTOR
63
ANALOG AUDIO
SELECTOR
20
22
USER TELEVISION
EQUIPMENT

FIG. 2b

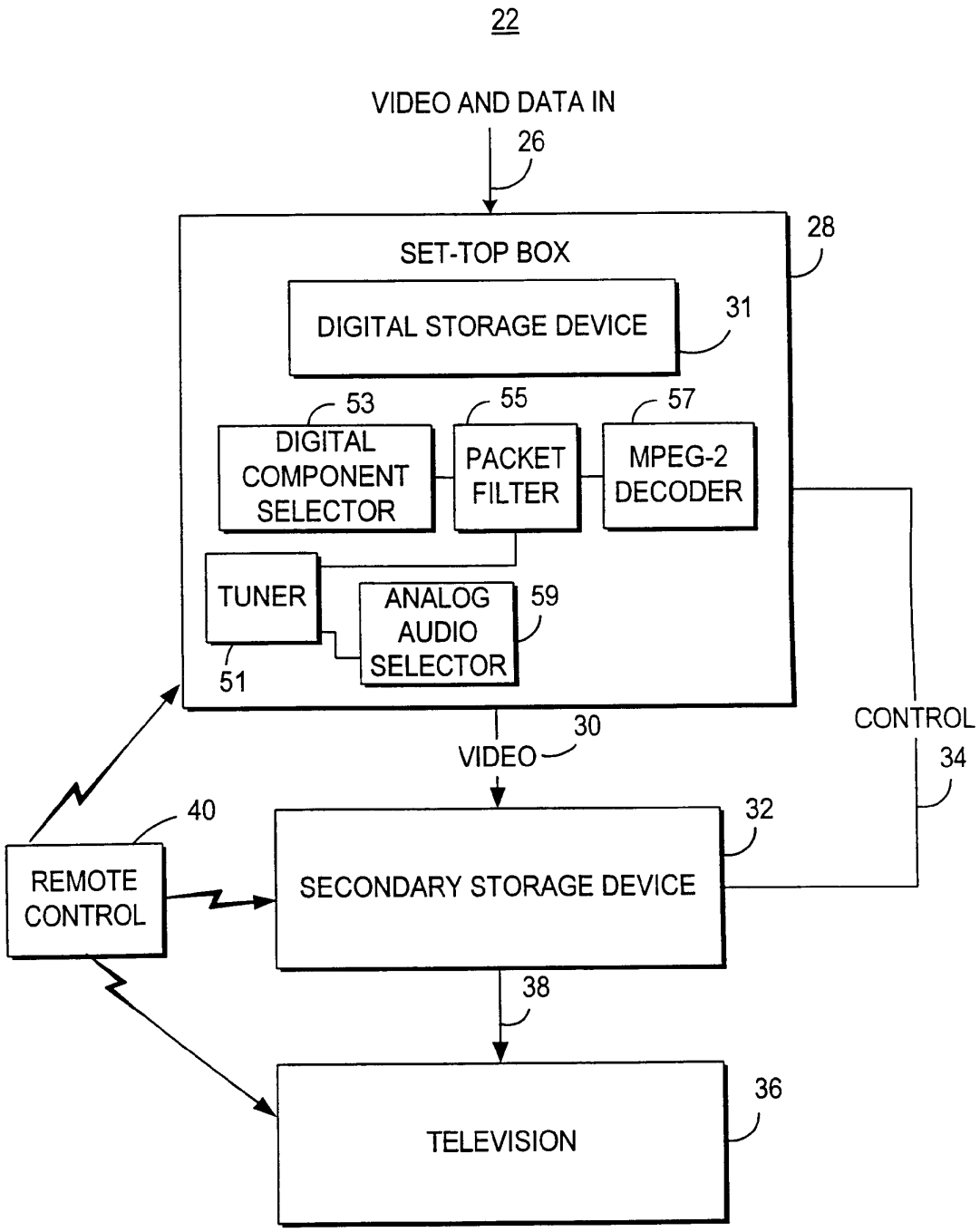

22
VIDEO AND DATA IN
26
SET-TOP BOX
28
DIGITAL STORAGE DEVICE
31
53
55
57
DIGITAL COMPONENT SELECTOR
PACKET FILTER
MPEG-2 DECODER
TUNER
ANALOG AUDIO SELECTOR
59
51
CONTROL
34
VIDEO
30
40
32
REMOTE CONTROL
SECONDARY STORAGE DEVICE
38
36
TELEVISION

FIG. 3

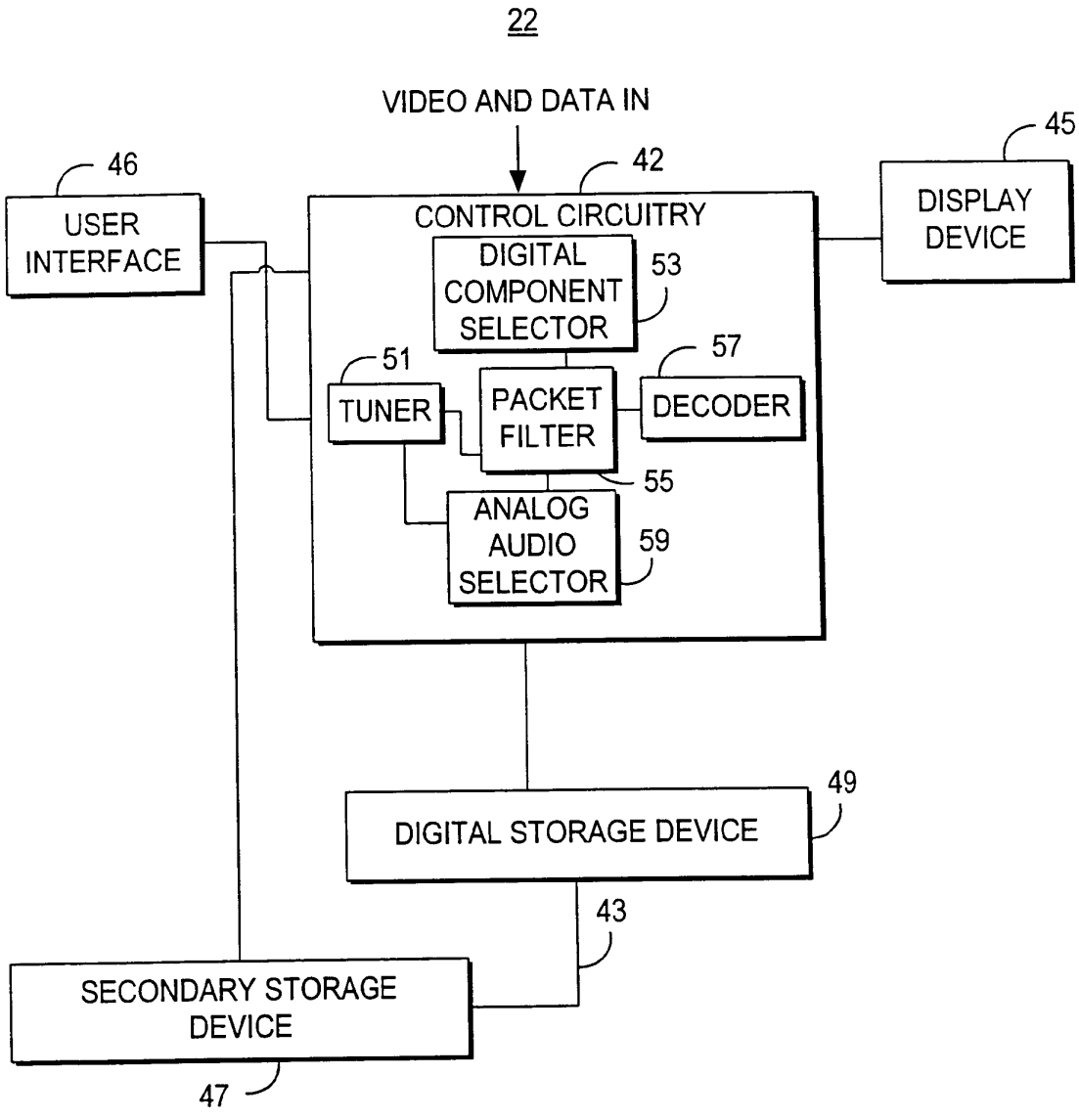

22
VIDEO AND DATA IN
46
USER INTERFACE
42
CONTROL CIRCUITRY
DIGITAL COMPONENT SELECTOR
53
51
TUNER
PACKET FILTER
57
DECODER
55
ANALOG AUDIO SELECTOR
59
45
DISPLAY DEVICE
49
DIGITAL STORAGE DEVICE
43
SECONDARY STORAGE DEVICE
47

FIG. 4

100

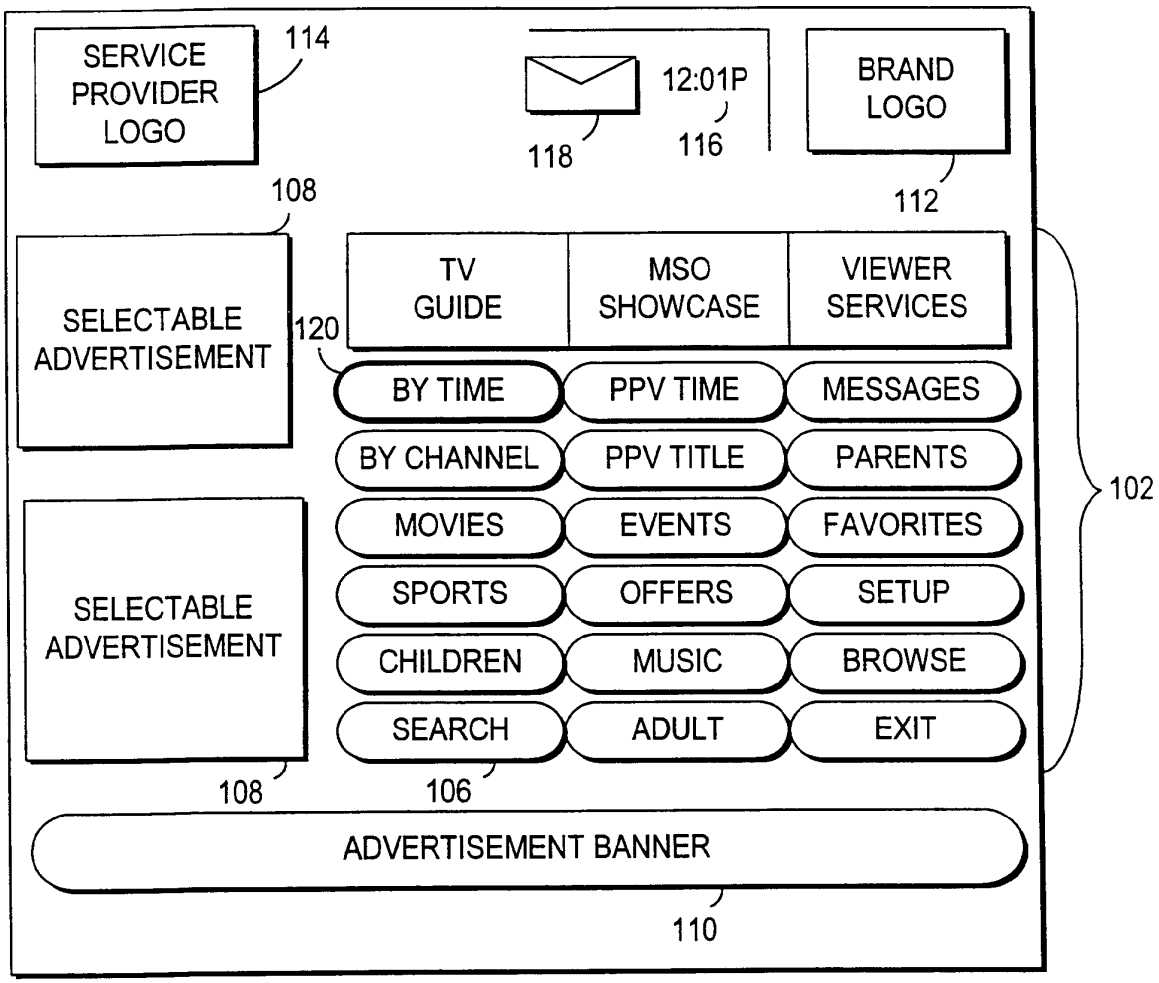

SERVICE PROVIDER LOGO
114
12:01P
118
116
BRAND LOGO
112
108
SELECTABLE ADVERTISEMENT
120
TV GUIDE
MSO SHOWCASE
VIEWER SERVICES
BY TIME
PPV TIME
MESSAGES
BY CHANNEL
PPV TITLE
PARENTS
MOVIES
EVENTS
FAVORITES
SPORTS
OFFERS
SETUP
CHILDREN
MUSIC
BROWSE
SEARCH
ADULT
EXIT
102
SELECTABLE ADVERTISEMENT
108
106
ADVERTISEMENT BANNER
110

FIG. 5

130

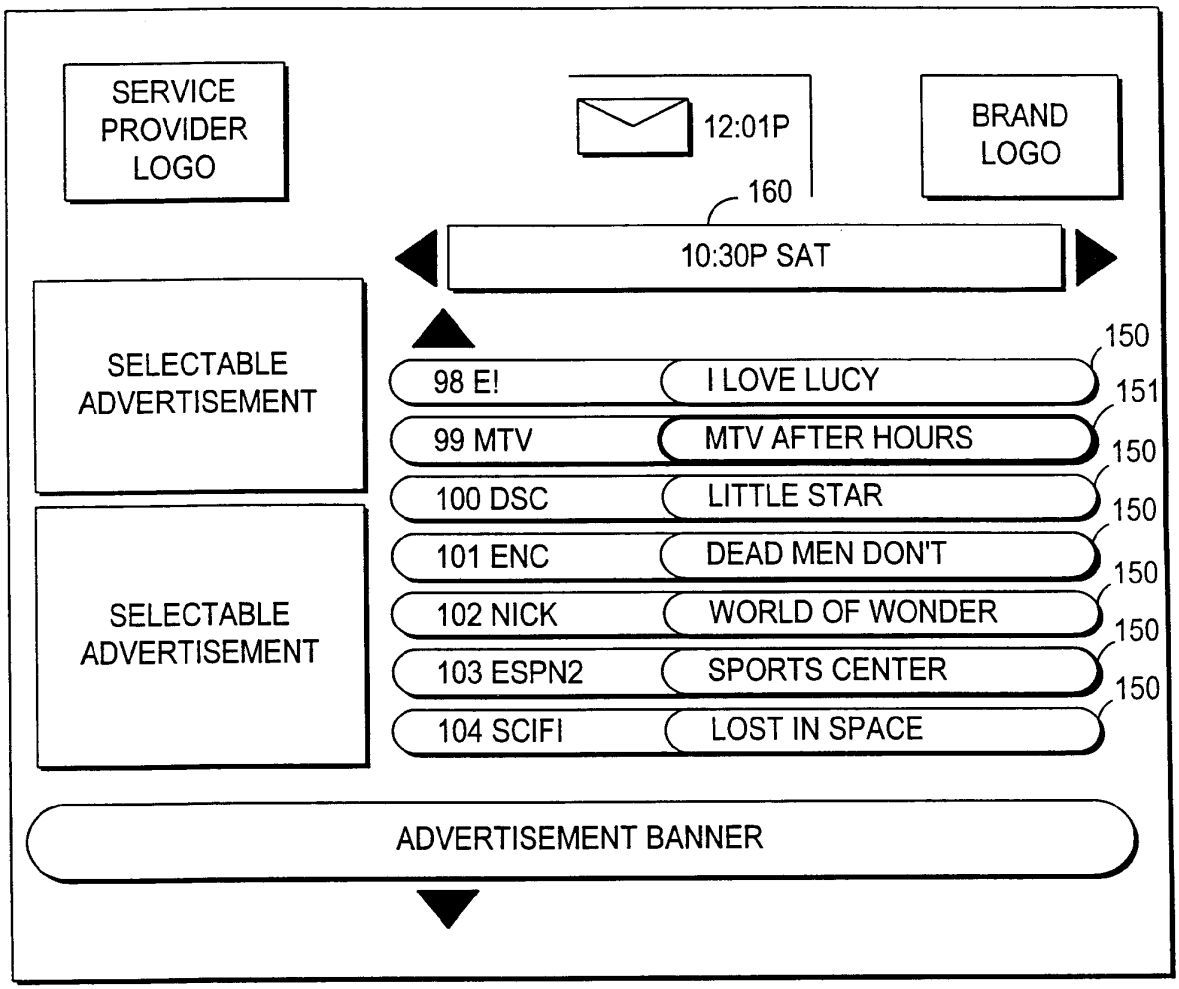

SERVICE PROVIDER LOGO
12:01P
BRAND LOGO
160
10:30P SAT
SELECTABLE ADVERTISEMENT
SELECTABLE ADVERTISEMENT
150
98 E!
I LOVE LUCY
151
99 MTV
MTV AFTER HOURS
150
100 DSC
LITTLE STAR
150
101 ENC
DEAD MEN DON'T
150
102 NICK
WORLD OF WONDER
150
103 ESPN2
SPORTS CENTER
150
104 SCIFI
LOST IN SPACE
ADVERTISEMENT BANNER

FIG. 6a

135

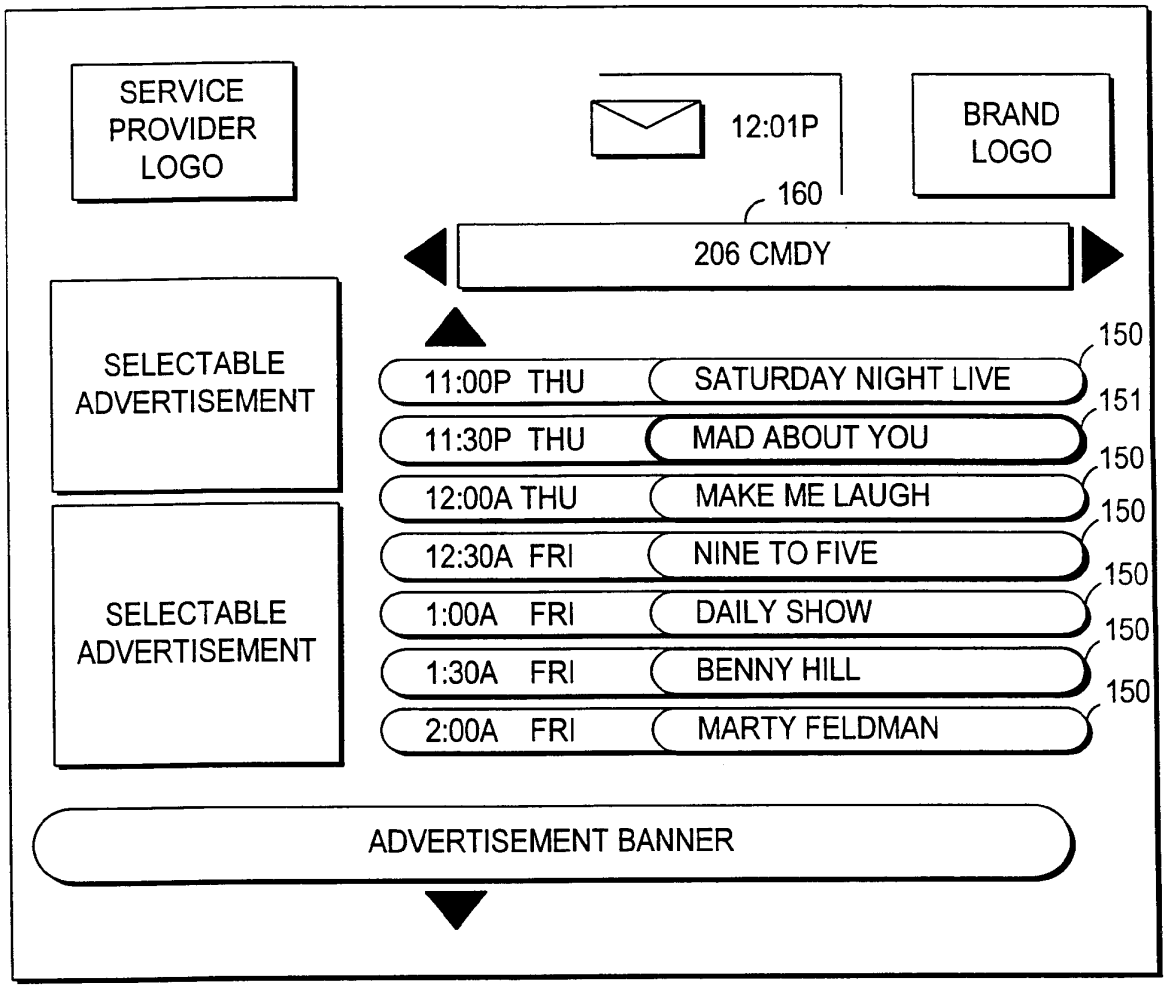

SERVICE PROVIDER LOGO
12:01P
BRAND LOGO
160
206 CMDY
SELECTABLE ADVERTISEMENT
SELECTABLE ADVERTISEMENT
150
11:00P THU
SATURDAY NIGHT LIVE
151
11:30P THU
MAD ABOUT YOU
150
12:00A THU
MAKE ME LAUGH
150
12:30A FRI
NINE TO FIVE
150
1:00A FRI
DAILY SHOW
150
1:30A FRI
BENNY HILL
150
2:00A FRI
MARTY FELDMAN
ADVERTISEMENT BANNER

FIG. 6b

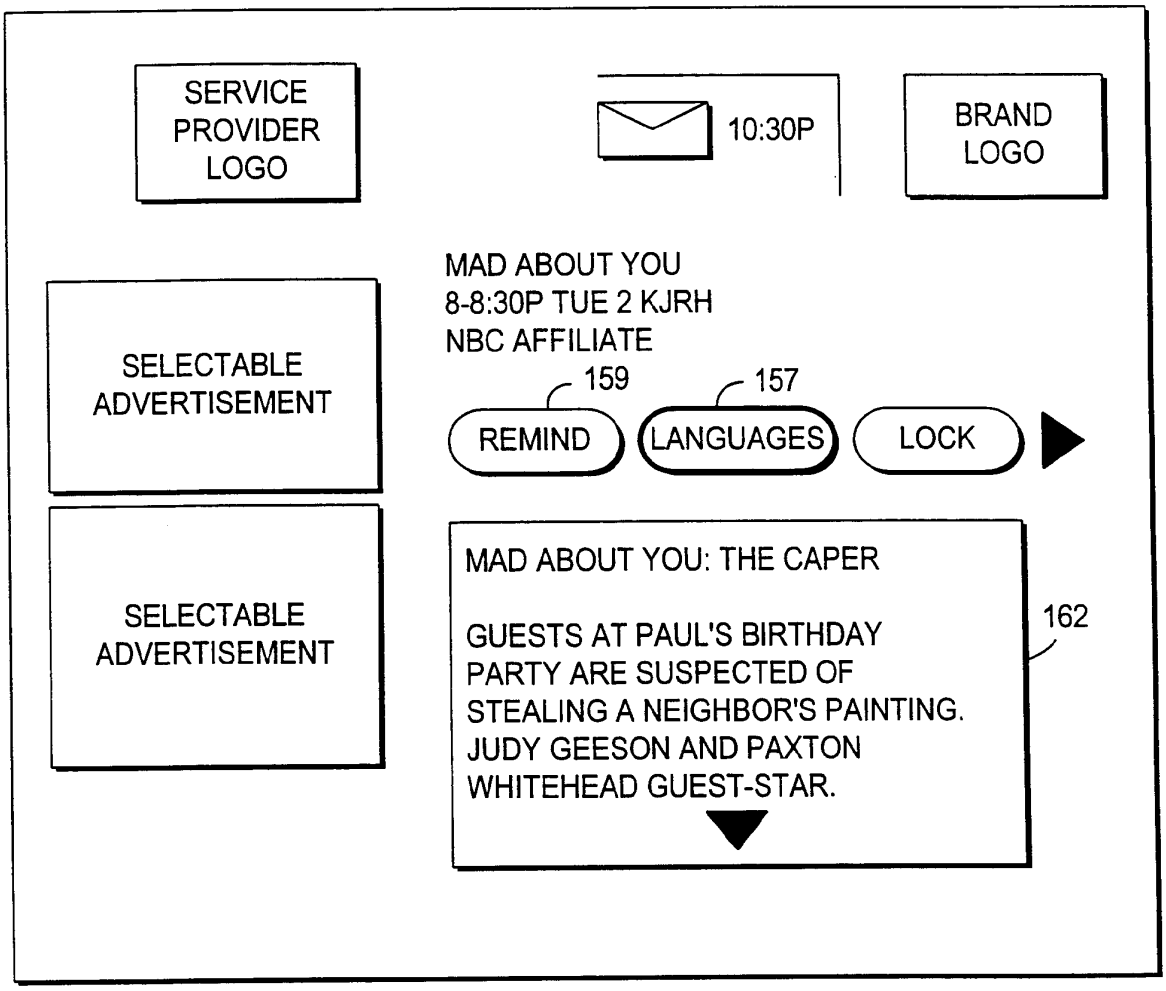

161
SERVICE PROVIDER LOGO
10:30P
BRAND LOGO
MAD ABOUT YOU
8-8:30P TUE 2 KJRH
NBC AFFILIATE
159
157
REMIND
LANGUAGES
LOCK
SELECTABLE ADVERTISEMENT
SELECTABLE ADVERTISEMENT
MAD ABOUT YOU: THE CAPER
GUESTS AT PAUL'S BIRTHDAY PARTY ARE SUSPECTED OF STEALING A NEIGHBOR'S PAINTING. JUDY GEESON AND PAXTON WHITEHEAD GUEST-STAR.
162

FIG. 7a

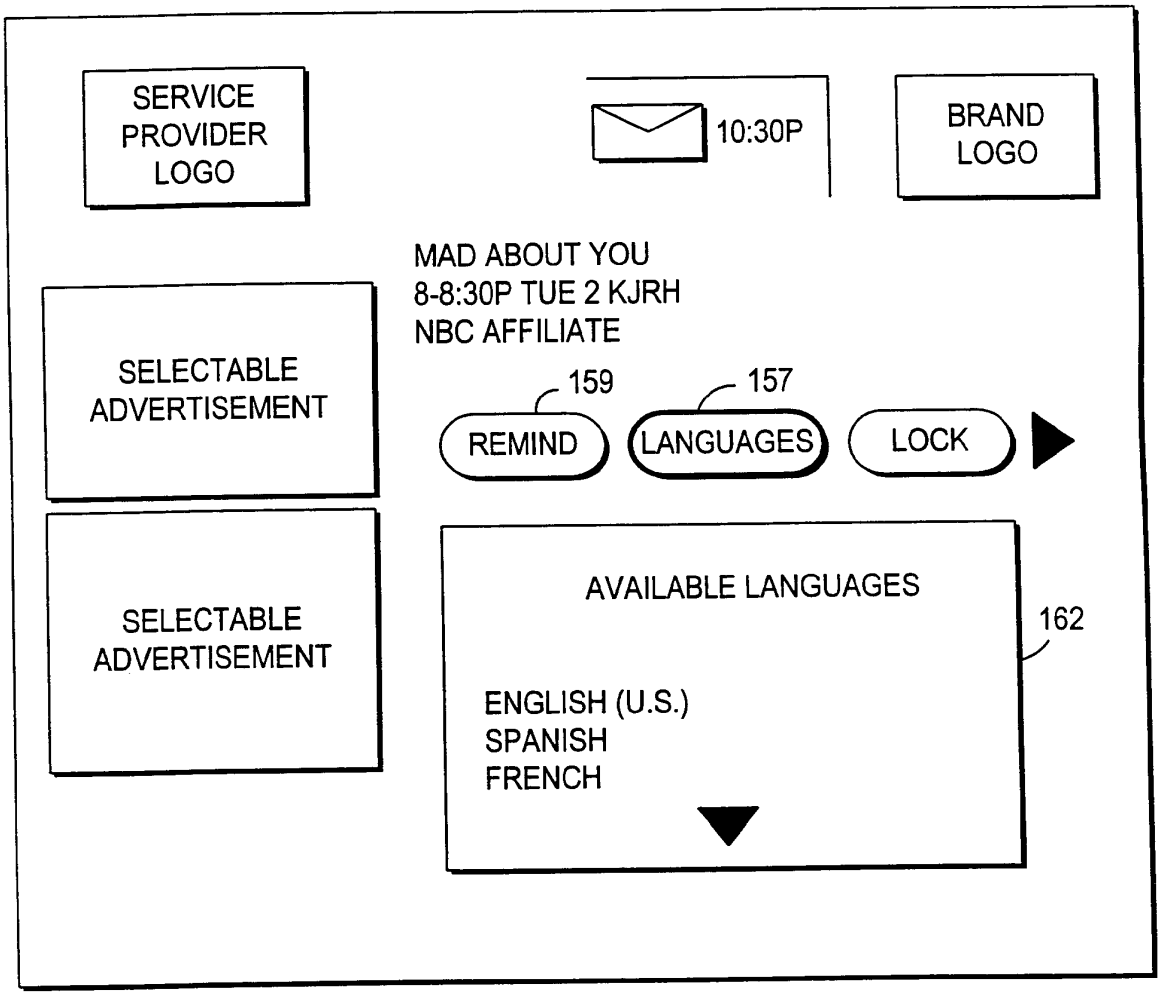

161
SERVICE PROVIDER LOGO
10:30P
BRAND LOGO
MAD ABOUT YOU
8-8:30P TUE 2 KJRH
NBC AFFILIATE
SELECTABLE ADVERTISEMENT
159
157
REMIND
LANGUAGES
LOCK
SELECTABLE ADVERTISEMENT
AVAILABLE LANGUAGES
162
ENGLISH (U.S.)
SPANISH
FRENCH

FIG. 7b

200

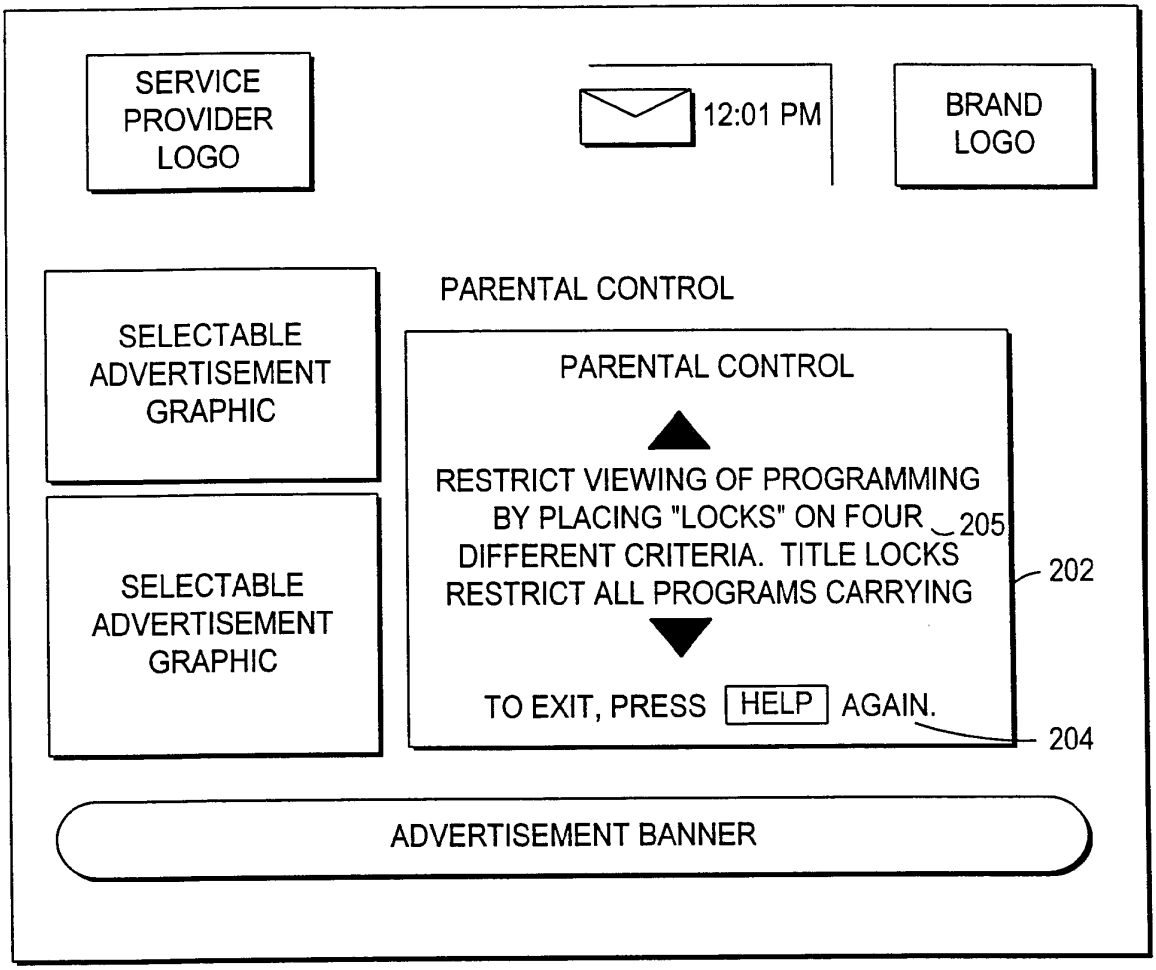

SERVICE PROVIDER LOGO
12:01 PM
BRAND LOGO
SELECTABLE ADVERTISEMENT GRAPHIC
PARENTAL CONTROL
PARENTAL CONTROL
RESTRICT VIEWING OF PROGRAMMING BY PLACING "LOCKS" ON FOUR DIFFERENT CRITERIA. TITLE LOCKS RESTRICT ALL PROGRAMS CARRYING
205
202
SELECTABLE ADVERTISEMENT GRAPHIC
TO EXIT, PRESS HELP AGAIN.
204
ADVERTISEMENT BANNER

FIG. 8

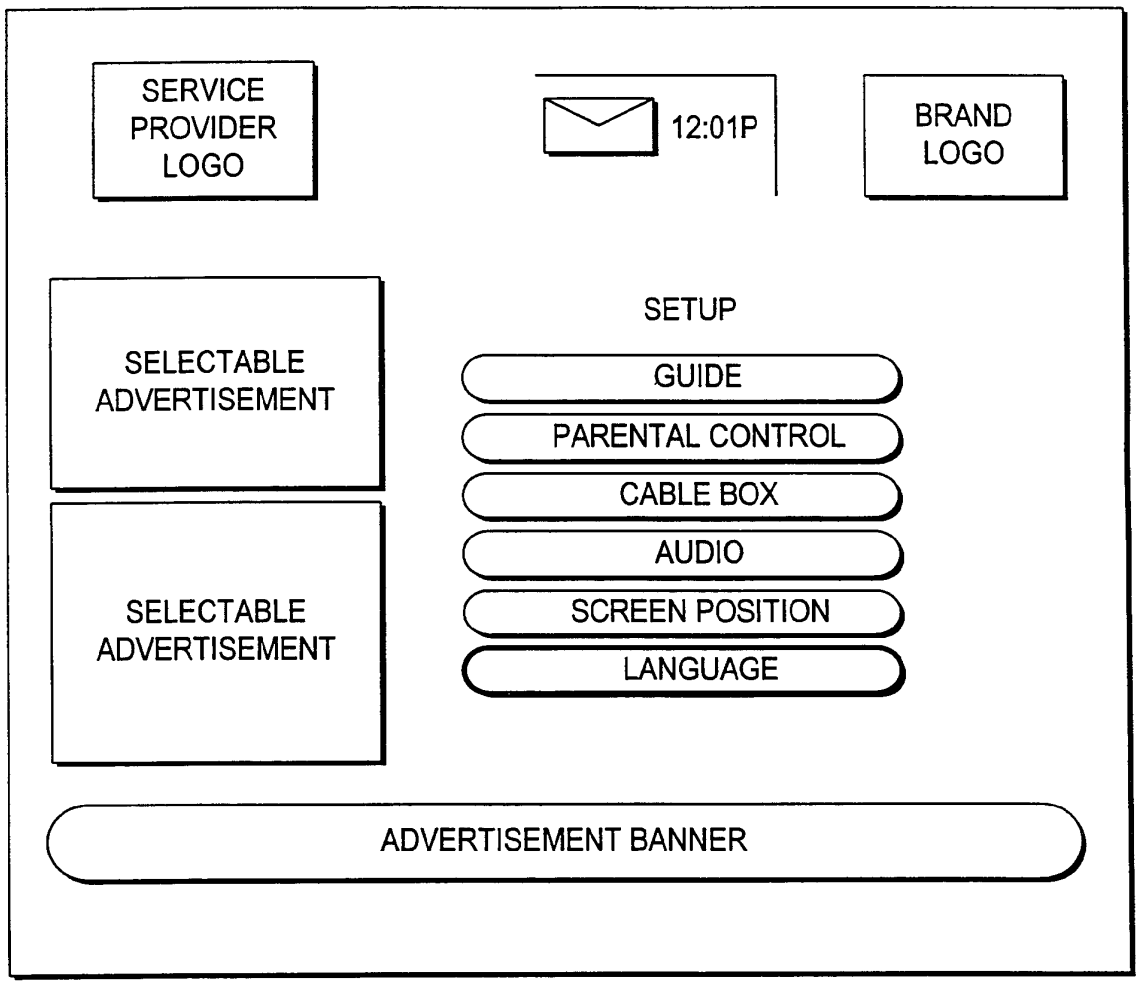

300
SERVICE PROVIDER LOGO
12:01P
BRAND LOGO
SELECTABLE ADVERTISEMENT
SELECTABLE ADVERTISEMENT
SETUP
GUIDE
PARENTAL CONTROL
CABLE BOX
AUDIO
SCREEN POSITION
LANGUAGE
ADVERTISEMENT BANNER

FIG. 9

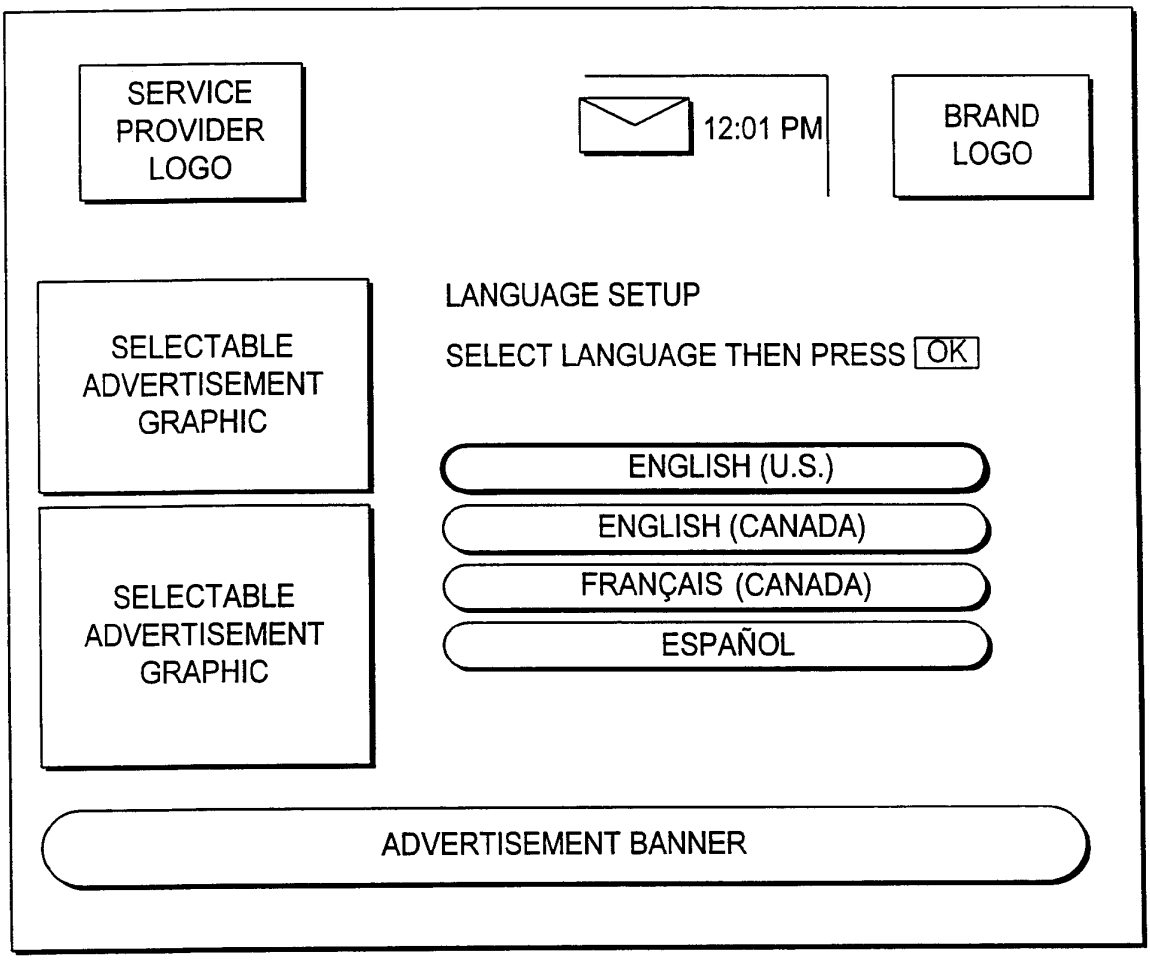

310
SERVICE PROVIDER LOGO
12:01 PM
BRAND LOGO
SELECTABLE ADVERTISEMENT GRAPHIC
LANGUAGE SETUP
SELECT LANGUAGE THEN PRESS OK
ENGLISH (U.S.)
ENGLISH (CANADA)
FRANÇAIS (CANADA)
ESPAÑOL
SELECTABLE ADVERTISEMENT GRAPHIC
ADVERTISEMENT BANNER

FIG. 10

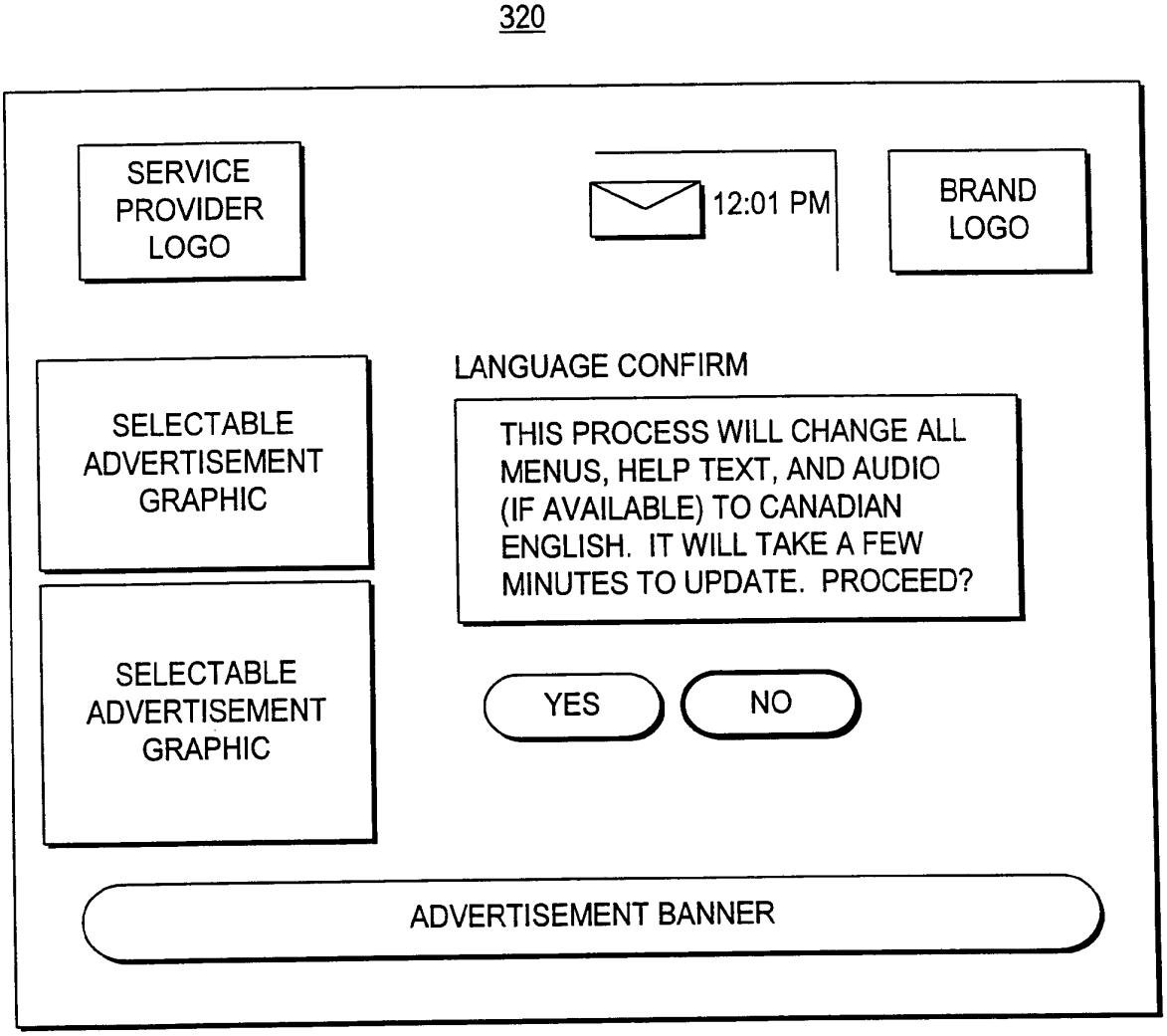

320
SERVICE PROVIDER LOGO
12:01 PM
BRAND LOGO
LANGUAGE CONFIRM
SELECTABLE ADVERTISEMENT GRAPHIC
THIS PROCESS WILL CHANGE ALL MENUS, HELP TEXT, AND AUDIO (IF AVAILABLE) TO CANADIAN ENGLISH. IT WILL TAKE A FEW MINUTES TO UPDATE. PROCEED?
SELECTABLE ADVERTISEMENT GRAPHIC
YES
NO
ADVERTISEMENT BANNER

FIG. 11

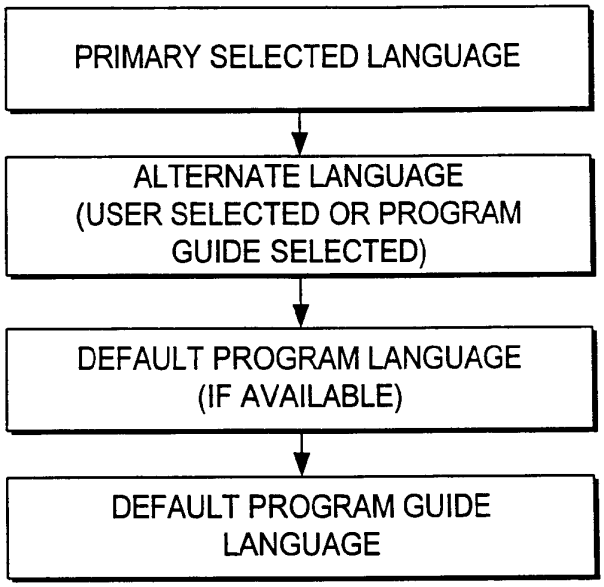

PRIMARY SELECTED LANGUAGE
ALTERNATE LANGUAGE (USER SELECTED OR PROGRAM GUIDE SELECTED)
DEFAULT PROGRAM LANGUAGE (IF AVAILABLE)
DEFAULT PROGRAM GUIDE LANGUAGE

FIG. 12

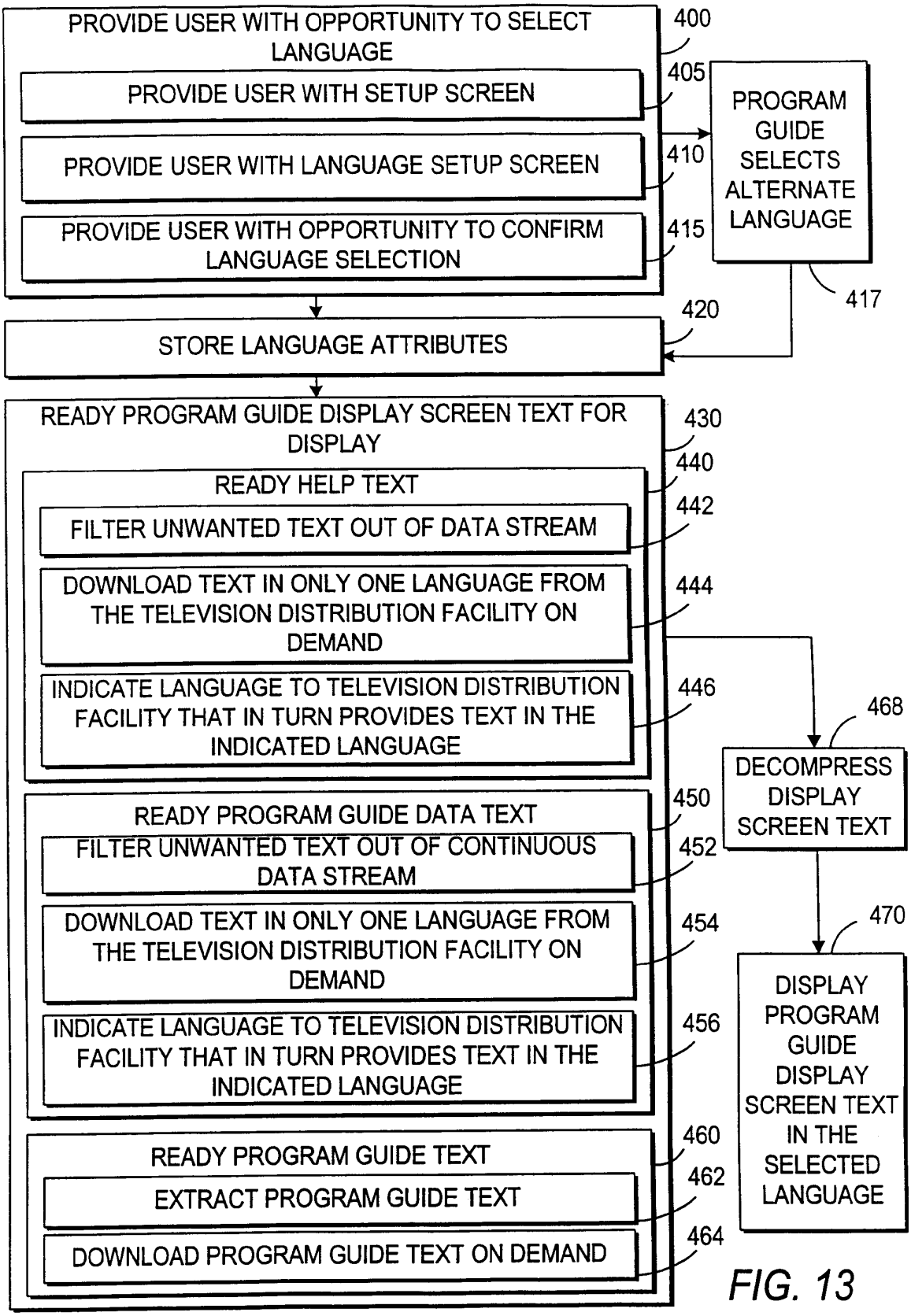

PROVIDE USER WITH OPPORTUNITY TO SELECT LANGUAGE
400
PROVIDE USER WITH SETUP SCREEN
405
PROVIDE USER WITH LANGUAGE SETUP SCREEN
410
PROVIDE USER WITH OPPORTUNITY TO CONFIRM LANGUAGE SELECTION
415
PROGRAM GUIDE SELECTS ALTERNATE LANGUAGE
417
STORE LANGUAGE ATTRIBUTES
420
READY PROGRAM GUIDE DISPLAY SCREEN TEXT FOR DISPLAY
430
READY HELP TEXT
440
FILTER UNWANTED TEXT OUT OF DATA STREAM
442
DOWNLOAD TEXT IN ONLY ONE LANGUAGE FROM THE TELEVISION DISTRIBUTION FACILITY ON DEMAND
444
INDICATE LANGUAGE TO TELEVISION DISTRIBUTION FACILITY THAT IN TURN PROVIDES TEXT IN THE INDICATED LANGUAGE
446
READY PROGRAM GUIDE DATA TEXT
450
FILTER UNWANTED TEXT OUT OF CONTINUOUS DATA STREAM
452
DOWNLOAD TEXT IN ONLY ONE LANGUAGE FROM THE TELEVISION DISTRIBUTION FACILITY ON DEMAND
454
INDICATE LANGUAGE TO TELEVISION DISTRIBUTION FACILITY THAT IN TURN PROVIDES TEXT IN THE INDICATED LANGUAGE
456
READY PROGRAM GUIDE TEXT
460
EXTRACT PROGRAM GUIDE TEXT
462
DOWNLOAD PROGRAM GUIDE TEXT ON DEMAND
464
468
DECOMPRESS DISPLAY SCREEN TEXT
470
DISPLAY PROGRAM GUIDE DISPLAY SCREEN TEXT IN THE SELECTED LANGUAGE

FIG. 13

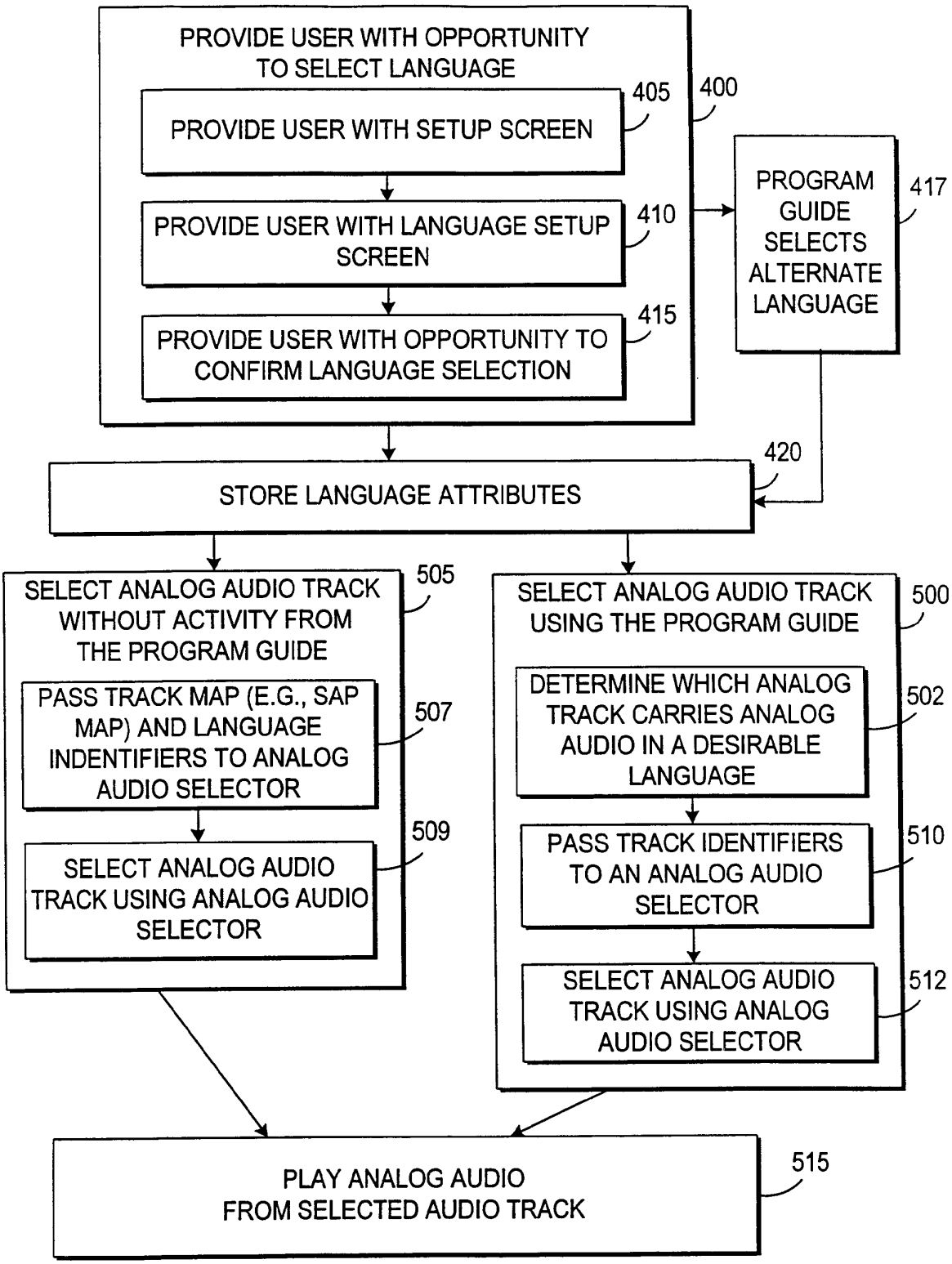

PROVIDE USER WITH OPPORTUNITY TO SELECT LANGUAGE
PROVIDE USER WITH SETUP SCREEN
405
400
PROVIDE USER WITH LANGUAGE SETUP SCREEN
410
PROVIDE USER WITH OPPORTUNITY TO CONFIRM LANGUAGE SELECTION
415
PROGRAM GUIDE SELECTS ALTERNATE LANGUAGE
417
STORE LANGUAGE ATTRIBUTES
420
SELECT ANALOG AUDIO TRACK WITHOUT ACTIVITY FROM THE PROGRAM GUIDE
505
PASS TRACK MAP (E.G., SAP MAP) AND LANGUAGE INDENTIFIERS TO ANALOG AUDIO SELECTOR
507
SELECT ANALOG AUDIO TRACK USING ANALOG AUDIO SELECTOR
509
SELECT ANALOG AUDIO TRACK USING THE PROGRAM GUIDE
500
DETERMINE WHICH ANALOG TRACK CARRIES ANALOG AUDIO IN A DESIRABLE LANGUAGE
502
PASS TRACK IDENTIFIERS TO AN ANALOG AUDIO SELECTOR
510
SELECT ANALOG AUDIO TRACK USING ANALOG AUDIO SELECTOR
512
PLAY ANALOG AUDIO FROM SELECTED AUDIO TRACK
515

FIG. 14

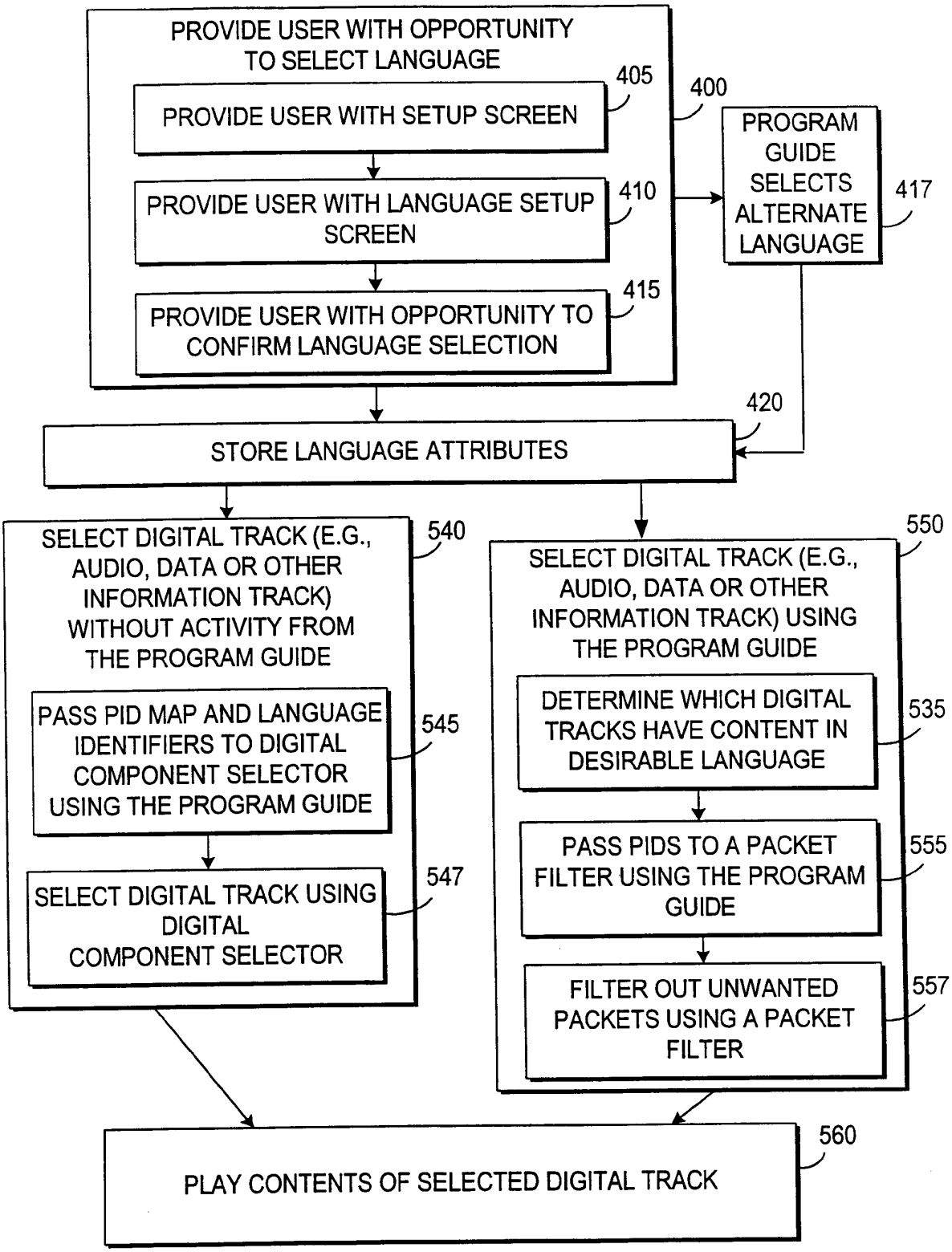

PROVIDE USER WITH OPPORTUNITY TO SELECT LANGUAGE
405
PROVIDE USER WITH SETUP SCREEN
410
PROVIDE USER WITH LANGUAGE SETUP SCREEN
415
PROVIDE USER WITH OPPORTUNITY TO CONFIRM LANGUAGE SELECTION
400
PROGRAM GUIDE SELECTS ALTERNATE LANGUAGE
417
420
STORE LANGUAGE ATTRIBUTES
SELECT DIGITAL TRACK (E.G., AUDIO, DATA OR OTHER INFORMATION TRACK) WITHOUT ACTIVITY FROM THE PROGRAM GUIDE
540
PASS PID MAP AND LANGUAGE IDENTIFIERS TO DIGITAL COMPONENT SELECTOR USING THE PROGRAM GUIDE
545
SELECT DIGITAL TRACK USING DIGITAL COMPONENT SELECTOR
547
SELECT DIGITAL TRACK (E.G., AUDIO, DATA OR OTHER INFORMATION TRACK) USING THE PROGRAM GUIDE
550
DETERMINE WHICH DIGITAL TRACKS HAVE CONTENT IN DESIRABLE LANGUAGE
535
PASS PIDS TO A PACKET FILTER USING THE PROGRAM GUIDE
555
FILTER OUT UNWANTED PACKETS USING A PACKET FILTER
557
PLAY CONTENTS OF SELECTED DIGITAL TRACK
560

FIG. 15

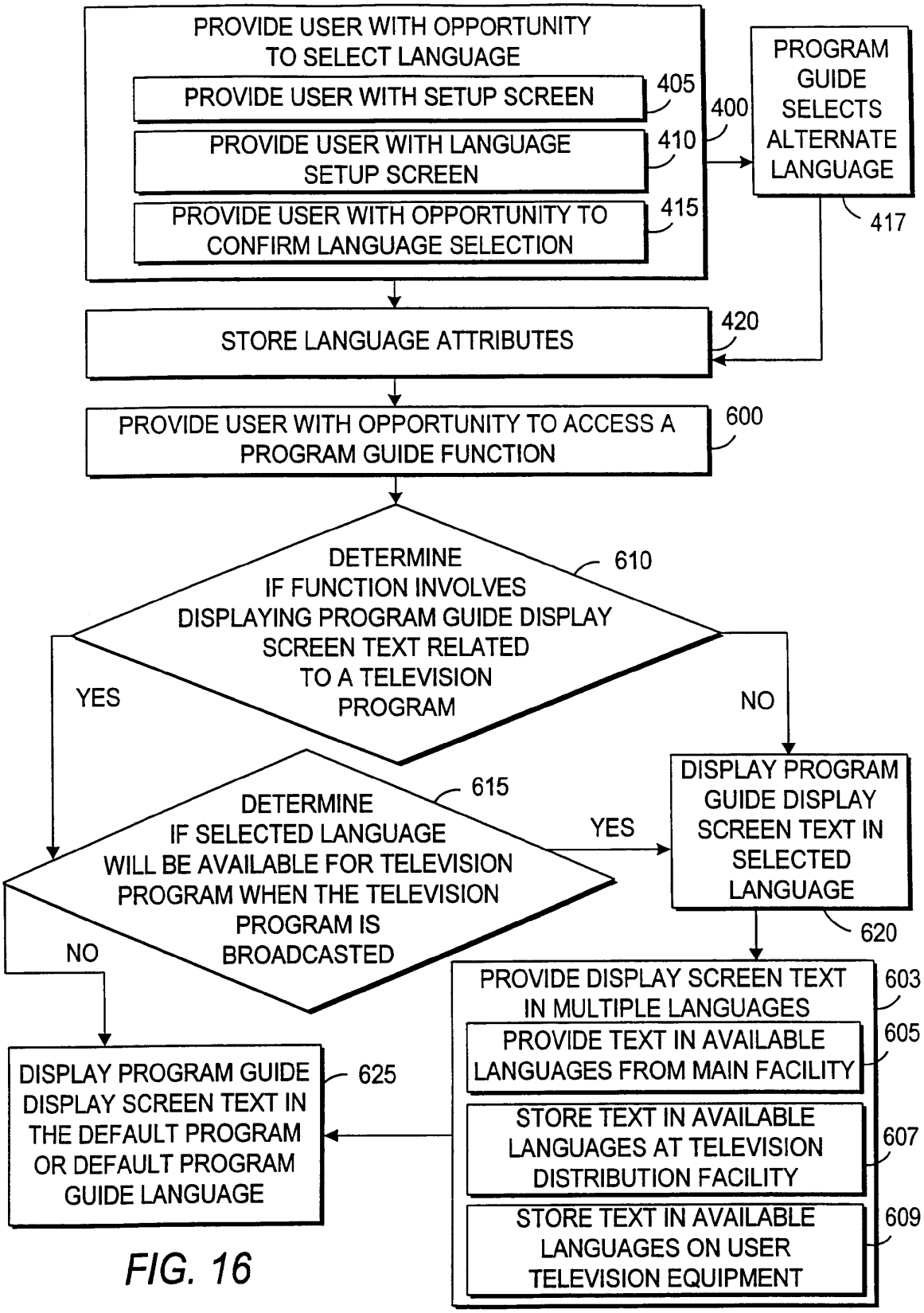

PROVIDE USER WITH OPPORTUNITY TO SELECT LANGUAGE
PROVIDE USER WITH SETUP SCREEN
405
PROVIDE USER WITH LANGUAGE SETUP SCREEN
410
PROVIDE USER WITH OPPORTUNITY TO CONFIRM LANGUAGE SELECTION
415
400
PROGRAM GUIDE SELECTS ALTERNATE LANGUAGE
417
STORE LANGUAGE ATTRIBUTES
420
PROVIDE USER WITH OPPORTUNITY TO ACCESS A PROGRAM GUIDE FUNCTION
600
DETERMINE IF FUNCTION INVOLVES DISPLAYING PROGRAM GUIDE DISPLAY SCREEN TEXT RELATED TO A TELEVISION PROGRAM
610
YES
NO
DETERMINE IF SELECTED LANGUAGE WILL BE AVAILABLE FOR TELEVISION PROGRAM WHEN THE TELEVISION PROGRAM IS BROADCASTED
615
YES
NO
DISPLAY PROGRAM GUIDE DISPLAY SCREEN TEXT IN SELECTED LANGUAGE
620
PROVIDE DISPLAY SCREEN TEXT IN MULTIPLE LANGUAGES
603
PROVIDE TEXT IN AVAILABLE LANGUAGES FROM MAIN FACILITY
605
STORE TEXT IN AVAILABLE LANGUAGES AT TELEVISION DISTRIBUTION FACILITY
607
STORE TEXT IN AVAILABLE LANGUAGES ON USER TELEVISION EQUIPMENT
609
DISPLAY PROGRAM GUIDE DISPLAY SCREEN TEXT IN THE DEFAULT PROGRAM OR DEFAULT PROGRAM GUIDE LANGUAGE
625

FIG. 16

INTERNATIONAL SEARCH REPORT

Inter onal Application No
PCT/US 00/16878

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04N7/173

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04N

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	EP 0 744 866 A (NOKIA TECHNOLOGY GMBH) 27 November 1996 (1996-11-27) the whole document	1,33,65, 96-98 2-32, 34-64, 66-95
Y A	US 5 585 838 A (MATTHEWS III JOSEPH H ET AL) 17 December 1996 (1996-12-17) the whole document	1,33,65, 96-98 2-32, 34-64, 66-95
A	PATENT ABSTRACTS OF JAPAN vol. 1995, no. 04, 31 May 1995 (1995-05-31) & JP 07 030814 A (NEC CORP), 31 January 1995 (1995-01-31) abstract	1-98

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

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

Date of the actual completion of the international search	Date of mailing of the international search report
31 August 2000	19/09/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Greve, M

1

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INTERNATIONAL SEARCH REPORT

Inte onal Application No
PCT/US 00/16878

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
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A	EP 0 299 830 A (ACTV INC) 18 January 1989 (1989-01-18) abstract	1-98
A	WO 80 00209 A (TELEASE INC) 7 February 1980 (1980-02-07) abstract	1,25,65, 87
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A	WO 97 42763 A (SCHEIN STEVEN ;KLOSTERMAN BRIAN L (US); STARSIGHT TELECAST INC (US)) 13 November 1997 (1997-11-13) the whole document	1-98

1

Form PCT/ISA/210 (continuation of second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter ..onal Application No
PCT/US 00/16878

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(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
10 October 2002 (10.10.2002)

PCT

(10) International Publication Number
WO 02/080552 A2

(51) International Patent Classification[7]: H04N 7/173

(21) International Application Number: PCT/IB02/00852

(22) International Filing Date: 15 March 2002 (15.03.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/823,658 29 March 2001 (29.03.2001) US

(71) Applicant: KONINKLIJKE PHILIPS ELECTRONICS N.V. [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).

(72) Inventor: VAN EE, Jan; Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

(74) Agent: GROENENDAAL, Antonius, W., M.; Internationaal Octrooibureau B.V., Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

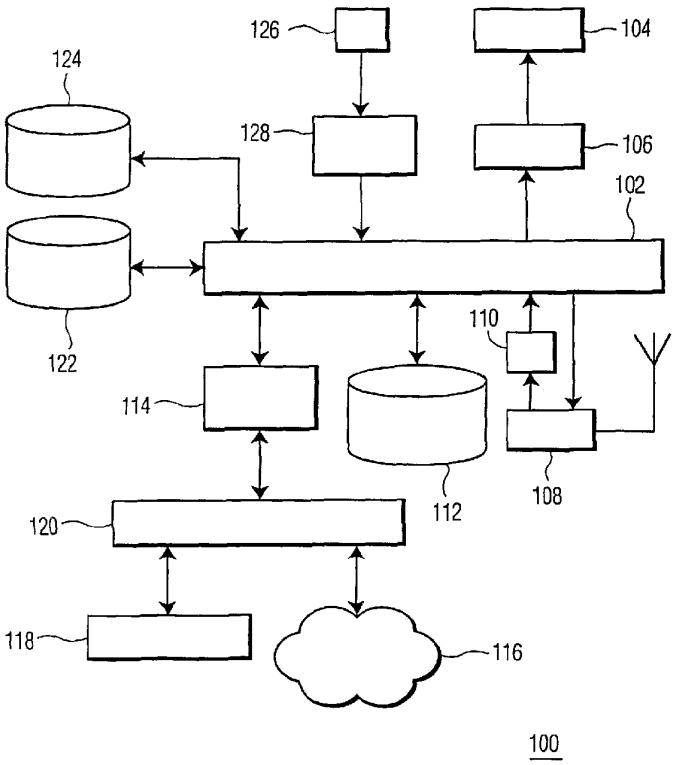
(81) Designated State *(national)*: JP.

(84) Designated States *(regional)*: European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR).

Published:
— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: VIRTUAL PERSONALIZED TV CHANNEL



(57) Abstract: A data management system creates a personalized content information channel for an end-user by enabling to automatically play out a plurality of concatenated content information segments. These segments or programs have been selected on the basis of a criterion independent of a respective resource of respective ones of the segments.

WO 02/080552 A2

Virtual personalized TV channel

FIELD OF THE INVENTION

The invention relates to personalizing the presentation of content information, in particular, but not exclusively, TV broadcasts.

BACKGROUND ART

Philips Electronics markets a Personal Video Recorder (PVR) that is powered by the TiVo service. The PVR allows a user to pause, rewind, slow-motion, and even frame-forward and back live TV. Fast forward with "Smart Scan" lets the user choose what to watch or skip. The PVR is compatible with direct broadcast satellite, cable and antenna. The PVR digital video recorder is connected between a TV set and cable box (digital or analog), satellite receiver, and/or antenna. Via the user's existing phone line, the recorder downloads up-to-date programming information from the TiVo service. The service further lets the user manage and create his/her own TV schedule with automatic digital recordings of favorite shows that are saved to a hard disk drive (HDD) without the user having to explicitly set a timer.

The PVR has several user-selectable operational modes listed as options in an on-screen menu. Choosing the option "now playing" brings up a graphical user interface that lists the programs previously recorded on the HDD. The user can select any of the programs for playing out. Choosing the option "watch live TV" lets the user watch any currently broadcast TV program.

SUMMARY OF THE INVENTION

The PVR decribed above lets the user watch live TV programs or recorded programs according to the user selecting the operational mode and the available content information in that mode. For example, a live broadcast is selected from an electronic program guide (EPG) or by simply tuning to a specific channel via the remote's channel up/down keys. An EPG is an application in an interactive TV service that creates, based on data received from the service provider, an on-screen overview of all programs available. A recorded program is selected for play out by selecting the program from the list presented in

the "now playing mode". Accordingly, the user selects each time an individual program by interacting with the EPG or list of recorded items, or surfs the channels until coming across a program to his/her current liking. That is, each time the user has to select an item of content information for play-out. The invention now, facilitates the selecting and at the same time increases the user-friendliness and level of user control regarding program selection.

The invention provides a data management system for creating a personalized content information channel for an end-user by enabling to automatically play out a plurality of concatenated content information segments, or programs, selected on the basis of a criterion independent of a respective resource of respective ones of the programs. The concatenation enables a substantially continuous, or back-to-back, play-out as if the personalized channel were a conventional TV or radio channel. Respective resources comprise, for example, respective TV channels with live broadcasts.

Preferably, the system comprises a recording device for time-shifting the play-out of at least a specific one of the programs so as to have it fit into the concatenation of the programs per personalized channel. The recording device can also be used as a resource for supply of a content information segment to the personalized channel. Multiple personalized content information channels can be created, each respective one thereof being associated with, e.g., a respective topic such as "movies", "educational documentaries", "sports", "shows", etc., or "westerns", "musicals", "movies featuring Katherine Hepburn", "science fiction movies", etc.

Alternatively, or in addition, respective channels are created for respective members of the family so that everyone has his/her own personalized channel with content information according to his/her profile. As mentioned above, a resource may also comprise or provide recorded content information, e.g., as stored on a PVR or on a DVD in a DVD jukebox, on a CD or solid state memory, as a video-on-demand service, etc.

Alternatively, a personalized channel comprises different types of programs or segments, as selected from the available resources. For example, a user has specified that his/her personalized channel on Saturday's be created as follows: first the news from CNN, then the weather forecast on the local weather channel, then a movie at PBS, and afterwards a late-night comedy show after a coffee break.

The system may only have to switch among live TV channels on occasion in order to create the personalized channel. However, in order to provide flexibility and user adaptability, recording for later play-out, and resources other than TV programs are included in the personal channel. The channel may not be limited to video only as a conventional TV

channel, or audio only as a conventional radio channel, but may instead comprise content information of diverse formats for being played out via respective associated apparatus (display monitor, loudspeaker system, etc.).

Preferably, the system comprises a generator for generating an overview of the concatenated programs, preferably in a graphical user interface (GUI). Preferably, the overview allows some degree of user-interactivity, e.g., for letting the end-user control the compilation of the programs in the personalized channel, e.g., an order of playing -out the programs assigned to the concatenation or substituting another program for an earlier assigned one, etc.

An example of the invention relates to the creation of one or more virtual TV channels containing only programs which match predefined criteria, e.g., implicitly derived from a user's TV watching profile, explicitly defined by a user, etc. When multiple virtual TV channels are created, specific virtual channels can be assigned to family members, or a single person can create multiple virtual channels according to different kinds of content (based on topic, e.g., "my sports", "my news", "my movies", etc.).

Preferably, virtual channels can be locked, and it is possible to allow children to only watch the virtual channel(s) set up for them by their parents (virtual channels can also be made to 'black out' at times when the parents do not want their children to watch TV). Once set up, a user interacts with a virtual channel like he or she interacts with a conventional TV channel. When one program ends, the system automatically switches to the appropriate conventional channel or another resource for the next program in the virtual channel.

Preferably, certain programs are stored in a buffer, e.g., a hard-disk drive (HDD) -based video recorder for time-shifted play-out, so as to reduce the occurrence of empty time slots or program overlap in a virtual channel. At any moment in time at most one program can be active for every virtual channel. There are many ways in which this program can be selected for a given virtual channel. For example, the user can explicitly select programs from all available conventional TV channels, e.g., through an EPG, for each or each desired, time slot in a virtual channel.

Alternatively, or in combination with the user-selection, a virtual channel is automatically created based on a user's viewing profile by filling time slots with a matching or otherwise suitable program from all available conventional channels. For example, the user selects a program type for every time slot in a virtual channel, and based on a user's viewing profile a specific instance of that program type is automatically assigned to that time

slot. As another example, the user explicitly selects programs for some of the time slots, and all other time slots are filled based on the user's viewing profile.

The expression "personalized content information channel" or "virtual channel" has been chosen to refer to the invention to indicate the continuous or substantially continuous back-to-back supply of content information as if it were a conventional TV or radio channel, wherein programs are concatenated in time by the broadcaster. In the invention, the selection of programs for back-to-back supply is under control of the individual end-user. Note that the programs in a conventional TV channel all comprise video content, and that all programs in a conventional radio channel comprise only audio. The invention allows to create a personalized channel on the home equipment across the media (audio, video, etc.) and the available resources (TV, radio, Internet, DVD, CD, HDD recorder, Video-on-Demand, etc.). For example, a personalized channel makes available on a specific day a live TV broadcast, a recorded TV broadcast, a DVD movie from the home network's DVD jukebox or player, a concert played from a CD on the home network, an audio program streamed via the Internet, etc.

An aspect of the invention resides in providing a service via a data network, e.g., the Internet. The service enables to create a personalized content information channel for an end-user, and comprises enabling to automatically play out a plurality of concatenated content information segments selected on the basis of a criterion independent of a respective resource of respective ones of the segments. Respective resources comprise, for example, respective TV channels, and the service supplies, for example, a personalized EPG and controls the switching between the proper channels or the proper channels and a recording device. The service controls the recording of at least a specific one of the segments for time-shifting the play-out so as to have it fit into a concatenation of the segments. The service may enable to create multiple personalized content information channels.

The service may supply an overview of the concatenated segments scheduled for the personalized channel. The overview is, e.g., a personalized EPG or ECG (electronic content guide; see, e.g., U.S. serial no. 09/568,932 (attorney docket US 000106) filed 5/11/00 for Eugene Shteyn and Rudy Roth for ELECTRONIC CONTENT GUIDE RENDERS CONTENT RESOURCES TRANSPARENT, referred to below. The overview preferably allows user-interactivity, e.g., for modifying the concatenation under user-control. In this way, the management of playing out and recording of the content information for this individual user is delegated to a server system. The server system may comprise a dedicated server to optimize the matching between content information and user profile. The server

preferably has access to a profile of the user, to the user's home network for play-out and record control purposes, and to an inventory of content information (or parts thereof made accessible by explicit agreement from the user) for selecting pre-recorded local content. Note that a user data base according to content information preferences is a valuable tool for commercial enterprises to offer products and services in targeted ads to the appropriate demographic groups.

Another aspect of the invention resides in a software application for being installed on a home network. The application controls the creating of a personalized content information channel for an end-user by enabling to automatically play out a plurality of concatenated content information segments that have been selected on the basis of a criterion independent of a respective resource of respective ones of the segments. EPG's and inventories of content information available locally, i.e., at the user's home entertainment equipment, enable the software application to select content segments under control of a user-profile and/or history of user-interaction with the equipment.

Reference is made to the following patent documents:

- U.S. serial no. 09/568,932 (attorney docket US 000106) filed 5/11/00 for Eugene Shteyn and Rudy Roth for ELECTRONIC CONTENT GUIDE RENDERS CONTENT RESOURCES TRANSPARENT. This document relates to a data management system on a home network. The system collects data that is descriptive of content information available at various resources, including for example, an electronic program guide (EPG), on the network. The data is combined in a single menu to enable the user to select from the content, regardless of their resource.

- U.S. serial no. 09/519,546 (attorney docket US 000014) filed 3/6/00 for Erik Ekkel et al., for PERSONALIZING CE EQUIPMENT CONFIGURATION AT SERVER VIA WEB-ENABLED DEVICE. This document relates to facilitating the configuring of CE equipment by the consumer by means of delegating the configuring to an application server on the Internet. The consumer enters his/her preferences in a specific interactive Web page through a suitable user-interface of an Internet-enabled device, such as a PC or set-top box or digital cellphone. The application server generates the control data based on the preferences entered and downloads the control data to the CE equipment itself or to the Internet-enabled device.

- U.S. serial no.09/807618 (Attorney docket US 018028) filed 3/8/01 for Eugene Shteyn for ACTIVITY SCHEDULE CONTROLS PERSONALIZED ELECTRONIC CONTENT GUIDE. This document discloses a system and method wherein

electronic content information and the time slots for play-out are being determined based on the activities scheduled in the user's electronic calendar and the user's profile or declared interests. In this manner, the recording and downloading of content is automated based on the user's life style. More specifically, an EPG and/or ECG is under control of the user's personal schedule, e.g., as represented on the user's electronic organizer with the user's scheduled personal activities.

A data processing system is provided for managing electronic content information under control of data representative of at least one activity scheduled in a user's calendar. The system preferably has a control output for control of a data recording device for recording the electronic content. The system also preferably has an input for receiving input data representative of an EPG, and an input for receipt of the data representative of the activity. The latter is then used for data communication between the system and an electronic calendar on, e.g., the user's PDA.

The managing may comprise selecting specific content information based on a profile of the user. The profile comprises, for example, a preference regarding an attribute (e.g., genre, semantic content, performer, etc.) of the content information based on which the user ordinarily decides whether or not to watch or listen to it. The profile may also comprise relative priorities of the activities scheduled in the calendar with respect to each other and/or with respect to certain content information, or relative priorities of content information entities or files. The profile gives further criteria, in addition to the calendar, based on which the system processes, e.g., records or not, content information.

The system preferably creates a GUI for presenting an overview of the specific content information available in the time slots other than those associated with the scheduled activities in the calendar. The system preferably dynamically adjusts the processing upon a user interaction with the calendar. For example, if the user enters a new activity into the calendar or cancels a scheduled one, the availability changes of the time slots that can be used for processing or playing out content information. Based on, e.g., the user's profile, the system may allocate new time slots to suitable content or time-shift the content to a new time slot fitting into the profile of the user.

- U.S. ser. no. 09/160,490 (attorney docket PHA 23,500) filed 9/25/98 for Adrian Turner et al., for CUSTOMIZED UPGRADING OF INTERNET-ENABLED DEVICES BASED ON USER-PROFILE. This document relates to a method of enabling customizing a technical functionality of network- (e.g., Internet-) enabled equipment of an end-user. According to the method a profile of the end-user and information about a technical

feature for use with the equipment are stored at a server system. Based on the user-profile it is determined whether or not the user should be notified about the availability of this feature. If it has been decided that there is a match between the user profile as stored and the information about this feature, the end-user gets notified via the network of the option to obtain the feature for being added to his/her equipment. In case the feature relates to new software, it can be downloaded via the network for preferably automatic installation in the equipment. In case the feature comprises a hardware component, it can be shipped to the end-user upon acceptance of the offer. A helpdesk is preferably provided through the network to help the end-user install the feature. This concept is based on the insight that network-enabled equipment will become a flexible repository into which the end-user can place new and exciting features over time dependent on the user's needs or desires, context of use, advancement of technology, etc.

Not all end-users are always interested in all possible features for creating enhanced functionality of the equipment. Accordingly, a user-profile is established, either when the user registers his equipment with the notification service, or dynamically as a consequence of the user's interaction with the server system, or through a combination thereof. The profile is used to select technical features that are likely of interest to the user. In this manner, the user is kept abreast of the latest trends of interest to him/her. This service implicitly supports virtual recycling as equipment needs to be designed for the purpose of being upgraded.

The modular approach of adding or deleting technical software or hardware features as needed thus assists in slowing down the trend that products becoming obsolete fairly quickly, but without barring the manufacturer or aftermarket sales organizations from continuing doing business. This service is specifically relevant to vertical markets. A vertical market is a particular branch of commercial activity for which similar products or similar services are relevant. Examples of vertical markets are education, offices, hotels, consumers, hospitals, etc. Each of these segments have unique requirements for hardware devices and their functionality. Hardware manufacturers can make their devices more relevant to a specific vertical market segment by combining a relevant set of applications and services.

- U.S. ser no. 09/653,784 (attorney docket US 000220) filed 9/1/00 for Frank Caris et al., for STB CONNECTS REMOTE TO WEB SITE FOR CUSTOMIZED CODE DOWNLOADS. This document relates to marketing a set top box (STB) together with a programmable remote. The remote has a dedicated button to connect the STB to a specific server on the Internet. The consumer can notify the server of his/her other CE equipment,

which he/she desires to be controllable through the same remote as the one that came with the STB. The server downloads to the STB data representative of the relevant control codes. The STB is provided with means to program the remote with these codes. In return the server has obtained detailed and accurate information about this consumer's equipment. A reliable customer base can thus be built for streamlining Help Desk operations.

BRIEF DESCRIPTION OF THE DRAWING

The invention is described in further detail, by way of example and with reference to the accompanying drawing, wherein Fig.1 and 2 are block diagrams of systems in the invention.

Throughout the drawing, same reference numerals indicate similar or corresponding features.

DETAILED EMBODIMENT

Fig.1 is a block diagram of a system 100 in the invention. System 100 comprises a data processing unit 102 with an onboard memory. System 100 further comprises a play-out apparatus 104, here a display monitor, coupled to unit 102 via an encoder 106; a TV tuner 108 whose content information output is coupled to unit 102 via a D/A converter 110, and whose control input is connected to unit 102 for controllably switching channels; a storage 112, e.g., a HDD, for storing digital content information; a network interface 114 for connecting unit 102 to an external network like the Internet 116 and to a home network 118 via a gateway or a hub 120; a storage 122 for storing a currently valid EPG; and a storage 124 for storing a user profile, e.g., in terms of the user's preferences with regard to genre's or types of content information or in terms of a history of user interaction with content offered via the EPG or available from other resources on home network 118, such as a DVD jukebox (not shown). The user interacts with system 100, e.g., via a remote control device 126 and an IR receiver 128 coupled to unit 102 for processing the IR commands.

In this example, the user profile represents the types of content information (e.g., audio, video) and time slots wherein the user wants to have the content information made available to him/her. The profile may also comprise indications of relative priorities this particular user assigns to certain programs. The priorities may be dependent on the time of the day or the day of the week, for example. Under control of the profile, and the available content information, system 100 creates a personalized channel for this user with content information segments, e.g., programs, played out back to back, or, in other words, without the

user having to switch channels, or switch content providing resources. The back-to-back play-out can be interrupted automatically for a certain time period, e.g., if the user has specified this in advance in the profile or by a manual override through remote 126. Unit 102 selects content segments that match the user's profile based on the information available from EPG 122, from an inventory of recorded content 112 and based on information on the resources on home network 118.

EPG's are supplied by the service provider as data, and thus can be interpreted as to their semantic content and thus can serve as a basis for finding a match between the user's preferences and the available programs.

The recorded content information 112 comprises programs recorded on a previous occasion, e.g., under control of EPG 122. A recording control software application (not shown) running on unit 102 tags the content being recorded with the associated EPG data so as to enable semantic querying for the purposes of finding a match. Home network 118 comprises, for example, a DVD jukebox or a CD jukebox. Each DVD or CD has a unique identifier that enables to identify its content information, either through a service (not shown) on the Internet or by the data itself. In addition, the user may manually create a description of an inventory of his/her collection of content information on home network 118, e.g., via a PC, and make that available to unit 102. Accordingly, information about the content information available is present as data to enable a query, that has been given as input a description of the user's profile.

Once system 100 has identified matching content for the time slots specified (if any), system 100 arranges broadcast programs, received via tuner 108 and played out in real time, recorded or time-shifted broadcast programs in storage 112, Internet TV (via a PC on home network 118) and a video-on-demand program (via a set top box on home network 118) in time and in a preferred order by control of the access to the programs' resources (tuner 108; storage 112; home network 118; Internet 116) and control of recording programs in storage 112.

In above example of the invention, user profile storage 124 is part of the user's local equipment. Fig.2 illustrates another example of a system 200 in the invention. In system 200, user profile 124 is stored at a remote server 202 that communicates with unit 102 via the Internet 116. Server 202 also has access to the EPG 204 to which service this user has subscribed. EPG 122 is the locally cached version of (a part of) EPG 204. Based on this, server 202 can find a match and send the recommended match as a control script to unit 102. This script controls tuner 108, the recording of programs in storage 112 and the playing out

of recorded programs from storage 112. Preferably, server 202 has also access to an inventory of content information on home network 118, and to content providing services to which this user has access, e.g., via an STB or via the Internet. Based on this information, server 202 can optimize the matching of the content information with the user's profile and download the control script to unit 102 for control of tuner 108, control of storage 112, control of gateway 120 and control of home network 118. An advantage is that the processing power for running the queries and for generating the control scripts resides at a dedicated server instead of at the user's equipment. Moreover, the user can access his/her profile through the Internet from any connected PC or STB.

Server 202 thus obtains information about the profiles of this user and others who want to delegate the control at least partly to service provider 202. This customer base is highly valuable to third parties such as content providers, e.g., to optimize their services based on demographics, and on-line retailers, e.g., to provide targeted advertisements. Note that the supply of control scripts to enable creation of personalized content information channels is a business model that can be subsidized at least partly by advertisements that can be downloaded, e.g., from server 202 onto home network 118 or unit 102 and interspersed with, or overlaid on, the content information made available under control of the script.

Still other examples of an embodiment of the invention delegate the storage of content 112 to a remote server as well. The play-out time is known in advance and the download time of the remotely stored content is to be taken into account when preparing for play-out

CLAIMS:

1. A data management system (100) for creating a personalized content information channel for an end-user by enabling to automatically play out a plurality of concatenated content information segments selected on the basis of a criterion independent of a respective resource of respective ones of the segments, at least one of the respective resources providing content other than a liver or locally recorded TV program.

2. The system (100) of claim 1, wherein the respective resource comprises a respective TV channel.

3. The system (100) of claim 1, comprising a recording device for time-shifting the play-out of at least a specific one of the segments so as to fit into a concatenation of the segments.

4. The system (100) of claim 1, arranged for creating multiple personalized content information channels.

5. The system (100) of claim 1, wherein at least one resource comprises recorded content information (112).

6. The system (100) of claim 1, comprising a generator for providing an overview of the concatenated segments scheduled for the personalized channel.

7. The system (100) of claim 3, having a user interface (126) for enabling the end-user to control a compiling of the segments in the concatenation.

8. A method of enabling to create a personalized content information channel for an end-user, the method comprising enabling to automatically play out a plurality of concatenated content information segments selected on the basis of a criterion independent of

a respective resource of respective ones of the segments, at least one of the respective resources providing content other than a live or locally recorded TV program.

9. The method of claim 8, comprising recording at least a specific one of the segments for time-shifting the play-out so as to fit into a concatenation of the segments.

10. The method of claim 8, comprising receiving a profile for the end-user selecting the plurality based on the profile.

11. The method of claim 10, further comprising selecting one or more advertisements and adding the selected advertisements to the plurality.

12. A software application for being installed on a home network for control of creating a personalized content information channel for an end-user by enabling to automatically play out a plurality of concatenated content information segments selected on the basis of a criterion independent of a respective resource of respective ones of the segments, at least one of the respective resources providing content other than a liver or locally recorded TV program.

13. A customer data base created from respective user profiles obtained for creating respective personalized content information channels for respective end-users by enabling to automatically play out a plurality of concatenated content information segments selected on the basis of a criterion independent of a particular resource of particular ones of the segments, at least one of the respective resources providing content other than a liver or locally recorded TV program.

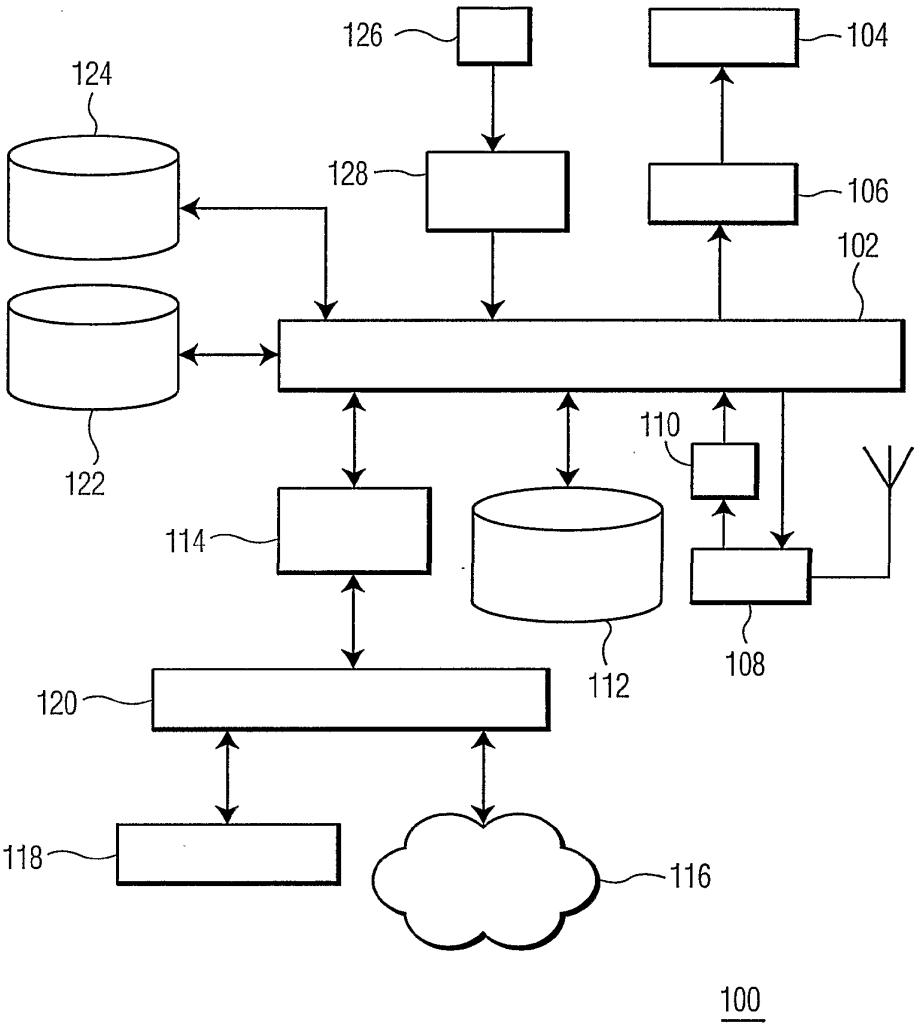


FIG. 1

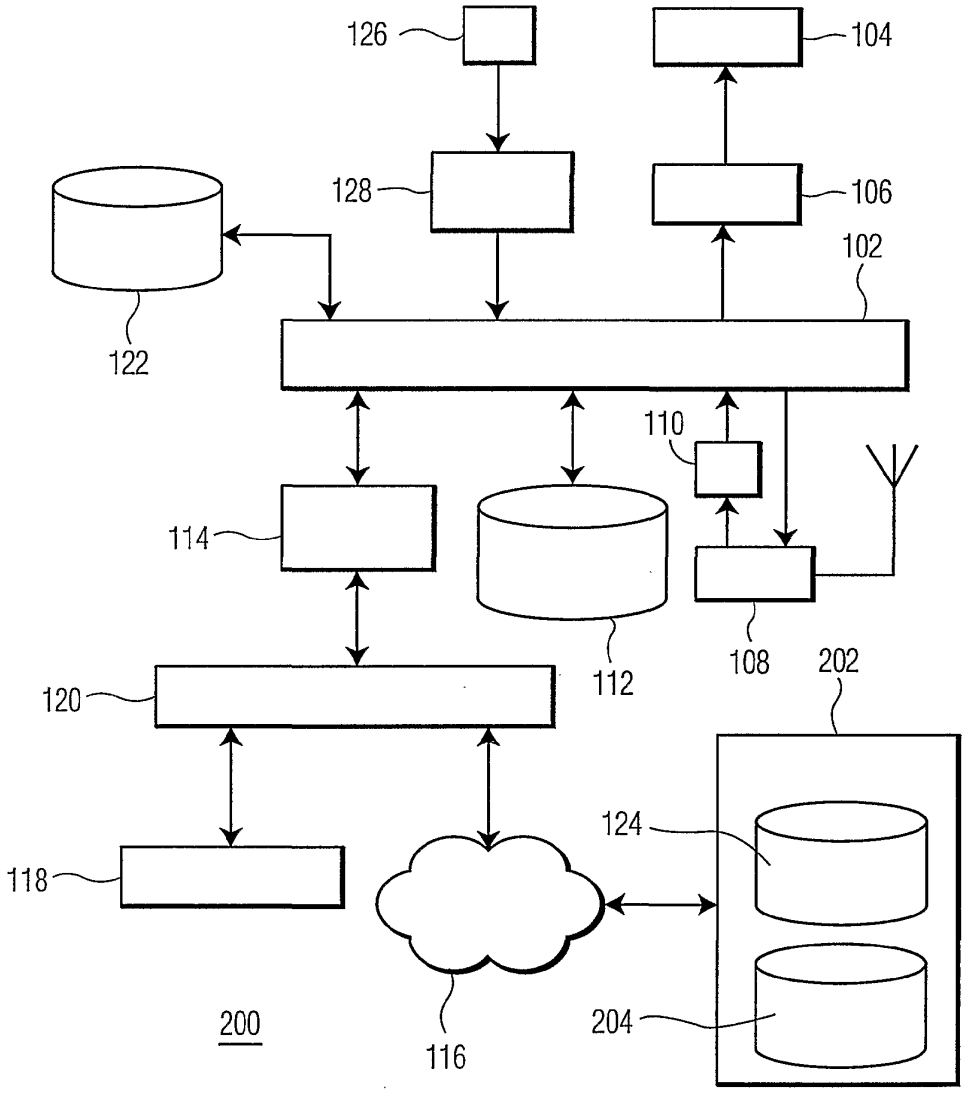

126
104
128
106
102
122
110
114
112
108
202
120
124
118
200
116
204

FIG. 2

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
30 May 2003 (30.05.2003)

PCT

(10) International Publication Number
WO 03/044755 A1

(51) International Patent Classification[7]: G08C 19/04, 19/10, 19/22, G05B 23/02, H04Q 9/00, G06F 3/00

(21) International Application Number: PCT/US01/47518

(22) International Filing Date:
8 November 2001 (08.11.2001)

(25) Filing Language: English

(26) Publication Language: English

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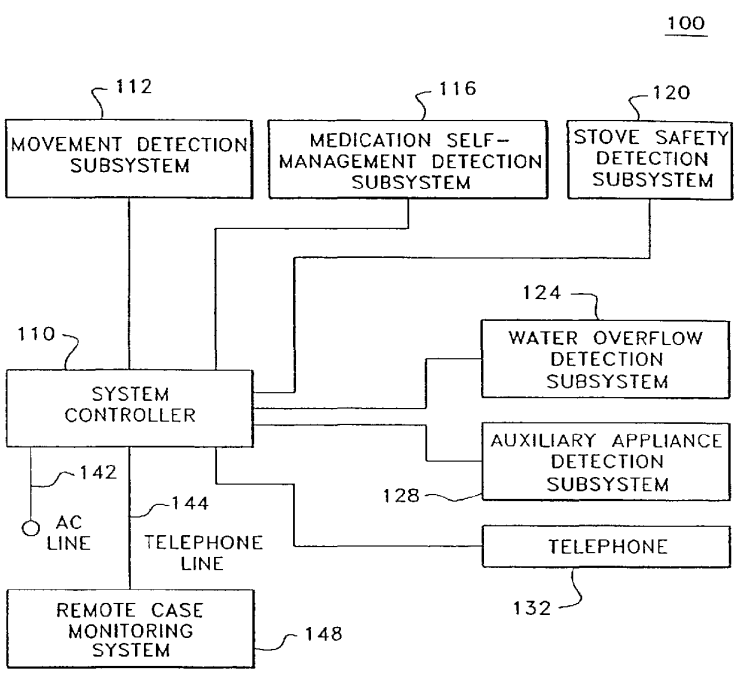
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(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: MONITORING A DAILY LIVING ACTIVITY AND ANALYZING DATA RELATED THERETO



(57) Abstract: A system is provided for monitoring a user in a user living area. The system includes a system controller (110) and an activity detection subsystem (112, 116, 120, 124 and 128). The activity detection subsystem (112, 116, 120, 124 and 128) monitors a daily living activity of the user and provides information representative of the daily living activity to the system controller (110). The system controller (110) includes a control circuit, which generates a control signal in response to the daily living activity information obtained by the activity detection subsystem (112, 116, 120, 124 and 128). Control information from the system controller (110) is applied by way of a control information communication channel both to the activity detection subsystem (112, 116, 120, 124 and 128) and to a remote monitoring site (148). The activity detection subsystem (112, 116, 120, 124 and 128) may be a system for determining the movement of the user around the home, medication compliance by the user, problem with usage of stoves or other potentially dangerous appliances, and selected auxiliary appliances.

WO 03/044755 A1

Published:
— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

MONITORING A DAILY LIVING ACTIVITY AND ANALYZING DATA RELATED THERETO

Field of the Invention

The present invention relates to a system for providing in-home monitoring and intervention to assist individuals, particularly functionally impaired persons, in maintaining independent living.

Background of the Invention

Several known user monitoring systems have an immediate response feature. In one prior art system if a user falls down and is unable to get up the user may push a button on a small radio frequency transmitter. This radio frequency transmitter may be worn by the user. For example, it may be worn on a necklace or on a key chain for convenience and to assure that it is available when it is needed. Pushing the button activates a device at the residence of the user which places a telephone call to a user remote monitoring site. Personnel at the remote monitoring site may listen and talk through a paging telephone in order to communicate with the user. Additionally, personnel at the user monitoring site may dispatch an ambulance or other assistance for the user.

There is a large number of devices designed to enhance medication compliance and to monitor the extent of non-compliance. Devices available in the prior art include timers, medicament containers and combinations of timers and containers. Also available in the prior art are multiple compartment timed containers which only open at timed intervals and beep until the compartment is opened and closed. Devices available to researchers include specialized containers and bottle caps which record the date and time of opening of the container. This information is provided in a machine transferable form which may be applied to a computer for analysis of scheduling and dosing compliance.

In addition, a variety of specialized dispensers using stripped, bubble wrapped medicaments is available. These dispensers are available from pharmacists and are adapted to provide the correct pills at scheduled times and use a less expensive method for loading doses than other prior art self-loading timed dispensers. One prior art system in particular uses a host computer system to control a dispensing schedule in addition to a local timer-memory system. Another system uses color coded indicia to aid in identification of medication by users.

Various home health monitoring systems are also known in the prior art. These systems fall into a broad category of devices which offer in-home electronic monitoring of health conditions ranging from fetal heart beat to blood pressure and blood sugar. Some of these health monitoring systems transmit a log to a central unit if a monitored parameter is outside a predetermined range. Other systems monitor predetermined health related parameters in the environment of the user.

The present invention comprises a user monitoring system for monitoring and intervening in selected activities of daily living for users requiring differing levels of monitoring or supervision. The user monitoring system monitors and provides interventions relating to four principal event domains. These event domains are (1) movement around the home, (2) medication compliance by the user, (3) problems with usage of stoves or other potentially dangerous appliances, and (4) selected auxiliary appliance control. Each of these event domains corresponds to a detection subsystem of the user monitoring system. Each detection subsystem is linked to the user monitoring system by means of radio frequency signals transmitted from subsystem sensors and received by a system controller device within the user monitoring system. In addition to using information obtained by monitoring the selected activities of daily living to make decisions locally, the user monitoring system produces, stores and transfers data concerning all monitored event domains and intervention activity to a remote case management system for further analysis and intervention. The remote case management monitoring system may use a knowledge base and an inference generator in order to make decisions regarding various types and degrees of intervention. The user monitoring system may provide reminders for the user to take their medications. Local and remote reprogramming of event parameters determining interventions and data recording are provided. The user monitoring system may execute controlled shutdown of the stove and other appliances as well as call the remote monitoring site in the event of possible emergencies. Data for monthly case monitoring reports which may include event logs of problem occurrences may be provided to permit cross-sectional and long-term trend analysis of difficulties. These may serve as a basis for case management decisions determining additional contacts and interventions.

Summary of the Invention

A system is provided for monitoring a user in a user living area. The system includes a system controller and an activity detection subsystem. The activity detection subsystem monitors a daily living activity of the user and provides information representative of the daily living activity to the system controller. The system controller includes a control circuit which generates a control signal in response to the daily living activity information obtained by the activity detection subsystem. Control information from the system controller is applied by way of a control information communication channel both to the activity detection subsystem and to a remote monitoring site.

Brief Description of the Drawings

The foregoing summary, as well as the following detailed description of preferred embodiments of the invention, will be better understood when read in conjunction with the appended drawings. For the purpose of illustrating the invention, there is shown in the drawings embodiments which are presently preferred. It should be understood, however, that the invention is not limited to the precise arrangements and instrumentalities shown. In the drawings:

Fig. 1 is a block diagram representation of the user monitoring system of the present invention;

Fig. 2 is a more detailed block diagram representation of the system controller device of Fig. 1;

Fig. 3 is a block diagram representation of the movement activity detection subsystem of the user monitoring system of Fig. 1;

Figs. 4A, B are side and top plan views of the medication self-management detection subsystem of the user monitoring system of Fig. 1;

Fig. 5 is a more detailed block diagram representation of the medication self-management detection subsystem of Figs. 4A, B;

Fig. 6 is a block diagram representation of the gas stove safety detection subsystem of the user monitoring system of Fig. 1;

Fig. 7 is a block diagram representation of the electric stove safety detection subsystem of the user monitoring system of Fig. 1;

Fig. 8 is a more detailed schematic representation of the current drain monitor of the electric stove safety detection subsystem of Fig. 7;

Fig. 9 is a schematic representation of the water overflow detection subsystem of the user monitoring system of Fig. 1;

Fig. 10 is a block diagram representation of the auxiliary appliance detection subsystem of the user monitoring system of Fig. 1;

Figs. 11A-11M are flow charts representing operations performed with respect to the various subsystems of the system of Fig. 1.

Fig. 12 is a block diagram representation of the user monitoring system of Fig. 1 wherein the internet is used as the communication channel.

Detailed Description of Preferred Embodiments

Referring to the drawings, wherein the same reference numerals are used to designate the same elements throughout, there is shown in Fig. 1 a block diagram representation of a user monitoring system 100 in accordance with a preferred embodiment of the present invention. The monitoring system may be used to monitor and assist elderly persons, functionally impaired persons or the like on a temporary short-term basis or on a long-term basis. The user monitoring system 100 includes a microprocessor based system controller device 110 linked to various sensors which are provided within a number of activity detection subsystems 112-128. Activity detection subsystems 112-123 are adapted to monitor various activities of daily living of the user of the monitoring system 100. Also included are the in-home telephone 132 which is located within the user living area being monitored and an outside telephone line 144.

Any number of daily living activity detection subsystems may be provided within the user monitoring system 100 of the present invention. The detection subsystems provided in one embodiment may include a movement detection subsystem 112, a medication self- management detection subsystem 116, and a stove safety detection subsystem 120. However, it will be understood that using differing types of monitors, any other activities of daily living may be sensed and detected within user monitoring system 100. Additionally, the user monitoring system 100 may be coupled to a computer based case monitoring system 148 by way of a telephone line 144. Formal and informal care givers may be provided with information to determine whether short and long term intervention is

required using the data transmitted to the case monitoring system 148. It will be understood that in addition to telephone line 144 or interactive television, any method of transmitting messages to system 148 may be used. For example, messages may be transmitted by an add-on fiber optic cable box or a portable transmitter.

The user monitoring system 100 integrates sensor data from different activity domains to make a number of determinations at predetermined times on a twenty-four hour basis. One activity domain determination within the user monitoring system 100 includes movement of the person being monitored. In this movement domain determinations are made by the movement detection subsystem 112 whether the user is up and around. The detection information which results from this determination by movement detection subsystem 112 is transmitted to the system controller device 110.

Another activity domain determination within the user monitoring system 100 is a determination of medication self-management. In this activity domain determinations are made whether the user is following a predetermined medication regimen. This determination is made by the medication self-management detection subsystem 116 of the user monitoring system 100. The detection information which results of this determination by medication self-management system 116 is also transmitted to the system controller device 110.

Stove usage is another activity domain which is monitored by the user monitoring system 100. In this activity domain determinations are made as to whether a stove has been left on inappropriately. Detection information in accordance with this determination is transmitted to the system controller device 110. This determination may be made by differing embodiments of the stove safety detection subsystem 120 depending on whether the stove being monitored by detection subsystem 120 is a gas stove or an electric stove.

In the preferred embodiment of the user monitoring system 100 it is also possible to monitor and control other designated appliances using one or more auxiliary systems subsystems 128. These auxiliary systems may include, for example, other potentially harmful appliances such as irons or electric space heaters. System controller device 110 also receives detection information representative of the determination of the detection subsystems 116, 128.

Referring to Fig. 2, there is shown a more detailed block diagram representation of the system controller device 110 of the user monitoring system 100. The system controller device 110 includes a computer 208 and a radio frequency multichannel receiver 212. The computer 208 may be any type of computer capable of running C++ or any similar functionally equivalent object code. The various channels of the radio frequency receiver 212 are provided within system controller device 110 for receiving radio frequency signals transmitted from the various detection subsystems 112-128 by way of detection system antennas provided within the various detection subsystems 112-128. It will be understood that a sufficient number of information channels required to accommodate the number of detectors should be provided within system 100. These communication channels may be provided, for example, by a number of radio frequency channels within radio frequency receiver 212.

The various channels of the radio frequency receiver 212 thus serve as detection information channels for receiving detection information within the monitoring system 100. However, it will be understood that any information channel or information conduit or means for applying information may be used to apply information from detection subsystems 112-128 to system controller 110. The system controller device 110 is also provided with an AC power line transmitter 202 for applying control signals to the various detection subsystems 112-128 and to the remote monitoring site 148. Additionally, a system controller modem 204, and a telephone interfacing circuit 202 are present within the system controller 110.

In the preferred embodiment of the user monitoring system 100 the system controller device 110 may also be provided with a voice data storage device 210. The voice data storage device 210 may be used within the user monitoring system 100 to store various audio reminder and inquiry messages which may be provided to the user being monitored at predetermined times.

The power supply of the system controller device 110 of the user monitoring system 100 may include a well regulated battery with a battery backup to prevent loss of valuable user data stored in the user monitoring system 100. The radio frequency multichannel receiver 212 of the system controller device 110 is a conventional multichannel radio frequency device having appropriate anti-interference technology for preventing

interference between the various subsystem channels and interference from external sources. The anti-interference technology may be, for example, broad spectrum modulation.

In the preferred embodiment of the system controller device 110 the radio frequency receiver 212 may be a pulsed radio frequency device. The power line transmitter 202 of the system controller device 110 is a conventional system for turning controlled appliances on and off. In the preferred embodiment of the user monitoring system 100, this control may be accomplished by sending pulsed radio frequency signals through the AC lines of the living areas of the user as understood by those skilled in the art. The use of different pulsed signals, decodable by different detection subsystems, is effective to provide any required number of control information channels for applying control signals to detection subsystems 112-128 by system controller 110. However, it will be understood that the transmission of control information from the system controller device 110 to the various detection subsystems 112-128 may be performed by any suitable information channels.

The controller modem 204 of the system controller device 110 may be a conventional modem capable of providing known incoming and outgoing modem protocols. The outgoing protocols of the controller modem 204 may be used for data transfer from the system controller device 110 to the case monitoring site 148 or to other locations by way of telephone line 144. The incoming protocols of the system controller modem 204 may be used for reprogramming various monitoring and intervention parameters of the user monitoring system 100. Reprogramming may be performed either by the remote case monitoring site 148 through the controller modem 204 or directly to the system controller device 110. Additionally, the incoming protocols may be used for any type of communication with the user monitoring system 100.

The local telephone interface circuit 206 of the system controller device 110 provides several functions within the user monitoring system 100. It transmits incoming calls received by the user monitoring system 100 by way of the telephone line 144 to the in-home telephone 132. The telephone interface device 206 also connects ringing voltage as well as synthesized voice messages from the voice data storage device 210 to the in-house telephone 132 on command to provide messages to the user by way of the in-home telephone 132. It also makes several determinations regarding the state of the in-house telephone 132. For example, determinations when the in-home telephone 132 is off-hook, when the in-home

telephone 132 is not off-hook, and whether the number one has been pressed on the in-home telephone 132 may be made by the local telephone interface circuit 206.

The user monitoring system 100 operates in a home mode and in an away mode. The away mode of the user monitoring system 100 may be selected by pressing a dedicated away switch (not shown) located in a convenient location in the home of the user. Additionally, the away mode of user monitoring system 100 may be remotely set from the case management monitoring host site 148. The home mode of the user monitoring system 100 may be passively set, for example, by the opening of a door when the user returns home.

In the preferred embodiment of the system controller device 110, a reprogrammable microprocessor receives detection information, makes determinations as set forth herein, and provides control information accordingly. However, it will be understood by those skilled in the art that any type of control circuitry capable of performing the operations set forth herein may be used within the user monitoring system 100.

Referring to Fig. 3, there is shown a block diagram representation of a preferred embodiment of the movement activity detection subsystem 112 of the user monitoring system 100. Within the user monitoring system 100, movement sensed by the movement activity detection subsystem 112 is assumed to indicate that the user being monitored is up and around.

It will be understood by those skilled in the art that the configuration of the movement detection subsystem 112 may vary according to the differing living areas being monitored by user monitoring system 100. However, in general the movement detection subsystem 112 includes at least one and preferably several motion sensors such as motion sensor 304 positioned at spaced locations within the home of the user or a conventional reed switch door opening such as sensor detector 308. The motion sensor 304 and the reed switch 308 are provided for determining whether there is movement or activity within the living area being monitored by the user monitoring system 100.

In the most basic embodiment of the detection subsystem 112, only a single motion sensor 304 may be provided. In this case the single motion sensor 304 is preferably placed between the bed of the user and the bathroom. In a case where only a single reed switch is provided within the movement detection subsystem 112, it is preferably placed on the door of the bathroom. Such basic configurations of the movement detection subsystem

116 are effective to determine whether the user being monitored has gotten out of bed or has gone to the bathroom after a predetermined time.

When an activity is sensed by the motion sensor 304 or the door opening sensor 308, a motion transmitter 306 of the motion detection subsystem 112 transmits a radio frequency signal by way of the motion antenna 302. This motion signal representing an activity of daily living by the user is received by the system controller device 110 of the user monitoring system 100. It is therefore activity of daily living information which indicates that the detected user movement has occurred within the home being monitored by the user monitoring system 100.

Similarly, a conventional reed switch (not shown) or other type of switch within the door opening sensor 308 is provided with a radio frequency door opening transmitter 312. The door opening transmitter 312 transmits a door opening signal indicating the opening of a door or cabinet to which the sensor 308 is applied. The door opening signal is transmitted by detection subsystem 112 is a radio frequency signal representative of this activity. It is transmitted to the system controller device 110 by way of the motion detection antenna 310.

If the dwelling being monitored is large or complex a more elaborate configuration of movement and activity sensors 304, 308 may be required within the movement detection subsystem 112 of the user monitoring system 100. However, in the preferred embodiment of the user monitoring system 100 at least movement from the bed and movement into and out of the bathroom should be monitored by the movement detection subsystem 112. Inappropriate periods of user inactivity as indicated by sensors 304, 308 or other sensor disposed in these locations may indicate a medical emergency. It will be understood that a plurality of motion sensors or switches such as reed switches may be placed in locations within the living area being monitored and that there are no theoretical limitations in the number of such devices which may be used with the movement detection system 112.

When the movement detection subsystem 112 operates in the home mode the user monitoring system 100 is in a twenty-four hour cycle. This twenty-four hour cycle includes information with respect to the usual waking time of the user being monitored. Using the motion sensors 304, 308 of the motion detection subsystem 112 the user

monitoring system 100 determines if the user remains in bed a specified length of time beyond the usual waking time or has not gone from the bed to the bathroom for a predetermined time period. If the user monitoring system 100 determines an abnormal lack of user activity such as this it may enter a wake up monitor phase.

In the wake up monitor phase of the user monitoring system 100 the system controller device 110 may place a telephone call to the user by way of the telephone 132 in order to determine whether the user is having a problem. If the telephone call placed by the system controller device 110 is answered, the user is prompted by the system controller device 110 to depress a predetermined key on the in-home telephone 132. For example, the user may be prompted to press the telephone key indicating the number one. If the user complies with the prompt from the system controller device 110 the wake up monitor phase of the user monitoring system 100 is complete. If there is no answer to the call placed by the system controller device 110 and the user monitoring system 100 is not in away mode, or if the user answers the telephone but does not depress the requested key, the user monitoring system 100 contacts the case monitoring site 148 with an immediate status report indicating a potential problem with the user.

Assuming all is well, the activity movement detection subsystem 112 of the user monitoring system 100 merely monitors all system status changes within system 100. This includes monitoring and storing information from the motion detectors 304, 308 representing movement and the opening and closing of doors, the usage of medication, the usage of the stove and appliances, and any other auxiliary devices which may be monitored by the user monitoring system 100.

Each status change detected by the user monitoring system 100 is assumed to indicate activity of the user being monitored. In the event of the detection of a period of inactivity in excess of a predetermined amount of time during the usual waking hours of the user, the user monitoring system 100 returns to the wake up monitor phase and places a telephone call to the user as previously described. The period of inactivity required for the user monitoring system 100 to return to the wake up monitor phase is adjustable depending upon the habits of a particular user but may, for example, be two and one-half hours.

When the user monitoring system 100 is in the away mode it does not record or report any activities. It merely waits for active or passive resetting of the home mode as

previously described. Active resetting of the home mode of the user monitoring system 100 occurs when the user activates a dedicated home/away switch which may be mounted at any convenient location. Passive resetting of the mode of the user monitoring system 100 may occur when the user returns and changes the status of any detection subsystem 112-128.

Referring to Figs. 4A, B, and 5, there are shown a side view, a top plan view, and a schematic representation of a preferred embodiment of the medication self-management detection subsystem 116 of the user monitoring system 100 of the present invention. The medication self-management detection subsystem 116 comprises a medication holder 404 which is a specialized portable holder or caddy for holding at least one medication container 402 in a corresponding container opening 404.

In the preferred embodiment of the medication detection subsystem 116 a plurality of the medication containers 402 may be installed within their corresponding container openings 406 in the portable medication holder 404 when the user being monitored is not removing medication from them. The medication containers 402 and the container openings 406 within the medication holder 404 may be color coded. In this method the colors of a selected medication container 402 and its container opening 406 match each other. Likewise, each container opening 406 of the medication holder 404 may be provided with a matching colored light 408. The colored lights 408 assist the user in returning a removed medication container 402 to its correct container opening 406.

When a medication container 402 is disposed within a container opening 406 of the medication holder 404 the medication container 402 closes a conventional normally open switch 416. When the medication container 402 is removed from the opening 406 of the medication holder 404 it releases the normally open switch 416 causing it to open. When a switch 416 within the medication holder 404 is opened or closed in this manner by a medication container 402 a radio frequency medication transmitter 424 is activated. In this manner the medication self-management detection system 116 communicates this activity of daily living information with the system controller device 110.

The radio frequency signal provided by the medication transmitter 424 when it is activated by a switch 416 is pulse code modulated by pulse coder 420. The modulating of the pulse coder 420 is performed in a series of differing manners according to which switch 416 within the medication container 404 is opened. The selected pulse coded signal

from the medication transmitter 424 is received, decoded, and stored by the system controller device 110 of the user monitoring system 100.

While the medication container 402 is removed from the medication holder 404 its matching colored light 408 is activated. This causes the color code of the medication container 402 removed from the medication holder 404 to be displayed as previously described. When the medication container 402 is replaced in its opening 406 of the medication holder 404 and the transmitter 424 is activated to transmit a corresponding pulse code modulated signal, the colored light 408 turns off and the transmission from the medication transmitter 424 to the system controller device 110 terminates. The termination of the transmission by the medication transmitter 424 indicates to the system controller device 110 that the medication container 402 has been returned to its opening 406 in the medication holder 404.

It will be understood by those skilled in the art that any number of medication openings 406 may be provided within a container holder 404 of the medication self-management detection subsystem 116. However, it is believed from current research that the daily medication management needs of a majority of users of the user monitoring system 100 may be met by eight medication openings 406 and eight corresponding medication containers 402 although only three are shown in order to simplify the drawings. It will also be understood that the openings 406 of the container holder 404 and the medication containers 402 may be provided with keying features so that only the correct medication container 402 may be placed into an opening 406 of the medication holder 404.

While the above describes many of the features of a preferred embodiment of the medication self-management detection system 116, it should be noted that various arrangements of medication holders and dispensers may be used. For example, the medications within a medication holder 404 may be organized according to the time of day they are taken. In this type of organization medications which are taken at the same time may be loaded together into a single compartment within the medication holder 404. A plurality of these compartments may be provided within the medication self-management detection system 116. The opening and closing of these compartments may be monitored by the medication self-management detection system 116 in substantially the same manner as

previously described with respect to monitoring the removal of the medication containers 402 from the openings of the medication holder 404.

As previously described the pulsed transmissions from the medication transmitter 424 to the system controller device 110 may carry a plurality of differing codes corresponding to the plurality of differing medication containers 402. Each pulse code corresponds to an individual medication container 402 and indicates when its corresponding medication container 402 is currently removed from the medication holder 404.

The system controller device 110 of the user monitoring system 100 is programmed to record the times of removal and replacement of each medication container 402 within medicine holder 404 according to these transmissions. It is also programmed to determine scheduled on-time removals of each of the medication containers 404 from the medicine holder 404. Compliance data representative of these determinations according to transmissions from the medication self-management detection system 116 may be transferred to the case monitoring site 148 for intervention decisions.

The system controller device 110 of the user monitoring system 100 may be programmed to determine when user compliance does not conform to a scheduled regimen. After a selected time period, for example, one-half hour, without user compliance, voice data from the voice data storage device 224 may be applied by the controller device 110 to the in-home telephone 132 to remind the user to take medications. The system controller device 110 may also provide general and specific reminders and inquiries to the user concerning medications after the user returns from being away. These reminders and inquiries may be made with respect to all medications or with respect to specific medications. The system controller device 110 may also provide specific time scheduled reminders to take medication.

Referring to Figs. 6, 7, there are shown two embodiments of the stove safety detection subsystem 120, the stove safety detection subsystem 600 and an electric stove safety detection subsystem 700. The stove safety detection systems 600, 700 of Figs. 6, 7 are preferred alternate embodiments which are adapted for monitoring and controlling gas stoves and electric stoves, respectively.

The stove safety detection subsystems 600, 700 of the user monitoring system 100 each include an appropriate stove-in-use sensor for determining when a monitored stove

is turned on. Each stove safety detection subsystem 600, 700 also includes an appropriate shut-off receiver unit for receiving a radio frequency transmission from the system controller device 110 by way of the AC lines to turn the monitored stove off and protect the user. The stove-in-use sensors of the stove safety detection subsystems 600, 700 continuously provide information to the system controller device 110 of the user monitoring system 100 regarding whether the monitored stove is currently on.

The stove-in-use sensor 604 of the gas stove safety detection subsystem 600 is a gas flow monitor 604. The gas flow monitor 604 is disposed in the gas line 602 which supplies gas to the gas stove 610 in order to monitor the gas supplied by the gas line 602 to the gas stove 610. Gas flow information from the gas flow monitor 604 is pulse coded by a pulse coder 612. The coded signal from the pulse coder 612 is transmitted to the system controller device 110 by a gas stove transmitter 620 by way of the gas stove antenna 616.

The system controller device 110 may determine that the gas stove 610 must be shut off in accordance with the coded information from the gas flow monitor 604. If this determination is made by the system controller device, it applies a control signal to the gas stove safety detection subsystem 600 by way of the AC line 630. The control signal to the gas stove detection system 600 from the system controller device 110 is generated and transmitted by way of the AC power line transmitter 216 as previously described. This control signal is received by the controller receiver 628 of the gas stove safety detection subsystem 600. The controller receiver 628 instructs a gas shut off valve 608 by way of a step down circuit 608 to terminate gas flow through gas line 602 to the gas stove 610 in response to the control signal. This turns off the gas stove 610.

When the user monitoring system 100 monitors an electric stove 710, an electrical current draw monitoring device 704 is provided for use along with the electric stove safety detection system 700. The electrical current monitoring device 704 is applied to the AC power line 706 which supplies power to the electrical stove 710. By monitoring the AC power line 706 detector subsystem 700 is able to indicate the on/off status of the burners of the electric stove 710. On/off status information is coded by the pulse coder 712 and transmitted by an electric stove transmitter 720 by way of antenna 716 to the system controller device 110.

The system controller device 110 may determine that the electric stove 710 must be shut off in accordance with the coded information from the current draw monitor 704 as previously described with respect to the gas stove safety detection system 600. If electric stove 710 is to be shut off, the system controller device 110 applies a control signal to the electric stove safety detection subsystem 700 by way of the AC line 730. This signal is received by a controller receiver 728 of the electric stove safety detection subsystem 700. The controller receiver 728 instructs the electrical trip relay 708 to interrupt electricity through the electrical power supply line 702 to electrical stove 710. This turns electric stove 710 off.

When the stove safety detection subsystems 600, 700 provide information indicating that a stove is on, shut down predetermined control algorithms are followed in order to determine whether the stove 610, 710 should be turned off. These predetermined control algorithms are executed within the system controller device 110 of the user monitoring system 100. In the preferred embodiment of the user monitoring system 100 the algorithms operate upon coded information transmitted from the stove safety detection management subsystems 600, 700 and the movement detection subsystem 112 in the following manner although the other algorithms may be used if desired:

> If (no movement detected for 30 minutes) or (away-mode status) and stove-on status), then (call with stove reminder).
>
> If (no answer to call), then initiate shut down and record event. If (call is answered and 1 is pressed), override shut down.
>
> If (stove on status) and (smoke detector tripped), then initiate shut down and record event.
>
> If (stove is on for [X] minutes), then alert remote site host with automated telephone message: "Your stove is on, do you want it on ? If yes, press 1; otherwise, it will be turned off." Answering the telephone and pressing 1 override the shut-down sequence.

Additionally, management subsystems 600, 700 may include smoke detector sensor devices 632, 732 coupled to radio frequency transmitters 620, 720. The smoke detection sensor devices 632, 732 may be standard optical smoke detector modified to include a subsystem switching circuit (not shown) which is effective to provide a smoke detect control signal when smoke is detected by the senor devices 632, 732. The radio frequency transmitters 620, 720 of the smoke detection subsystem is coupled to the system switching circuit of the smoke detection sensor devices 632, 732 in a manner well understood by those skilled in the art.

When the sensor devices 632, 732 detect smoke within the home of the user they sound a fire alarm in a conventional manner. Additionally, the detection of smoke by the sensor devices 632, 732 activates subsystem switching circuit which activates the respective smoke detector transmitter 620, 720. In response the smoke detection transmitters 620, 720 provide a pulsed radio frequency control signal by way of the antenna 616. This control signal conveys information to the system controller device 110 of the user monitoring system 100. The information transmitted by the subsystems 600, 700 in this manner indicates to the system controller device 110 that smoke was detected by a sensor device 632, 732. It may also indicate which particular sensor device is triggered if more than one sensor device 632, 732 is used within a subsystem 600, 700.

Referring to Fig. 8, there is shown a more detailed schematic representation of the current draw monitor 704 of the electric stove detection subsystem 700. The current drain monitor 704 may include a passive clamp coil 730 disposed around the electrical supply line 706 which applies electrical energy to the electric stove 710. Electromagnetic fields arising from the current applied to the stove 710 by way of the electrical supply line 706 thus induce current in the passive clamp coil 730. The current induced in the passive clamp coil 730 may be rectified by a bridge rectifier 734, amplified by an amplifier 738, and applied to a diode switch 742. The diode switch 742 may then control the gate of silicon control regulator 746 to apply energy to the pulse coder 712.

It will be understood that any method may be used for sensing the electromagnetic fields arising from the current applied to the stove by way of the electrical supply line which induces current in the passive clamp coil 730, provided the current induced in the passive clamp coil is used to toggle an electronic switch of suitable design to

control a pulsed radio frequency signal indicating to the system controller the on/off state of the stove 710. Additionally, it will be understood by those skilled in the art that pulse code 710 may be controlled by any other means for determining the state of stove 710.

Referring to Fig. 9, there is shown a preferred embodiment of the water overflow detection subsystem 124 of the user monitoring system 100. The water overflow detection subsystem 124 may be installed on plumbing fixtures such as sinks and bathtubs within the home of the user being monitored by the user monitoring system 100. Within the water overflow detection subsystem 124 a water level sensing device 1004 and a remote controlled shut-off device 1030 are provided in communication with the system controller device 110 of the user monitoring system 100.

In the principles of its operation, the water overflow detection subsystem 124 is similar to the gas stove safety subsystem 600 previously described. The water level sensing device 1004 or water level monitor 1004 sends information to the system controller device 110 by means of a pulsed radio frequency water level transmitter 1002. The system controller device 110 is programmed to initiate shut off of water within overflow detection subsystem 124 by means of a radio frequency remote control signal. The radio frequency remote control signal is transmitted through the home of the user by way of the AC lines.

The control signal from the system controller device 110 is received by the controller receiver 1044, stepped down by step down circuit 1040. The stepped down signal is used to control resetable electrically controlled water valves 1034, 1038. The electrically controlled valve 1034 may control water flow from an inlet pipe 1026 to a tub supply pipe 1028. The electronically controlled valve 1038 may control water flow from an inlet pipe 1026 to a sink inlet pipe 1032.

The water level sensing device 1004 includes two water level detectors 1006, 1012, and a siren module 1018 having a conventional timer. A siren transducer such as a piezoelectric crystal is also provided. A three-state pulsed radio frequency transmitter 1002 may be provided within the water overflow detection subsystem 124.

When water is sensed at a warning level by the level detector 1006 the system controller device 110 of the user monitoring system 100 is informed that water is approaching the warning level mark. When this is detected the user monitoring system 100 calls the user on the in-home telephone 132 in order to provide a reminder. When the level

detector 1012 determines that the water level has approached the high water mark, the siren 1024 sounds. Additionally, the received radio frequency pulse data informs the system controller device 110 of the user monitoring system 100 to turn the water off. This event is logged within the system controller device 110. The water overflow detection subsystem 124 may be programmed to permit resetting of the valves 1034, 1038 in response to commands from within user monitoring system 100 or from the case monitoring site 148.

Referring to Fig. 10, there is shown a block diagram representation of the auxiliary appliance detection subsystem 128 of the user monitoring system 100. The auxiliary appliance detection subsystem 128 provides additional channels to the user monitoring system 100 for monitoring and controlling further appliances 1116 or devices 1116.

The on/off state of the further device 1116 is monitored and transmitted to the system controller device 110 of the user monitoring system 100 by means of a current draw detector 1108. The current draw detector 1108 monitors current applied to the device 1116 by way of the AC power supply line 1114. The current draw detector 1108 is coupled to a radio frequency auxiliary transmitter 1112 which transmits a two state signal representing on and off. This information may be used by the system controller device 110 both for status change data and for generating a daily activity data log. The current draw sensor 1108 of the auxiliary detection subsystem 128 should be sufficiently sensitive to distinguish between trickle draw and operational power when auxiliary device 1116 is a solid state device such as a television or a clock radio.

In addition to the monitoring of the use of a auxiliary device 1116, automatic remote control of the device 1116 may be accomplished. The system controller device 110 of the user monitoring system 100 may be programmed to control a controlled outlet or receptacle adapter which applies energy to the AC line 1114. This control may be exercised at predetermined times of the day or upon certain environmental occurrences. For example, when the user monitoring system 100 is in the away mode this feature may be used to automatically turn the auxiliary appliance 1116 off. More than one auxiliary subsystem 128 may be provided within the user monitoring system 100.

Furthermore, monitoring system 100 may be provided with an auxiliary detection system which is not monitored by a current draw monitor 1108 or controller

receiver 1104. For example, the multichannel receiver 212 of system controller 110 may be used to monitor smoke detection subsystem 900 shown in Fig. 9.

It will be understood that many differing combinations of auxiliary detection subsystems may be provided within the user monitoring system 100 of the present invention. It will also be understood that these combinations may be used in combination with automated dialing systems at other locations. Automated dialing systems which may call the dwellings of various users, for example, one or more times a day have been developed. This provides the user with an opportunity to return a predetermined signal if there are no problems and return a different predetermined signal or no signal if there are problems.

These services may give users up to six automated contacts per day. For example, an automated dialing system for providing medication compliance reminders, suitable for use with the user monitoring system 100, has been field tested. In this automated reminder system users were called daily and reminded to follow their medication regimen.

Referring to Figs. 11A-11M, there are shown flow chart representations of the operations of the various subsystems of the user monitor system 100. Fig. 11A is a flow chart representation of a method for determining which of the various subsystems has initiated an event for processing by the controller 110. Fig.11B is a flow chart representation of a method for determining whether the user has arisen by a designated wake up time. This method may be performed in response, for example, to a signal from the motion sensor 304. Fig. 11C is a representation of a method for determining whether the user is complying with the medication schedule as indicated by the subsystem 116.

Fig. 11D is a representation of methods for determining whether a stove has been left on according to the subsystem 600 and whether the smoke detector 732 has been activated. Fig. 11E is a flow chart representation of a method for turning off the stove 610, 710. Fig. 11F is a flow chart representation of a method for controlling water flow according to the subsystem 124. A pseudocode representation of a method for controlling water flow is set forth in Table I.

Is there a flow

If yes

Is there a change of state

If yes

send event to main controller

If no

recycle to flow monitor

If no

Is there a change of state

If yes

send event to main controller

If no

recycle to flow monitor

Is there water overflow

If yes

Send event to main controller

If no

Is there water warning

If yes

send event to main controller

If no

recycle to water overflow

Table I

Fig 11G is a flow chart representation of a method for alerting a user that an appliance has been left on, for example, in accordance with the bridge rectifier 734. Fig 11H shows a method for calling a designated party when an alert has been determined. Fig 11I shows a method for recording the detection of movement, for example, in response to a signal from the motion sensor 304.

Fig. 11J is a flow chart representation of a method for reading switches within the user monitoring system 100. A pseudocode representation of a method for reading switches is set forth in Table II.

Is the switch open

If yes

Is there a state change

If yes

send event to controller
turn off light

If no

recycle to open test

If no

Is there a state change

If yes

send event to main controller
turn on light

If no

recycle to open test

Table II

Fig. 11K is a flow chart representation of an algorithm for determining either current flow or gas flow. Fig. 11L is a flow chart representation of an algorithm for detecting water overflow. Fig. 11M is a flow chart representation of an algorithm for controlling an auxilliary appliance. A pseudocode representation of this method is set forth in Table III.

Is the automatic timer set

If yes

Is there current draw

If yes

Is turn off timer exceeded

If yes

turn off appliance
send event to controller

If no

recycle to AT set

If no

Is turn on time exceeded

If yes

turn on appliance
send event to controller

If no

recycle to AT set

If no

Is there current draw

If yes

Is there a state change

If yes

send event to main controller

If no

recycle to AT set

If no

Is there a state change

If yes

send event to main controller

If no

recycle to AT set

Table III

As previously described, using the microprocessor based system controller device 110 and a system of sensors the user monitoring system 100 can determine, for example, whether users are up and about in their homes and whether they are having difficulty managing their medications. It can also be determined whether the user has accidentally left a stove on or has failed to get out of bed a predetermined number of hours after a usual waking time. If the user monitoring system 100 detects any of these or other problems it can then call the user on the in-home telephone 132 to provide a reminder about the medications, stove, or other detected problems.

Using this data from the user monitoring system 100, the remote case monitoring system 148 may provide on-line case monitoring of each user by receiving standard information and information designated as priority information and analyzing the

received information. In order to do this, the remote case monitoring system 148 converts incoming data on each user into various summary reports which track the activities of the client. This makes it possible to distribute specialized gerontological every day living summary reports to users, family members, case managers, physicians and others. It also makes it possible to collect and act upon the designated priority information which may indicate immediate problems for the user. For example when a user appears not to have gotten out of bed a problem may be indicated.

Additionally, the collection of this kind of data by the remote case monitoring system 148 may provide an aggregate data base for identifying which users require personal interventions and which do not. In order to perform these functions the remote case monitoring system 148 serves as a central hub for the collection, analysis and exchange of information which has direct case management import. It should be understood that in different embodiments of the inventive concept different degrees of autonomy of the local system controller 110 in relation to the remote system 148 are possible. In one embodiment a local system controller 110 may be programmed to perform many functions performed by the remote case monitoring system 148 in another embodiment.

For example the dialing and sending of voice messages to a list of relatives and providers may be performed either by the local system controller 110 or the remote case monitoring system 148. However, it will be understood that the primary function of the local system controller 110 is to provide lower level case management of local observations and decisions and the primary function of the remote case monitoring system 148 is to provide higher level case management to enable long term interpretation of the data obtained from the user monitor system 100 and intervention in view of the long-term interpretation.

Thus in the preferred embodiment of the present invention, the user monitoring system 100 or the remote case management system 148 may use its electronic records to enable the production of scheduled periodic user activity reports based upon information gathered by the various subsystems of the user monitoring system 100. These periodic reports may include collections, compilations and arrangements of information on any or all of the monitored activities within the user's living area. These electronic records may be used in combination with any other information to produce any type of periodic activity reports desired on the user being monitored. These user activity reports may be used

by a professional case manager or a designated family member to determine if the user is experiencing problems with specific activities of daily living. Thus these problems may be dealt with before they become a threat to the continued well being of the user and the ability of the user to live independently.

Furthermore, in addition to providing remote case monitoring and in-home reminders, the user monitoring system 100 may be programmed to take corrective actions when certain problems are detected. For example, if the user being monitored has not gotten out of bed by a predetermined time the user monitoring system 100 may call the user on the telephone 132. If there is no answer to the telephone call the user monitoring system 100 may be programmed to automatically transmit this information to the remote case monitoring site 148.

A social worker, health professional or designated family member at the remote case monitoring site 148 may respond to the transmitted information according to a predetermined protocol. In addition to transmitting the information to the remote case monitoring site 148 the user monitoring system 100 may provide control signals within the home of the user. For example, if the user monitoring system 100 of the present invention determines that a stove has been left on, the user monitoring system 100 itself can turn off the stove.

The remote case monitoring system 148, in association with the user monitoring system 100, may serve the functions of a case management site. In an example of the case management site function of the remote case monitoring system 148 the case management site may monitor approximately fifty distributed clients, each using a distributed user electronic monitoring system 100. The fifty clients thus have the system controller 110 and various subsystem sensors installed in their dwellings in ways appropriate for the specific configuration of their living areas. For example, the various subsystem sensors must be adapted for different floor plans and furniture arrangements.

The remote case monitoring system 148 may receive information from the distributed user monitoring systems 100 on an immediate basis or at predetermined time intervals. For example, the remote case monitoring system 148 may receive information hourly, daily or weekly basis. If one of the clients does not get out of bed within a predetermined time duration and does not answer the telephone, the local system controller

110 of the user monitoring system 100 at that client's house may call the case management site. At the case management site, this event may be brought to the immediate attention of the human case monitor, for example, by means of a computer screen. The remote case manager may examine individual case and data records for the client being monitored to learn the predetermined response for the monitored person when the reported event occurs.

Likely interventions required of personnel at the case management site may include calling a local case manager, a hospital social worker or a local next of kin. Other actions the remote case monitor may execute include calling the user, remotely downloading the last twenty-four or forty-eight hours worth of event summary information from the local user monitoring system 100 and remotely initiating a diagnostic sequence on the local user monitoring system 100.

The protocol of procedures for intervention by the remote case monitor 148 may differ from one remote case monitoring system 148 to another and from one user to another. It is anticipated in the preferred embodiment of the invention that various intervention decisions such as who to call when predetermined events occur and what messages to deliver may be carried out by a machine intelligence expert system (not shown) at the remote case monitoring system 148 or by a person or a combination of both. The local user monitoring system 100 may also be programmed to carry out such decisions as who to call when appropriate. For example, the user monitoring system 100 may have a contact list of people to contact in various emergencies.

In addition to receiving and interpreting data indicating the need for intervention in event of emergencies, the remote case monitoring system 148 routinely receives downloaded data from individual user monitoring systems 100 at predetermined intervals. This data is interpreted on the individual and aggregate level by means of trend analysis software which detects larger than statistically normal deviations from event pattern measurements. The remote case monitoring system 148 may use this analysis to produce periodic summary reports of events relating to everyday living tasks in the home environment of the user. More specifically these reports may be used to detect certain event classes, to weight them in terms of their relative importance and to compare them with baselines of task performance. The events weighed with respect to their importance may include getting out of bed, managing medication, the proper control of a stove, the proper

control of water flow, and the proper control of selected electrical appliances. Based upon the reports of these events, gerontological living summary reports may be prepared in machine form and paper form at the remote case management system 148 for distribution to predesignated parties involved in the case management of the user of the user monitoring system 100. These parties may include the users themselves, relatives of the user, case manager social workers, physicians and other appropriate formal and informal providers.

Two additional functions of the remote case monitoring system 148 may be provided. These functions are: (1) the remote programming and reprogramming of the user monitoring system 100, and (2) the generation of aggregate and individual level data on relatively large numbers of users. This data may serve both as an empirically grounded knowledge base driving the decision protocols for both humans and machines as well as research data for further development of the user monitoring system 100.

In order for these functions to be performed data must be transmitted between the user monitoring system 100 and the remote case monitoring system 148. Information transmitted to the system controller 110 of the local user monitoring system 100 from the remote case monitoring system 148 may include three different types of commands: queries, diagnostics and settings. The query commands request the downloading of specific information from the memory of the user monitoring system 100 to the remote case monitoring system 148. The requested information forms the basis of the gerontological everyday living events report along with specific information necessary for case monitoring by the remote system 148. For example the status of different subsystems of the user monitoring system 100 might be made available to the remote system 148 when the motion subsystem 112 indicates that the user has not gotten up in the morning.

The diagnostic commands to the local user monitoring system 100 test the different subsystems of the system 100 by suppressing the ability of the system 100 to either call out interventions or change settings on any of the remotely controlled devices while at the same time initiating a sequence of event codes which indicate the presence of various kinds of problems as if they were indicated by the different subsystems.

The setting commands from the remote case management system 148 to the user monitoring system 100 reset the parameters on the timers within the user monitoring system 100 as well as other variable values for the decisions made in the decision trees

described hereinbelow. These parameters may include, but are not limited to, the time of waking up, the times for taking different medications and the length of time which should elapse prior to turning off the stove.

Transfer information transmitted in the opposite direction, from the system controller 110 of the user monitor system 100 to the remote case monitoring system 148, includes two types: (1) priority specific data transfer and (2) standard data transfer. Priority specific data transfer is initiated by the local system controller 110 by means of dialing the remote case monitoring system 148 by way of the telephone line 144 or by means of another data link (not shown) and indicating the presence of a problem which the remote case monitoring system 148 must detect, record and act upon.

Situations in which the local system controller 110 dials out to inform the remote case monitoring system 148 that the user did not get out of bed or that the stove was left on, are potential emergencies and are therefore examples of priority specific data transfer. Standard data transfer includes the downloading of event log information for each subsystem. This information is used to produce trend analysis reports which show the frequency of occurrence of different events over a predetermined time period such as six months. Thus the trend analysis report might show that over the course of six months the user became increasingly noncompliant with medications and/or increasingly likely to leave the stove on inappropriately. Using a known trend analysis technique, software driven reports can detect increasing frequencies of problems of every day activities.

The trend analysis report may be a monthly paper or machine report which provides several indicators of performance on different areas of everyday living monitored by the user monitoring system 100. These areas may include waking and sleeping, medication management, stove management, water flow management and the operation of additional appliances. The raw data for this report is based on the event log data transferred from the local system controller 110 remote system using standard data transfer and priority specific modes. The raw data is used to provide a continuous baseline of the successful and not successful completion of the five task areas.

For example, in one month a user may use the stove fifty-five times and leave it on in violation of the programmed protocol two times. The monthly report line for the stove category might then show fifty-five uses and two usage errors. Furthermore, usage

errors may be classified according to level of importance by means of a weighting system. An error of, for example, skipping one medication may be weighted as considerably less significant compared with an error of leaving the stove on and leaving the apartment for several hours. Thus not only are errors recorded and plotted against continuous baselines over time in the trend analysis report of the system of the present invention, but the report is intended to contain a ranking system to reflect the potential negative impacts of different errors.

In addition to errors, the trend analysis report can plot deviations in behavior indicating changes in plot trend. For example, the trend analysis report can plot waking and sleeping hours and the number of times a user goes to the bathroom. While none of this in itself indicates a situation requiring intervention, sudden changes in sleep habits, bathroom use, even appliance use may indicate sudden changes in health or cognitive well being requiring a relative or a case management social worker or case management social worker or a physician to visit or interview the user.

While any number of combinations of interpreted data can be used in any number of specialized reports, it is anticipated that most case management sites and most relatives would want to know the frequency and severity of specific errors, the extent and accuracy of medication compliance and whether a waking or sleeping pattern of a user is changing radically. The trend analysis report provides case managers and relatives with this information and enables them to better help the user by locating subtle changes in behavior patterns, monitoring various kinds of potentially dangerous errors and keeping a record of baseline functioning in relation to monitored activities.

While the operation of the monitoring system 100 has been described principally with respect to the monitoring of a gerontological patient, it will be understood that system 100 may be used to monitor any type of patient, for example, infants and burn victims. Additionally, it will be understood that, using the correct sensors, monitoring system 100 may monitor any parameters relevant to these patients, for example, ambient temperature, body temperature and blood pressure. In general, anything which may be sensed by a sensor and converted into an electrical signal may be monitored by the monitoring system 100. Additionally, the data could be made available to a doctor prior to routine doctor's appointments in addition to being used to compile reports at the remote

monitoring site 148. The system could be monitored by a friend or relative rather than by professionals at a remote monitoring site.

Local microprocessor based system controller 110 and its associated system of sensors can determine any activity of daily living desired. For example, system controller 110 can determine whether users are up and moving around in their homes. Additionally, it can determine, for example, whether the user is having difficulty managing medications, whether the user has failed to get out of bed a predetermined number of hours after a usual waking time, and whether the user has left the stove on. Furthermore, system controller 110 can determine other detected problems.

As previously described, various degrees of autonomy of local system controller 110 from remote monitoring system 148 can be obtained in various embodiments of the invention. Thus, system controller 110 can be programmed to perform many functions performed by remote monitoring system 148 in other embodiments of the invention. However, it is understood that the primary function of local system controller 110 is to provide lower level case management of local observations and decisions and the primary function of remote monitoring system 148 is to provide higher level case management and enable long term interpretation of the data.

Using the information sent from local system controller, remote case monitoring system 148 can provide on-line case monitoring of any number of users by receiving standard priority information or other information and analyzing the received information. When performing these operations remote case monitoring system 148 converts incoming data on each user into various summary reports which track the activities of the individual users.

Monitoring and analyzing the received information in this manner makes it possible for remote case monitoring system 148 to distribute specialized everyday living monitoring summaries (ELMS) reports to other parties. For example, the reports obtained in this manner can be distributed to family members, doctors, case managers, and others.

The monitoring and analyzing by system controller 110 and remote case monitoring system 148 also makes it possible to collect action priority information. For example it is possible to determine when users do not get out of bed. In addition it may

provide an aggregate data base for identifying users requiring personal intervention. Additionally, it may be possible to provide a central hub for the collection and exchange of information with direct case management resources.

Local system controller 110 can be programmed to perform a variety of functions related to data base report generation and intervention decisions. In one embodiment of the invention system controller 110 can be programmed to learn activity patterns of the user. The learning by system controller 110 occurs through analyzing sensor data and performing a variety of operations that change various parameters of the user. For example, timing and frequency parameters of expected activity events can be changed based upon a trend analysis of the past timing, frequency, duration and concomitance of events. The trend analysis can be based upon an interval of a week, a month, or other time period for which data is internally stored.

The learning of user activity patterns by system controller 110 or remote case monitoring system 148 can be accomplished using various techniques. In most of these techniques the learning process involves the changing of variable values, parameter settings and decision algorithms. The quantities changed in this manner are changed with respect to interpreting data derived by sensors for machine initiated interventions and the production of various reports.

The determinations of the system of the present invention are based upon the assumption that the best predictor of future behavior is past behavior and upon the empirical knowledge of the relatively invariant frequency, timing, and duration of essential activities of daily living as part of daily and weekly cycles. Using these bases, it is possible to use a variety of methods to determine whether the activities on a certain day fall within or outside of the range of statistically expected occurrences of the activities. In the preferred embodiment, the user monitoring system uses well known algorithms for analyzing continuous baseline data.

Variable values obtained by system controller 110 or remote case monitoring system 148 can be in the form of time and date stamped event data or transformations thereof. For example, the variables can be a count or a weighted frequency of occurrence of a predetermined measurement, such as the number of times within a predetermined time period a medication is taken or a toilet is flushed.

Using programming and statistical techniques well known and understood by those skilled in the art, system controller 110 can be enabled to learn the typical timing and frequency of a user taking each prescribed medication as well as the number of times that a user typically uses the toilet. Using such techniques it is also possible to learn the typical timing and frequency of the user opening and closing the refrigerator door, the silverware cabinet, the microwave oven, and the stove, as well as the typical time of getting out of bed in the morning.

Typical variable values used in the method of the present invention for the purpose of, for example, report generation and learning, can be understood in the common statistical sense of measures of a central tendency paired with an appropriate measure of dispersion. The measurement of the central tendency of sensor events can include measurements such as mean, median, and mode. The measure of dispersion can be measurements such as standard deviation and interquartile range.

There are various techniques for statistically determining a typical value of a measured event and then using this value to predict the value of future events. A common technique sets the typical value equal to its measure of central tendency bounded by a confidence level (sigma) equal to +/- the appropriate number of dispersion units to account for an alpha level of (typically) .05. For each measurement within an activity or event domain, these standard statistical procedures apply, especially as used in relation to continuous baseline or moving averages. For example, motion out of bed, the opening of a refrigerator, or taking a medication, controller system 110 may store this information and compare it with past similar events using well known statistical methods of determining whether it falls within or outside of the typical range.

For example, a waking time may be compared with thirty previous waking times by determining whether it deviates by more than two standard deviations from the arithmetic mean of the previous thirty waking times. This is one type of comparison of an individual data point with a baseline computed as a moving average of past events.

Controller 110 can be programmed to make decisions based upon comparisons of new event data with past event data such as this. For example, machine initiated interventions and special data transfers or reports can be generated if a user appears to sleep more than two standard deviations past the average waking time. In this case the

trigger event is the lack of a signal from the sensor configuration used to establish that the user got out of bed. Thus, controller 110 need not remain programmed to expect the user to be awake at a predetermined time. Rather it can adjust and readjust the expected wake up time based upon the past sleep and waking patterns of the user.

In a similar fashion, system controller 110 can be programmed to permit the computing of average or typical expected values for any sensor based data or data derived from sensor based information. Programming controller 110 in this manner requires programming it to permit storing and updating of moving averages and sigma values for time, duration, and frequency of the activity and comparing the stored updated values to incoming data points.

System controller 110 can be enabled to change parameter settings in which variables are specified. For example, the number of medications within a medication regime can be increased from two to three on a daily basis. Using an additional position/compartment/switch provided on the medication monitor, the present invention can determine information for initializing a new variable associated with the new medication and begin recording time and date stamped information on its usage.

After several days, while the user takes the new medication, the average time and frequency baselines associated with the new medication become stable. Simultaneously, the sigma level (per. eg. two standard deviations) tends to become smaller in terms of the number of measured units as the number of observations increases. This permits system controller 110 to detect errors such as taking too few or two many of the third medication in a given day.

Other changes in parameters that can be learned by system controller 110 are those associated with changes in meal preparation by the user. An individual user may have a pattern of preparing meals twice daily. For example, the user may normally prepare meals only in the morning and in the evening. The user may only rarely prepare lunch. The timing, frequency and duration of the sensor correlates of meal preparation change.

In principal, it is possible for the system controller to learn any pattern of repeated behaviors conveyed to it by a sensor capable of signaling the occurrence, non occurrence, time and duration of any activity event.

Activities of Daily Living: "ADL's"

ADL's (Activities of Daily Living/Instrumental Activities of Daily Living) comprise those goal oriented activities which must be performed by or for a person in order to live independently in their dwelling. These include bathing, transferring, dressing, eating, grooming, meal preparation, light housekeeping, laundry, medication management, and other necessary tasks relating to personal care and household maintenance. We turn now to additional means for sensing and monitoring various activities germane to the current invention.

Toilet use can be monitored various sensor configurations. In the preferred embodiment, a motion detector and a flush switch detector are used in concert with a pressure sensor/position sensor combination on the toilet seat. The motion detector is placed in the bathroom and indicates the presence of individual(s) without regard to specific activity.

Bed-wetting can provide a problem requiring monitoring in a variety of situations. Bed-wetting can be monitored by means of moisture sensors placed under the on the surface of an under sheet pad on which the monitored individual lies.

Meal preparation may be monitored by means of a combination of sensors indicating the opening and closing of drawers, cabinets and appliances typically used by the client to prepare meals. In one embodiment, the refrigerator door, the silverware drawer and the microwave were monitored with reed switches to determine the presence, timing and duration of use corresponding to meal preparation. In an alternative embodiment, electric current flow detectors could be used to record the use of various appliances (e.g., coffee maker, toaster oven, etc.) used in meal preparation. Additional heat sensor configurations could be used to scan the stove. Pressure sensors, with or without weight differentiating means, could be used in the chairs at the eating table, etc.

For the current invention, variety of means have been developed to employ a small radio frequency transmitter and movement sensing trigger which can be attached directly to household objects thereby conveying to the system controller when these objects are manipulated. The preferred embodiment uses such an object movement detector (OMD) consisting of an inertia-momentum sensitive switch (mercury bulb or vibration detector) coupled to a transmitter with a timer/bounceless switch and timer reset which is small, low

in current draw and which can be attached to the object. When the object is moved/manipulated, a pulsed RF signal is emitted which identifies the object and is received by the local controller and time and date stamped. Such a jiggle detector can be attached to brooms and hairbrushes, electric razors and assisted devices like walkers and reachers.

Eating can be monitored through the use of pressure pad sensors on tables and chairs and if need be the use of OMD's on silverware. Housekeeping can be monitored by placing OMD's on broom, dustpan, vacuum cleaner to react to manipulation. In principal, any ADL/IADL can be monitored by means of a configuration of sensors and this information transmitted to the local controller and integrated into the daily activity log for use by care providers or for machine initiated interventions such as reminders. Laundry activities can be detected using a current draw detector on a washer or dryer. The appliances' electric lines can be passively coupled to a current draw detector configured to transmit a signal to the local controller when they are in use resulting in time date stamp and duration data to be logged.

Grooming consists of a variety of behaviors, commonly inclusive of hair brushing (for women), shaving (for men). This affords the possibility to attach an object movement detector (OMD) onto the hairbrush, razor, and other grooming implements to signal the local controller when the grooming behavior is taking place.

Bathing can be monitored by several means. A variety of devices can be coupled to the plumbing to determine if water is flowing into the tub/shower. A water/moister detector can be placed in the tub or at the opening of the faucet/shower head to react to the presence of water flow without direct physical connection to the plumbing. A pressure sensitive switch in an insulated no slip mat at the bottom of the tub/shower could be fitted with an RF unit so when the individual steps or sits on the surface the information is conveyed to the local controller. Each or a combination of these methods could be used to determine bath/shower use and transmit sensor data to the local controller.

Dressing consists of a complex ensemble of tasks requiring both cognitive and manipulative functions. For this reason specialists in geriatric functional assessment regard dressing as a benchmark of overall functional health and the length of time it takes to get dressed as an indicator of level of functioning sensitive to changes in ability. Dressing

can be monitored by placing reed switches on the dresser drawers and placing sensors in the closets can indicate the presence, time and duration of dressing activity.

Non-ADL Activity monitoring

In addition to task oriented activities, there are repeatedly occurring behaviors which are both important to the individual's lifestyle and indicative of their normal behavioral routine. This behavior includes a range of sedentary recreational activities such as television watching, radio or audio entertainment usage, computer usage, book reading, needlepoint, etc.

Such activities can be monitored in various ways. Those involving the use of electronic or electrical appliances can be monitored by a variety of means capable of determining when the appliance is on or off. For example, a television can trigger a current draw detector or a photo diode mounted on the corner of the CRT display. The detector should be configured to send data whenever the television is turned on or turned off so that it would be possible to log the time on time off on a daily basis. Given the popularity of television and the relative regularity with which it is viewed by many people, it may be useful to use this data in various ways. For example, behaviors whose change can be monitored could include early and late television watching. Similar techniques could be employed in relation to CD, radio, VCR's, computers, etc. which could produce information indicative of normal daily activity.

For example, an individual may typically watch favorite programs in the afternoon between 2 and 5 pm Mondays through Fridays. This activity, while not directed toward achieving functional performance goals maybe nevertheless an important part of the typical or normal daily routine of the individual. Changes in television viewing routine patterns, for example not watching the afternoon shows or watching 14 hours of television continuously may indicate a change of activity rooted in a health, cognitive or other problems and therefore may provide very useful information for reporting purposes or interventions. The preferred embodiment of the monitoring system television use is monitored by means of a current draw detector. However, it is to be understood by those skilled in the art that many commonly used means of determining whether the unit is on or off can be used to send a signal to the monitoring system. Furthermore, similar techniques

could be employed in relation to CD, radio, VCR's, computers, etc. which could produce information indicative of normal daily activity.

Distinguishing Among Several Individuals in Dwelling Unit

The present invention also includes means for distinguishing the activities of individuals in multi individual dwelling units. It may sometimes be useful to separately log the activities of two or more individuals living in the same household. In the case of medication adherence, this simply entails using separate medication monitoring caddies for each individual, each caddy signaling the local controller unit codes unique to the individual person being monitored. In the case of other activities, such as transference, toilet use, bathing, meal preparation, laundry and housekeeping it is necessary to introduce a variety of methods for distinguishing among multiple individuals and creating a separate activity log for each individual. Described below are a variety of methods that do not require the user to carry a special device on their person and rely entirely upon the individuals interaction with objects in their environment. Also described below is a special device, for example any type of transponder worn by the individual, which emits a very short range signal detectable used to detect the proximity of specific individuals to objects in their environment used in carrying out the monitored activities of daily living. In the preferred embodiment of the invention, the transponder or a similar device is not required for the system to work, but adds additional information to increase the validity of the determination of which individual is performing which task and when.

For transferring in and out of bed, it is possible to configure pressure sensitive switch pads on either side of the bed, on the floor, on the mattress, or both. With knowledge of who routinely sleeps on the right and who sleeps on the left, it is possible to configure these pressure sensors to indicate whether individual a or individual b is out of the bed.

For transferring onto chairs, it is possible to use a pressure sensitive sensor that responds to relative weight with sufficient precision as to distinguish between two individuals, such as a husband or wife. It may be possible to know which chair is customarily occupied by which individual, especially in relation to a married couple.

For toilet use, the above described differential weight sensor could be installed in the toilet seat along with a tilt switch sensor to indicate when the seat is in the upright position (customary for male urination) or in the downward position. Additionally

weight sensor pads could be embedded in a 'bath mat' in front of the toilet to assess weight differential. A variety of techniques could be used to signal toilet flushing, such as a flotation switch connected to an signaling unit such that when the water level in the tank drops below a threshold level, a the normally open float switch closes.

For bathing, a waterproof version of the weight sensitive bath mat could be placed in the bathtub to determine the differential weight of the person.

With respect to differential weight, in most case it is useful in a two individual household and the weight threshold should be adjusted to approximately the mean of the weight of the two individuals. Given the possibility that either individual may loose weight over time (or gain which is rarer) and the two weights become close to equal, it may be necessary to repeatedly weigh the individuals. This can be done unobtrusively using any known methods or just by wiring the scale and reminding the individuals to weigh in using his/her scales or transponders or some other means for differentiating the weights.

Physiological Measuring of Health Conditions

The monitoring of health conditions among individuals in their dwelling units consists of monitoring both their activities and their physiological functioning. A wide variety of physiological functioning measuring and monitoring devices are available for home use as variables, including, but not limited to, body temperature, pulse rate, weight, blood sugar, blood pressure, and oxygenation. All of these devices, such as infrared temperature, blood sugar and pulse readers, are currently available with digital readouts and could be easily modified to transmit the information to the local controller so that these physiological data could be recorded along with the activity data and integrated into a single report combining both kinds of information for family and professional care givers as well as for triggering machine initiated interventions. Many devices for taking measurements usable in accordance with the present invention are taught in Alyfuko, U.S. Patent No. 5,410, 471, which is incorporated by reference herein.

Furthermore, the system of the present invention can assist users in the measurements. For example, in order to determine blood pressure a user can be instructed by the system to be seated, put on the cuff and perform other required steps. If the readings obtained are not within predetermined ranges, the user can be instructed to repeat to the

measurement. This can be done by interactive software on the user's PC or by way of the internet.

An example of readings indicating intervention could be if a person is showing an trend toward decreased activity during the day and is not sleeping in bed at night. This can reflect symptoms of congestive heart failure (CHF). In this case decreased activity may be measured as fewer total movements around the house, fewer total movements going in and out of the dwelling unit, less frequent or slower (longer average duration) stair climbing (where applicable), and/or longer sleeping hours. The local controller could be programmed to trigger an intervention in view of decreased activity and/or not sleeping in bed at night, which would entail a request/reminder for taking a blood pressure reading during the next day. It could also plot the blood pressure against a continuous baseline of previously taken blood pressures, and, if either diastolic or systolic pressures fall outside of upper and lower critical values (sigma levels), action could be taken informing the monitored individual, their physician and/or other appropriate persons of a possible change in health status. Instructions to seek checkups or contact care providers can be the interventions indicated by the reports of the present invention.

When the physician compares the blood pressure data, activity log data and medication compliance data within an integrated health and functioning report, they are provided information invaluable for making adjustments to therapy. For another example, frequent over night bathroom use may indicate the presence of an infection. By combining information about toileting and body temperature readings in a single report, the physician or other care giver could be informed of evidence of an infection and make sure that the monitored individual is quickly seen by the appropriate providers. Again, it is possible to program the local controller to take action based on behavioral changes, physiological changes or a combination of the two. For example, the local controller may be programmed to request that the monitored individual take temperature and blood pressure or other measurements after night of unusual bathroom or other activity. In principal, any combination of physiological measuring devices can be integrated into the system by equipping them with a compatible RF transmitter and enabling these devices in the software.

In the various embodiments, the monitored individual is asked to participate in periodic automated check ups during which time they are reminded and prompted by the local controller to sit down at a table, take their temperature, take their blood pressure, etc. The controller prompts them using a synthesized or recorded voice that can be heard through speakers connected to a personal computer wherein the microprocessor of the local controller resides or a speaker phone connected to the local controller in the form of a stand alone unit. The individual is thereby instructed on what to do during the check up. The data captured by the controller is analyzed against the continuous baseline average and the results reported to the remote monitoring site. Thus the present invention permits the integration of information with respect to physiological and behavioral measures into a single report for human end users and/or machine initiated interventions.

Portability

While the current invention consists of various means for monitoring individual user or users in a dwelling unit, there is no reason why portable appliances could not be incorporated into the system. For example, a portable medication monitoring device could be carried by the user out of the home. This device could be enabled to record and/or remind the individual to take their medications. Upon returning to the dwelling unit, the medication unit is able to communicate by RF signaling to the local controller and information about medication taken outside of the dwelling unit is integrated with the information about medication taken that was collected in the dwelling unit. Thus it would be possible to integrate information about medication taking behaviors of the user outside the dwelling unit with the information obtained within the dwelling unit to develop a more complete picture of the individuals daily behavior.

In addition to portable medication monitoring, it is possible to have portable physiological monitoring (e.g., heart, respiration, blood oxygenation, blood pressure, etc.) and/or activity movement monitoring (e.g. odometer, walking odometer-like device, etc.) Likewise, similarly to the above described portable medication monitoring, it is technically easy to create data transfer channels and links integrate the signal data gathered from the portable units within the home-based local controller and use this as the basis for the production of daily living reports for human and machine use. Such reports and information products might prove very useful to maintaining the health and functionality of users.

Security and Environmental Monitoring

In addition to goal oriented functional activities and other behaviors which make up the routine everyday activity of individuals, the monitoring system of the present invention is capable of collecting and analyzing information relating to security, safety and environmental concerns within the dwelling unit. As described above, various embodiments of the monitoring and report generating system may be used to log activities relating to dangerous appliances, such as the stove, and, necessary, to take automatically initiated action in the event of a problem, such as shutting off the stove if it is determined that it has been left on too long or in the event that smoke or heat detector has been triggered.

Also described above are means and procedures for monitoring bathtub overflow, and in a similar manner, overflow of sinks in a dwelling unit. Both of these functions focus on detecting events that, if unchecked, may have serious negative consequences to the safety of the monitored individuals and/or the condition of the dwelling unit. In addition to these functions, there is a wide range of additional events impacting the security and safety of individuals and their dwelling units, which may prove very useful. For example, monitoring the closing and locking of the door leading outside of the house or apartment, along with reports and reminders, would reduce the risk of security problems for many individuals. Forgetful or disoriented individuals may be particularly helped by such a function. The monitoring of door closing and locking could be accomplished by a standard magnetic reed switch which opens and closes a circuit causing signals to be sent to the local controller in conjunction with a switch configuration fitted to the locking mechanism in such a manner as to enable the detection of the state of the locking mechanism as being either locked or unlocked. This switch would then be connected to the appropriate signaling device to convey information to the local controller so that the monitoring system could integrate this information into various reports and intervention decisions.

Ambient temperature above and below healthful levels is a real threat to the health and well being of frail elderly populations in particular. Each year heat waves and cold snaps kill scores, if not hundreds, of older people in part because of their physiological inability to adequately judge extreme and dangerous variation in ambient temperature. Many temperature detecting units, with either electronic or mechanical thermostatic components, are familiar to those skilled in the art of environmental control. Such units are commercially

available and routinely used in the monitoring and control of heating and cooling of buildings. By connecting temperature sensors to the appropriate signaling system, room temperature data can be transferred to the local controller, logged, analyzed and serve as the basis of machine generated reports as well as interventions. In the preferred embodiment of monitoring system, temperature sensors are used to trigger alerts and, if need be, automatically initiated communication with care givers if the temperature rises above a high threshold or falls below a low threshold. This functionality can save lives.

In principle, the information from security and environmental detectors can be integrated with the behavioral data within the local controller and be used, in conjunction with the behavioral information, to enable a variety of interventions. For example, the system could be configured and programmed to sense that the front door is unlocked, to note that there has been no movement in the dwelling unit since the door was shut, and take action by automatically locking the door. A variety of algorithms are possible for making interventions based on a combination of security and behavioral data.

Similarly, temperature data could be used in combination with behavioral information to inform analysis and interventions. For example, an increase in the amount of time an individual stays in bed along with the information that the room temperature has fallen below 50 degrees may be useful information to family or professional care givers who need to take quick action to help the individual. As with door locking and physiological measurements, there is no reason why environmental variables such as temperature could not be integrated into the reports and interventions of the monitoring system. Other environmental variables may include, smoke and particulate dust detectors (such as an optical smoke detector would measure), noise and vibration, carbon monoxide, humidity, etc. Any environmental condition that can be automatically detected using sensors could be used in connection to the monitoring system here described.

Internet

The use of the internet as a means of communication between the local controller and the remote monitoring site not only makes use of an efficient and cost effective means of exchanging information but also affords the possibility of multiple users and various types of individual and institutional users to access report information posted by local controllers to a website. In one embodiment, a number of local controllers use a

modem and automated dial up software to post activity logs onto a website using email as the means of data transfer. The posted email is then subject to interpretive post processing, converted to a variety of summary reports for different users. For example, relatives of the monitored individual may access the website, type in a pin number or password, and for access a report about basic day to day activities. Or a physician group at a hospital could access the website using and institutional portal and be able to get a report on medication adherence in greater detail than that available to the monitored individual family members. The remote monitoring station with its website could also be programmed to store and process financial and billing information relating to the access fees and report request transactions for the various individual and institutional clients. For example, family members might pay a relatively low monthly fee for monitoring and a small transaction fee for each report accessed while a health provider system might pay a substantially higher per month fee and report fee. Billing can be done by the remote monitoring site computer along with the above discussed processing and transfer of activity information on the monitored clients.

Whereas the internet provides excellent means of exchange of information in non emergency situations, it may be useful to couple the system to a pager to call helpers and family in case of an alarm code. For example, if a monitored individual does not get out of bed before a critical time lapse, paging can be done in conjunction with or in place of phone calls. Using alphanumeric display technology common in pager systems, the nature of the possible emergency can be designated using ASCII codes in place of the synthesized voice used on a voice telephone.

The internet can be used as a means of information transfer between local and remote controllers for any purpose. For example, the local controller can dial up an internet service provider (ISP), log on, and send or receive packets of data for purposes of analysis, intervention, report writing, reprogramming, etc. The remote monitoring site, structured as a web page, can store, analyze and disseminate a wide variety of user reports in various ways. In one embodiment, the local controller is programmed to access the internet periodically (e.g. every 6, 12, 24 or other number of hours) and transfer data to a remote site in the form of web server. The remote monitoring site receives the information and makes it available to the client, family, professional care givers, case managers, health care providers and others

who can access this information by logging on and entering secure portals using standard identification and password protocols. This enables a wide variety of users to make queries of the reports, analysis and records based on the monitored client(s).

Furthermore, the plurality of user portals by which clients (i.e., monitored individuals), family members (informal care givers), health providers, social support agencies (formal care givers), can each access client information at will could be used to automatically create a transaction record usable for information tracking and billing purposes. Figure 12 below illustrates an embodiment of an internet web site with multiple user portals. In this way, clients and other subscribers can be tracked and billed for information accessed in a wide variety of ways. In one embodiment, clients gain free access and registered family members can make a number of included queries per month with a per query charge thereafter. Hospitals can also be charged a per query fee.

In addition to placing client information on a web server and allowing registered users to access the information, it is also useful to periodically transfer information and reports to subscribers via e-mail. Thus family members, physicians, case managers and others can receive periodic machine generated reports on the client (daily, weekly, monthly, etc) via email which may be received on one's computer or any other device capable of receiving email messages. In addition, emergency or quick response options for information transfer via the internet are afforded by linking the internet with a wide variety of wireless devices, including, but not limited to cell phones, pagers and personal data assistants. For example, if a monitored individual does not get out of bed before a critical time lapse, paging can be done in conjunction with or instead of phone calls. Using alpha numeric display technology common in pager systems, it would be possible to designate the nature of the possible emergency using displayed printed words in place of the synthesized voice used on a voice telephone.The linking of local controller 100 and the remote monitoring site via internet as a communication channel need not alter the essential features of the local controller and remote monitoring site. The local controller can be used for obtaining, storing, organizing and analyzing sensor based data in the dwelling units of the monitored individuals. As mentioned above, it is possible to configure/program the local controller to carry out many of the functions of the remote monitoring site. Thus a wide variety of embodiments with differing amounts of functionality distributed among local

controllers and remote monitoring systems are possible. In principal all functions of report generation, automated behavioral and physiological profiling, machine initiated reminders and interventions can be carried out for individuals within a single dwelling units by the local controller. It is therefore possible to greatly reduce the number and complexity of functions of the remote monitoring site as long as an end user receives information about the client from this site.

In one embodiment the remote site is reduced to a pager, phone or radio receiver, which signals care givers and others when the client is in need or reports information via synthesized voice or displayed text. In this case the functionality of the local controller is maximized and the remote monitoring site minimized. On the other hand it is possible to have a monitoring system configured whereby sensors are placed in a dwelling unit and the local controller consists of no more than a system for gathering their outputs into a usable communication channel which then is processed by the remote monitoring site. This would be a minimalized local controller dependent for data analysis functionality almost entirely by the remote monitoring system. In the preferred embodiment, higher level functions of case management pertaining to the collection and analysis of data on single or many individuals in single or many dwelling units are carried out by a remote monitoring system whereas local controllers function primarily to log, analyze, report and make automated inventions based on sensor data within a single dwelling unit and the local controller is in the dwelling unit and that the remote is not.

The ubiquity of the internet makes it a preferred means of communication link between the local controllers and the remote monitoring site. There are various means of transferring data to, through and from the internet known to those skilled in the art. In a preferred embodiment the communications link between local and remote monitoring sites can be established and maintained by email. The activity log is simply uploaded as a text file and mailed to the remote site, which receives it, places it in the correct mailbox, processes it and then may automatically send out reports via email to end users (e.g., family, physicians, social workers, etc.) , or posts reports on a secure website accessible by password to family and professionals.

Referring now to Fig. 12, the preferred embodiment of the internet based remote monitoring site is organized in the form of a web page 1001. Web page 1001 allows clients to access information about the monitored individuals by means of client portals. Two portals are shown. The individual portal 1007, allows the monitored individual and designated individuals (such as family members) to access the behavioral and other information which is accumulated and integrated by the local controller and transferred to the internet by any variety of commonly used means. The institutional portal 1008, allows for institutions (e.g., health care providers, case management service units, insurers, etc.) to access information about monitored client). In the preferred embodiment these portals make use of commonly employed means for assuring security of the information about individual clients such as the use of PIN numbers, encryption, firewalls, etc. to assure that only authorized parties are able to access secured information. In principal, any number of portals could be used to accommodate different groups of clients with differing access to information.

A report generator 1002, a data base of monitored information 1003, and an incoming data portal 1004 form the means for generating a wide variety of reports from data accumulated by the local controller. The incoming data portal 1004 receives packets of information from any number of local controllers. In this embodiment, e-mail serves as the means for data transfer wherein the incoming data portal is configured to receive from the monitored individuals. The data base of monitored information 1003 contains a client background record of each monitored individual which includes demographics, medical and functional needs, plus billing information (e.g. postal address, phone number, etc.).

With respect to the data coming in from the incoming data portal 1004, the data base of monitored information 1003 also sorts and stores data files for each individual local controller, automatically updates the data base with newly received information and maintains an a record of instructions which determine the form, content and receiver of reports to be generated by the information. These instructions include, but are not limited to, the type and number of monitored events to be included in a given report, the particular type of summary used within the report (counts, sums, averages, critical levels, verbal descriptions of events, graphical descriptions of events, etc.), the frequency of the reporting

period (hourly, daily, weekly monthly, etc.) as well as information pertinent to the receiver of said reports (name, relationship, e-mail address, phone/pager numbers, postal address, etc.).

In this way the data base of monitored information 1003 includes the local controller accumulated data plus additional information about the monitored individual, the reports to be generated, and the parties to receive these reports. At time intervals determined in individual record instructions contained in the data base of monitored information 1003, the data is processed through the report generator 1002 wherein a variety of reports are produced reducing the data collected by the local controller to numerical, graphical and written reports. These reports are then saved and transferred to the report sender 1006 which can sort, store and transfer the reports to a variety of end users by means including e-mail, automated or live human telephone calls, voice/alpha numeric paging and postal mail by means of printing the report on paper and physically sending it to the appropriate customer. Any single or combination of commonly used means for conveying numerical, graphical and written information can be used.

The preferred embodiment uses e-mail for non-priority reports and paging and telephone messaging for priority reports/alarms. Billing report generator 1010, billing data base 1005 together provide a means for tracking customer billable usage of reports and queries. For example, each query from a family member may be tracked, a per query cost total tallied, and an end of the month usage statement produced which can serve as the basis of a bill. Similar procedures could be in place for institutional customers: a hospital may contract for 1,000 queries a month, pay a set amount, and then pay an additional amount per query when the contracted number is exceeded. The operation of billing report generator 1010 and billing data base 1005 require linkage to the monitored client data base 1003 so that information about the form and content of the reports, as well as customer and client information could be used to develop the billing reports. In addition, linkage with the report sender 1006, especially in so far as it sends reports by post mail, would be useful as a necessary means for printing and distributing the bill at the end of the billing cycle. Using means commonly employed in automated and semi automated billing systems, it is possible

to configure the data bases in a number of ways with billing report generators to accurately and efficiently generate bills for services provided.

The above description of the internet based remote monitoring site also includes functions for reprogramming and maintenance of the local controllers 110. The previously described reprogramming function is capable of resetting parameters controlling data collections and interventions, as well as testing and status checking of local controller and its network of sensors. Such functions may prove useful if not essential in the development of various installations of the monitoring system.

It should be pointed out that any functionality described above as embodied in the monitored client data base 1003 could in a given embodiment be located in the report generator 1010 and that any functionality described as part of the report sender 1006 could in actuality be located in the report generator 1002 or monitored data base 1003. In principal, it makes no difference where the functionality is embodied relative to the conceptual block diagram, as long as the functionality exists.

It will be appreciated by those skilled in the art that changes could be made to the embodiment described above without departing from the broad inventive concept thereof. It is understood, therefore, that this invention is not limited to the particular embodiments disclosed, but it is intended to cover all modifications within the spirit and scope of the present invention as defined by the appended claims.

Claims

1. A user monitoring system having an activity detection subsystem for monitoring a user having a behavioral activity and a physiological parameter in a user living area, said system including a remote monitoring site, comprising:

(a) a system controller;

(b) a first detector device capable of being activated in response to an occurrence of said behavioral activity to provide behavioral activity information to said system controller;

(c) a second detector device for determining a value of said physiological parameter in said user living area to provide physiological parameter information to said system controller;

(d) a control circuit for generating a first control signal in response to said behavioral activity information and a second control signal in response to said physiological parameter information;

(e) a control information communication channel for applying said first and second control signals to said remote monitoring site; and

(f) a remote generator for generating an integrated report representative of both said behavioral activity and said physiological parameter.

2. The user monitoring system of Claim 1, wherein said occurrence of said behavioral activity is determined independently of physiological measurements.

3. The user monitoring system of Claim 2, wherein said occurrence of said behavioral activity is determined at said user living area.

4. The user monitoring system of Claim 1, comprising circuitry for intervening in said user living area in accordance with said integrated report.

5. The user monitoring system of Claim 1, comprising a trend analysis report determined in accordance with said integrated report.

6. The user monitoring system of Claim 5, comprising circuitry for intervening in said user living area in accordance with said trend analysis.

7. The user monitoring system of Claim 1, wherein said monitoring system comprises a plurality of programming instructions and said programming instructions are reprogrammed from a location outside said user living area.

8. The user monitoring system of Claim 7, comprising circuitry for intervening in said user living area in accordance with reprogrammed instructions.

9. The user monitoring system of Claim 1, wherein said control information communication channel comprises the internet.

10. The user monitoring system of Claim 1, wherein said behavioral activity comprises meal preparation.

11. The user monitoring system of Claim 1, wherein said behavioral activity comprises an activity level of said user.

12. The user monitoring system of Claim 1, wherein said behavioral activity comprises an awakening activity of said user.

13. The user monitoring system of Claim 1, wherein said behavioral activity comprises sleeping activity of user.

14. The user monitoring system of Claim 1, wherein said behavioral activity comprises bathroom usage by said user.

15. The user monitoring system of Claim 1, wherein at least one of said first and second detectors comprises an appliance.

16. A system for monitoring a user in a user living area, said system including a remote monitoring site comprising;

(a) a system controller;

(b) an activity detection subsystem for monitoring a daily living activity of said user independently of physiological measurements, said activity detection subsystem having at least one detector device capable of being activated in response to an occurrence of said daily living activity and capable of determining at said user living area that said daily activity has occurred to provide information to said system controller representative of said daily living activity, said system controller having a control circuit for generating a control signal in

response to said information representative of said daily living activity;

(c) a control information communication channel interfaced to the internet for applying said control signal to said remote monitoring site by way of said internet;

(d) a report generator for generating a scheduled periodic report on said daily living activity, said scheduled periodic report having collections of said information representative of a selected daily living activity; and

(e) circuitry for intervening in said user living area in accordance with said scheduled periodic report.

17. The system for monitoring a user of Claim 16, wherein said occurrence of said daily living activity is determined independently of physiological measurements.

18. The system for monitoring a user of Claim 17, wherein said occurrence of said daily living activity is determined at said user living area.

19. The system for monitoring a user of Claim 16, comprising a further detector device for generating a further control signal in response to a physiological parameter of said user determined in said user living area for providing an integrated report representative of both said daily living activity and said physiological parameter.

20. The system for monitoring a user of Claim 19, comprising a trend analysis report determined in accordance with said integrated report.

21. The system for monitoring a user of Claim 19, comprising circuitry for intervening in said user living area in accordance with said integrated report.

22. The system for monitoring a user of Claim 16, comprising a plurality of programming instructions wherein said programming instructions are reprogrammed from a location outside said user living area.

23. The system for monitoring a user of Claim 22, comprising circuitry for intervening in said user living area in accordance with reprogrammed instructions.

24. The system for monitoring a user of Claim 16, wherein said control information communication channel comprises a plurality of internet portals.

25. The system for monitoring a user of Claim 16, wherein said daily living activity comprises meal preparation.

26. The system for monitoring a user of Claim 1, wherein said daily living activity comprises an activity level of said user.

27. The system for monitoring a user of Claim 1, wherein said daily living activity comprises an awakening activity of said user.

28. The system for monitoring a user of Claim 16, wherein said daily living activity comprises sleeping activity of user.

29. The system for monitoring a user of Claim 16, wherein said daily living activity comprises bathroom usage by said user.

30. The system for monitoring a user of Claim 19, wherein at least one of said detector devices comprises an appliance.

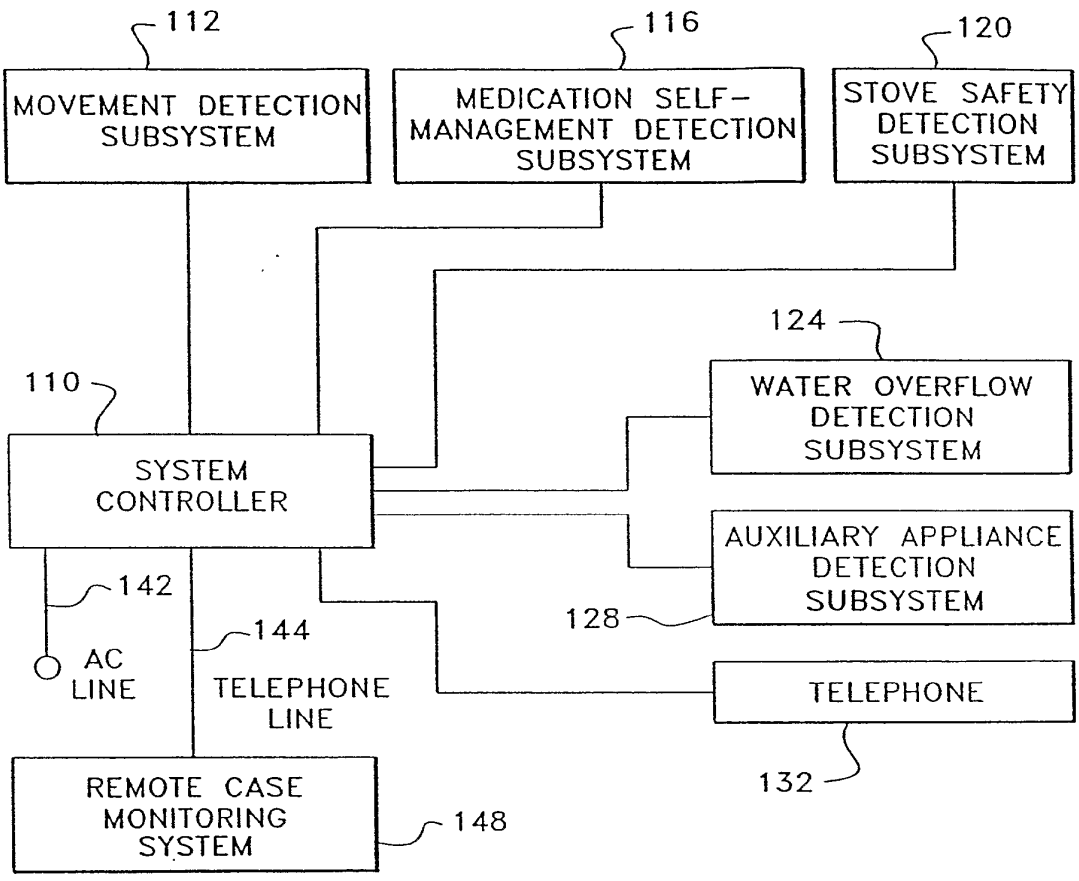

100
112
MOVEMENT DETECTION SUBSYSTEM
116
MEDICATION SELF-MANAGEMENT DETECTION SUBSYSTEM
120
STOVE SAFETY DETECTION SUBSYSTEM
124
WATER OVERFLOW DETECTION SUBSYSTEM
110
SYSTEM CONTROLLER
AUXILIARY APPLIANCE DETECTION SUBSYSTEM
128
142
AC LINE
144
TELEPHONE LINE
TELEPHONE
132
REMOTE CASE MONITORING SYSTEM
148

FIG. 1

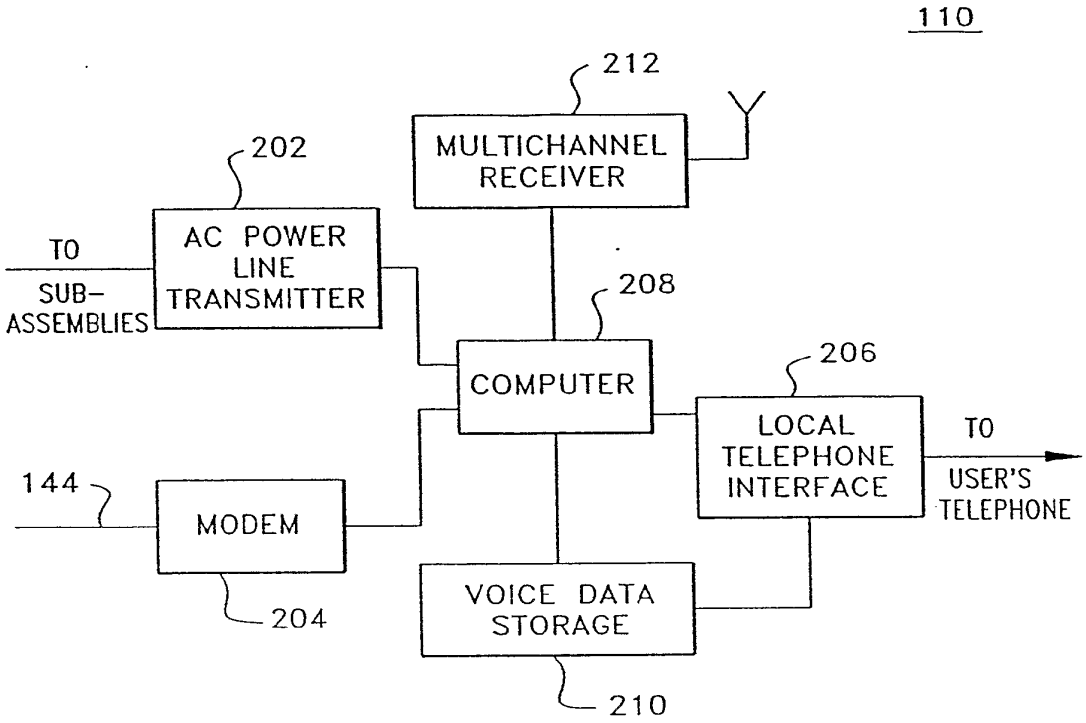

110
212
MULTICHANNEL RECEIVER
202
AC POWER LINE TRANSMITTER
TO SUB-ASSEMBLIES
208
COMPUTER
206
LOCAL TELEPHONE INTERFACE
TO USER'S TELEPHONE
144
MODEM
204
VOICE DATA STORAGE
210

FIG. 2

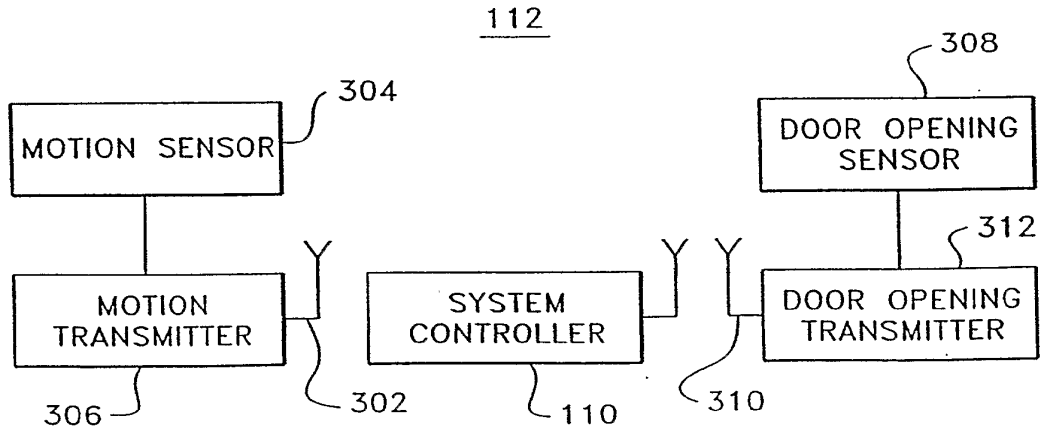

112
308
304
MOTION SENSOR
DOOR OPENING SENSOR
312
MOTION TRANSMITTER
SYSTEM CONTROLLER
DOOR OPENING TRANSMITTER
306
302
110
310

FIG. 3

116

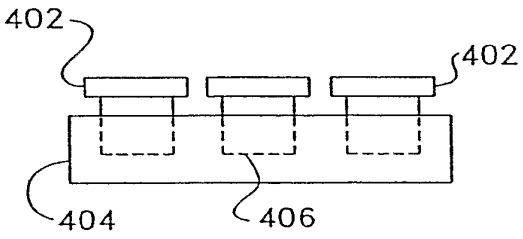


FIG. 4A

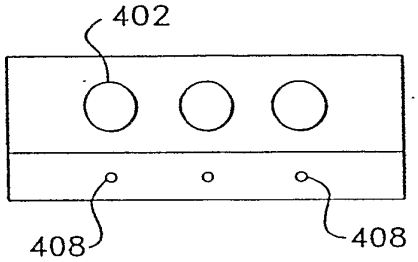


FIG. 4B

115

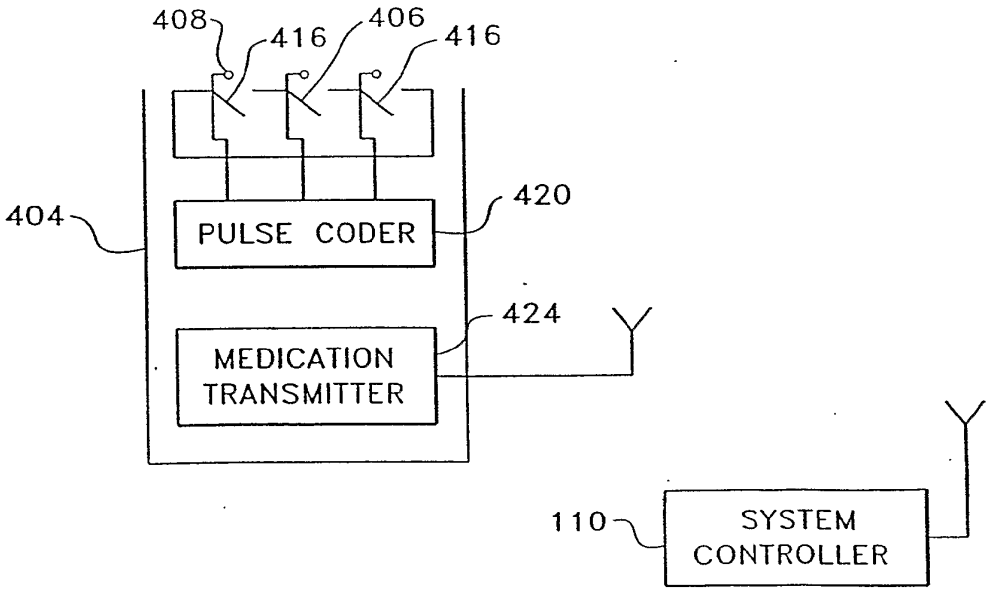


FIG. 5

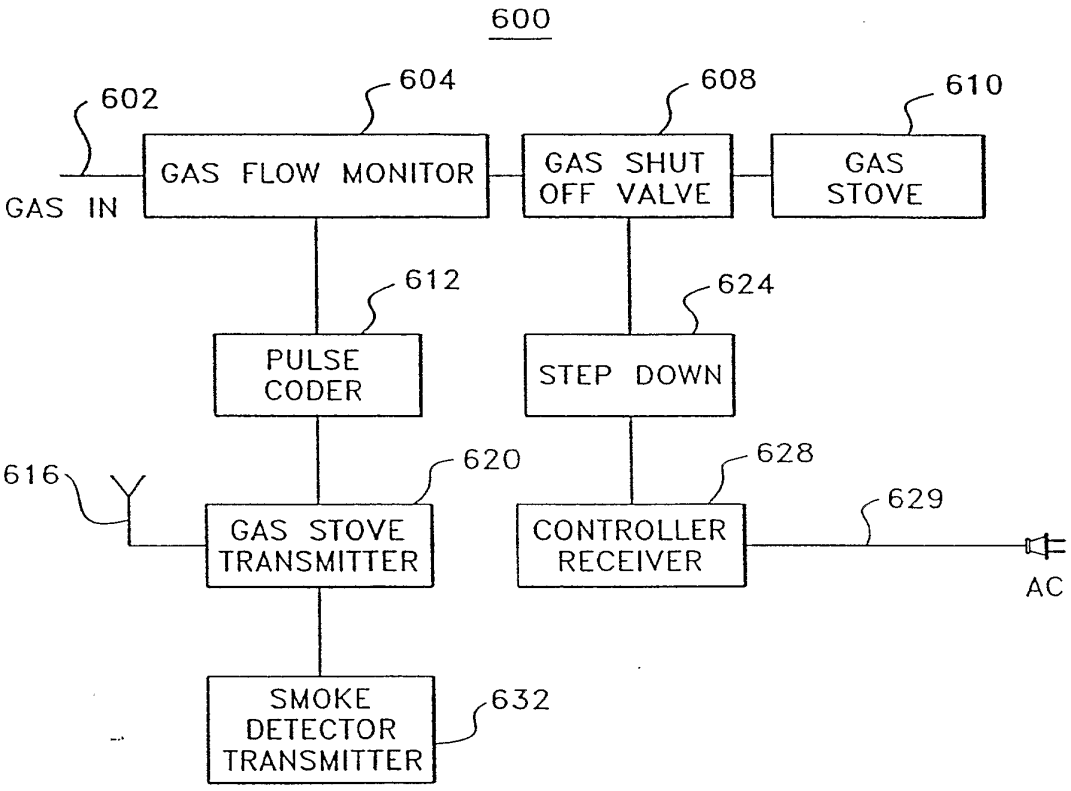

600
602
604
608
610
GAS IN
GAS FLOW MONITOR
GAS SHUT OFF VALVE
GAS STOVE
612
624
PULSE CODER
STEP DOWN
616
620
628
629
GAS STOVE TRANSMITTER
CONTROLLER RECEIVER
AC
SMOKE DETECTOR TRANSMITTER
632

FIG. 6

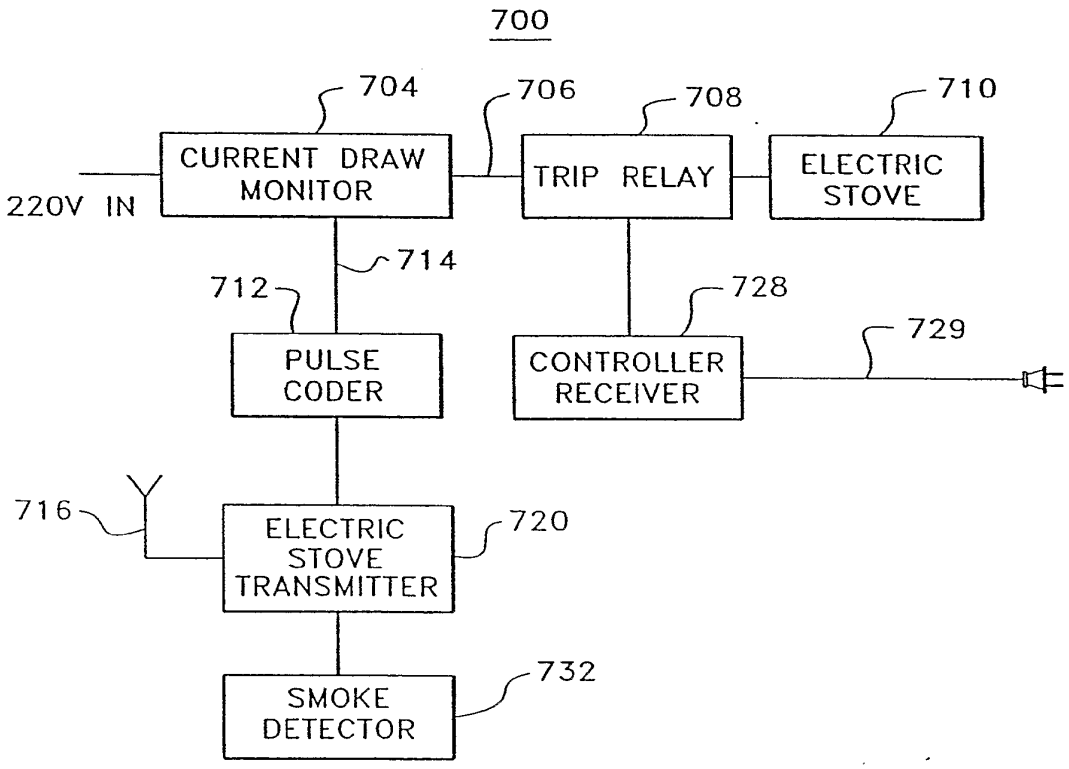

700
704
706
708
710
CURRENT DRAW MONITOR
TRIP RELAY
ELECTRIC STOVE
220V IN
714
712
728
729
PULSE CODER
CONTROLLER RECEIVER
716
ELECTRIC STOVE TRANSMITTER
720
732
SMOKE DETECTOR

FIG. 7

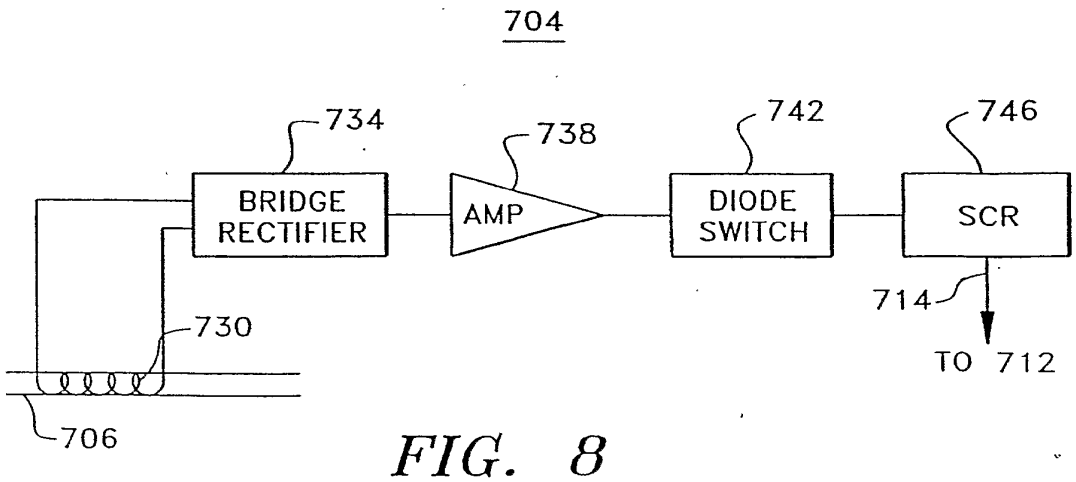

704
734
738
742
746
BRIDGE RECTIFIER
AMP
DIODE SWITCH
SCR
714
730
TO 712
706

FIG. 8

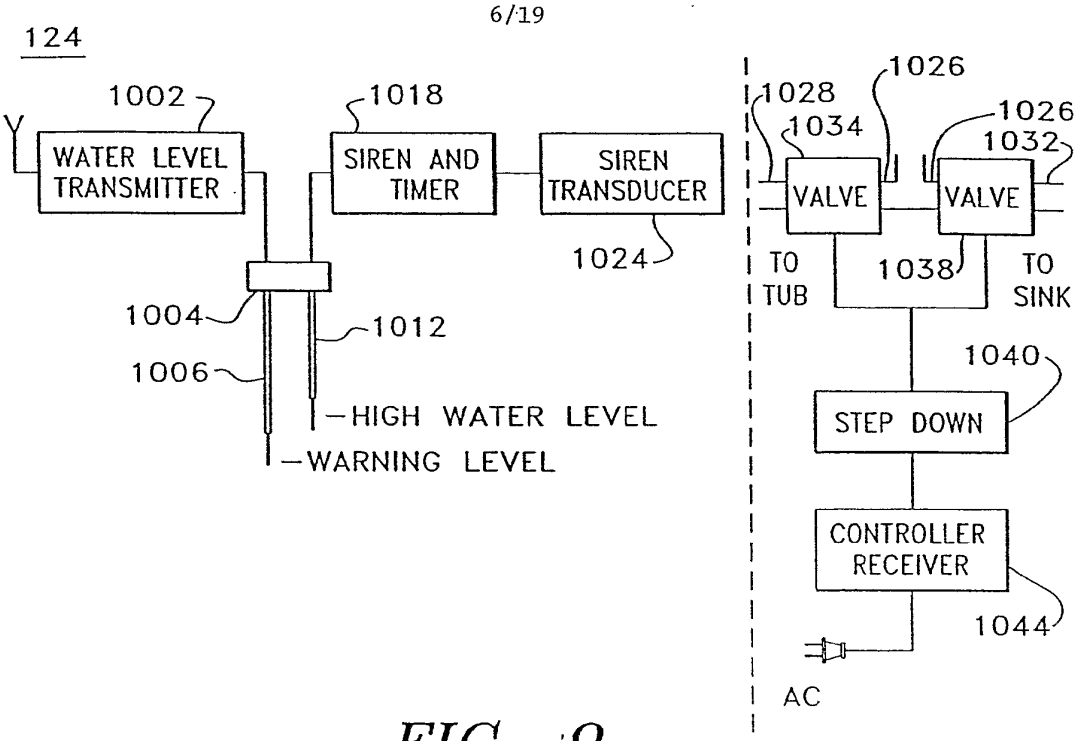

124
1002
WATER LEVEL TRANSMITTER
1018
SIREN AND TIMER
SIREN TRANSDUCER
1024
1004
1012
1006
HIGH WATER LEVEL
WARNING LEVEL
1026
1028
1034
1026
1032
VALVE
VALVE
TO TUB
1038
TO SINK
1040
STEP DOWN
CONTROLLER RECEIVER
1044
AC

FIG. 9

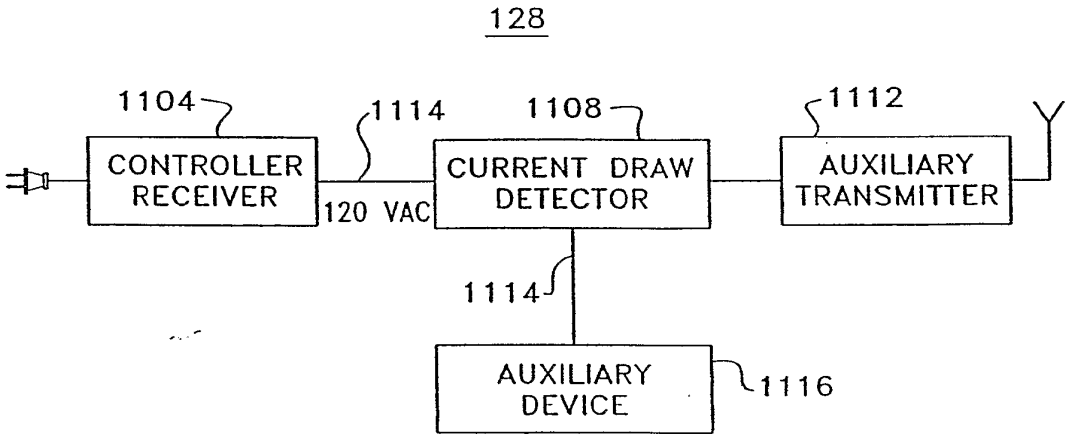

128
1104
CONTROLLER RECEIVER
1114
120 VAC
1108
CURRENT DRAW DETECTOR
1112
AUXILIARY TRANSMITTER
1114
AUXILIARY DEVICE
1116

FIG. 10

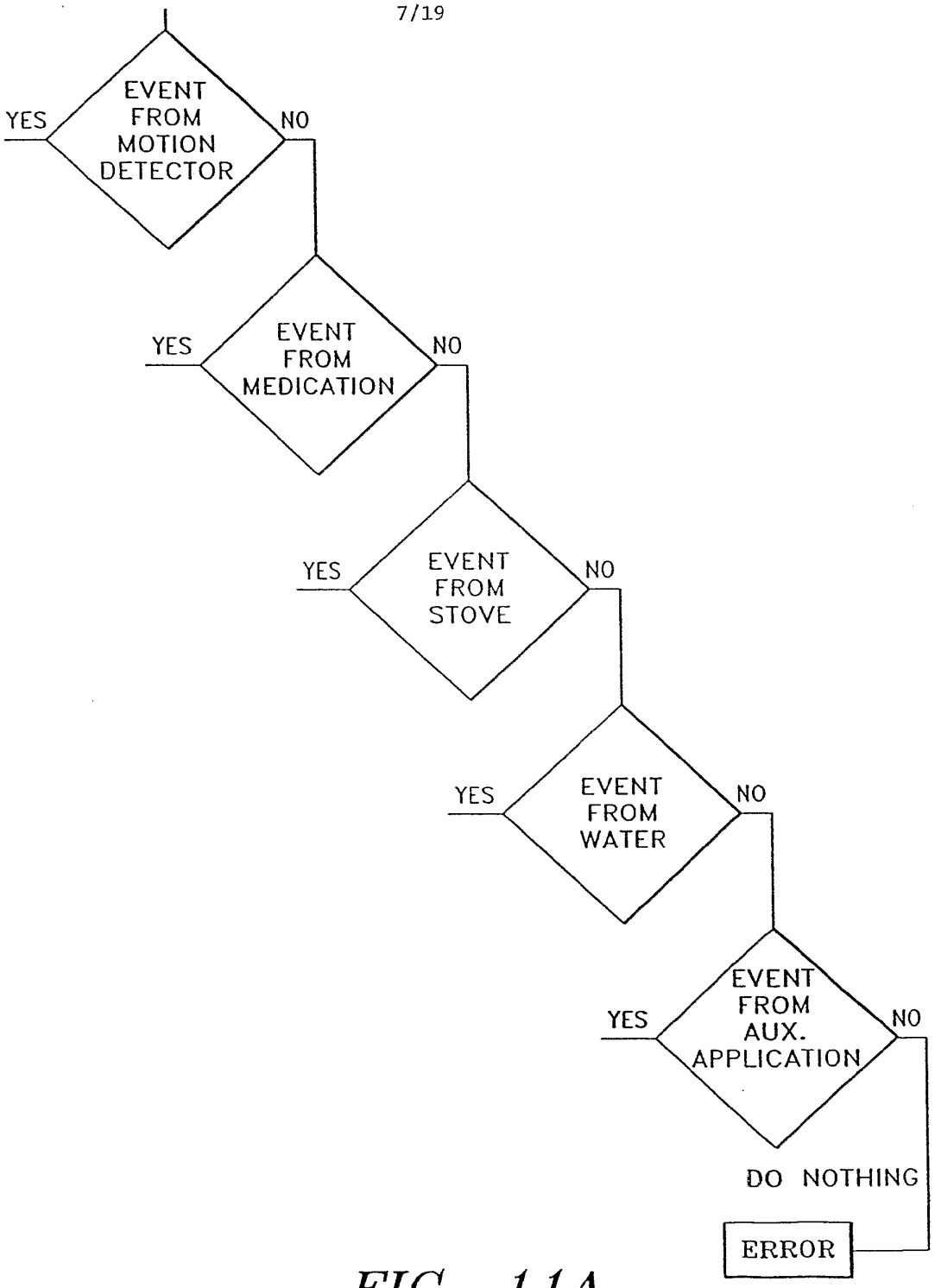

EVENT FROM MOTION DETECTOR
YES
NO
EVENT FROM MEDICATION
YES
NO
EVENT FROM STOVE
YES
NO
EVENT FROM WATER
YES
NO
EVENT FROM AUX. APPLICATION
YES
NO
DO NOTHING
ERROR

FIG. 11A

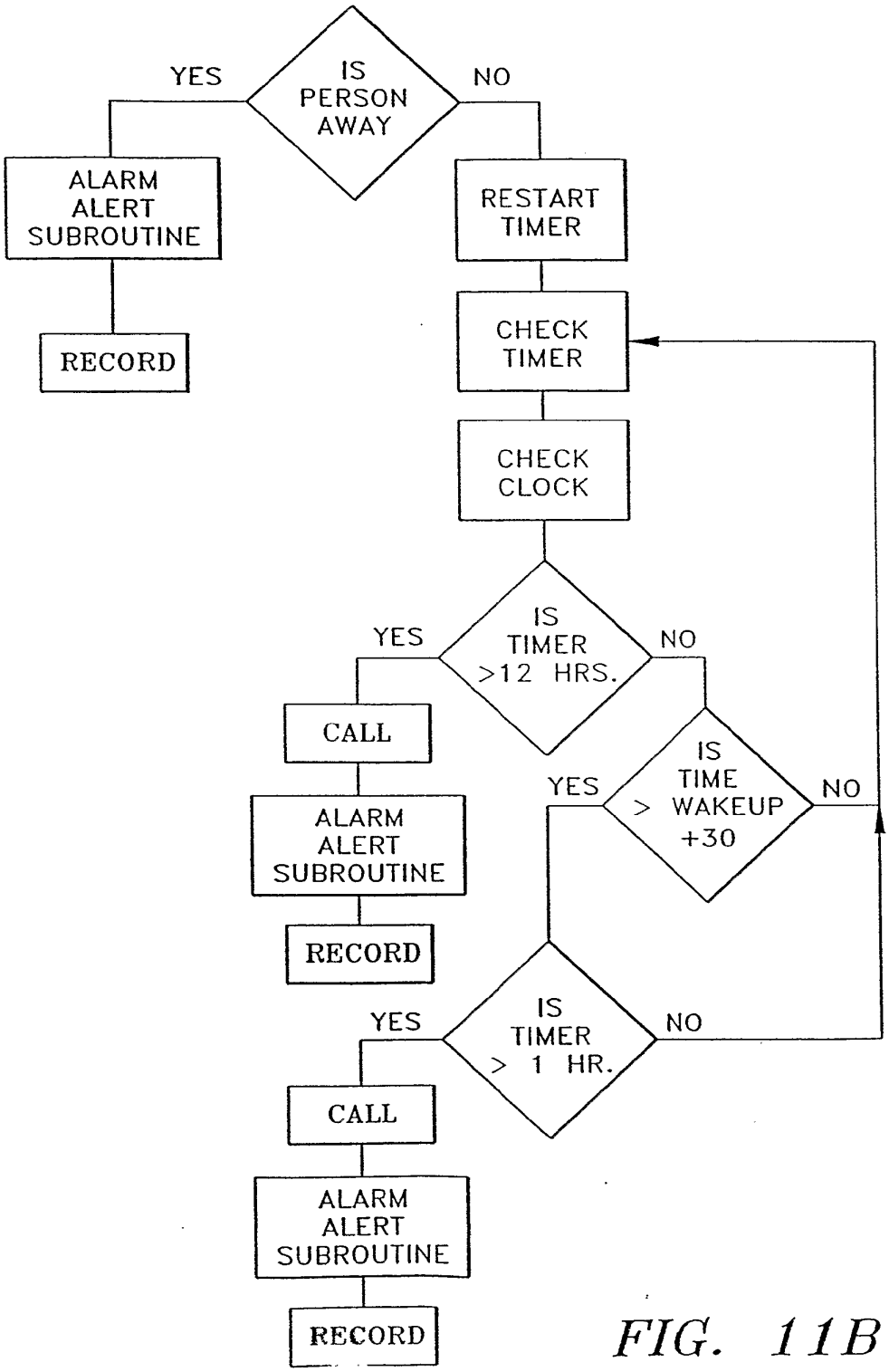

IS PERSON AWAY
YES
NO
ALARM ALERT SUBROUTINE
RECORD
RESTART TIMER
CHECK TIMER
CHECK CLOCK
IS TIMER >12 HRS.
YES
NO
CALL
ALARM ALERT SUBROUTINE
RECORD
IS TIME > WAKEUP +30
YES
NO
IS TIMER > 1 HR.
YES
NO
CALL
ALARM ALERT SUBROUTINE
RECORD

FIG. 11B

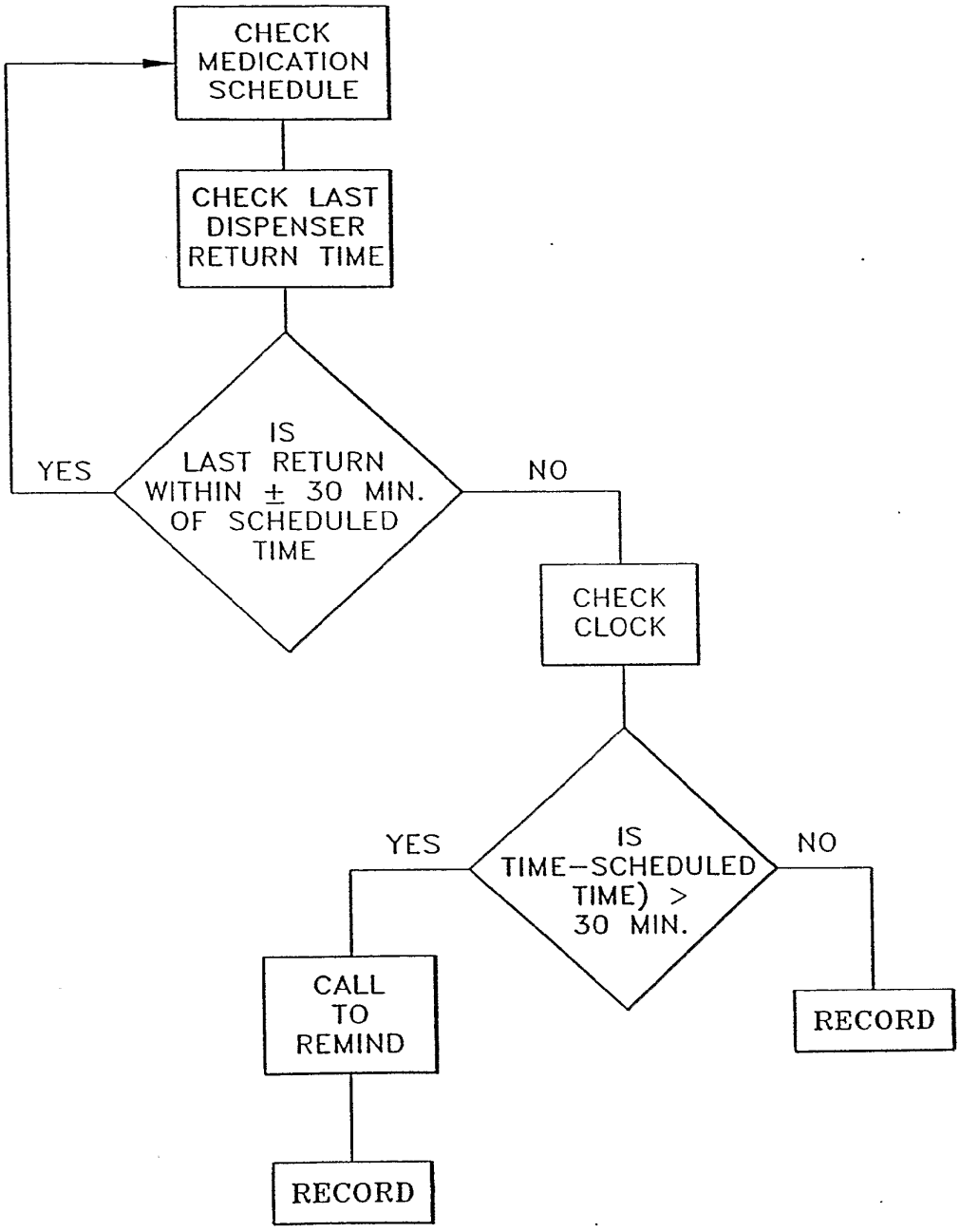

CHECK MEDICATION SCHEDULE
CHECK LAST DISPENSER RETURN TIME
IS LAST RETURN WITHIN ± 30 MIN. OF SCHEDULED TIME
YES
NO
CHECK CLOCK
IS TIME−SCHEDULED TIME) > 30 MIN.
YES
NO
CALL TO REMIND
RECORD
RECORD

FIG. 11C

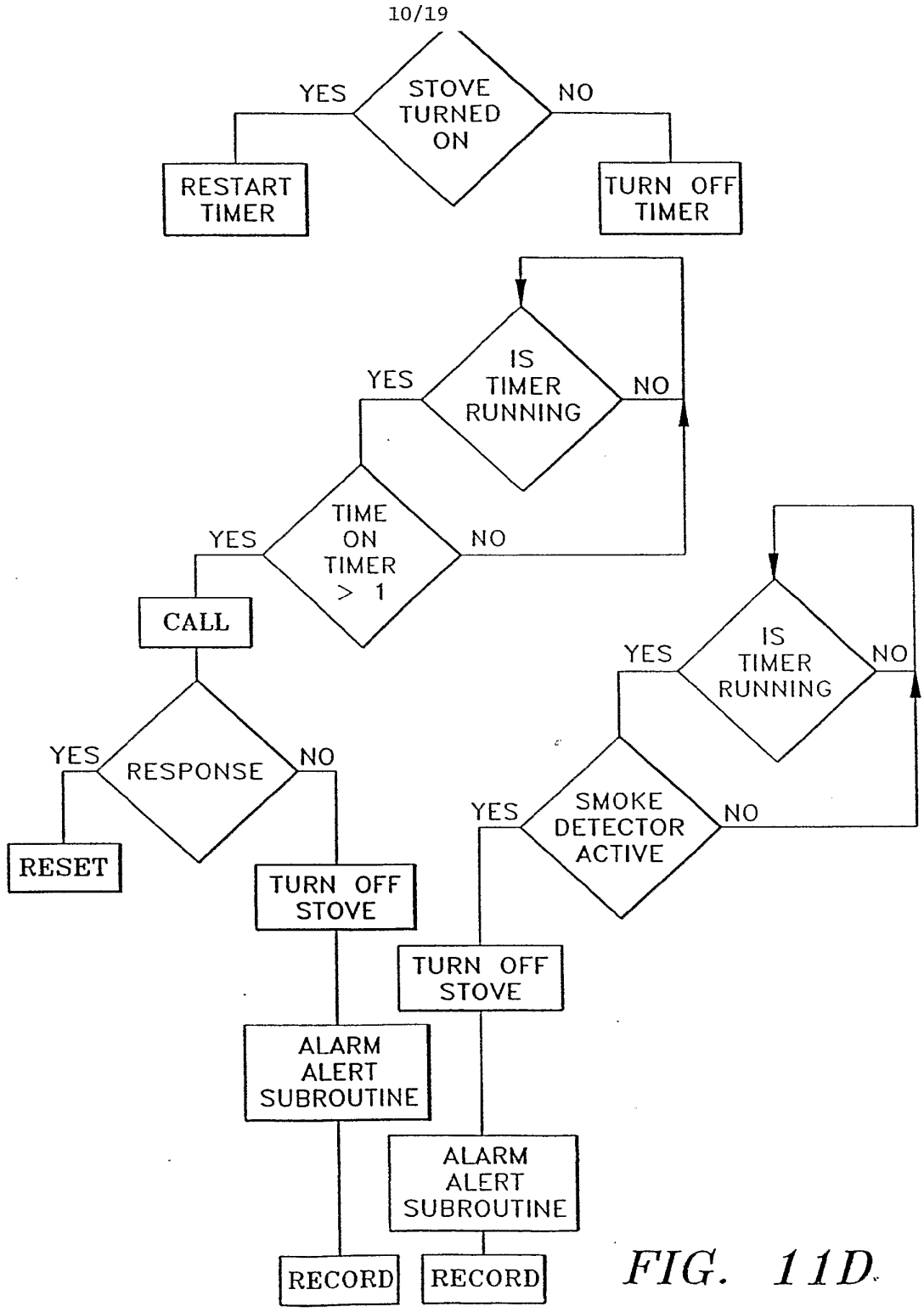

STOVE TURNED ON
YES
NO
RESTART TIMER
TURN OFF TIMER
IS TIMER RUNNING
YES
NO
TIME ON TIMER > 1
YES
NO
CALL
RESPONSE
YES
NO
RESET
TURN OFF STOVE
ALARM ALERT SUBROUTINE
RECORD
IS TIMER RUNNING
YES
NO
SMOKE DETECTOR ACTIVE
YES
NO
TURN OFF STOVE
ALARM ALERT SUBROUTINE
RECORD

FIG. 11D

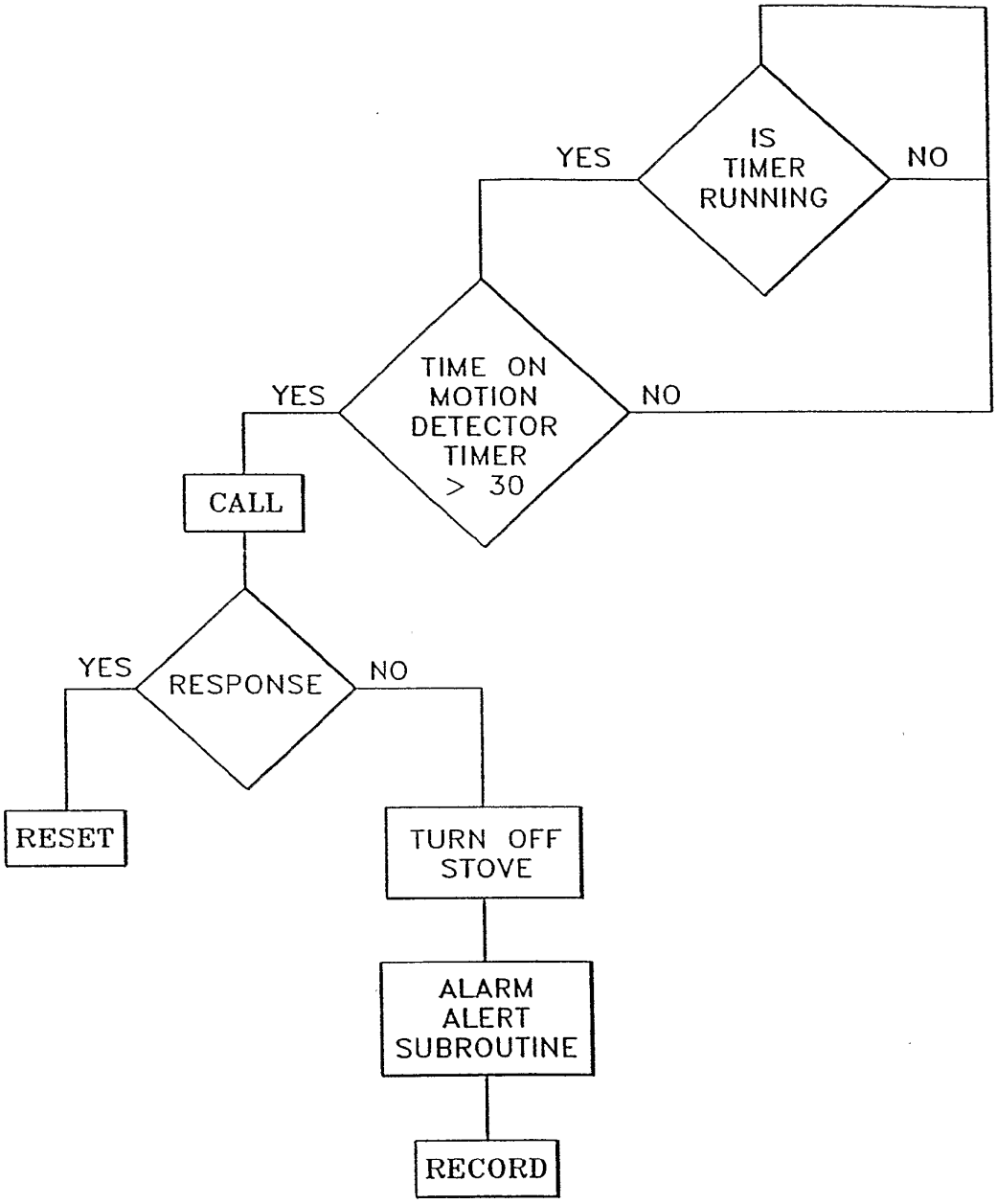

IS TIMER RUNNING
YES
NO
TIME ON MOTION DETECTOR TIMER > 30
YES
NO
CALL
RESPONSE
YES
NO
RESET
TURN OFF STOVE
ALARM ALERT SUBROUTINE
RECORD

FIG. 11E

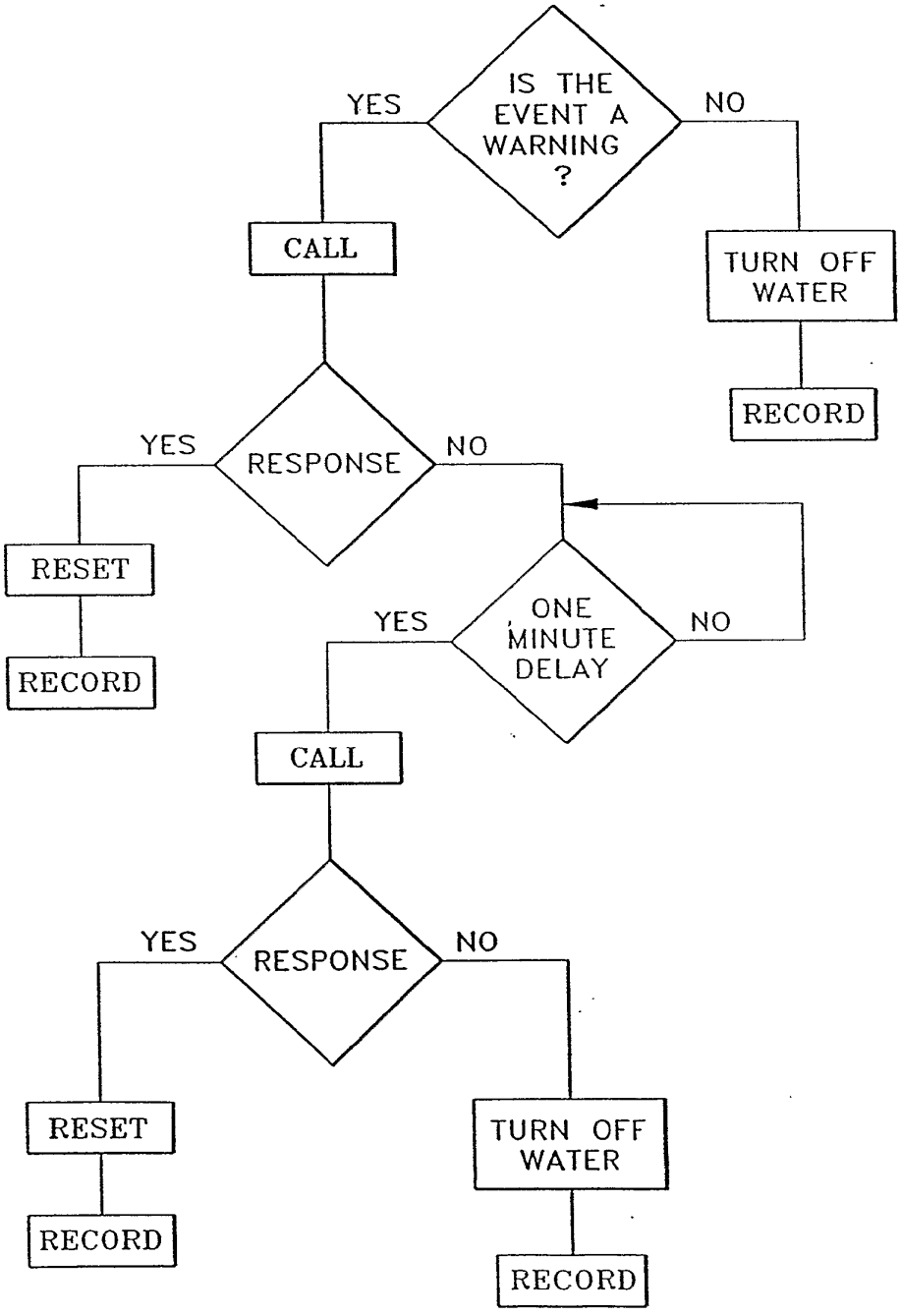

IS THE EVENT A WARNING ?
YES
NO
CALL
TURN OFF WATER
RECORD
RESPONSE
YES
NO
RESET
RECORD
ONE MINUTE DELAY
YES
NO
CALL
RESPONSE
YES
NO
RESET
RECORD
TURN OFF WATER
RECORD

FIG. 11F

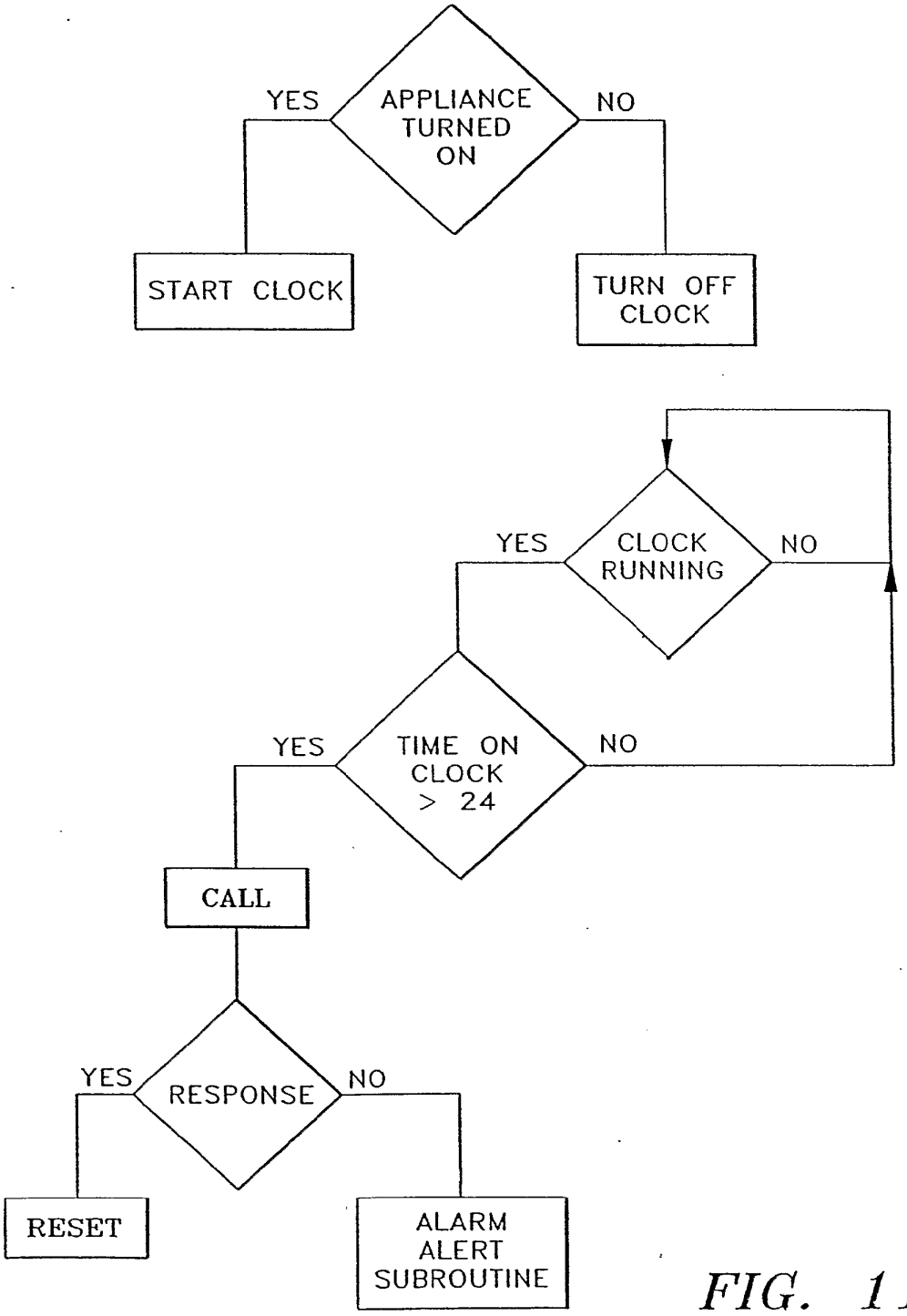

APPLIANCE TURNED ON
YES
NO
START CLOCK
TURN OFF CLOCK
CLOCK RUNNING
YES
NO
TIME ON CLOCK > 24
YES
NO
CALL
RESPONSE
YES
NO
RESET
ALARM ALERT SUBROUTINE

FIG. 11G

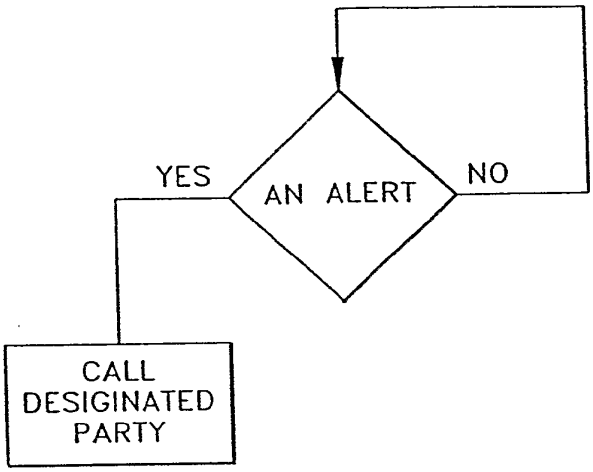


FIG. 11H

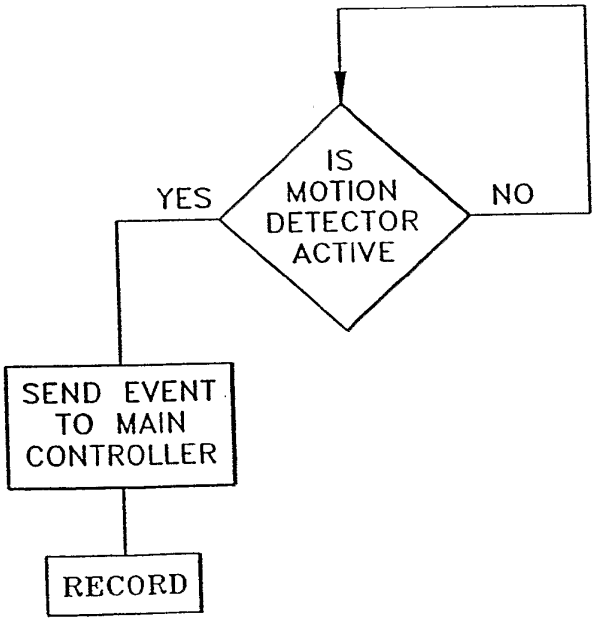


FIG. 11I

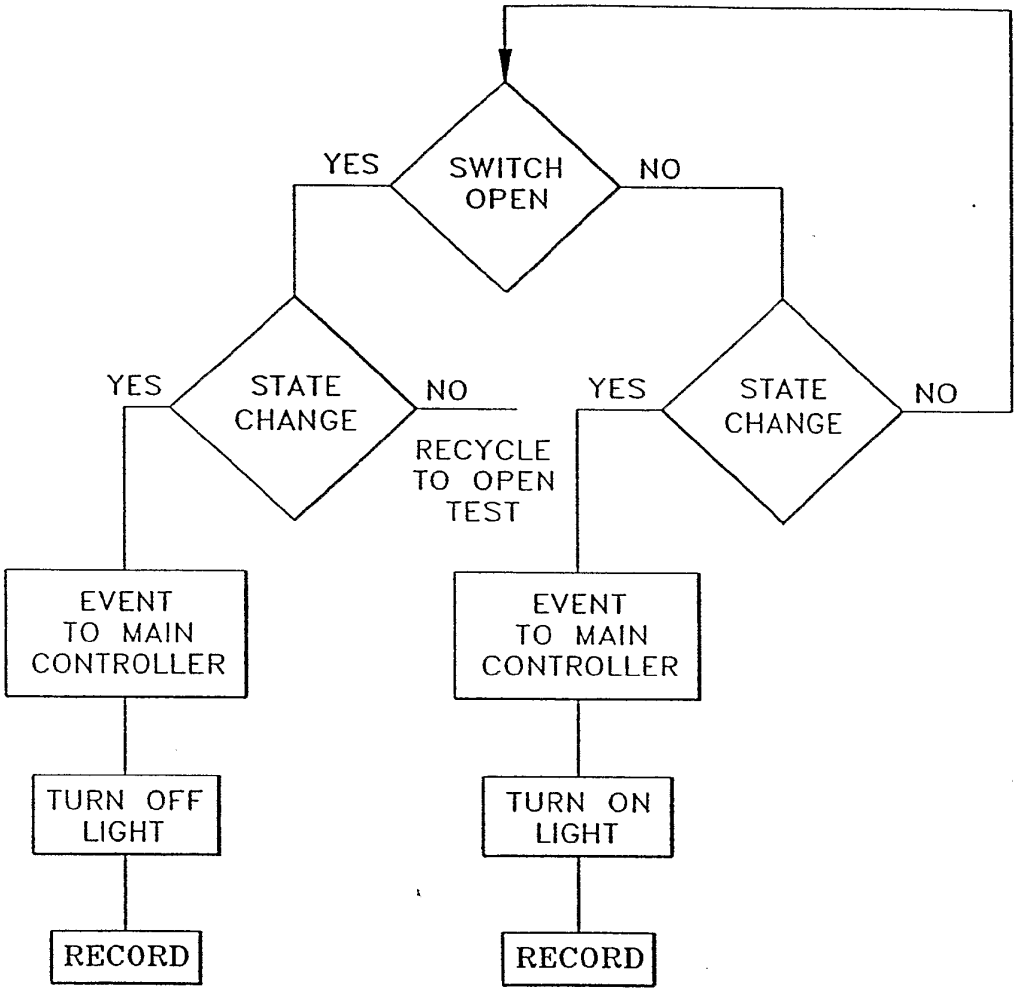

SWITCH OPEN
YES
NO
STATE CHANGE
YES
NO
RECYCLE TO OPEN TEST
STATE CHANGE
YES
NO
EVENT TO MAIN CONTROLLER
EVENT TO MAIN CONTROLLER
TURN OFF LIGHT
TURN ON LIGHT
RECORD
RECORD

FIG. 11J

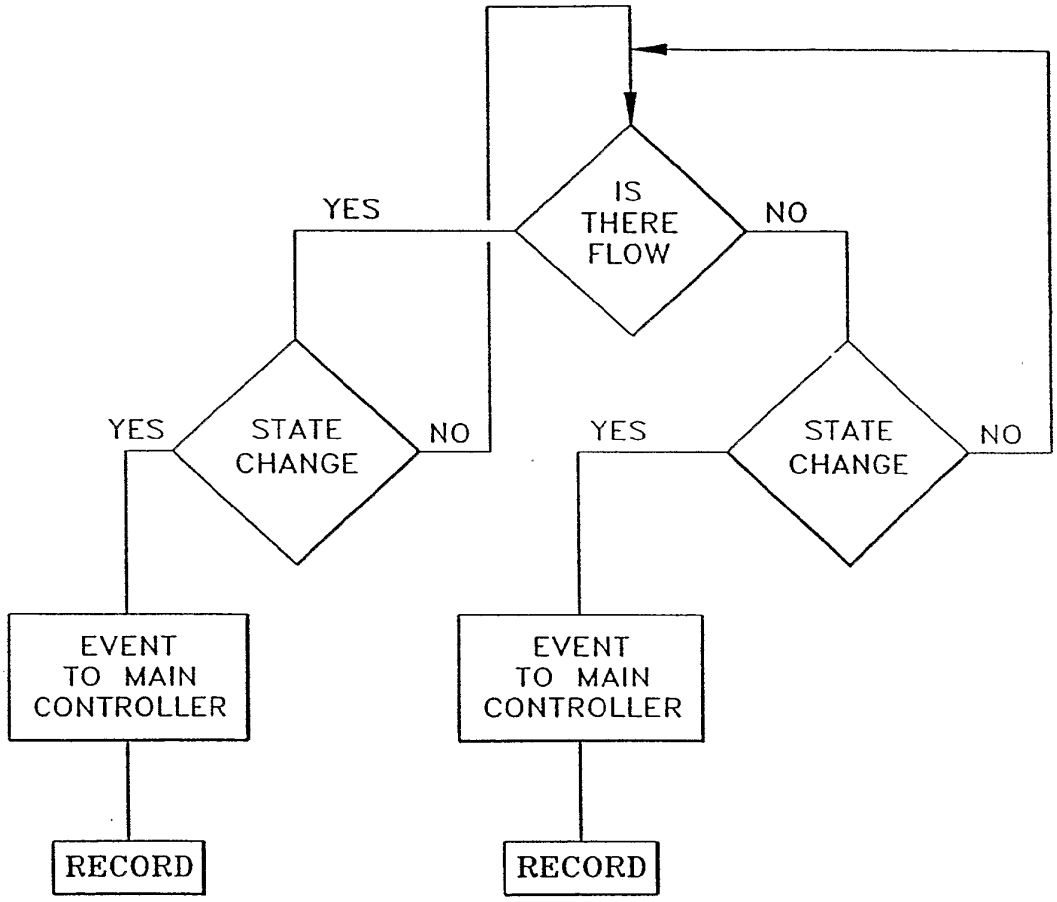

IS THERE FLOW
YES
NO
STATE CHANGE
YES
NO
STATE CHANGE
YES
NO
EVENT TO MAIN CONTROLLER
EVENT TO MAIN CONTROLLER
RECORD
RECORD

FIG. 11K

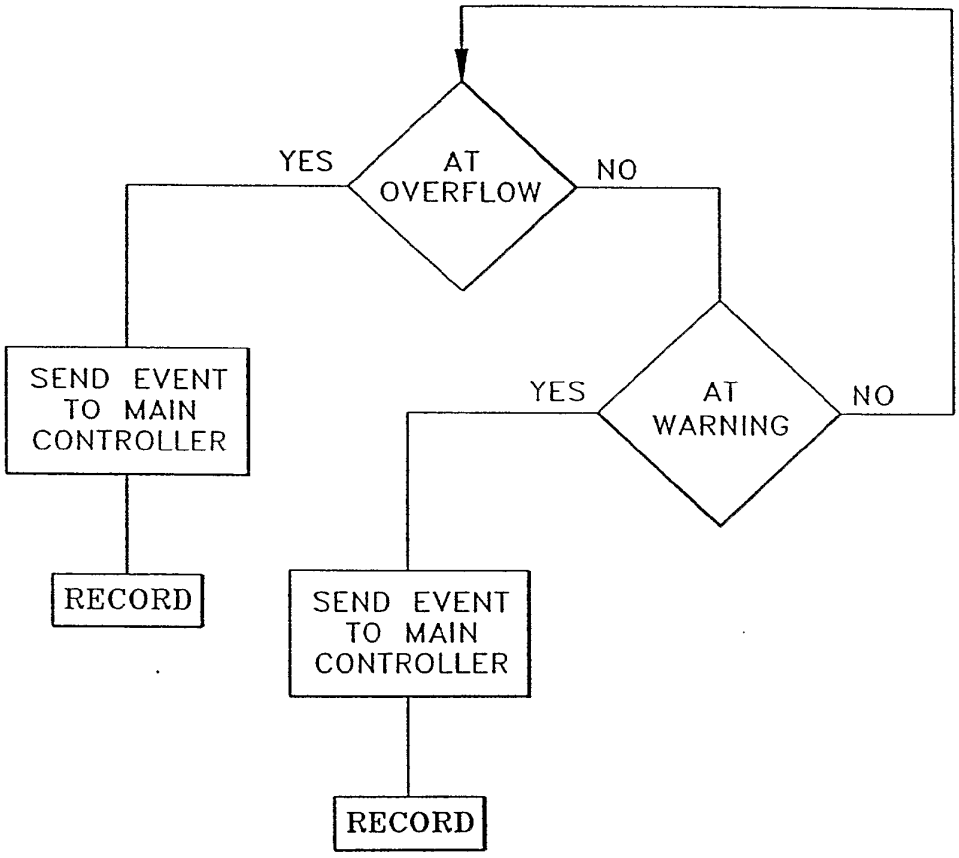

AT OVERFLOW
YES
NO
SEND EVENT TO MAIN CONTROLLER
RECORD
AT WARNING
YES
NO
SEND EVENT TO MAIN CONTROLLER
RECORD

FIG. 11L

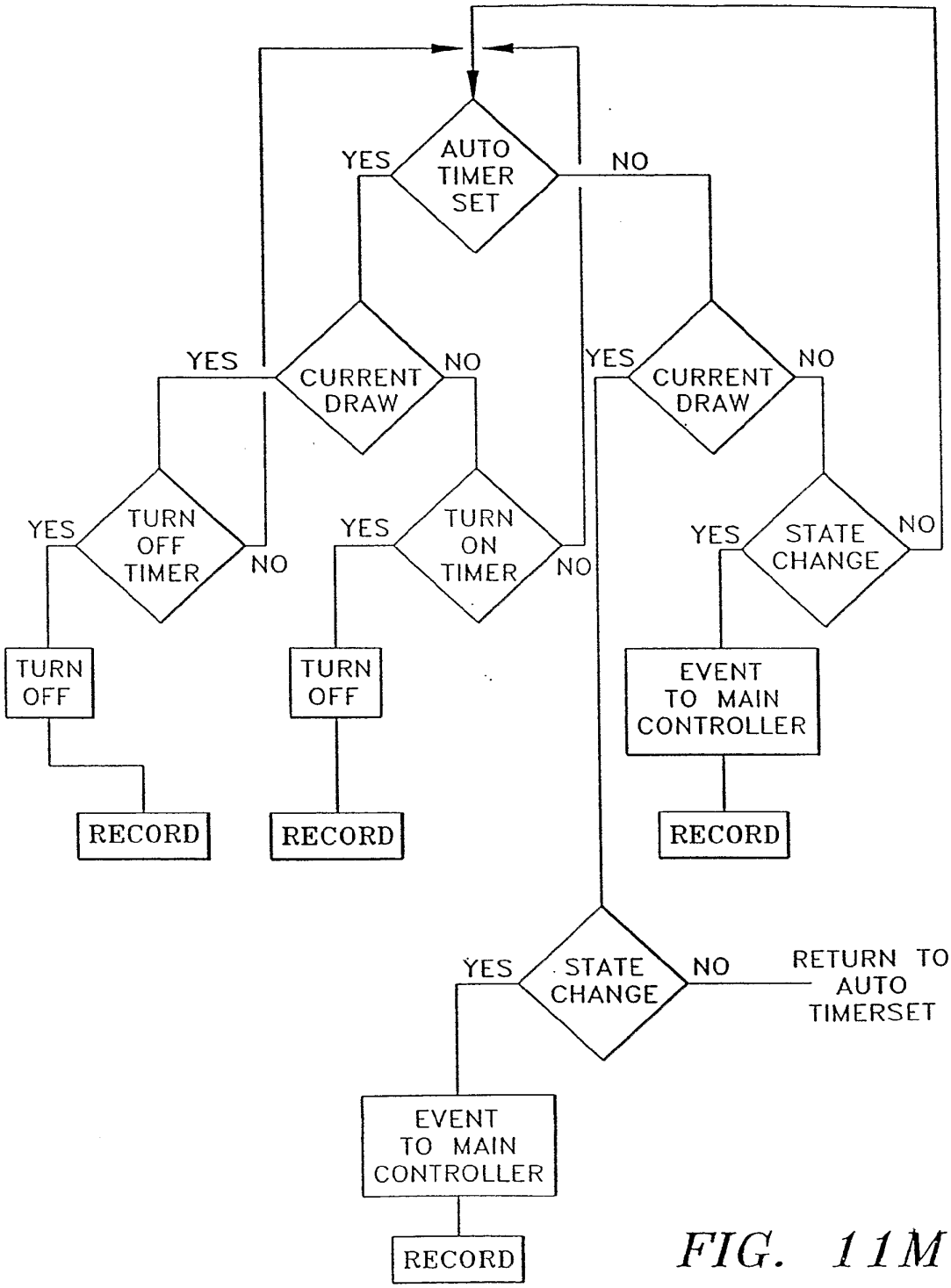

AUTO TIMER SET
YES
NO
CURRENT DRAW
YES
NO
CURRENT DRAW
YES
NO
TURN OFF TIMER
YES
NO
TURN ON TIMER
YES
NO
STATE CHANGE
YES
NO
TURN OFF
TURN OFF
EVENT TO MAIN CONTROLLER
RECORD
RECORD
RECORD
STATE CHANGE
YES
NO
RETURN TO AUTO TIMERSET
EVENT TO MAIN CONTROLLER
RECORD

FIG. 11M

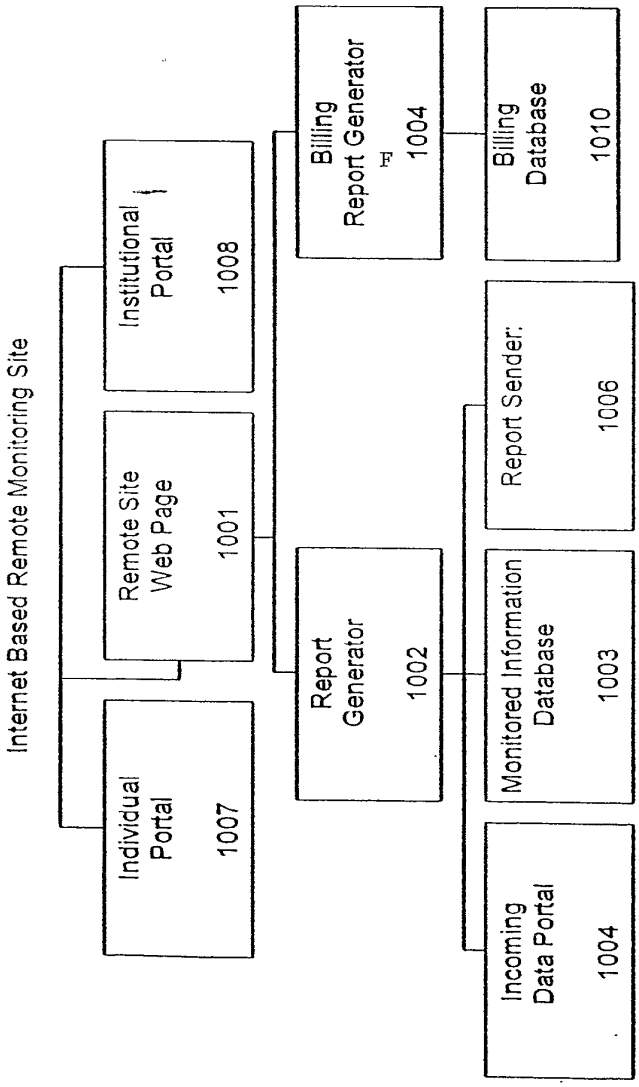

Internet Based Remote Monitoring Site
Individual Portal 1007
Remote Site Web Page 1001
Institutional Portal 1008
Report Generator 1002
Billing Report Generator F 1004
Billing Database 1010
Report Sender 1006
Monitored Information Database 1003
Incoming Data Portal 1004

Fig. 12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/47518

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G08C 19/04, 19/10, 19/22; G05B 23/02; H04Q 9/00; G06F 3/00
US CL : 340/870.11, 870.07, 825.19, 825.06; 710/18

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 340/870.11, 870.07, 825.19, 825.06; 710/18

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONE

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 6,002,994 A (LANE et al) 14 December 1999 (14.12.1999) see entire document.	1-30
x	US 5,692,215 A (KUTZIK et al) 25 November 1997 (25.11.1997) see entire document.	1-30

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
23 March 2002 (23.03.2002)	19 APR 2002
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230	Authorized officer Michael Horabik Telephone No. 703/305-4700

Form PCT/ISA/210 (second sheet) (July 1998)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/47518

Continuation of B. FIELDS SEARCHED Item 3:
EAST
search terms: monitoring, activity, physiological

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
6 December 2007 (06.12.2007)

PCT

(10) International Publication Number
WO 2007/137611 A1

(51) International Patent Classification:
H04N 5/44 (2006.01)

(21) International Application Number:
PCT/EP2006/005206

(22) International Filing Date: 31 May 2006 (31.05.2006)

(25) Filing Language: English

(26) Publication Language: English

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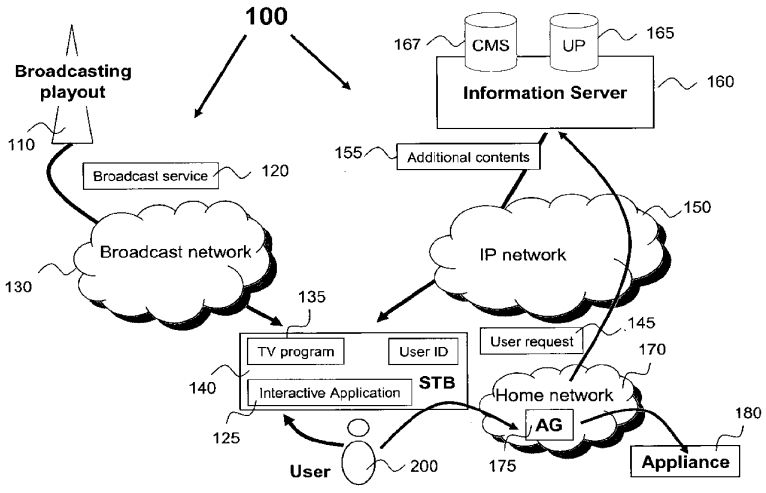
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) **Title:** METHOD AND TV RECEIVER FOR STORING CONTENTS ASSOCIATED TO TV PROGRAMS



(57) **Abstract:** In order to offer contents on demand services triggered by broadcasted TV programs in an efficient and effective way, there is provided that notifications are received by a TV receiver, for example a set-top box (140), on the availability of additional contents (such as movie tracks, back stages, audio and/or video interviews, written articles, songs, photos, games, software programs, catalogues, brochures, electronic books, electronic tickets, electronic discounts, electronic bonuses,...) together with TV programs, and these additional contents are automatically collected and stored into electronic appliances, for example a portable electronic appliance (180), at the request of a user (200).

WO 2007/137611 A1

METHOD AND TV RECEIVER FOR STORING CONTENTS ASSOCIATED TO TV PROGRAMS

DESCRIPTION

The present invention relates primarily to a method for storing contents associated to TV programs and additionally to a TV receiver adapted to carry out this method.

Field of the Invention

In the past, some TV broadcasters provided teletext information in addition to broadcast video using the same signal; the teletext service is provided still nowadays.

With the advent of digital TV transmission technology, TV broadcasters are now able to provide much more than broadcast video and teletext. Transmission of digital signals may occur in different ways. In digital terrestrial television (DTT) systems, the broadcast signal is transmitted "over the air" to an antenna. Other widespread systems include cable TV systems and satellite TV systems. Finally, IP systems are viable means to bring television into a household and provide users a means to receive video, audio and data content.

Today, many viewers receive digital television via a set-top box [STB], which decodes digital signals and displays them on a TV monitor usually of a TV set. Advanced STBs can also be programmed to execute applications that can interact with the user through the use of the remote control device of the STB and with service centers using a modem and a communications network, typically the public switched telephone network

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[PSTN]. The STB comprises a computer that runs a program which decodes the TV signal and executes the software that is transmitted either through a broadcast channel (together with the audio or video streams) or through a return channel. Return channel is the physical path used by the STB to let the client interact with a server. For example, through the return channel, interactive TV users can transmit information (e.g. votes, questionnaires, ...) to a service center or request the transmission of information (e.g. timetable of trains, stock exchange quotes, ...) from a service center. The physical path can be a wired connection, such as a telephone line or an xDSL line, or a wireless connection, e.g. GPRS or UMTS.

Concerning the type of services provided to the user, we can distinguish between two different paradigms to access the contents: the Broadcasting and the Content on Demand, in short form CoD.

Broadcasting is typical for broadcasting TV networks (i.e. terrestrial, cable or satellite), even if it can be used also on IP networks, sometimes called with different names depending on the distribution network (e.g. "webcasting" on Internet). According to this paradigm, the service provider can decide what contents to distribute and their schedule independently from any direct user request. The user can only tune its STB on a suitable "channel" to access the contents. The schedule of each channel can be made available in many ways, e.g. on magazines or on so-called Electronic Program Guide (EPG) or Broadband Content Guide (BCG).

CoD is typical for IP networks. The user selects a piece of contents among those offered by the service provider and requests either its streaming or (if the STB is equipped with a Hard Disk) its download at a specific time. Broadcasting is a push service (that is a service where the service provider, in this case the broadcaster,

sends information out regardless of whether anyone has requested it or even is tuned in), while CoD is a pull service (that is a service where the service provider sends information out only when someone has requested it).

Background of the Invention

From patent n° US6789106, it is known a method and a structure that allows a user who has access to an audio/visual object to cause an interactive control element of an interactive multimedia system to grab and store for future retrieval and peruse the audio/visual object by simply activating a selection mechanism of the interactive multimedia system. The interactive control element of the interactive multimedia system receives a plurality of audio/visual objects for play from the content provider and causes each such object to be stored to a temporary storage element as it is played. In response to the user activating the selection mechanism of the interactive multimedia system, it is determined whether the interactive control element has completed storing an audio/visual object to the temporary storage element that the user has selected via the selection mechanism. If the interactive control element has completed storing the selected audio/visual object to the temporary storage element, the selected audio/visual object is transferred from the temporary storage element to a long-term storage element. If, however, the interactive control element has not completed storing the selected audio/visual object to the temporary storage element, it is determined whether the selected audio/visual object is currently being played. If it is not currently being played, this means that the selected object may not be available locally and the interactive control element retrieves the selected audio/visual object from the content provider (if necessary) and stores it in the long-term storage element. If

the selected audio/visual object is being currently played, then the interactive control element continues to store the selected audio/visual object within the temporary storage element until the selected audio/visual object is stored in its entirety (has finished playing) and then transfers it from the temporary storage element to the long-term storage element, where it can be retrieved at some later time when desired.

From patent application nº US2002/0087988, it is known an interactive TV contextual content surfing method, system and program product that enables viewers to surf from one related program to another program through hyperlinking. A TV broadcast station receives interactive TV program content generated by creators. The content is categorized by the creator and provided to the broadcast station in the MPEG or webstreaming video/audio formats. A broadcast server stores a dynamic table of correspondence between TV program categories and TV channel numbers. The hyperlinking information contains a list of channels that broadcast the same nature of programs by referencing the correspondence table. The server broadcasts the hyperlinking information to the list of channels. The broadcast network carries the TV programs and associated classification information in separate channels to the local TV station for retransmission to TV devices including set-top boxes. The set-top box stores program information by categories in classification tables, contents of a TV program guide section, and recorded programs.

From patent nº US6215483, it is known a method and apparatus for receiving logical address links in advance of a television program and combining such links with those links that may be received in real-time during a television broadcast. According to one aspect of this

invention, content associated with a TV program may be automatically displayed by a client system, such as an Internet terminal or a computer equipped with a TV tuner. Prior to broadcast of a TV program, TV listing information is stored in the client system. The TV listing information includes one or more batch mode logical addresses, e.g. Uniform Resource Locators (URLs), that identify content, such as Internet content. The client system alerts the viewer of the existence of an active logical address associated with the current TV program by providing a visual indication. After the visual indication has been selected by the viewer, the client system displays the content identified by the logical address. Additionally, one or more real-time logical addresses may be received by the client system embedded in a video signal associated with the TV program. The real-time logical addresses may be embedded in either a text service channel (e.g., T1, T2, T3, T4) or a captioning service channel (e.g., CC1, CC2, CC3, CC4) of the vertical blanking interval (VBI) of the video signal. When both real-time logical addresses and batch mode logical addresses are associated with a TV program, the client system determines which to bring to the attention of the user of the client system based upon a set of predefined rules. Features of the present invention are applicable to many broadcast television (TV) systems including National Television Standards Committee (NTSC), Phase Alternate Lines (PAL), and Sequential Couleur Avec Memoire (SECAM) as well as the proposed High Definition Television (HDTV) standard.

From patent application n° WO02/085024, it is known a video-processing method and system for enriching one or several primary video signals by association of additional data in a video scene encoded in accordance with the MPEG4 standard, this associating allowing

simultaneous display of a primary video signal and said additional data, and enabling a user to interact with and access the contents of said additional data.

From patent application n° US2005/0193425, it is known a method for delivery and presentation of information relevant to the contents of frames in an audio/video program that enables TV viewers to retrieve information on the contents (for example, objects, items, concepts and the like) contained in a frame or a set of frames (video segments) when they watch TV or video programs. The information relevant to the contents of frame(s) is delivered to a STB or DVR by third-party service providers through back channels such as the Internet if the information of how to accurately access the frames pointed by STB users are delivered to the service providers, and the content-relevant information may be presented in the form of a GUI for the TV viewer. This disclosure relates to the processing of program guide information and, more particularly, to techniques for delivering information on video segments of broadcast TV programs to STBs.

Summary of the Invention

The Applicant has noted that, due to their structure, present commercial STBs are not adapted to delivery of CoD services requested by a user in an efficient, effective and flexible way, easy to be used by ordinary people while watching TV and using electronic appliances, particularly portable ones.

The Applicant has found that it can be possible to overcome the above cited problems by receiving notifications on the availability of additional contents (such as movie tracks, back stages, audio and/or video

interviews, written articles, songs, photos, games, software programs, catalogues, brochures, electronic books, electronic tickets, electronic discounts, electronic bonuses, ...) together with TV programs, and by automatically collecting and storing these additional contents on electronic appliances, for example a portable electronic appliance, at the request of a user.

This can be achieved through appropriately designed TV receivers, such as a set-top boxes, and appropriately assembled TV signals.

The additional contents are downloaded directly or indirectly (but without user intervention) into the electronic appliance for future use by the user.

Particularly, the present invention provides for an STB with a return channel (e.g. PSTN, xDSL, GPRS, etc.), a home network and a mass storage device, such as an external HDD, an USB storage or an MP3 player. The STB and the mass storage device are connected to the home network and communicate through it and the home network is connected to an external IP network through an access gateway (this connection is used to implement the return channel of the STB). Additionally, the STB could be univocally identifiable, for example by data stored on a smart card, permanent storage, serial number, etc. The synchronization between a TV program and the starting of an interactive application can be achieved by means of different techniques: for example the streaming events can be used in the case of MHP [Multimedia Home Platform], the standard middleware specified by DVB [Digital Video Broadcasting] for interactive TV.

According to a typical embodiment of the present invention, a user, while he is watching a TV program, is

notified on the screen of his TV set that some additional contents associated to this TV program are available through e.g. a red button appearing in a corner of the screen; then the user may check what the available contents are and select the one (or the ones), for example an MP3 file, he is interested to download on his portable electronic appliance, for example an MP3 player, through e.g. a menu appearing on the screen. Automatically, the selected contents are downloaded into the electronic appliance and the user can enjoy e.g. the music at any later time and place he likes.

Brief Description of the Drawings

The present invention will become more clear from the following description to be considered in conjunction with the annexed drawing in which:

Fig.1 shows a system that is able to implement some embodiments of the present invention, and

Fig.2 shows a flowchart of an embodiment of the method according to the present invention.

Detailed Description of the Invention

In Fig.1, the overall system is indicated with reference 100 and comprises:

- a broadcasting playout 110,
- an information server 160,
- a set-top box (STB) 140,
- an access gateway (AG) 175,
- an electronic appliance 180;

Set-top box 140 is connected to broadcasting playout 110 through a broadcast TV network 130; set-top box 140 is connected to information server 160 through the access gateway 175 and an IP network 150; set-top box 140 is connected to electronic appliances 180 through the access

gateway 175 and a home network 170; set-top box 140 is also connected to a traditional television set that is not shown in the figure. The connection between set-top box 140 and access gateway 175 is advantageously an Ethernet connection. Additionally, in Fig.1, a user 200 is shown that uses the set-top box, the television set and the electronic appliance. In general, system 100 comprises a plurality of STBs as there is usually at least one STB for each household. Within some of the households there will be a home network to which a plurality of electronic appliances are connected.

Broadcasting playout 110 distributes broadcast services 120, including TV programs 135 and associated interactive applications 125; broadcasting playout 110 is connected to the users' STBs through the broadcast TV network, such as DTT [Digital Terrestrial Television], satellite television or cable television.
Preferably, the format of the broadcast services is the MPEG-2 TS [Moving Picture Expert Group Transport Stream]; a clear and quite brief description of this standard can be found e.g. in patent application n° US2005/0193425 which is incorporated herein by reference.
The kind of modulation depends on the kind of TV network, as specified by the DVB [Digital Video Broadcasting] consortium. In a single MPEG-2 TS many components are multiplexed together, for example: TV program, interactive applications and additional information, such as the AIT [Application Information Table]. The multiplexing can be done by the broadcaster at the playout or by a content provider.

Information server 160 stores, manages and distributes additional contents 155 (such as related audio track) usually by using a content management system (CMS) 167. Additionally, it could manage a user profiling

system (UP) 165 and the interaction with the end-user STBs. Typically it communicates to STB 140 (and to the other STBs of system 100) through an IP network being fixed (e.g. based on ADSL) and/or mobile (e.g. based on GPRS). Preferably, the protocol used for the communication between information server 160 and STB 140 is HTTP [Hyper Text Transfer Protocol], but other protocols could be used such as e.g. FTP [File Transfer Protocol] for downloading and RTP [Real-time Transport Protocol] for streaming.

STB 140 can receive broadcast services, decode them, play the TV programs and run the interactive applications.

The interactive applications can be embedded in the broadcast services, but they can also be natively available on the STB or sent to it through the IP network. Among the functionalities that can be supported by the interactive applications, we can mention: the presentation of information sent through the broadcast network (e.g. a notification of additional contents available on demand); the management of the graphical user interface (e.g. conversion of a key selection into a specific action, such as to send a request to an information server, specifically information server 160); the management of the return channel, in order to enable the bidirectional communication between the user and an information server, specifically information server 160; the management of the communication with a smart card that could be located within an STB, specifically STB 140, or connected to a home network, specifically home network 170, and that would be used to store sensitive information, such as identification data and decryption keys, in order to read and update data recorded on the smart card. Additionally, the interactive applications

could also manage the transfer of additional contents 155 toward electronic appliance 180 through home network 170. The protocol used for the communication between STB 140 and electronic appliance 180 could be HTTP, but also proprietary protocols could be used. In this case, typically a conversion of protocols should be performed either by STB 140 or by access gateway 175.

Access gateway 175 provides two basic functionalities: it is the bridge between home network 170 and the IP network 150 and it is the router among the devices connected to home network 170, including set-top box 140 and electronic appliances 180 but not excluding e.g. one or more PCs. Access gateway 175 could be advantageously provided with intelligent features, such as discovery of devices on the network, protocol conversion, association between file format and device, etc.

Electronic appliance 180 could be for example a media player or an MP3 portable player (others of the many possible examples will be provided in the following) where the additional contents received by STB 140 from information server 160 will be stored.

In the following, the overall working of an embodiment of the method according to the present invention is described. In order to represent the core components of the invention, a simple case is illustrated, where no other systems are considered, such as e-payment system, DRM [Digital Rights Management] system, user profiling system, parental control system, etc.; in practice, these other systems are likely to be involved and used.

The flowchart of the main actions are depicted in Fig.2.

Action 0 : User 200 switch on the TV set and STB 140.

Action 1 : The TV set is tuned on a specific channel and user 200 is watching a TV program. The interactive application that controls the CoD [Content on Demand] service according to the present invention is downloaded to STB 140, but it keeps the "sleeping" status until it receives a specific event. Many different techniques can be used for managing the life cycle of the application, in case the MHP [Multimedia Home Platform] stack is implemented on STB 140, the application can be controlled by means of stream events. DSM-CC [Digital Storage Media Command and Control] stream events are markers that are embedded in a transport stream via MPEG-2 private sections, with each marker consisting of an identifier and a time reference. The identifier allows each stream event to be uniquely identified, while the time reference indicates at what point in the stream the event should trigger the change of the interactive application status, from "sleeping" into "running".

Action 2 : User 200 sees e.g. a red sign in a corner of the screen of the TV set and pushes the red button of the remote control device of STB 140. The red sign is produced by the interactive application that now is in the 'running' status.

Action 3 : The interactive application shows a GUI [Graphic User Interface], that presents on the screen of the TV set a list of additional contents available on demand, preferably together with additional information, such as dimension of the file, time needed for downloading, etc. .

Action 4 : User 200 checks the offer and decides whether to request the download of any content.

Action 5 : If User 200 is not interested in downloading any content, he pushes again the red button of the remote

control device of STB 140 and come back watching the TV program.

Action 6 : If User 200 is interested in downloading any content, he selects from the GUI the items he is interested in and sends a request 145 to an information server, specifically information server 160, indicating what is the target electronic appliance (in the case of Fig.1, there is only one electronic appliance shown, namely appliance 180, but many others can be provided).

Action 7 : The interactive application checks whether the indicated appliance is on and connected.

Action 8 : If the indicated appliance is not ready, a notification appears on the screen of the TV set, inviting the user to check the status of his home network, specifically network 170, and of the indicated appliance, specifically appliance 180.

Action 9 : If the indicated appliance is on and connected, the interactive application converts the commands received from user 200 into a message and send it to information server 160. This message includes the IP address associated to STB 140 and the content items requested by user 200, but it could also include additional information such as ID of STB 140, TV channel on which STB 140 is currently tuned on, etc. .

Action 10 : Information Server 160 downloads the contents, that are routed by access gateway 175 to electronic appliance 180. When download is finished, a notification appears on the screen of the TV set.

Action 11 : User 200 can disconnect appliance 180 from home network 170 and bring it with him for enjoying the downloaded content items at a convenient occasion.

The above described specific embodiment is subject to many variations and extensions; some of these will be considered in detail in the following.

A first extension is related to the network to be used for delivering the CoD service. In fact, if the same content items are of interest to a certain number of users or if return cannel becomes not available or has a limited bandwidth, the additional content items can be sent through a broadcast channel, in particular the broadcast TV channel. This can be achieved for example by a mechanism similar to that used in the PPV [Pay-Per-View] services, using a suitable identification system to identify the user and/or the STB, where television viewers can purchase events to be seen on a TV set and pay for the private telecast of that event to their homes later.

In case the return channel is available, the interactive application in STB 140, after sending the request to information server 160, triggered by user 200, receives an acknowledgement from information server 160 and keeps waiting for receiving an event on a specific TV channel; the event may indicate not only that the requested content items are coming but also the channel used for transferring the requested content items that can be e.g. the same TV channel or on a different TV channel of the same multiplex.

After receiving any event, the interactive application checks whether the contents are associated to its previous request; this can be done e.g. simply by comparing the ID of the contents with the ID provided with the acknowledgement; anyway, more complex and tamper-resistant techniques based on certificates can be used. When the event corresponding to the requested contents arrives, the application checks that the electronic appliance is operative and connected and starts the download and storage into the appliance.

In case the return channel becomes not available or has a limited bandwidth,information server 160 should send to

broadcasting playout 110 the correspondence between the STB and/or User and the requested items. Broadcasting playout 110 can multiplex on a same stream the additional contents and the ID of the recipient (STB and/or User), in order to make the STB to recognize the content items that should be downloaded into appliance 180.

A second extension relates to the download time of the contents requested by the user. The download may start immediately after information server 160 receives the user's request, but a mechanism to delay the delivery of the contents to an appropriate timeframe can be set up in addition or in replacement to the immediate download. This would be particularly useful for example in case of a subscription model service or for more efficient bandwidth occupancy (e.g. downloads could be concentrated during the night). This can be implemented for example in the following way. The acknowledgement from information server 160 could include the information about the time frame when the contents are available for the download (starting time and duration). Then, the application set up the connection with information server 160 at the indicated time in the indicated time frame.

A third extension relates to the personalization of the CoD service, i.e. the offer of additional contents could be personalized to the specific users and/or STBs. Assuming that an STB can communicate with a smart card, either physically inserted in the STB or in some device connected to the home network (e.g. physically inserted in access gateway), the list of contents proposed to the user on the TV screen could depend on the user profile associate to that smart card. For example, the user will be able to download any item in the list only if he has applied for a premium service, or in the other case he

will be able to choose and/or to receive only free contents.

Some variations require the possibility of the STB to write information on a smart card. In this case, for example, the reward for viewing a TV program could be the access to PPV services or games. In this case, a certificate is downloaded on the smartcard through the interactive application on the STB. In the case of games, if necessary, also the game could be downloaded on an appliance connected to the STB.

Finally, one interesting possibility is that the system according to the present invention can be connected with an e-commerce infrastructure; in fact, the download of contents may be subject to a payment to be carried out through an e-commerce infrastructure.

As it is apparent from the preceding description, the present invention can be implemented in many different ways and can find many different applications. Therefore, in the following, the present invention will be set out in general terms in line with the annexed claims.

Essentially the present invention relates to a method for storing contents associated to a TV program into an electronic appliance.

In general, this method comprises the steps of:

A) receiving a TV signal through a TV receiver, the TV signal carrying at least the TV program and data relating to contents associated to said TV program,

B) decoding the TV signal and identifying said contents data,

C) asking the user his interest in said contents,

D) getting a reply from the user specifying which of said contents he is interested in,
E) collecting said specified contents, and
F) storing said collected contents into an electronic appliance;

wherein said steps are carried out sequentially and automatically, i.e. without the intervention of the user with the exception of his reply at step D.

The TV receiver may be a TV STB, but can also be a TV set with an integrated STB or other kinds of electronic devices able to receive TV signals and to show video on a screen directly or indirectly connected to the receiver. It can be noted that depending on how the present invention is implemented step E and step F can be strictly connected and partially overlapping; in fact, the collecting step comprises all the activities that precedes the storage of the contents into the electronic appliance. If, for example, the contents is first temporary stored into the TV receiver or STB and then permanently stored into the electronic appliance, the temporary storage may be regarded as part of step E or as part of step F.

Typically, according to the present invention, the collected contents are stored into non-volatile storage means of the electronic appliance for future use by the user; such storage means can be e.g. semiconductor integrated circuit as it would be the case of an MP3 player or a PDA or a mobile cellular phone.

Typically, according to the present invention, the contents associated to the TV program are multimedia contents, i.e. a combination of different media for example audio and video.

Anyway, important application of the present invention may provide that the stored contents are not directly multimedia contents but are keys for decrypting multimedia contents or licenses for using multimedia contents or keys for accessing multimedia contents. In this case, typically, the user can freely download multimedia contents at any time and in any way but can use these downloaded multimedia contents only if he has downloaded the key or license during or as a consequence of the TV program. The electronic appliance where storage is to take place according to the present invention may be any device separate from the TV receiver and from the STB that is provided with a non volatile storage capability and is adapted to store in a non volatile manner the content specified by the user, i.e., to store the content for a time sufficient to allow the user to play it at a time of her/his choice.

The electronic appliance where storage is to take place according to the present invention may be connected directly or indirectly to the TV receiver. An example of a direct connection would be through an USB port or a Bluetooth link or some dedicated cable. An example of indirect connection would be through e.g. a home local area network. In this case, the storage of contents into the electronic appliance may takes place through the TV receiver.

One further possibility is that the electronic appliance is a smartcard (or chip card), for example a SIM card. This is a typical case when the contents correspond to keys; anyway, it is also applicable to Java games, sounds or images for mobile cellular phones.

The electronic appliance where storage is to take place according to the present invention may be connected

directly or indirectly to the Internet. In this case, the transfer of contents into the electronic appliance may take place directly from an information server via the Internet and e.g. through the access gateway without the help of the TV receiver.

The electronic appliance where storage is to take place according to the present invention may be connected directly or indirectly to a fixed or mobile telephone network. In this case, the transfer of contents into the electronic appliance may take place directly from an information server through the telephone network without the help of the TV receiver.

One or more of the steps set out above may be carried out taking into account the identity of a user and/or of the TV receiver, the identity being stored in the TV receiver or in a smartcard associated to the TV receiver. This feature is useful for limiting or discriminating the possibility of storage e.g. according to service subscriptions or regional/national preferences.

One or more of the steps set out above may be carried out taking into account a user profile, the user profile being stored in the TV receiver or in a smartcard associated to the TV receiver. This feature is useful for personalizing the offer of contents to the various different users; as it is known more and more users expect personalized services; for example, if a user is interested only in classic music no red dot will appear on his screen when only pop music contents are associated to the TV program he is watching.

Typically, step C and said step D are carried out by the TV receiver through an interactive application stored or downloaded into the TV receiver.

Typically, step C provides that at least one image is displayed on a display associated to the TV receiver; this image could be a menu partially superimposed to the TV video sequence.

Typically, step D provides that the TV receiver receives input from the user; this input could derive from the keys of the remote control device of the TV receiver.

Typically, step E provides that the TV receiver sends at least one message to an information center through a wired data network or wireless data network or telephone network.

Many possibilities exist for the content of such message sent from the TV receiver to the information center; additionally, a number of consecutives messages may be provided.

If at step C only one single content item was offered to the user, at step E the message should indicate (explicitly or implicitly) the interest of the user to this single item; if at step C some content items were offered to the user, at step E the message should contain information identifying the contents specified by the user.

At step E, the message may indicate the identity of the TV receiver and/or of the user; this may be useful for billing the cost of the contents specified by the

user or for checking the authorization of the user to store the contents specified.

As already mentioned, step E may provide that the TV receiver detects the operative status of the electronic appliance before sending one or more messages to the information center; additionally, step E may provide that the TV receiver alerts the user if it detects that the electronic appliance is not operative, i.e. not ready or able to store contents.

At step E, the message may indicate a telecommunication address, for example the IP address, of the electronic appliance. This is useful for allowing that the information center is able to communicate directly with the electronic appliance e.g. for carrying out the transfer of the contents. For example, the information center might transfer an image (to be used as background image) to a mobile cellular phone by making a direct phone call.

At step E, the message may indicate a service request for the provision of contents to the user in push mode. It is in fact possible that during a TV program it is offered to the user not simply one or more contents items but e.g. a subscription for the regular reception of content items. For example, a user may be interested in regularly updating his MP3 player with the song of a certain singer or in regularly updating his PDA with the stock rates of a certain company or in regularly receiving on his UMTS cellular phone the trailers of the new films etc.

Step E (collection) and step F (storage) may be carried out through two different communication channels; in fact, collection may require a narrow bandwidth while

storage may require a wide bandwidth; additionally, collection is primarily carried out by the TV receiver while storage is primarily carried out by the electronic appliance.

As already mentioned, the contents specified by the user may be transmitted by the information center in step E and/or in step F to the TV receiver for temporary storage or directly to said electronic appliance.

A first possibility for such transmission of contents (used in the embodiment described herein in detail) is to use the return channel of a TV system which is a bidirectional communication link.

A second possibility for such transmission of contents is broadcast transmission through the same TV signals; as the bandwidth for such transmission of contents within a TV signal is limited, the transfer of contents may be rather slow.

As already mentioned, other possibilities exist. The storage of the contents specified by the user at step F may be carried after a certain period of time from the collection at step E, in particular it may be carried out immediately after.

The storage of the contents specified by the user at step F may be carried at a time specified by the user or at a time specified by the information center.

According to a further aspect the present invention relates also to a TV receiver having the features (hardware and/or software) adapted to carry out the method set out above, particularly only steps from A to E or all the steps from A to F.

CLAIMS

1. Method for storing contents associated to a TV program into an electronic appliance (180), comprising the steps of:

A) receiving a TV signal through a TV receiver (140), the TV signal carrying at least the TV program and data relating to contents associated to said TV program,

B) decoding the TV signal and identifying said contents data,

C) asking the user (200) his interest in said contents,

D) getting a reply from the user specifying which of said contents he is interested in,

E) collecting said specified contents, and

F) storing said collected contents into an electronic appliance (180);

wherein said steps are carried out sequentially and automatically.

2. Method according to claim 1, wherein said collected contents are stored into non-volatile storage means of said electronic appliance.

3. Method according to claim 1, wherein said contents associated to said TV program are multimedia contents.

4. Method according to claim 1, wherein said contents associated to said TV program are keys for decrypting multimedia contents or licenses for using multimedia contents or keys for receiving multimedia contents.

5. Method according to claim 1, wherein said electronic appliance is connected directly or indirectly to said TV receiver.

6. Method according to claim 5, wherein said electronic appliance is a smart card.

7. Method according to claim 1, wherein said electronic appliance is connected directly or indirectly to the Internet.

8. Method according to claim 1, wherein said electronic appliance is connected directly or indirectly to a fixed or mobile telephone network.

9. Method according to claim 1, wherein one or more of said steps is carried out taking into account the identity of said user and/or of said TV receiver, said identity being stored in said TV receiver or in a smartcard associated to said TV receiver.

10. Method according to claim 1, wherein one or more of said steps is carried out taking into account a user profile, said user profile being stored in said TV receiver or in a smart card associated to said TV receiver.

11. Method according to claim 1, wherein said step C and said step D are carried out by said TV receiver through an interactive application stored or downloaded into said TV receiver.

12. Method according to claim 1, wherein said step C provides that at least one image is displayed on a display associated to said TV receiver.

13. Method according to claim 1, wherein said step D provides that said TV receiver receives input from the user.

14. Method according to claim 1, wherein said step E provides that said TV receiver sends at least one message to an information center through a wired or wireless data or telephone network.

15. Method according to claim 14, wherein said step E provides that said TV receiver sends to said information center information identifying said specified contents.

16. Method according to claim 14, wherein said step E provides that said TV receiver sends to said information center the identity of said TV receiver and/or of said user.

17. Method according to claim 14, wherein said step E provides that said TV receiver detects the operative status of said electronic appliance before sending said at least one message to said information center.

18. Method according to claim 17, wherein said step E provides that said TV receiver alerts the user if it detects that said electronic appliance is not operative.

19. Method according to any of claims from 14 to 18, wherein said step E provides that said TV receiver sends to said information center a telecommunication address of said electronic appliance.

20. Method according to any of claims from 14 to 19, wherein said at least one message comprises a service request for the provision of contents in push mode.

21. Method according to claim 1, wherein said step E and said step F are carried out through two different communication channels.

22. Method according to claim 1, wherein said step E and/or said step F provides that an information center sends said specified contents to said TV receiver for temporary storage or directly to said electronic appliance.

23. Method according to claim 22, wherein said step E and/or said step F provides that said information center sends said specified contents through the return channel of a TV system.

24. Method according to claim 22, wherein said step E and/or said step F provides that said information center sends said specified contents in broadcast mode in particular through TV signals.

25. Method according to claim 1, wherein said step F is carried out at a time specified by said user.

26. Method according to claim 1, wherein said step F is carried out at a time specified by an information center.

27. Method according to claims 25 or 26, wherein said step F is carried out after a certain period of time from said step E.

28. TV receiver (140) characterized by being adapted to carry out at least steps from A to F of the method according to any of claims from 1 to 29 when connected to an electronic appliance provided with non volatile storage capability.

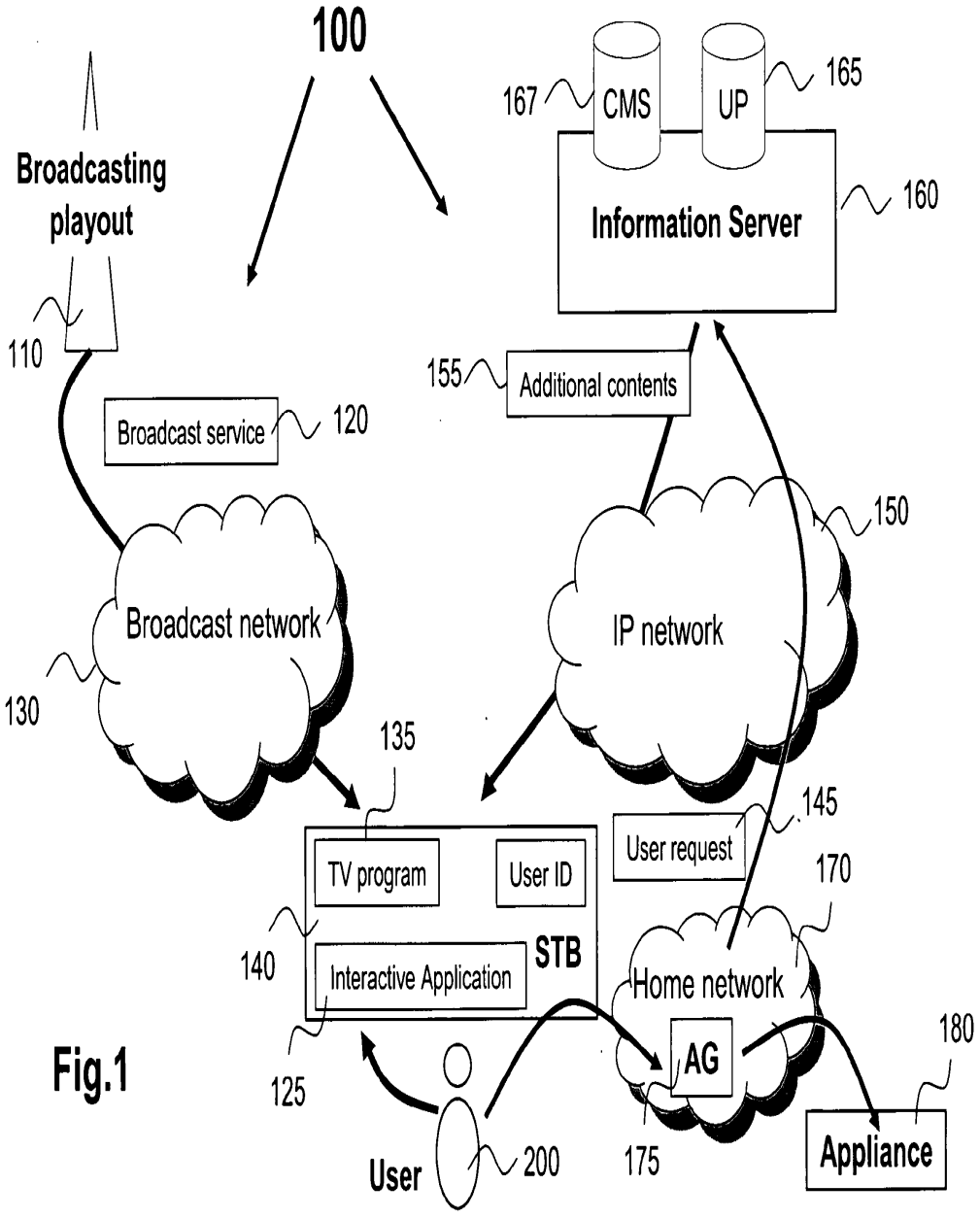

100
Broadcasting playout
110
167
CMS
UP
165
Information Server
160
155
Additional contents
Broadcast service
120
150
Broadcast network
IP network
130
135
145
User request
TV program
User ID
170
140
Interactive Application
STB
Home network
AG
180
125
User
200
175
Appliance

Fig.1

The user switches on the TV and STB
0
The user is watching a TV program
1
A red sign appears on the screen and
the user push the red button on the Remote Control
2
A list of items and information appear on the screen
3
The user push the red button
on the Remote Control
5
Is the user interested in any item?
4
NO
YES
The user selects the items to be downloaded and identifies the target appliance
6
A notification appears on the TV screen
To remind the user to switch on the appliance
8
Is the appliance on and connected?
7
NO
YES
The interactive application converts the user request into messages
and send them to the information server
9
The information server downloads the contents
10
The user can disconnect the appliance and enjoy the content
11

Fig.2

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2006/005206

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04N5/44

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H04N

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 101 39 669 A1 (RTL NEWMEDIA GMBH [DE] RTL INTERACTIVE GMBH [DE]) 27 February 2003 (2003-02-27)	1,3,5, 7-28
Y	paragraph [0011]; figures 1,5	2,4
Y	US 5 907 350 A (NEMIROFSKY FRANK R [US]) 25 May 1999 (1999-05-25)	2,4
A	column 2, line 59 - column 4, line 64	1,28
X	US 2004/172662 A1 (DANKER DANIEL [US] ET AL) 2 September 2004 (2004-09-02) paragraph [0003]; figures 1-4 paragraph [0018] - paragraph [0046]	1,3,5, 7-28
A	US 2002/194264 A1 (UCHIYAMA KOICHIRO [JP] ET AL) 19 December 2002 (2002-12-19) figure 8	1-28

-/--

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 January 2007	19/01/2007

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Brod, Rosemarie

2

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2006/005206

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2003/061607 A1 (HUNTER CHARLES ERIC [US] ET AL) 27 March 2003 (2003-03-27) figures 1-3	1-28
A	US 2005/086690 A1 (GILFIX MICHAEL [US] ET AL) 21 April 2005 (2005-04-21) figures 4-6	1-28
A	EP 1 304 876 A2 (ATI TECHNOLOGIES INC [CA]) 23 April 2003 (2003-04-23) figures 1,2	1-28

2

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2006/005206

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2006/005206

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 10139669 A1	27-02-2003	NONE	
US 5907350 A	25-05-1999	NONE	
US 2004172662 A1	02-09-2004	NONE	
US 2002194264 A1	19-12-2002	WO 02099696 A2 JP 2004530390 T	12-12-2002 30-09-2004
US 2003061607 A1	27-03-2003	NONE	
US 2005086690 A1	21-04-2005	CN 1610405 A	27-04-2005
EP 1304876 A2	23-04-2003	US 2003079224 A1	24-04-2003

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
1 December 2011 (01.12.2011)

PCT

(10) International Publication Number
WO 2011/148054 A1

(51) International Patent Classification:
G06F 17/30 (2006.01) *H04N 5/445* (2011.01)

(21) International Application Number:
PCT/FI2011/050472

(22) International Filing Date:
24 May 2011 (24.05.2011)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
20105574 25 May 2010 (25.05.2010) FI

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

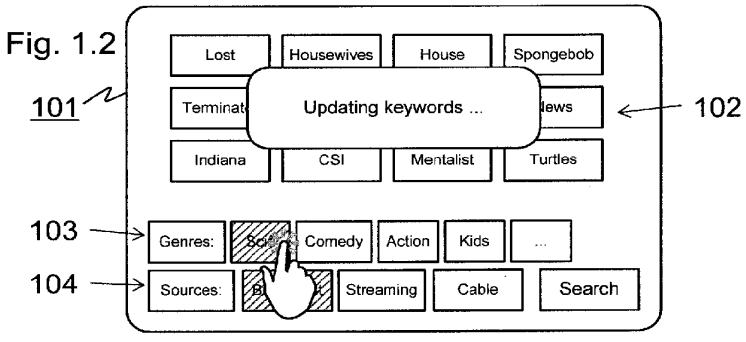
(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(54) **Title**: USER INTERFACE FOR MEDIA DEVICE



(57) **Abstract**: A user interface for a media device for: determining a present context of a media usage application; determining search terms based on metadata related to media items that are available within the present context; forming a search criteria collection comprising a plurality of search criteria from the determined search terms; graphically displaying the search criteria collection to a user; allowing the user to select desired search criteria; detecting user selection of a search criterion in the search criteria collection and responsively after each selection of a search criterion updating the search criteria collection such that the search criteria in the updated search criteria collection match with all the selected search criteria; and searching for media items that are available within the present context to filter media items the metadata of which matches with the selected search criteria.

WO 2011/148054 A1

USER INTERFACE FOR MEDIA DEVICE

TECHNICAL FIELD

The present invention generally relates to a user interface for a media device. The invention relates particularly, though not exclusively, to a user interface of mobile television with a touch display.

BACKGROUND ART

Television sets have become increasingly intelligent appliances. Some television sets feature recording, electronic program guide and even time shifting capabilities. On the other hand, similar features are being provided for mobile devices such as portable television receivers and dedicated portable television sets. Moreover, other sources of media are also being used for rendering media to a user by various media devices. However, the portable devices in particular may suffer from restricted display size such that typical menu based access to various functions and operations may appear laborious and unintuitive. This problem is further accented by the increasing number of new functions and decreasing size of mobile televisions or media devices in general. Hence, it is an object of the invention to further enhance the user interface of media devices.

SUMMARY

According to a first aspect of the invention there is provided a method comprising:

determining a present context of a media usage application;

determining search terms based on metadata related to media items that are available within the present context;

forming a search criteria collection comprising a plurality of search criteria from the determined search terms;

graphically displaying the search criteria collection to a user;

allowing the user to select desired search criteria;

detecting user selection of a search criterion in the search criteria collection and responsively after each selection of a search criterion updating the search criteria collection such that the search criteria in the updated search criteria collection match with all the selected search criteria; and

searching for media items that are available within the present context to filter media items the metadata of which matches with the selected search criteria.

Advantageously, the method may enable performing context-sensitive searches without need to type search words. Moreover, by automatically adapting the search criteria collection, the search may rapidly be focused to media items desired by the user.

The determining of the present context may involve determining a broadcast context in which broadcast media items are being defaulted to content source.

The determining of the present context may involve determining a streaming context in which streaming media items are being defaulted to content source.

The determining of the present context may involve determining a cable context in which cable television media items are being defaulted to content source.

The method may further comprise selecting one or more alternative content sources of media items. Advantageously, when checking other television programs while watching terrestrial TV, the user may quickly expand or shift the search to other media sources.

The method may further comprise determining one or more attributes related to presently consumed media content and determining the present context using said one or more attributes. The attributes may relate to metadata items, genres and content sources.

The method may further comprise allowing the user to define a group of search criteria for producing a representative single Boolean value for combining with one or more other search criteria or groups of search criteria.

Advantageously, the method may allow forming powerful searches by combining conditions related to two or more different search criteria into a single representative Boolean value.

The method may further comprise modifying search conditions that link different search criteria together. The search conditions may comprise one or more of the following: AND; NOT; OR; NEAR; XOR (exclusive OR).

Advantageously, the search may be easily and intuitively modified by the user. The modification of the search may be implemented by selecting again a selected search criterion and cycling associated search condition through a set of different alternatives for the search condition.

The method may further comprise removing a given search criterion from the selected search criteria by selecting said given search criterion again. The removing may be performed when the search condition has been selected again so many times that all the available search conditions have been cycled through.

The method may further comprise additionally searching for media items that are available within the present context to filter media items the metadata of which matches at least partially with the selected search criteria. The additional searching may be carried out simultaneously with the searching for media items that are available within the present context to filter media items the metadata of which matches with the selected search criteria. The results (or their subset) of the additional searching may be presented on or after presenting the results of the searching for media items that are available within the present context to filter media items the metadata of which matches with the selected search criteria.

According to a second aspect of the invention there is provided an apparatus configured to perform a method according to the first aspect of the invention. The apparatus may be configured to perform any embodiment of the first aspect.

According to a third aspect of the invention there is provided a computer program configured to cause a computer, when performing the computer program, to perform a method according to the first aspect of the invention. The computer program may be configured to cause the computer to perform any embodiment of the first aspect.

According to a third aspect of the invention there is provided a memory medium carrying any foregoing computer program.

The memory medium may comprise a digital data storage such as a data disc or diskette, optical storage, magnetic storage, holographic storage, opto-magnetic storage, phase-change memory, resistive random access memory, magnetic random access memory, solid-electrolyte memory, ferroelectric random access memory, organic memory or polymer memory. The memory medium may be formed into a device without other substantial functions than storing memory or it may be formed as part of a device with other functions, including but not limited to a memory of a computer, a chip set, and a sub assembly of an electronic device.

Different non-binding aspects and embodiments of the present invention have been illustrated in the foregoing. The above embodiments are used merely to explain selected aspects or steps that may be utilized in implementations of the present invention. Some embodiments may be presented only with reference to certain aspects of the invention. It should be appreciated that corresponding embodiments may apply to other aspects as well.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described, by way of example only, with reference to the accompanying drawings, in which:

Figs. 1.1 to 1.6 show a set of different drawings illustrating different screens and acts by a user in a use case according to a first example of the invention;

Figs. 2.1 to 2.8 show a set of different drawings illustrating different screens and acts by a user in a use case according to a second example of the invention;

Figs. 3.1 to 3.6 show a set of different drawings illustrating different screens and acts by a user in a use case according to a third example of the invention;

Figs. 4.1 to 4.4 show a set of different drawings illustrating different screens and acts by a user in a use case according to a first example of the invention;

Figs. 5.1 and 5.2 show a set of different drawings illustrating different screens and acts by a user in a use case according to a fifth example of the invention; and

Fig. 6 shows a schematic drawing of a mobile media device according to an embodiment of the invention.

DETAILED DESCRIPTION

In the following description, like numbers denote like elements.

This description discloses various embodiments of the invention. The description uses only for illustration an example apparatus a mobile media device with a touch screen and also with a television receiver or more decoder. It is appreciated that other input methods are likewise applicable for use, such as input methods as the following: computer mouse, multi-touch track pad, keyboard and remote controller. Moreover, it is not intended to restrict the invention to mobile media devices: to the contrary, embodiments of the invention exist in which a desktop computer, set top box, television set, game console or other fixed applicance or home appliance is used to provide one or more features of the invention.

Numerous different embodiments are explained here in connection with one another solely to demonstrate at least one way in which these embodiments can interwork without intention to restrict the invention to use of all or any of these embodiments. Instead, each of these embodiments is intended to serve as an invention for this patent application or any continuation or divisional application.

In this document, the term television decoder is intended to cover both television broadcast signal reception (and decoding) devices for cable, terrestrial or satellite networks as well as packet data and other distribution networks provided media reception.

Fig. 6 shows a schematic drawing of a mobile media device 100 according to an embodiment of the invention. The mobile media device 100 comprises an antenna connection 110 that either is configured for coupling with an antenna connector or is connected with a mobile antenna. The mobile media device 100 further comprises a display 120, a memory 130 comprising work memory 140 and non-volatile memory 150 with computer executable program code 160. The mobile media device 100 further comprises a television decoder or receiver 170, a user input device 180 and a processor 190 configured to control operation of the mobile media device 100 according to the program code 160 by executing the program code in place in the non-volatile memory 150 or in the work memory 140. The user input device 180 may comprise dedicated parts such as one or more keys, a cursor control device or the like, or the user input device 180 may be formed using the display 120 if the display 120 is a touch display.

The mobile media device 100 may be, for instance, a portable television, game device, mobile phone, personal digital assistant, or a navigation device.

The inventors have realized that when the amount of available audio and video content is large, the user may not easily find the things he is looking for by just browsing. Moreover, entry of text with small media devices is also often challenging because of lack of a proper keyboard. For instance, many devices that have a touch screen user interface are lacking keyboards but instead sport virtual keyboards that are displayed on-screen.

It is next described how using a sophisticated search functionality the user may easily find available desired content. This search functionality provides the user with ability to gather information of the context in which the user invoked the

search and to propose different context-sensitive search criteria (e.g. search key strings) to the user. This search functionality provides the user with ability to modify the proposed search criteria by adding search criteria, removing search criteria and changing search conditions (such as Boolean operators) that are applied to combine the search criteria.

In the following example, a graphical user interface (GUI) is used with an advantage of ease of use to modify search criteria. The GUI has a presentation output for show to the user context related keywords which include pre-selected criteria and other criteria (or criterion) which the user may add to the search criteria.

USE CASE EXAMPLES

Use case 1: sci-fi tonight

The user desires to check if there will be a sci-fi movie broadcasted tonight. This use case is described in the following with reference to Figs. 1.1 to 1.6.

1.1. The user opens a search view from a media management application – initial keywords 102 are shown to the user in a criteria collection. Fig. 1.1 illustrates step 1.1. This is the initial view for a search window 101. The keywords 102 as well as genres 103 and content sources 104 are selected based on existing data and user viewing habits. With shown keywords, it is guaranteed to be found at least one result. At least one content source 104 has to be selected in this particular embodiment. Here the broadcast content source has been automatically selected. In other words, in this phase, a present context of a media usage application is determined, search criteria are formed and displayed to the user.

1.2. The user selects desired program genres 103. The selected genres form part of search criteria and the keywords in the criteria collection are updated based on the selected one or more genres. The user has selected one genre (sci-fi) which is then identified by highlight. As content source, broadcasting has been selected by the user or automatically based on the determined present context. In response to the selection of a search

criterion (the genre), the keywords in the criteria collection are automatically updated, based on the selected genre and content source.

1.3. In response, remaining keywords in the criteria collection are updated based on the user keyword selection. New keywords are shown in the collection of criteria. At this point, all the shown keywords match with selected search criteria "sci-fi" and "broadcast". All of the displayed keywords are extracted from available content items e.g. by looking into program guide data or other available metadata.

It is appreciated that selecting either of the desired program genre 103 or desired keywords 102 may correspond to selecting by the user of desired search criteria.

1.4. The user selects the desired keywords 102. The user selects keywords "Star" and "Galactica". The other keywords of the criteria collection are automatically updated.

1.5. The user desires to conduct a search using the selected criteria. The available content is searched by checking metadata of each content item among a plurality of different content items and then a hit list will be produced indicative of found contents and displayed to the user. All the shown keywords match to the search criteria "sci-fi", "broadcast". All the shown keywords and also related to the selected further criteria i.e. keywords "Star" and "Galactica". The user is happy with these search options and selects "Search" 105.

1.6. A hit list 106 is shown in result of searching with the selected search criteria. If the user is not happy with the results, the user may try changing the search criteria and performing the search again. The search results are shown to the user. A back-key 107 may be provided for the user so that if the user is not satisfied with the results, the user can go back and refine the search options using the back-key. Alternatively, or additionally, the user may edit the selected criteria.

The previously presented first use case exemplified how few keystrokes may suffice to identify desired content item. Moreover, the user need not remember

exact keywords by heart as he is provided with different alternatives to choose from. Further advantageously, there is no need to tap in entire words for use in the search so that also problems caused by typographic errors may be avoided simultaneously with accelerating the search process.

Use case 2: context related search

This use case relates to a case in which the user wants to see what else there is to see related to a user-selected program such as the program being presented or the program for which the user has invoked an information display. In this use case it is shown that keywords are updated every time user modifies search criteria. Another alternative is to maintain a static list of keywords. This alternative may suit in cases where the user sees several valid keywords and wants add them all into search criteria. In order to temporarily freeze the search criteria selection i.e. the keyword list, the user may use a corresponding control or enter individual selections in a manner that is indicative of the desire to avoid adapting of the remaining search criteria. For instance, the user may tap and hold for a while an item in order to avoid changing the remaining search criteria, or tap the screen with many fingers (e.g. on two or more different sides about the criteria selection).

An example of this use case is presented in the following with reference to illustrative Figs. 2.1...2.8:

2.1. The user has program event info 201 displayed, user selects search.

2.2. The search window 101 with keywords, and preselected genres and content source based on current event is shown.

2.3. The user adds also streaming sites to the search options by tapping on this option among the shown alternatives in the sources group 104.

2.4. Search view updates the keywords based on data received from streaming media sites.

2.5. Updated keywords 102 are shown.

2.6. The user selects two keywords 102 “Flashforward” and “teaser”, and keywords are updated automatically.

2.7. The user selects “Search” 105.

2.8. The search result view 202 is shown with programs matching to genre “Sci-

fi" and "action" and are from content sources "broadcast" and "streaming" and contain keywords "Flashforward" and "teaser".

Use case 3: Advanced criteria editing

This use case relates to a case in which the user wants to change the way in which the selected search criteria are combined by grouping some search criteria and by excluding some keywords. This use case presents features similar to using parenthesis marks in text-based Boolean search. In the following, a process is explained with reference to Figs. 3.1 to 3.6:

3.1. The user has initiated search and has a search window 301 with a collection of search criteria some of which have been selected, genres and content source based on current event. The selected search criteria are shown as search terms combined by AND function in a search term field 302.

3.2. The user taps to end of the search criteria area as an indication of a desire to modify the search criteria by adding parentheses to the proposed search criteria. In response, parentheses are added around the selected search criteria in the search term field 302.

3.3. The user selects a further keyword 303 from the keyword collection by tapping that word. The selected further keyword 303 is appended to the search criteria with a Boolean operator "AND" in the search term field 302.

3.4. The user taps once more the further keyword 303 in order to change the Boolean operator that links this keyword to the search criteria. In response, the Boolean operator that links this further keyword to other selected keywords is changed to OR operator.

3.5. The user taps the further keyword 303 once more so that the Boolean operator is changed to NOT. The user is happy with this choice of Boolean operator. If the user tapped fourth time on a given keyword (e.g. on the further keyword), that keyword would be removed from the selected keywords.

3.6. The user desires to change the search criteria so that the Boolean operator between two keywords within the parentheses would be connected by the Boolean operator OR. The user taps once the latter of these keywords. In

response, the latter keyword (Scientists in this example) is tapped and the Boolean operator between the two selected search terms in parentheses is changed. In one further example, the tapped search term is moved to the end of the selected search terms within its nesting level (in parentheses or if outside parentheses, then to the last search term in the list outside the parentheses). Using the example of the starting state of Fig. 3.6, if the user taps again the search term Flashforward, then that term is moved to be the latter search term (in reading direction, accounting for such cultural customization). The previously present Boolean operator AND is removed, and the following Boolean operator OR is inserted before the moved search term.

Use case 4: Results view

This use case starts from the state in which the user has completed search for content items and a results window 202 shows the found items.

4.1. The user desires to see more information of the first item, so he taps the screen on the first item area. Some related action buttons are also shown to the user, such as Record 401, Recommend 402, Remind 403 and/or set favourite 404.

4.2. The user desires to see more information of the third item, so he taps that item or an area about that item that is associated to that item.

4.3. The user desires to set reminder for third item, so he taps the shown reminder button 403. In response, a dialog 405 about the taken action is shown for the user. The dialog may be produced e.g. by presenting to the user a callout that provides a response to the user about the taken action. The callout may disappear automatically. Alternatively, the callout may be closed by using a particular closing control or by tapping outside the callout.

4.4. The user decides to start watching first item, so he taps and holds it. Content 406 of the selected item is rendered for the user.

Use case 5: Automatically updating search results

In large and high resolution devices, the search results and criteria may be displayed simultaneously e.g. in single combination window 501. In this case

search results may be updated every time user modifies the selected search criteria.

5.1. The user has opened the combination window 501 and has some search criteria selected. Related results are shown in response to the selecting of the search criteria. The user further modifies the selected search criteria.

5.2. After the selected search criteria have been modified, the displayed search results are automatically updated correspondingly in the combination window 501.

MISCELLANEOUS FURTHER EMBODIMENTS

Some further examples of different alternatives and options involve the possibility to add day or date criteria such as search today, this week, given date or date range; using of parental guidance rating as a search criterion, and using keywords other than contextually related words, such as recently used or frequently used search criteria. Moreover, various implementations have been designed such as grouping of the search criteria of different types (Related, Last, Most used, etc.) on different tabs; indicating the Boolean operator used with each of the selected search criteria by associated appearance (hatch, color, font appearance etc), displaying of a legend that illustrates which Boolean operator is associated with each of the selected search criteria; and providing a list of different content types for use as search criteria. Moreover, the search criteria or a subset of the search criteria (such as the genre, type and/or source) may be presenting with scrolling controls so that a portion of the search criteria is logically outside the presently displayed area. Further still, the search with the search criteria may comprise two parts, including a first part in which it is searched for media items with metadata that matches with the search criteria, and a second part, in which it is searched for media items with metadata that partially matches with the search criteria. The second part of the search may be carried out simultaneously with the first part, or separately from the first part. For instance, the second part of the search may be carried out only if the number of matching media items is lower than a predetermined lower threshold so that the user can then be presented with a desired number of media items. The number of media items searched and / or presented for the second part may be defined using a) a constant amount, b) based on their matching rate (percentage of similarity with search criteria), c) total

number of media items when counting also the found media items of the first part, or d) any combination of the options a) to c).

Various embodiments have been presented. It should be appreciated that in this document, words comprise, include and contain are each used as open-ended expressions with no intended exclusivity.

The foregoing description has provided by way of non-limiting examples of particular implementations and embodiments of the invention a full and informative description of the best mode presently contemplated by the inventors for carrying out the invention. It is however clear to a person skilled in the art that the invention is not restricted to details of the embodiments presented above, but that it can be implemented in other embodiments using equivalent means or in different combinations of embodiments without deviating from the characteristics of the invention.

Furthermore, some of the features of the above-disclosed embodiments of this invention may be used to advantage without the corresponding use of other features. As such, the foregoing description shall be considered as merely illustrative of the principles of the present invention, and not in limitation thereof. Hence, the scope of the invention is only restricted by the appended patent claims.

Claims:

1. A method comprising:

determining a present context of a media usage application;

determining search terms based on metadata related to media items that are available within the present context;

forming a search criteria collection comprising a plurality of search criteria from the determined search terms;

graphically displaying the search criteria collection to a user;

allowing the user to select desired search criteria;

detecting user selection of a search criterion in the search criteria collection and responsively after each selection of a search criterion updating the search criteria collection such that the search criteria in the updated search criteria collection match with all the selected search criteria; and

searching for media items that are available within the present context to filter media items the metadata of which matches with the selected search criteria.

2. The method of claim 1, wherein the determining of the present context involves determining a present content source context in which present content source is defaulted to content source.

3. The method of claim 2, wherein the determining of the present context is based on the metadata of a currently selected program.

4. The method of claim 2 or 3, wherein the determining of the present context involves determining presently available content sources and defaulting to the content source the presently available content sources.

5. The method of any one of the preceding claims, wherein the method further comprises selecting one or more alternative content sources of media items.

6. The method of any one of the preceding claims, wherein the method further comprises determining one or more attributes related to presently consumed media content and determining the present context using said one or more attributes.

7. The method of any one of the preceding claims, wherein the method further comprises allowing the user to define a group of search criteria for producing a representative single Boolean value for combining with one or more other search criteria or groups of search criteria.

8. The method of any one of the preceding claims, wherein the method further comprises modifying search conditions that link different search criteria together.

9. An apparatus comprising a memory comprising operating instructions and a processor configured to cause the apparatus to perform according to the operating instructions the method according to any one of the preceding claims.

10. A computer executable program comprising computer executable program code configured to cause a program, when executing the program code, to perform the method according to any one of the claims 1 to 8.

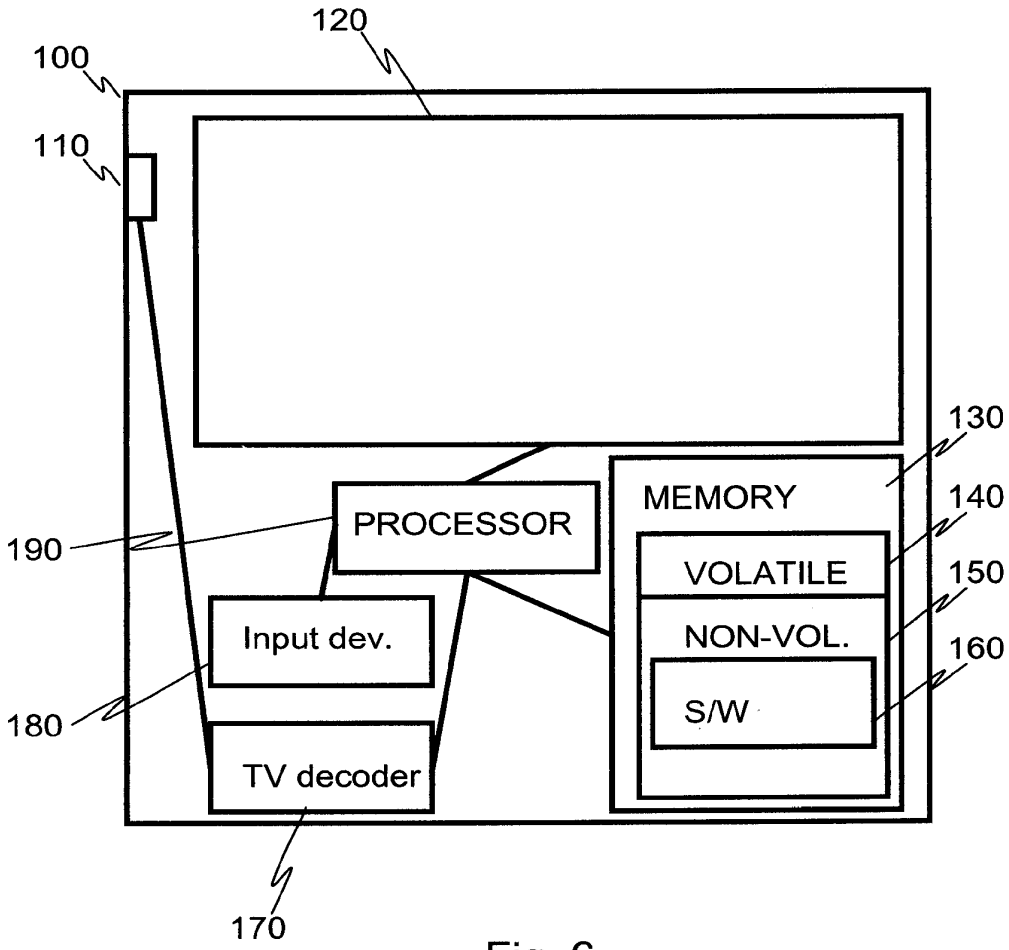

120
100
110
130
MEMORY
140
PROCESSOR
190
VOLATILE
150
Input dev.
NON-VOL.
160
S/W
180
TV decoder
170

Fig. 6

Fig. 1.1

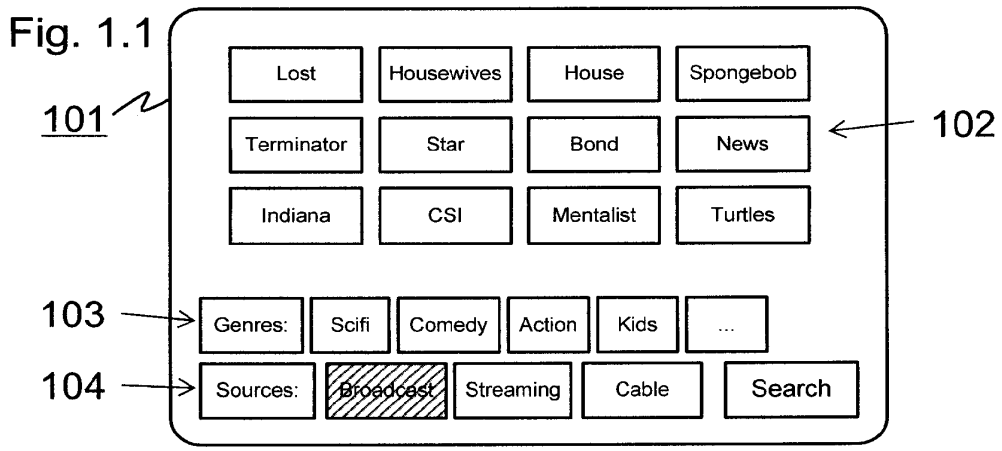


Fig. 1.2

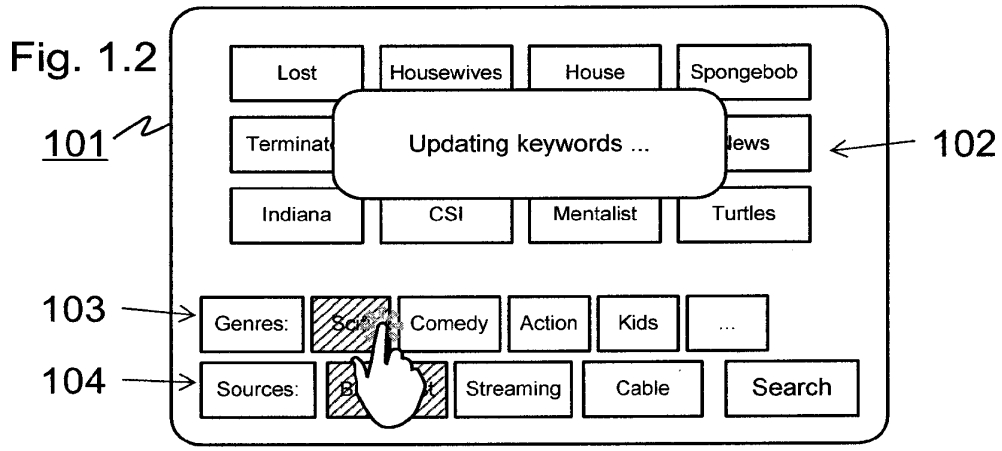


Fig. 1.3

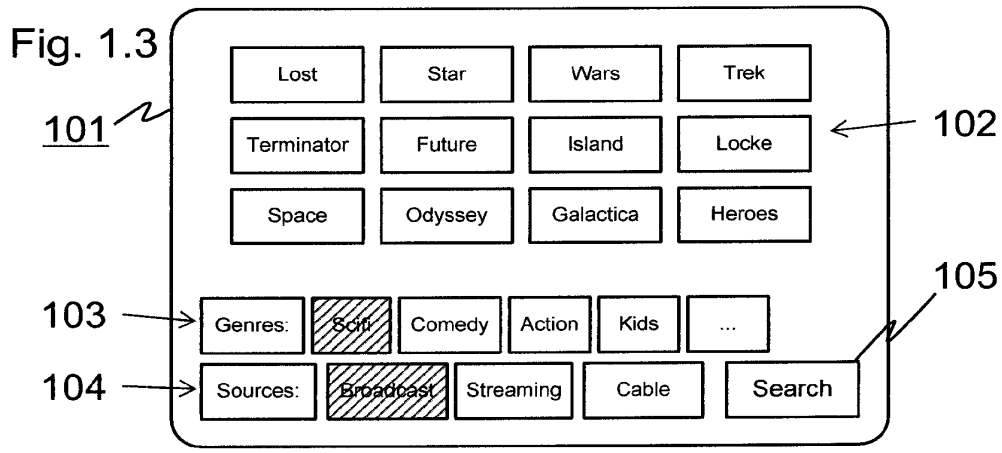


Fig. 1.4

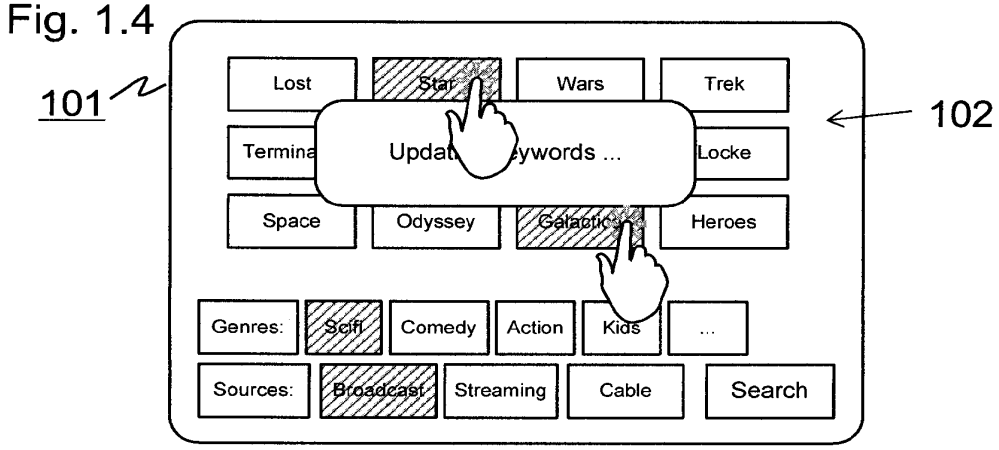


Fig. 1.5

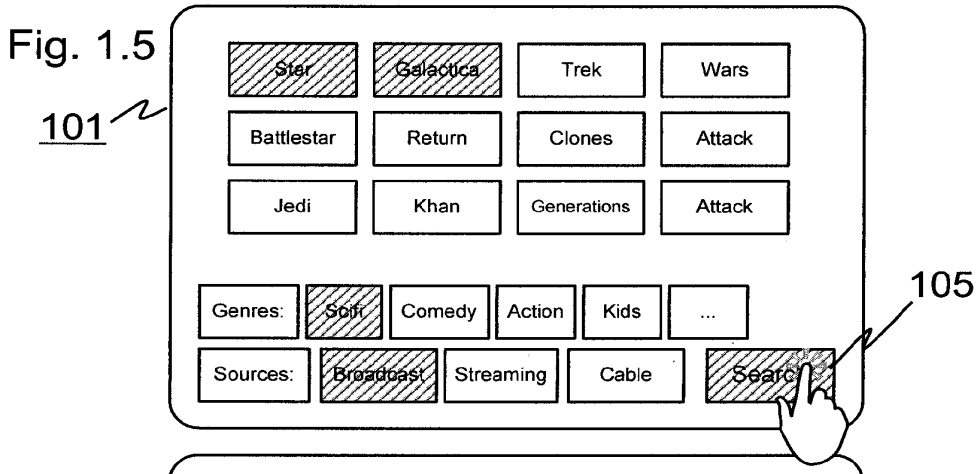


Fig. 1.6

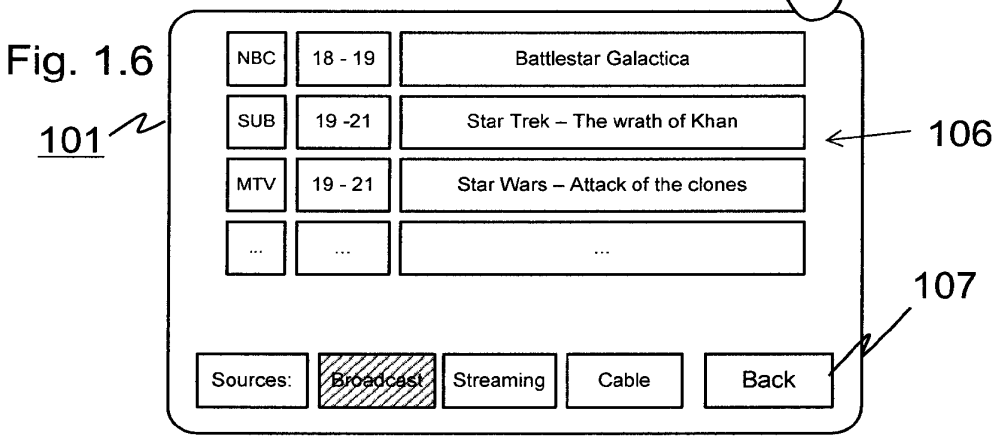


Fig. 2.1

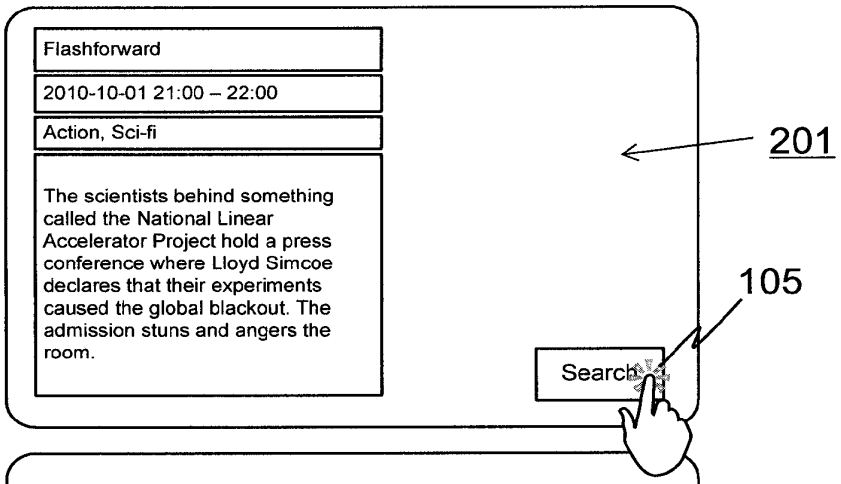


Fig. 2.2

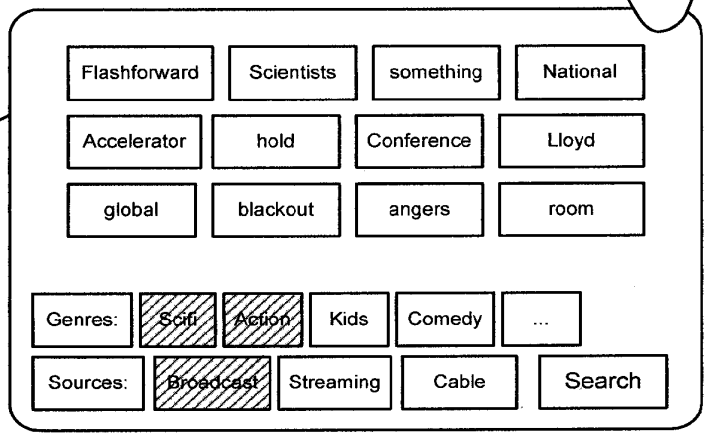


Fig. 2.3

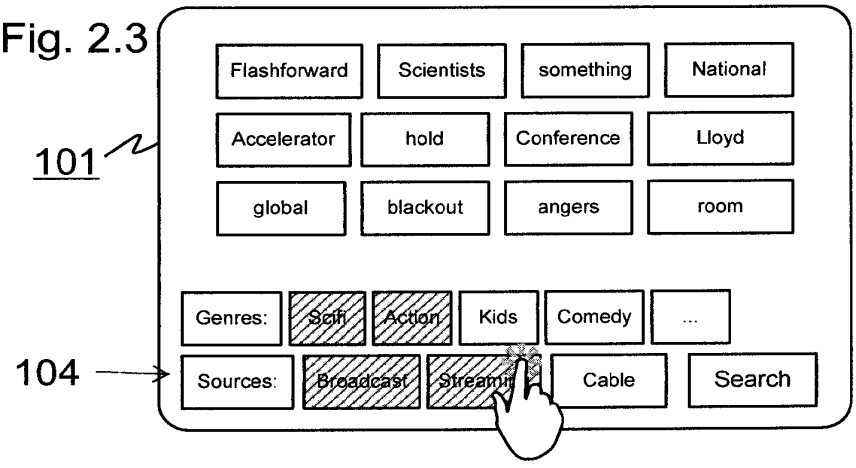


Fig. 2.4

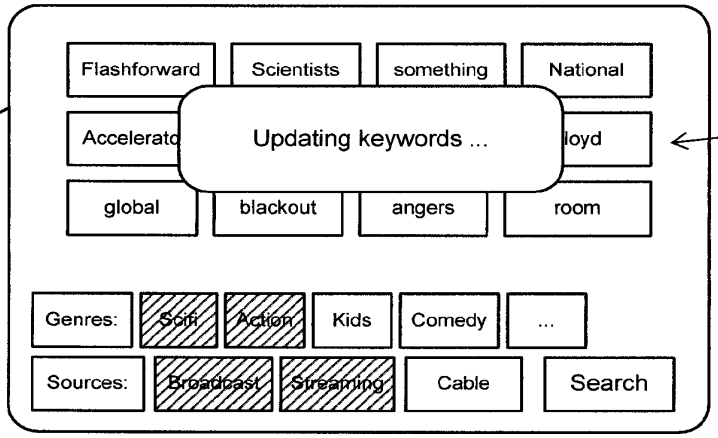


Fig. 2.5

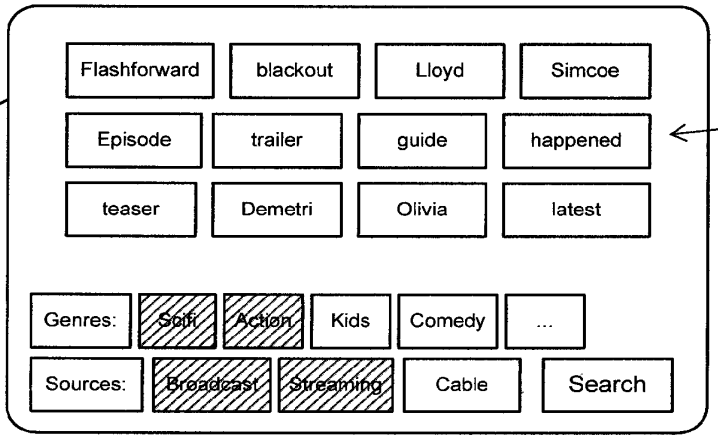


Fig. 2.6

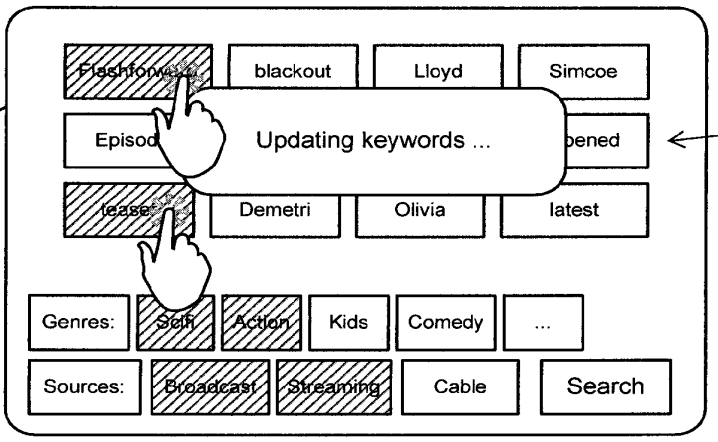


Fig. 2.7

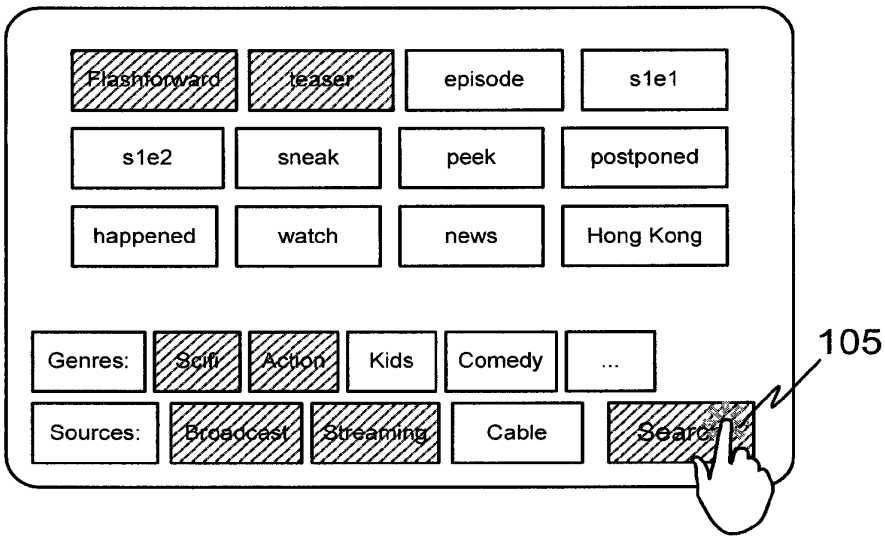
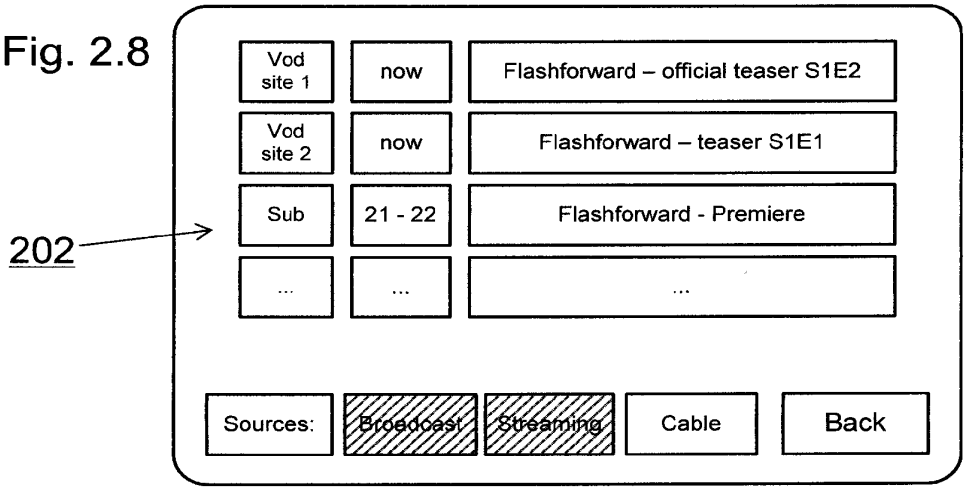

Flashforward
teaser
episode
s1e1
s1e2
sneak
peek
postponed
happened
watch
news
Hong Kong
Genres:
Scifi
Action
Kids
Comedy
...
Sources:
Broadcast
Streaming
Cable
Search
105

Fig. 2.8


202
Vod site 1
now
Flashforward – official teaser S1E2
Vod site 2
now
Flashforward – teaser S1E1
Sub
21 - 22
Flashforward - Premiere
...
...
...
Sources:
Broadcast
Streaming
Cable
Back

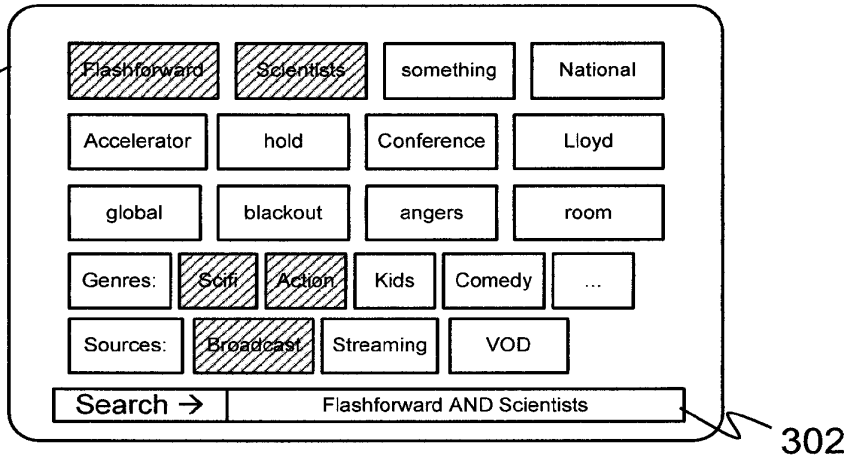

301
Flashforward
Scientists
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National
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hold
Conference
Lloyd
global
blackout
angers
room
Genres:
Scifi
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Comedy
...
Sources:
Broadcast
Streaming
VOD
Search →
Flashforward AND Scientists
302

Fig. 3.1

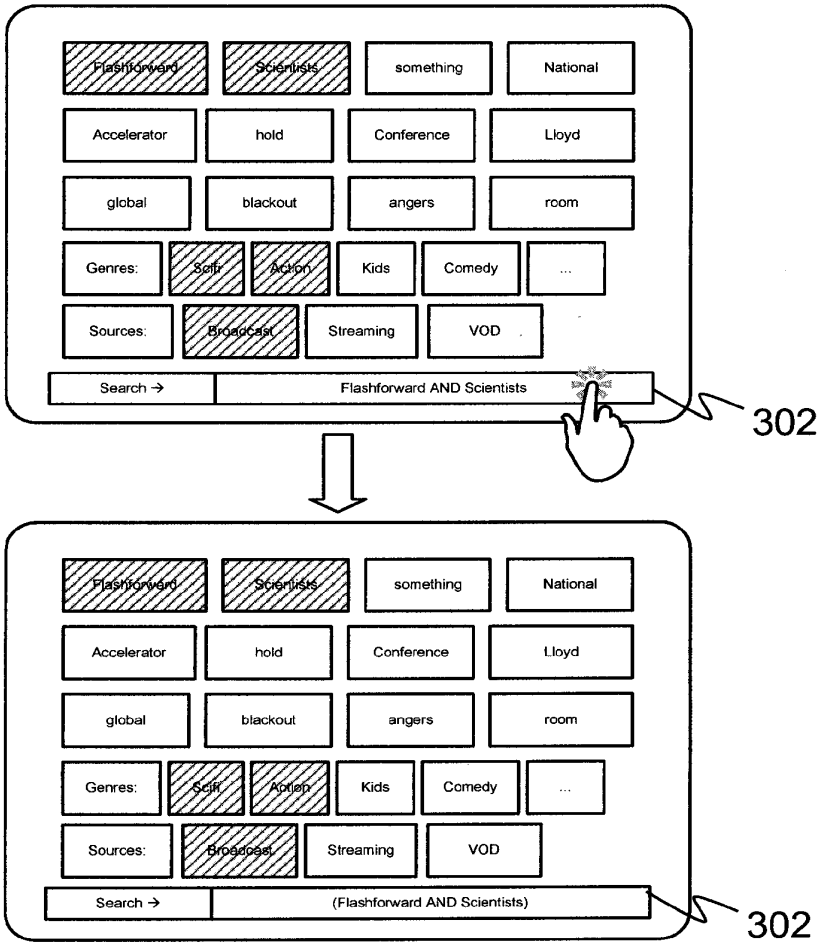

Flashforward
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hold
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global
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angers
room
Genres:
Scifi
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Kids
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Broadcast
Streaming
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Flashforward AND Scientists
302
Flashforward
Scientists
something
National
Accelerator
hold
Conference
Lloyd
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Genres:
Scifi
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...
Sources:
Broadcast
Streaming
VOD
Search →
(Flashforward AND Scientists)
302

Fig. 3.2

Fig. 3.3

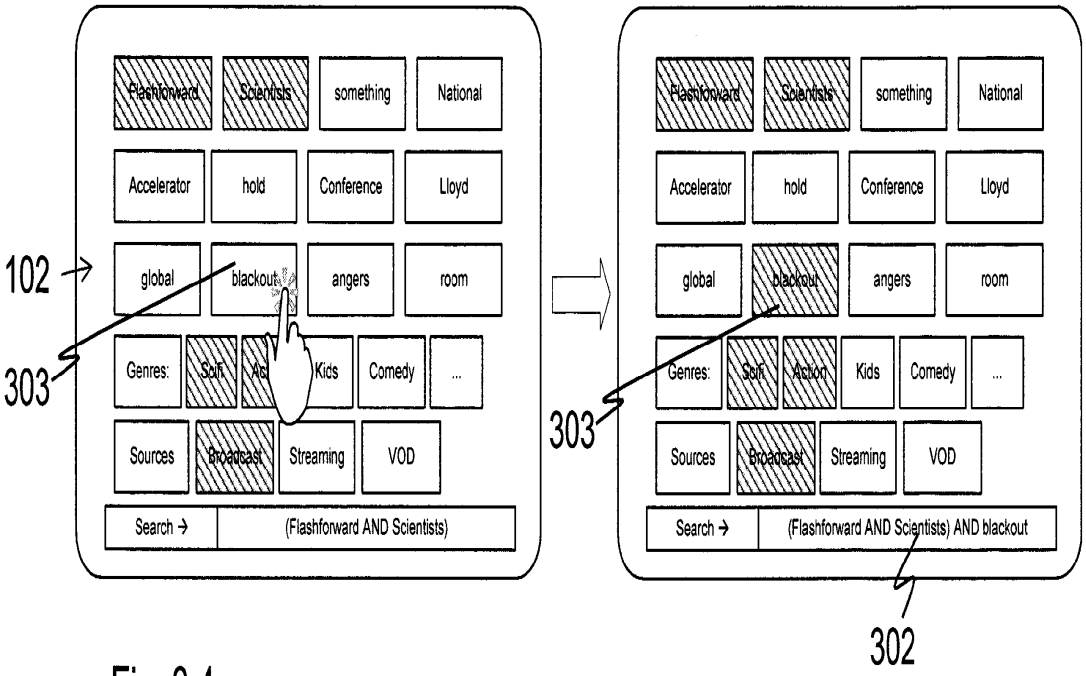

Flashforward
Scientists
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room
Genres:
Scifi
Kids
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Broadcast
Streaming
VOD
Search →
(Flashforward AND Scientists)
102
303
Flashforward
Scientists
something
National
Accelerator
hold
Conference
Lloyd
global
blackout
angers
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Genres:
Scifi
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...
Sources
Broadcast
Streaming
VOD
Search →
(Flashforward AND Scientists) AND blackout
303
302

Fig. 3.4

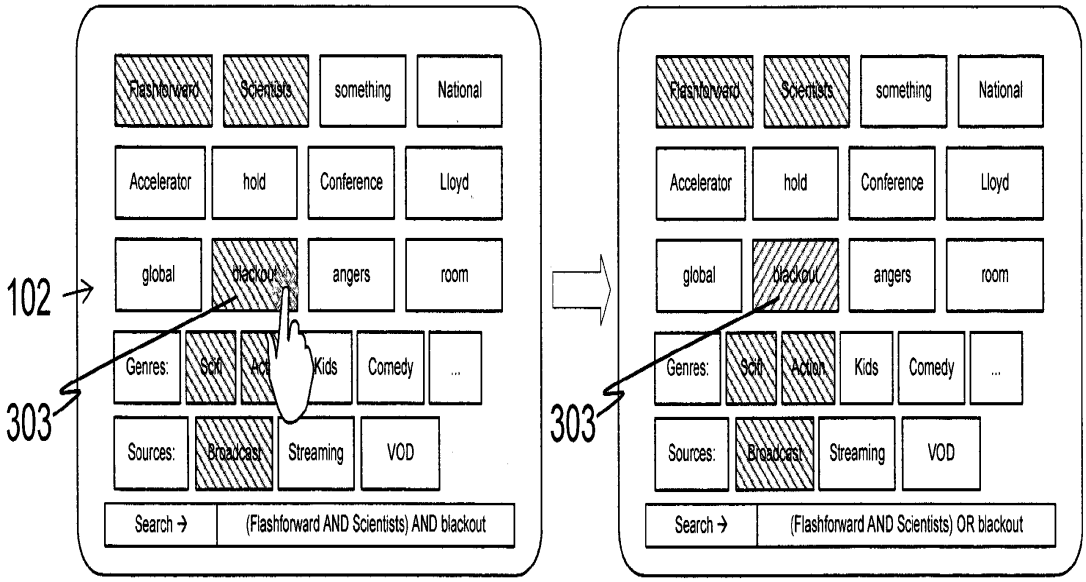

Flashforward
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Genres:
Scifi
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Sources:
Broadcast
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Search →
(Flashforward AND Scientists) AND blackout
102
303
Flashforward
Scientists
something
National
Accelerator
hold
Conference
Lloyd
global
blackout
angers
room
Genres:
Scifi
Action
Kids
Comedy
...
Sources:
Broadcast
Streaming
VOD
Search →
(Flashforward AND Scientists) OR blackout
303

Fig. 3.5

Flashforward
Scientists
something
National
Accelerator
hold
Conference
Lloyd
global
blackout
angers
room
Genres:
Scifi
Action
Kids
Comedy
...
Sources:
Broadcast
Streaming
VOD
Search →
(Flashforward AND Scientists) OR blackout
102
303
(Flashforward AND Scientists) NOT blackout
302

Fig. 3.6

Flashforward
Scientists
something
National
Accelerator
hold
Conference
Lloyd
global
blackout
angers
room
Genres:
Scifi
Action
Kids
Comedy
...
Sources:
Broadcast
Streaming
VOD
Search →
(Flashforward AND Scientists) NOT blackout
(Flashforward OR Scientists) NOT blackout

Fig. 4.1

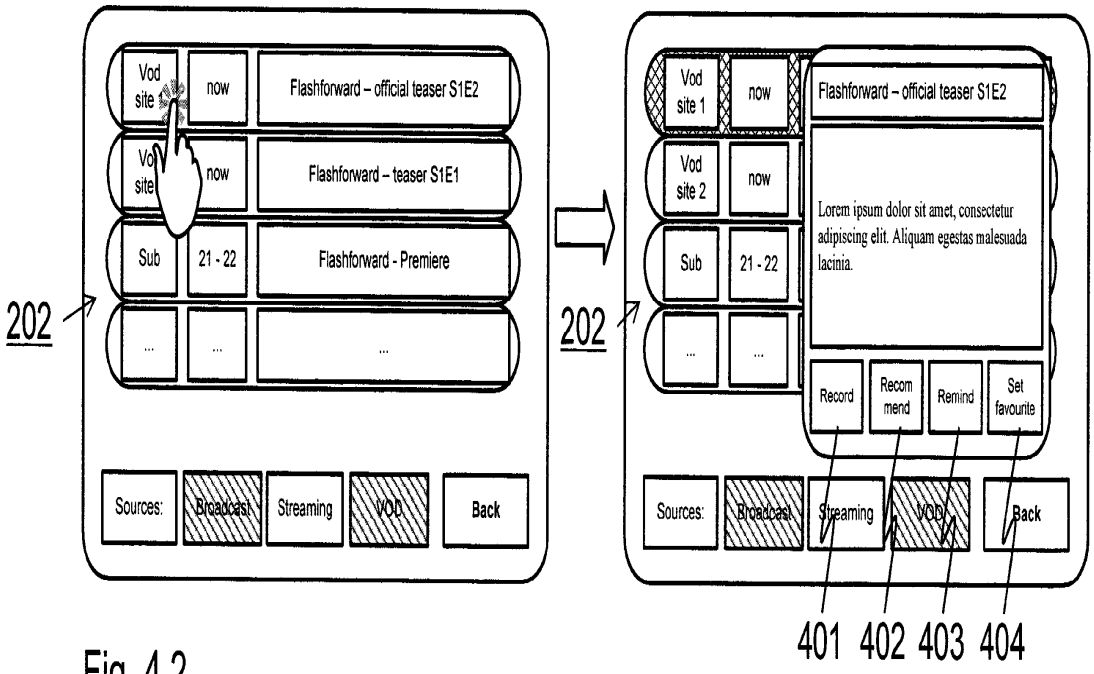

202
Vod site
now
Flashforward – official teaser S1E2
Vod site
now
Flashforward – teaser S1E1
Sub
21 - 22
Flashforward - Premiere
...
...
...
Sources:
Broadcast
Streaming
VOD
Back
202
Vod site 1
now
Flashforward – official teaser S1E2
Vod site 2
now
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Aliquam egestas malesuada lacinia.
Sub
21 - 22
...
...
Record
Recom mend
Remind
Set favourite
Sources:
Broadcast
Streaming
VOD
Back
401 402 403 404

Fig. 4.2

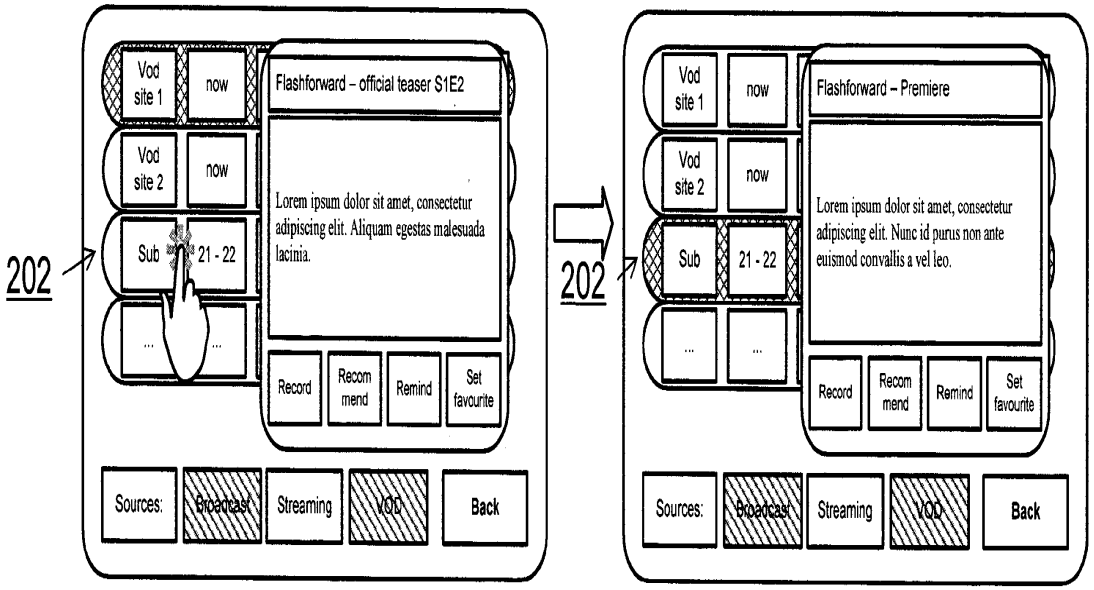

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Vod site 2
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Vod site 1
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Fig. 4.3

Vod site 1
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Sources:
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Reminder set for Flashforward - Premiere
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Fig. 4.4

Vod site 1
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Sources:
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406

Fig. 5.1

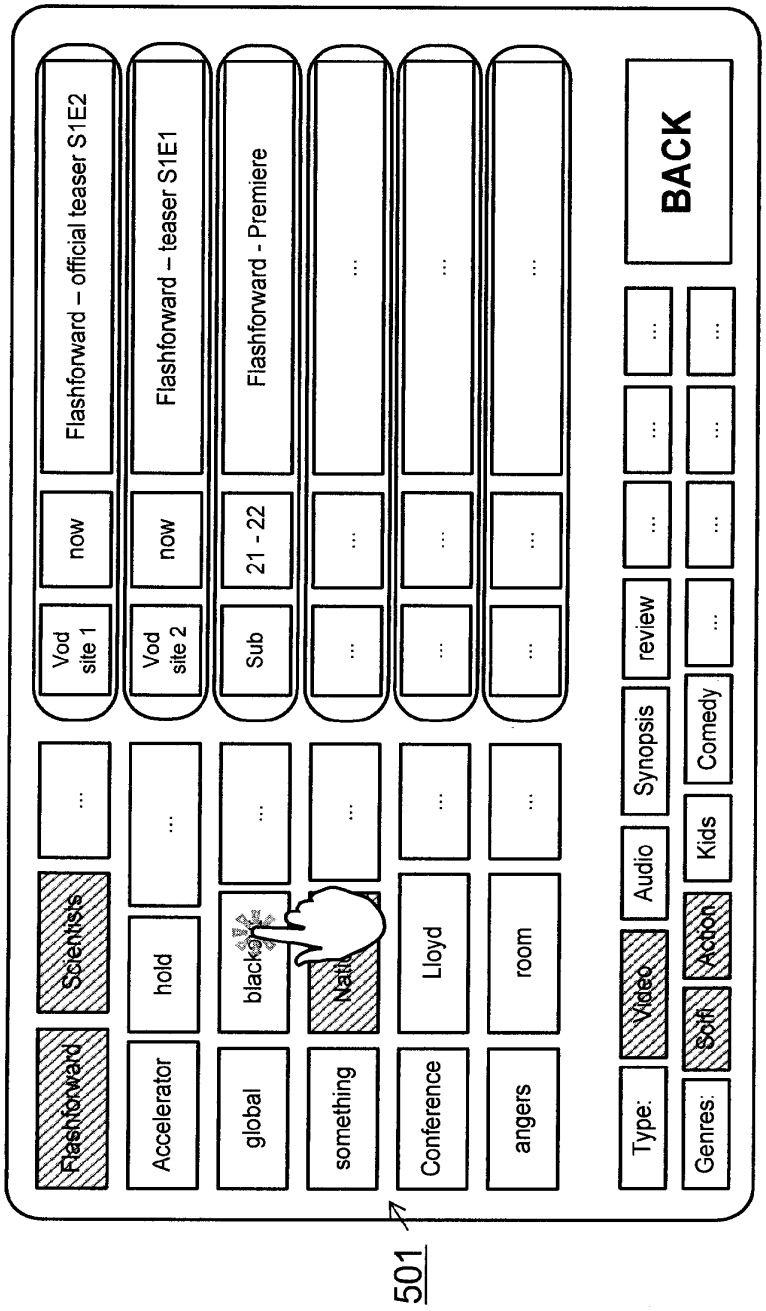
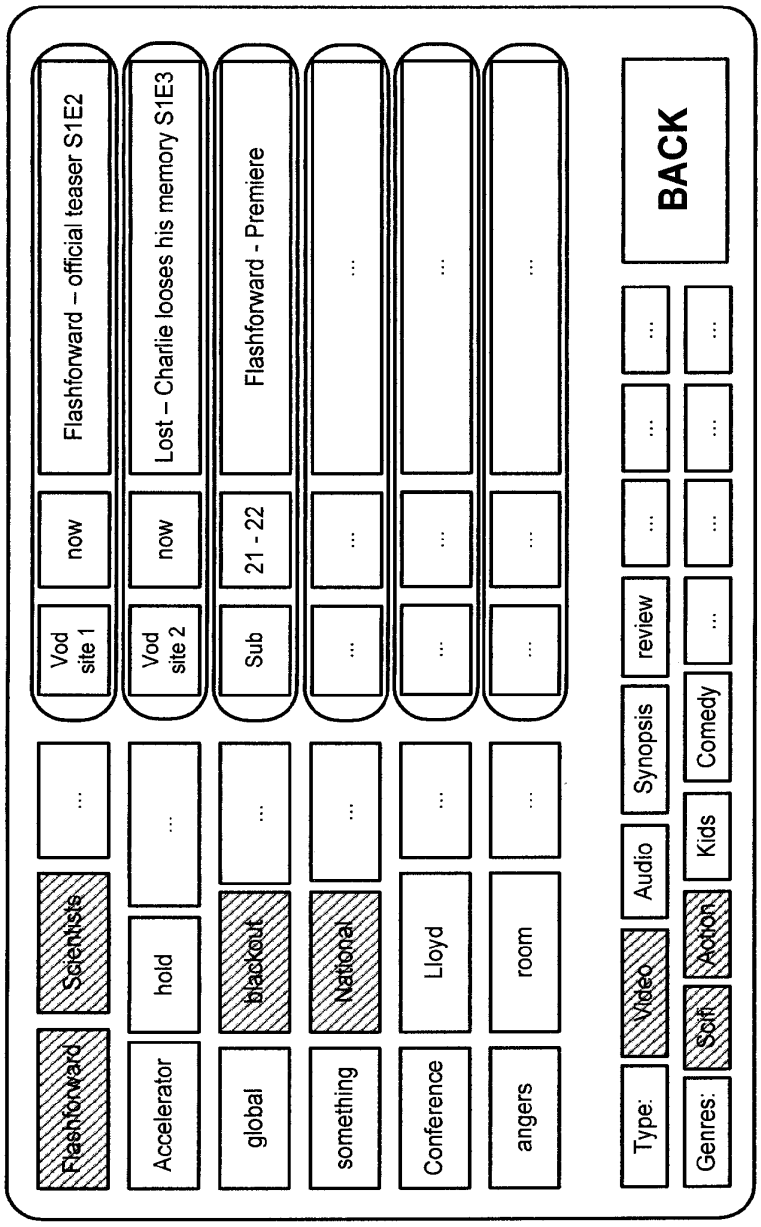

Flashforward
Scientists
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Vod site 1
now
Flashforward – official teaser S1E2
Accelerator
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...
Vod site 2
now
Flashforward – teaser S1E1
global
black
...
Sub
21 - 22
Flashforward - Premiere
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Conference
Lloyd
...
...
...
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Video
Audio
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review
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...
Genres:
Soft
Action
Kids
Comedy
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BACK
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Fig. 5.2


Flashforward
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Scientists
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room
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Vod site 1
Vod site 2
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Flashforward – official teaser S1E2
Lost – Charlie looses his memory S1E3
Flashforward - Premiere
Type:
Genres:
Video
Scifi
Audio
Action
Synopsis
Kids
review
Comedy
BACK
501

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI2011/050472

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: G06F, H04N

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

FI, SE, NO, DK

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

EPO-Internal, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2009259647 A1 (CURTIS SCOTT) 15 October 2009 (15.10.2009) paragraphs [0003], [0018], [0020], [0022]-[0023], [0028], [0033]-[0036], [0040], Figures 5-7	1-10
X	US 7529743 B1 (ERSHOV ALEXANDER V) 05 May 2009 (05.05.2009) the whole document, especially column 3, lines 2-7, 18-20, 35-41, 43-44, and 51-67; column 4, lines 41-45; column 8, lines 27-28; Figures 1, 2, 3, 8, and 9	1-10
A	US 2010077334 A1 (YANG GYUNG HYE et al.) 25 March 2010 (25.03.2010) paragraphs [0029], [0063]-[0064]; Figures 4A-4C	1-10

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
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"O" document referring to an oral disclosure, use, exhibition or other means
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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
04 October 2011 (04.10.2011)	06 October 2011 (06.10.2011)

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/FI2011/050472

Patent document cited in search report	Publication date	Patent family members(s)	Publication date
US 2009259647 A1	15/10/2009	CN 101567007 A	28/10/2009
US 7529743 B1	05/05/2009	US 7970764 B1 US 7610185 B1	28/06/2011 27/10/2009
US 2010077334 A1	25/03/2010	KR 20100035043 A	02/04/2010

International application No.
PCT/FI2011/050472

CLASSIFICATION OF SUBJECT MATTER

Int.Cl.
G06F 17/30 (2006.01)
H04N 5/445 (2011.01)

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
29 December 2011 (29.12.2011)

PCT

(10) International Publication Number
WO 2011/163481 A2

(51) International Patent Classification:
H04N 21/441 (2011.01) *H04N 21/475* (2011.01)

(21) International Application Number:
PCT/US2011/041642

(22) International Filing Date:
23 June 2011 (23.06.2011)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/357,573 23 June 2010 (23.06.2010) US

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP,

[Continued on next page]

(54) Title: TELEVISION SIGN ON FOR PERSONALIZATION IN A MULTI-USER ENVIRONMENT

(57) Abstract: Systems and methods according to the present invention provide sign on systems for devices, e.g., televisions, which balance ease of use with security and access control that is amenable to, e.g., household usage.

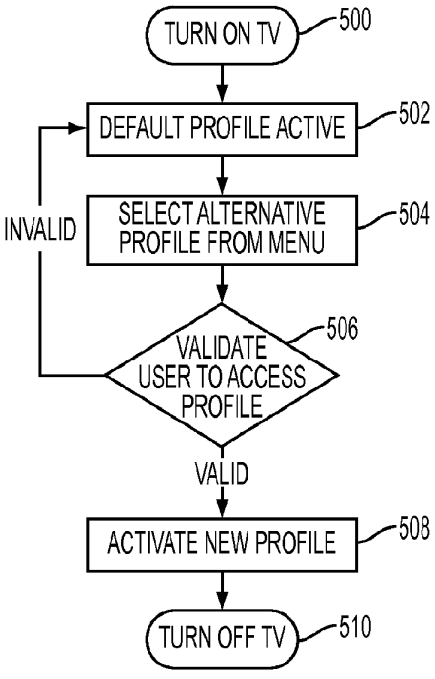


FIG. 5

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KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— *of inventorship (Rule 4.17(iv))*

Published:

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*

TELEVISION SIGN ON FOR PERSONALIZATION IN A MULTI-USER ENVIRONMENT

RELATED APPLICATION

[0001] This application is related to, and claims priority from, U.S. Provisional Patent Application Serial No. 61/357,573, filed on June 23, 2010, entitled "Multi-Media System Including Single Sign-On Capability", the disclosure of which is incorporated here by reference.

BACKGROUND

[0002] Technologies associated with the communication of information have evolved rapidly over the last several decades. Television, cellular telephony, the Internet and optical communication techniques (to name just a few things) combine to inundate consumers with available information and entertainment options. Taking television as an example, the last three decades have seen the introduction of cable television service, satellite television service, pay-per-view movies and video-on-demand. Whereas television viewers of the 1960s could typically receive perhaps four or five over-the-air TV channels on their television sets, today's TV watchers have the opportunity to select from hundreds, thousands, and potentially millions of channels of shows and information. Video-on-demand technology, currently used primarily in hotels and the like, provides the potential for in-home entertainment selection from among thousands of movie titles.

[0003] The technological ability to provide so much information and content to end users provides both opportunities and challenges to system designers and service providers. One challenge is that while end users typically prefer having more choices rather than fewer, this preference is counterweighted by their desire that the selection process be both fast and

simple. Unfortunately, the development of the systems and interfaces by which end users access media items has resulted in selection processes which are neither fast nor simple. Consider again the example of television programs. When television was in its infancy, determining which program to watch was a relatively simple process primarily due to the small number of choices. One would consult a printed guide which was formatted, for example, as series of columns and rows which showed the correspondence between (1) nearby television channels, (2) programs being transmitted on those channels and (3) date and time. The television was tuned to the desired channel by adjusting a tuner knob and the viewer watched the selected program. Later, remote control devices were introduced that permitted viewers to tune the television from a distance. This addition to the user-television interface created the phenomenon known as "channel surfing" whereby a viewer could rapidly view short segments being broadcast on a number of channels to quickly learn what programs were available at any given time.

[0004] Despite the fact that the number of channels and amount of viewable content has dramatically increased, the generally available user interface, control device options and frameworks for televisions has not changed much over the last 30 years. Printed guides are still the most prevalent mechanism for conveying programming information. The multiple button remote control with up and down arrows is still the most prevalent channel/content selection mechanism. The reaction of those who design and implement the TV user interface to the increase in available media content has been a straightforward extension of the existing selection procedures and interface objects. Thus, the number of rows in the printed guides has been increased to accommodate more channels. The number of buttons on the remote control devices has been increased to support additional functionality and content handling,

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e.g., as shown in Figure 1. However, this approach has significantly increased both the time required for a viewer to review the available information and the complexity of actions required to implement a selection. Arguably, the cumbersome nature of the existing interface has hampered commercial implementation of some services, e.g., video-on-demand, since consumers are resistant to new services that will add complexity to an interface that they view as already too slow and complex.

[0005] In addition to increases in bandwidth and content, the user interface bottleneck problem is being exacerbated by the aggregation of technologies. Consumers are reacting positively to having the option of buying integrated systems rather than a number of segregable components. An example of this trend is the combination television/VCR/DVD in which three previously independent components are frequently sold today as an integrated unit. This trend is likely to continue, potentially with an end result that most if not all of the communication devices currently found in the household will be packaged together as an integrated unit, e.g., a television/VCR/DVD/internet access/radio/stereo unit. Even those who continue to buy separate components will likely desire seamless control of, and interworking between, the separate components. With this increased aggregation comes the potential for more complexity in the user interface. For example, when so-called "universal" remote units were introduced, e.g., to combine the functionality of TV remote units and VCR remote units, the number of buttons on these universal remote units was typically more than the number of buttons on either the TV remote unit or VCR remote unit individually. This added number of buttons and functionality makes it very difficult to control anything but the simplest aspects of a TV or VCR without hunting for exactly the right button on the remote. Many times, these universal remotes do not provide enough buttons to access many levels of

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control or features unique to certain TVs. In these cases, the original device remote unit is still needed, and the original hassle of handling multiple remotes remains due to user interface issues arising from the complexity of aggregation. Some remote units have addressed this problem by adding "soft" buttons that can be programmed with the expert commands. These soft buttons sometimes have accompanying LCD displays to indicate their action. These too have the flaw that they are difficult to use without looking away from the TV to the remote control. Yet another flaw in these remote units is the use of modes in an attempt to reduce the number of buttons. In these "moded" universal remote units, a special button exists to select whether the remote should communicate with the TV, DVD player, cable set-top box, VCR, etc. This causes many usability issues including sending commands to the wrong device, forcing the user to look at the remote to make sure that it is in the right mode, and it does not provide any simplification to the integration of multiple devices. The most advanced of these universal remote units provide some integration by allowing the user to program sequences of commands to multiple devices into the remote. This is such a difficult task that many users hire professional installers to program their universal remote units.

[0006] Some attempts have also been made to modernize the screen interface between end users and media systems. However, these attempts typically suffer from, among other drawbacks, an inability to easily scale between large collections of media items and small collections of media items. For example, interfaces which rely on lists of items may work well for small collections of media items, but are tedious to browse for large collections of media items. Interfaces which rely on hierarchical navigation (e.g., tree structures) may be speedier to traverse than list interfaces for large collections of media items, but are not readily

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adaptable to small collections of media items. Additionally, users tend to lose interest in selection processes wherein the user has to move through three or more layers in a tree structure. For all of these cases, current remote units make this selection process even more tedious by forcing the user to repeatedly depress the up and down buttons to navigate the list or hierarchies. When selection skipping controls are available such as page up and page down, the user usually has to look at the remote to find these special buttons or be trained to know that they even exist. Accordingly, organizing frameworks, techniques and systems which simplify the control and screen interface between users and media systems as well as accelerate the selection process, while at the same time permitting service providers to take advantage of the increases in available bandwidth to end user equipment by facilitating the supply of a large number of media items and new services to the user have been proposed in U.S. Patent Application Serial No. 10/768,432, filed on January 30, 2004, entitled "A Control Framework with a Zoomable Graphical User Interface for Organizing, Selecting and Launching Media Items", the disclosure of which is incorporated here by reference.

[0007] TVs exist in a multi-user environment where the same device is typically used by different members of the household at different times, as well as by groups of individuals from both within and outside the household. The current connected TV environment offers many services originally built for the personal computer or mobile platforms as individual experiences that include private information. In addition, other services contain content that may not be appropriate for all the individual members of the household. Accordingly, it would be desirable to provide some sort of security mechanism which addresses these issues.

[0008] Existing solutions take a PC-style approach to dealing with the situation (if it is dealt with at all). In most cases, there is simply a single log-in to personalized services and

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all users of the connected TV or device share the information from the service. This login may occur per service. It can be remembered or may require log-in each time it is used. This makes for either a non-private or tedious scenario which discourages use of such services. Similarly, content services often require a login to enable the acquisition of age appropriate content each time such content is requested, which is also a tedious solution.

[0009] Alternatively, some solutions require a login into the entire system by the user in order to enable any private or restricted services. This is a traditional PC approach. It can be effective in single person homes if the login is remembered, however it does not account for the visitor user. The outside visitor is often referred to as the "babysitter factor."

[0010] Accordingly, it would be desirable to provide other sign-on solutions which are, for example, particularly adapted to the TV environment and which balances security and ease of use.

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SUMMARY

[0011] According to one exemplary embodiment, a method for controlling access to media content and services via a system includes the steps of receiving a first input to turn on the system, activating a default user profile which permits access to a first set of media content and services via the system without requiring validation of a system user's identity, receiving a request to switch from the default user profile to another profile, validating the request, and activating, if the request is validated, the another profile which permits access to a second set of media content and services via the system that is different from the first set of media content and services.

[0012] According to another embodiment, a controller for controlling access to media content and services through a television includes at least one interface configured to receive inputs from a user, a processor configured to receiving a first input associated with turning on the television and, in response to the first input, further configured to activate a default user profile which permits access to a first set of media content and services via the television without requiring validation of a system user's identity, wherein the at least one interface is further configured to subsequently receive a request to switch from the default user profile to another profile, wherein the processor is further configured to validate the request and to activate, if the request is validated, the another profile which permits access to a second set of media content and services via the system that is different from the first set of media content and services.

[0013] According to yet another exemplary embodiment, a television includes a display configured to display media content and service content which is accessible via a user

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interface, and a processor configured to generate a user interface, and control access to said media content and service content, in accordance with a currently active user profile;

wherein the processor is further configured to use a default user profile as the currently active user profile upon power on of the television.

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BRIEF DESCRIPTION OF THE DRAWINGS

[0014] The accompanying drawings illustrate exemplary embodiments of the present invention, wherein:

[0015] FIG. 1 depicts a conventional remote control unit for an entertainment system;

[0016] FIG. 2 depicts an exemplary media system in which exemplary embodiments of the present invention can be implemented;

[0017] FIG. 3(a) shows a 3D pointing device with which exemplary embodiments can be implemented;

[0018] FIG. 3(b) illustrates a user employing a 3D pointing device to provide input to a user interface on a television according to an exemplary embodiment of the present invention;

[0019] FIG. 4 illustrates an architecture of a television sign-on system according to an exemplary embodiment;

[0020] FIG. 5 is a flow chart showing a method for signing on to a television according to an exemplary embodiment;

[0021] FIG. 6 depicts a data flow according to an embodiment.

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DETAILED DESCRIPTION

[0022] The following detailed description of the invention refers to the accompanying drawings. The same reference numbers in different drawings identify the same or similar elements. Also, the following detailed description does not limit the invention. Instead, the scope of the invention is defined by the appended claims.

[0023] Exemplary embodiments provide a sign-on system and method that allow for the connected TV and devices interface to be personalized to an individual or a group so that various services can accommodate the viewer. Exemplary aspects of the system according to such embodiments include its streamlined login procedure, remote management features, and default behaviors to minimize inadvertent privacy violations in normal system use. Exemplary embodiments define a framework where the user can customize their experience and utilize a variety of access options based upon their personal tastes, interest and experience. Moreover, these embodiments provide for a "casual" security model that is adapted to TV usage and which prevents inadvertent access to another user's information without excessive security controls.

[0024] Prior to discussing such embodiments in detail, and in order to provide some context for this discussion, an exemplary aggregated media system 200 in which the present invention can be implemented will first be described with respect to Figure 2. Those skilled in the art will appreciate, however, that the present invention is not restricted to implementation in this type of media system and that more or fewer components can be included therein. Therein, an input/output (I/O) bus 210 connects the system components in the media system 200 together. The I/O bus 210 represents any of a number of different of

mechanisms and techniques for routing signals between the media system components. For example, the I/O bus 210 may include an appropriate number of independent audio "patch" cables that route audio signals, coaxial cables that route video signals, two-wire serial lines or infrared or radio frequency transceivers that route control signals, optical fiber or any other routing mechanisms that route other types of signals.

[0025] In this exemplary embodiment, the media system 200 includes a television/monitor 212, a video cassette recorder (VCR) 214, digital video disk (DVD) recorder/playback device 216, audio/video tuner 218 and compact disk player 220 coupled to the I/O bus 210. The VCR 214, DVD 216 and compact disk player 220 may be single disk or single cassette devices, or alternatively may be multiple disk or multiple cassette devices. They may be independent units or integrated together. In addition, the media system 200 includes a microphone/speaker system 222, video camera 224 and a wireless I/O control device 226. According to exemplary embodiments of the present invention, the wireless I/O control device 226 is a 3D pointing device. The wireless I/O control device 226 can communicate with the entertainment system 200 using, e.g., an IR or RF transmitter or transceiver. Alternatively, the I/O control device can be connected to the entertainment system 200 via a wire. One or more hard drives (or disks or flash drives) 280 can be provided for storage of recorded video, music or other media.

[0026] The entertainment system 200 also includes a system controller 228. According to one exemplary embodiment of the present invention, the system controller 228 operates to store and display entertainment system data available from a plurality of entertainment system data sources and to control a wide variety of features associated with each of the system components. As shown in Figure 2, system controller 228 is coupled,

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either directly or indirectly, to each of the system components, as necessary, through I/O bus 210. In one exemplary embodiment, in addition to or in place of I/O bus 210, system controller 228 is configured with a wireless communication transmitter (or transceiver), which is capable of communicating with the system components via IR signals or RF signals. Regardless of the control medium, the system controller 228 is configured to control the media components of the media system 200 via a graphical user interface described below.

[0027] As further illustrated in Figure 2, media system 200 may be configured to receive media items from various media sources and service providers. In this exemplary embodiment, media system 200 receives media input from and, optionally, sends information to, any or all of the following sources: cable broadcast 230, satellite broadcast 232 (e.g., via a satellite dish), very high frequency (VHF) or ultra high frequency (UHF) radio frequency communication of the broadcast television networks 234 (e.g., via an aerial antenna), telephone network 236 and cable modem 238 (or another source of Internet content). Those skilled in the art will appreciate that the media components and media sources illustrated and described with respect to Figure 2 are purely exemplary and that media system 200 may include more or fewer of both. For example, other types of inputs to the system include AM/FM radio and satellite radio.

[0028] More details regarding this exemplary entertainment system and frameworks associated therewith can be found in the above-incorporated by reference U.S. Patent Application entitled "A Control Framework with a Zoomable Graphical User Interface for Organizing, Selecting and Launching Media Items". Additionally, the interested reader is also referred to U.S. Patent Application Serial No.11/437,215, entitled "Global Navigation Objects in User Interfaces", filed on May 19, 2006, the disclosure of which is incorporated

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here by reference. Alternatively, remote devices and interaction techniques between remote devices and user interfaces in accordance with the present invention can be used in conjunction with other types of systems, for example computer systems including, e.g., a display, a processor and a memory system or with various other systems and applications.

[0029] As mentioned in the Background section, remote devices which operate as 3D pointers are of particular interest for the present specification, although the present invention is not limited to systems including 3D pointers and may be used with 2D devices or remote control devices such as that illustrated in Figure 1. However 3D pointing devices enable the translation of movement of the device, e.g., linear movement, rotational movement, acceleration or any combination thereof, into commands to a user interface. An exemplary loop-shaped, 3D pointing device 300 is depicted in Figure 3(a), however the present invention is not limited to loop-shaped devices. In this exemplary embodiment, the 3D pointing device 300 includes two buttons 302 and 304 as well as a scroll wheel 306 (scroll wheel 306 can also act as a button by depressing the scroll wheel 306), although other exemplary embodiments will include other physical configurations. User movement of the 3D pointing device 300 can be defined, for example, in terms of rotation about one or more of an x-axis attitude (roll), a y-axis elevation (pitch) or a z-axis heading (yaw). In addition, some exemplary embodiments of the present invention can additionally (or alternatively) measure linear movement of the 3D pointing device 300 along the x, y, and/or z axes to generate cursor movement or other user interface commands. An example is provided below. A number of permutations and variations relating to 3D pointing devices can be implemented in systems according to exemplary embodiments of the present invention. The interested reader is referred to U.S. Patent Application Serial No. 11/119,663, entitled (as amended)

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"3D Pointing Devices and Methods", filed on May 2, 2005, U.S. Patent Application Serial No. 11/119,719, entitled (as amended) "3D Pointing Devices with Tilt Compensation and Improved Usability", also filed on May 2, 2005, U.S. Patent Application Serial No. 11/119,987, entitled (as amended) "Methods and Devices for Removing Unintentional Movement in 3D Pointing Devices", also filed on May 2, 2005, U.S. Patent Application Serial No. 11/119,688, entitled "Methods and Devices for Identifying Users Based on Tremor", also filed on May 2, 2005, and U.S. Patent Application Serial No. 11/480,662, entitled "3D Pointing Devices", filed on July 3, 2006, the disclosures of which are incorporated here by reference, for more details regarding exemplary 3D pointing devices which can be used in conjunction with exemplary embodiments of the present invention.

[0030] It is anticipated that 3D pointing devices 300 will be held by a user in front of a display 308 and that motion of the 3D pointing device 300 will be translated by the 3D pointing device into output which is usable to interact with the information displayed on display 308, e.g., to move the cursor 310 on the display 308. For example, such 3D pointing devices and their associated user interfaces can be used to make media selections on a television as shown in Figure 3(b), which will be described in more detail below. Aspects of exemplary embodiments of the present invention can be optimized to enhance the user's experience of the so-called "10-foot" interface, i.e., a typical distance between a user and his or her television in a living room. For example, interactions between pointing, scrolling, zooming and panning, e.g., using a 3D pointing device and associated user interface, can be optimized for this environment as will be described below, although the present invention is not limited thereto.

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[0031] Referring again to Figure 3(a), an exemplary relationship between movement of the 3D pointing device 300 and corresponding cursor movement on a user interface will now be described. Rotation of the 3D pointing device 300 about the y-axis can be sensed by the 3D pointing device 300 and translated into an output usable by the system to move cursor 310 along the y_2 axis of the display 308. Likewise, rotation of the 3D pointing device 308 about the z-axis can be sensed by the 3D pointing device 300 and translated into an output usable by the system to move cursor 310 along the x_2 axis of the display 308. It will be appreciated that the output of 3D pointing device 300 can be used to interact with the display 308 in a number of ways other than (or in addition to) cursor movement, for example it can control cursor fading, volume or media transport (play, pause, fast-forward and rewind). Additionally, the system can be programmed to recognize gestures, e.g., predetermined movement patterns, to convey commands in addition to cursor movement. Moreover, other input commands, e.g., a zoom-in or zoom-out on a particular region of a display (e.g., actuated by pressing button 302 to zoom-in or button 304 to zoom-out), may also be available to the user.

[0032] According to exemplary embodiments of the present invention, user interfaces may use, at least in part, zooming techniques for moving between user interface views. The zooming transition effect can be performed by progressive scaling and displaying of at least some of the UI objects displayed on the current UI view to provide a visual impression of movement of those UI objects away from an observer. In another functional aspect of the present invention, user interfaces may zoom-in in response to user interaction with the user interface which will, likewise, result in the progressive scaling and display of UI objects that provide the visual impression of movement toward an observer. More information relating to

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zoomable user interfaces can be found in U.S. Patent Application Serial No. 10/768,432, filed on January 30, 2004, entitled "A Control Framework with a Zoomable Graphical User Interface for Organizing, Selecting and Launching Media Items", and U.S. Patent Application Serial No. 09/829,263, filed on April 9, 2001, entitled "Interactive Content Guide for Television Programming", the disclosures of which are incorporated here by reference.

[0033] Movement within the user interface between different user interface views is not limited to zooming. Other non-zooming techniques can be used, in addition to zooming or as an alternative thereto, to transition between user interface views. For example, panning can be performed by progressive translation and display of at least some of the user interface objects which are currently displayed in a user interface view. This provides the visual impression of lateral movement of those user interface objects to an observer.

[0034] Returning now to the application illustrated in Figure 3(b), the GUI screen (also referred to herein as a "UI view", which terms refer to a currently displayed set of UI objects) seen on television 320 is a home view. In this particular exemplary embodiment, the home view displays a plurality of applications 322, e.g., "Photos", "Music", "Recorded", "Guide", "Live TV", "On Demand", and "Settings", which are selectable by the user by way of interaction with the user interface via the 3D pointing device 300. Such user interactions can include, for example, pointing, scrolling, clicking or various combinations thereof. For more details regarding exemplary pointing, scrolling and clicking interactions which can be used in conjunction with exemplary embodiments of the present invention, the interested reader is directed to U.S. Patent Application Serial No. 11/417,764, entitled "METHODS AND SYSTEMS FOR SCROLLING AND POINTING IN USER INTERFACE", to Frank J. Wroblewski, filed on May 4, 2006, the disclosure of which is incorporated here by reference.

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Television Sign-On System

[0035] As mentioned above, exemplary embodiments provide a sign-on system and method that allow for the connected TV and devices interface to be personalized to an individual or a group so that various services can accommodate the viewer. Exemplary aspects of the system according to such embodiments include its streamlined login procedure, remote management features, and default behaviors to minimize inadvertent privacy violations in normal system use. Exemplary embodiments define a framework where the user can customize their experience and utilize a variety of access options based upon their personal tastes, interest and experience. Moreover, these embodiments provide for a "casual" security model that is adapted to TV usage and which prevents inadvertent access to another user's information without excessive security controls.

[0036] Thus exemplary embodiments provide for security mechanisms and sign-on systems which fulfill the user's or viewer's expectation in a "lean back" TV environment wherein he or she is unlikelty to want to engage in extensive interactive actions with the interface. To better exemplify the simple sign on experience and its role in the interactive TV ecosystem according to exemplary embodiments, consider the following exemplary use case.

[0037] Suppose that a particular household is comprised of four individuals: two parents, a teen aged daughter and a 10 year-old son. A television (simple) sign-on system according to embodiments is preferably thus designed to accommodate each of these people individually, as well as all the members of the household in different group configurations. The exemplary sign-on system can thus be set up with a default profile of "Family." Whenever the system is turned on, e.g., when the TV 212 or system controller 228 is powered up, or another profile logs out, the default Family profile becomes active. This Family

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profile, in this illustrative example, has access to the family Netflix and Hulu account (passwords are already embedded and hidden) but it limits views to PG and TV-14 rated content. Purchases from the app store can be made from this Family profile, but the user must enter a PIN to complete the transaction. This way, one of the parents can access a pay-per-view movie for the family from this shared, Family profile without having to change the active profile and the children can use the TV with the Family profile, but without direct access to services or transactions that require extra fees and that may require PIN code entry to access.

[0038] Continuing with this illustrative example, suppose that the father sits down late one evening to watch a movie and uses the simple profile agent widget to select his icon and enter his password. This changes the profile to "Dad" in the system from the default "Family" profile. The "Dad" profile may have different permissions/restrictions than the "Family" profile. For example, when he enters the Netflix service, there is no ratings limit and all of the content provided by Netflix is available for viewing. In addition, since the father has purchase privileges built in to his profile in this example, when he finds, for example, an app he wants to buy or a pay-per view movie that he wants to watch, he does not need a PIN to complete the transaction, instead the sign on system is automatic.

[0039] On another occasion, the daughter is watching TV alone. Using the profile agent widget, she engages her "Daughter" profile. Now she is able to invoke the Facebook/Twitter overlay so she can see updates in the on-screen ticker that are coming from her personal accounts using her personal access values. This profile according to this example does not allow purchases at all, even with a PIN code. The daughter could go back to the "Family" profile if she surreptitiously learns the PIN code, but she would not be able to

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add the app to her account or profile without one of the parent administrator's knowledge. When the daughter is done watching, she turns off the TV which automatically returns the profile to the default "Family" when it is turned back on.

[0040] It will be appreciated by those skilled in the art that the foregoing example is purely illustrative in the sense that profile parameters and characteristics may vary in any given system implementation depending, for example, upon the manner in which permissions and restrictions are to be allocated among the various individuals and/or groups that are identified for security purposes as potentially wanting to use the TV system. However, at least two particular points are brought out in this example which illustrate significant (but not necessarily required) aspects of the "casual" security model provided by exemplary embodiments. For example, as seen in the example, a user can invoke a secure profile at will but is not forced to always perform a login/logout model to stay protected, e.g., the turning off of the television (which many users have as an ingrained habit when they are finished watching TV) performs the secondary or dual function of logging them out of their personal profile. Second, while it may be possible to circumvent the lightweight security used in some embodiments (e.g., by the discovery of the PIN in the previous example), such an action can be identified and dealt with as is appropriate for any security "breach" that occurs within the family environment.

[0041] Having provided an illustrative example of a simple sign-on system according to an embodiment, some more details regarding exemplary architectures and functional units of such systems will now be discussed. According to some embodiments, simple sign-on systems can include a set of backend services and client interfaces disposed on a number of platforms as generally illustrated in Figure 4. Therein, the simple sign-on system 700

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according to an embodiment can be broken down into the following components:

1. A primary account 702 accessible from multiple platforms.
2. A catalog of devices 704 attached to (or associated with) the primary account 702.
3. A catalog of user profiles 706 attached to the primary account 702.
4. A library of applications 708 managed by the primary account 702, including stored application-specific data such as the username and password for each application.
5. Transaction services 710 to facilitate and manage commerce.
6. An interface 712 to an application store linked to the primary account.
7. Web-based user interfaces 714 for access and editing.
8. Device-based user interfaces 716 for access and editing.

Each of these exemplary elements of a simple sign-on system according to an exemplary embodiment will now be discussed in more detail.

[0042] The shared, primary account 702 is an account that aggregates all members of a household's simple sign-on system according to an embodiment. There is a primary account administrator whose name, location, contact information and primary account password is stored. The primary account also optionally stores payment information (e.g.,: credit card or PayPal information) for easy transactions. The payment information can also be PIN-protected so that it can be stored in the account but still require a PIN to complete a transaction. The account administrator(s) also can manage the device catalog 704, user profile catalog 706, and library of applications 708 which are linked to the primary account 702. According to at least some embodiments, the primary account 702 only has one of each of these catalogs/libraries 704, 706 and 708.

[0043] The device catalog 704 is used for the management of devices and includes a

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set of features to facilitate this effort. In order to verify devices, the catalog 704 will generate an initial activation code which can either be entered on the new device's client software, or can be generated by the device for entry in the catalog. There is a visible definition of the device and an internal definition that is used to determine compatibility with applications. Each device has a default name, but the account manager can create a unique name for easier identification. Finally, a device can have a default profile that is different than the default profile defined for the account 702. Devices can include any device managed by the simple sign-on system 700 including, but not limited to televisions and associated media source devices, e.g., an Internet modem, telephone device, DVD, satellite source/tuner, etc.

[0044] The catalog of user profiles 704 maintains and manages the "users" defined for the account 702. A user can be an individual, a group, or an abstract naming, and any of these types of users can be associated with a user profile. For example, the default profile in a household system 700 may be "family", as in the example provided above, with no password so that whenever a connected device becomes active, it is in a profile that is safe for all household members or visitors. Profiles are mirrored on client devices where possible so that network unavailability does not prevent usage of the device. Parameters that can be set for a profile include, but are not limited to:

a. Name of profile – a simple string which can be an individual name or set of people.
b. PIN – optional and can be used to allow a profile to access payment options.
c. Payment Authorization – a flag that defines whether this profile can make commerce transactions without needing PIN entry.
d. Icon – An image that is used to identify the profile in non-text contexts.

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e. Ratings Level – definition of the maximum rating level the profile has access to, a form of parental control.

f. Login – username and password for the profile.

g. Manager Enabled – a flag that defines whether the profile has administrative access to the primary account.

h. Application Set – the subset of applications in the application library 708 that are accessible to this profile. This also includes the username/password or other login information required by some applications for personal use and applicable only to the specific profile.

i. "Skin" Interface Information – data used to define a personalized appearance on devices which the profile is active.

[0045] The application library 708 can, for example, be a representation of the various applications that have been installed for use on the system. The applications themselves may run remotely, so the library 708 can be designed as a database to manage applications that may exist in multiple locations. Paid applications would typically include a stored key to verify their paid status. If an application (eg: Netflix) has a single account that is shared completely by the household, than account settings (username, password, etc) are stored in the application library 708, rather than in individual profiles 706. In this way, all profiles 706 with access to the application that has a single account for the household can use the shared account settings. These settings can only be changed by an account administrator according to this embodiment.

[0046] According to an embodiment, any application that is part of any profile is stored in the application library 708. However, a given profile may not have all library

applications available to it. For example, some applications may be excluded by choice (and can be added by the profile user at any time), while other applications may be restricted by parental control settings and thus can only be added by an account administrator. The application library 708 also maintains a flag that indicates ability for each application to function on different platforms. For example, a video-based application may be flagged as invalid for an audio-only connected platform. This is used to filter the library view when accessed from platforms that do not support all the applications.

[0047] The transaction services 710 (also referred to herein as a "commerce backend") provides an integrated transaction system to facilitate payment for applications, subscriptions and services. Part of this system involves the storage of relevant transaction information (e.g., name, address, credit card, etc.) so that once set, the user can take advantage of a simplified transaction experience, either directly (if using an authorized profile) or through the input of a PIN. Since the account access is available from the web as well as from the connected platform, the account administrator can use a more convenient web-access from a PC to enter the heavy textual information necessary to set up a transaction account.

[0048] The application store (and interface 712 thereto) provides an integrated application store model to system 700 which provides users with access to applications, subscriptions and services to be added to the account's application library 708. Purchased items (which can include free items) are added directly to the application library 708 for availability to different profiles 706. Access to the application store 712 is filtered by parental controls in the active profile, so a profile can restrict the view of the application store in the same way it restricts the view of content within applications and applications in the

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application library.

[0049] The web-based interface 714 provides a mechanism by which the simple sign-on system 700 can be accessed and used conveniently from various connected devices, e.g., a families personal computer or PDA which is not directly connected to system 700. As mentioned earlier, some account efforts may be easier to perform when done on a PC instead of on a TV screen with a remote. To facilitate this more convenient and efficient access, the complete system 700 is available via a standard web browser accessed through a PC, or mobile device, using the interface(s) 714. Depending upon the interface capabilities of the connected platform, some account functions may not be available, such as user management on an audio device. All account management, profile, and commerce functionality would typically be available through the web interface 714.

[0050] The device based (client-side) user interfaces 716 provide the primary connections to the system 700 via the various connected devices according to this embodiment. Each interface 716 will be scoped according to the capabilities of the device platform with which it is associated. While some devices may have all the features of the system accessible, others may work with a more limited set, requiring the user to go to the web-based interface 714 to handle some tasks. There can, however, be a set of core features which are required for any client-side variant including, for example, the ability to access a profile and "log-in" by some means, e.g., including a PIN entry. The core set of features could also include the ability to select an application from those available in the profile and use that application. Finally, the system 700 includes an "auto log-off" feature which automatically returns the system to a default profile if the system is turned off and on again. User login is a key aspect of the Simple Sign-On system because it should occur as

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seamlessly as possible to minimize the demand on the user.

[0051] As mentioned above, according to exemplary embodiments there will be a default profile that is engaged by each connected system 700. According to at least some embodiments, this default profile has no PIN required for entry, i.e., the system will automatically permit at least some access to the controlled system via the default profile albeit some functionality, e.g., purchasing, may later require PIN entry to be enabled. However, other non-default profiles may require an initial PIN entry to engage the access of the profile, i.e., some non-default profiles may require a PIN entry or other identification input prior to the profile being used at all.

[0052] As will be appreciated by the foregoing, casual security measures in accordance with these embodiments are intended to balance ease of use for connected systems (such as the family TV where ease of use, and no or minimal security is traditionally an expectation) and security/control over the rapidly grown number of services which are becoming available on such connected systems. While PIN-entry is overall one easy means of accessing a profile according to the foregoing exemplary embodiments, it will be recognized that there are some other alternatives that could potentially make profile access even more streamlined, such as:

1. Learned Signature: Using a touchpad or in-air gesture device, the user can teach the system a signature that the user can enter at any time in the future to automatically engage a profile. This can be done at any moment, immediately addressing a PIN-entry needed for a purchase, as an example.
2. Tremor Detection: If a device is able to detect individual tremor patterns (such as an in-air gesture device and as described in the above incorporated by reference patent)

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then these patterns can be identified to automatically offer a profile whenever the tremor is detected during a single session. It could be automatic as well, but the use case is better with a request because if a parent picks up the remote while the family is engaged, they may not want to enter their specific profile at that time.

3. Visual Identification: A more advanced system with built in video capabilities could "watch" the area and identify the individuals who are in position to load the appropriate profile. Since this is a situation where the users can change temporarily (one person leaves and returns a few minutes later) there is a built-in time factor to when the new profile is engaged. A restricted profile may still request the change after this given period of time much like the tremor detection.

[0053] Thus, for example, a login process according to an exemplary embodiment can include the steps illustrated in the method flowchart of Figure 5. Therein, at step 500, a user or viewer turns on a television. This results, as shown in step 502, is to activate a default profile which controls the user's access to media content and services via the television based on at least one control parameter associated with the television, e.g., one or more of the parameters set forth above. The user (or group of users) may then select an alternative profile from among other profiles associated with this account in the catalog 706, as shown in step 506. A validation of the user's right to access the alternative profile is performed at step 508. This step 508 can involve, for example, comparing a security identifier associated with the user, and input to the system (e.g., a PIN, tremor measured by a 3D pointing device, or other security inputs or biometric data) to a pre-stored security data item. If the validation process fails, then the default profile is maintained for controlling the system (e.g., the system of Figures 2, 3A, and/or 3B). Otherwise, if the user's security input is valid, the flow proceeds

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to step 508 where the new profile is activated. Then, control of the system, and corresponding access to media content, applications, purchasing, etc., is controlled in accordance with the preset parameters for the newly activated profile. At some point in time, when the user turns off the television, at step 510, this operation (and/or the corresponding next time the system is powered on) operates as an implicit request to logoff from the alternative profile. In this way, the user essentially logs out without requiring a separate step to do so, and the default profile will again become the active profile when the television is turned back on.

[0054] Figure 6 illustrates an exemplary profile data flow associated with control systems in accordance with embodiments. Therein, a current profile provides characteristics or parameters 602 which are used by the user interface 604 associated with, e.g., a television, to control accessibility to applications, programs (based e.g., on ratings), purchasing, as well as potentially other types of media content or services that might warrant a profile by profile selective access control.

[0055] Systems and methods for processing data according to exemplary embodiments of the present invention can be performed by one or more processors executing sequences of instructions contained in a memory device. Such instructions may be read into the memory device from other computer-readable mediums such as secondary data storage device(s). Execution of the sequences of instructions contained in the memory device causes the processor to operate, for example, as described above. In alternative embodiments, hard-wire circuitry may be used in place of or in combination with software instructions to implement the present invention.

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[0056] Numerous variations of the afore-described exemplary embodiments are contemplated. The above-described exemplary embodiments are intended to be illustrative in all respects, rather than restrictive, of the present invention. Thus the present invention is capable of many variations in detailed implementation that can be derived from the description contained herein by a person skilled in the art. All such variations and modifications are considered to be within the scope and spirit of the present invention as defined by the following claims. No element, act, or instruction used in the description of the present application should be construed as critical or essential to the invention unless explicitly described as such. Also, used herein, the article "a" is intended to include one or more items.

WHAT IS CLAIMED IS:

1. A method for controlling access to media content and services via a system comprising:

receiving a first input to turn on the system;

activating a default user profile which permits access to a first set of media content and services via the system without requiring validation of a system user's identity;

receiving a request to switch from the default user profile to another profile;

validating the request; and

activating, if the request is validated, the another profile which permits access to a second set of media content and services via the system that is different from the first set of media content and services.

2. The method of claim 1, further comprising:

receiving a second input to turn off the system;

receiving a third input to turn on the system;

activating the default user profile to control access to the system in response to the third input, wherein the second input operates as an implicit logoff of the another user profile.

3. The method of any of claims 1-2, wherein both the default user profile and the another user profile each include a purchasing parameter that indicates whether the respective profile enables commercial transactions via the system without requiring a PIN entry, the method further comprising:

receiving an input requesting a commercial transaction;

selectively permitting the commercial transaction to be processed via the system

based upon the purchasing parameter of the profile which is active at the time that the input requesting the commercial transaction is received.

4. The method of any of claims 1-3, wherein both the default user profile and the another user profile include an application parameter which identifies a subset of applications which are accessible when the system is operating in conjunction with the respective profile, the method further comprising:

displaying icons associated with applications which are accessible based upon the application parameter in a currently active profile.

5. The method of any of claims 1-4, wherein both the default user profile and the another user profile include a ratings parameter which identifies a maximum rating level associated with media content that can be accessed by the currently active profile.

6. The method of any of claims 1-5, wherein the step of validating the request further comprises at least one of: (a) comparing an input PIN with a stored PIN associated with the another profile; and (b) obtaining identifying information associated with a user who is currently using the system and comparing that identifying information with stored identity information associated with the another profile.

7. The method of any of claims 1-6, wherein the system includes a television.

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8. A controller for controlling access to media content and services through a television, the controller comprising:

at least one interface configured to receive inputs from a user;

a processor configured to receiving a first input associated with turning on the television and, in response to the first input, further configured to activate a default user profile which permits access to a first set of media content and services via the television without requiring validation of a system user's identity;

wherein the at least one interface is further configured to subsequently receive a request to switch from the default user profile to another profile;

wherein the processor is further configured to validate the request and to activate, if the request is validated, the another profile which permits access to a second set of media content and services via the system that is different from the first set of media content and services.

9. The controller of claim 8, wherein the at least one interface is further configured to receive a second input to turn off the system and then to receive a third input to turn on the system, and wherein the processor is further configured to activate the default user profile to control access to the system in response to the third input, wherein the second input operates as an implicit logoff of the another user profile.

10. The controller of any of claims 8-9, wherein both the default user profile and the another user profile each include a purchasing parameter that indicates whether the respective

profile enables commercial transactions via the system without requiring a PIN entry and wherein the processor is further configured to selectively permit or deny commercial transactions through the television to be performed based upon the purchasing parameter associated with a currently active one of the default user profile and the another user profile.

11. The controller of any of claims 8-10, wherein both the default user profile and the another user profile include an application parameter which identifies a subset of applications which are accessible when the system is operating in conjunction with the respective profile, wherein the processor is further configured to generate signals for displaying icons on the television associated with applications which are accessible based upon the application parameter in a currently active profile one of the default user profile and the another user profile.

12. The controller any of claims 8-11, wherein both the default user profile and the another user profile include a ratings parameter which identifies a maximum rating level associated with media content that can be accessed by the currently active profile, and wherein the processor is further configured to permit access to media content via the television based on the ratings parameter of a currently active one of the default user profile and the another user profile.

13. The controller of any of claims 8-12, wherein processor is further configured to validate the request by performing at least one: (a) comparing an input PIN with a stored PIN associated with the another profile; and (b) obtaining identifying information associated with

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a user who is currently using the system and comparing that identifying information with stored identity information associated with the another profile.

14. The controller of any one of claims 8-13, wherein the controller is integrated into the television.

15. The controller of any one of claims 8-13, wherein the controller is disposed in a separate housing from the television and is communicatively connected to the television.

16. A television comprising:

a display configured to display media content and service content which is accessible via a user interface;

a processor configured to generate a user interface, and control access to said media content and service content, in accordance with a currently active user profile;

wherein the processor is further configured to use a default user profile as the currently active user profile upon power on of the television.

17. The television of claim 16, wherein the processor is further configured to use the default user profile as the currently active user profile upon power on of the television automatically without any additional inputs from a user.

18. The television of any of claims 16-17, wherein the processor is further configured to enable switching the currently active user profile from the default user profile to another user

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profile upon receipt of validated user identity information.

19. The television of any of claims 16-18, wherein the processor is further configured to control the television using the default user profile whenever the television is restarted.

20. The television of claim 16 further comprising the controller of any one of claims 8-15.

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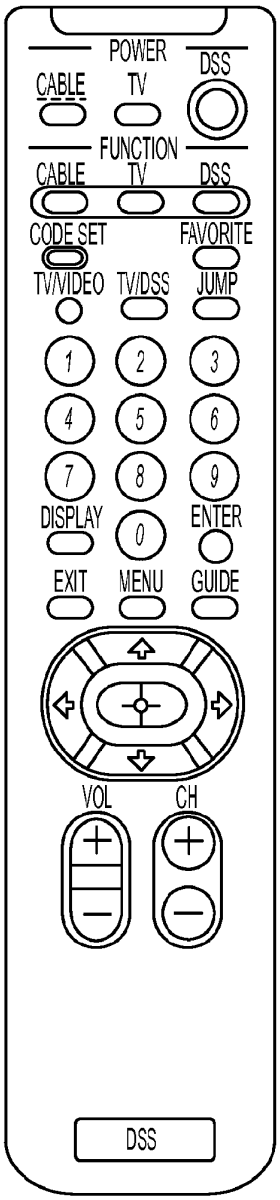


FIG. 1
PRIOR ART

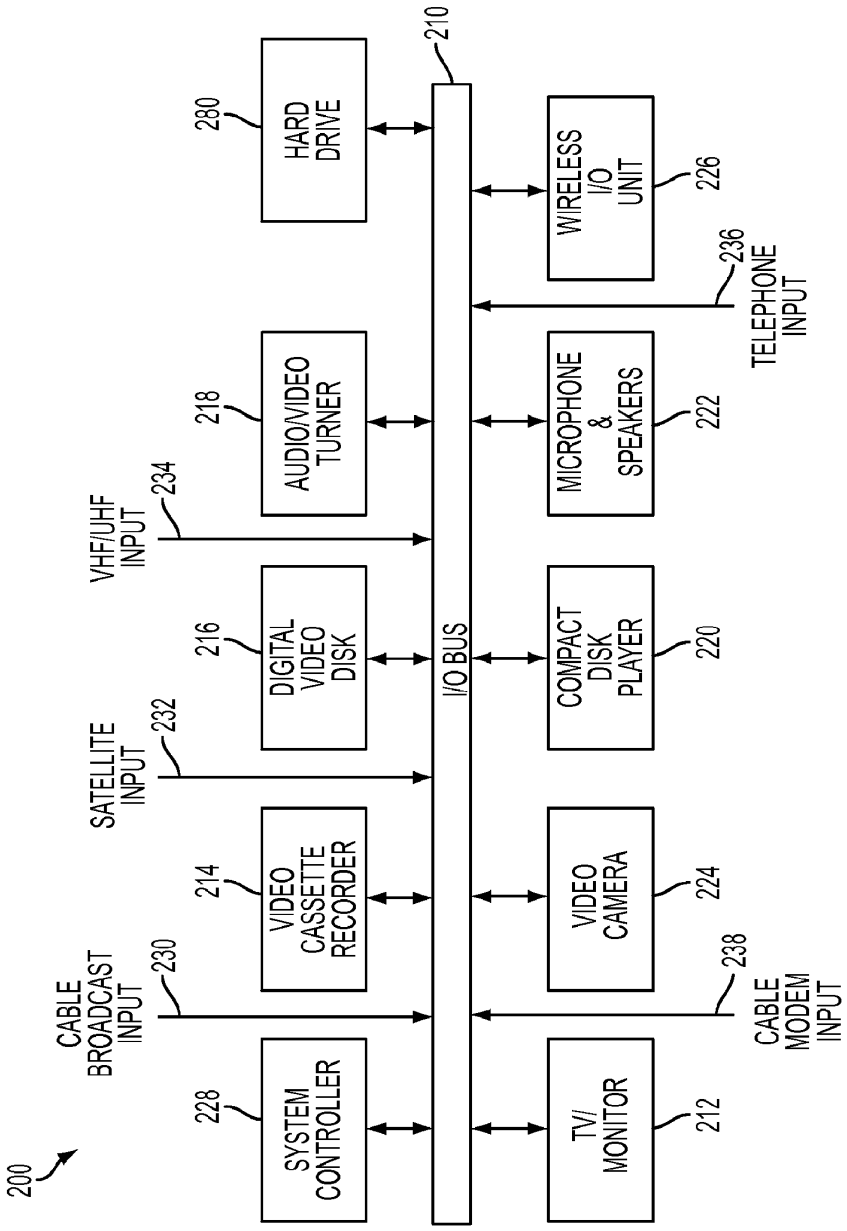

200
CABLE BROADCAST INPUT
230
SATELLITE INPUT
232
VHF/UHF INPUT
234
I/O BUS
210
SYSTEM CONTROLLER
228
VIDEO CASSETTE RECORDER
214
DIGITAL VIDEO DISK
216
AUDIO/VIDEO TURNER
218
HARD DRIVE
280
TV/ MONITOR
212
VIDEO CAMERA
224
COMPACT DISK PLAYER
220
MICROPHONE & SPEAKERS
222
WIRELESS I/O UNIT
226
CABLE MODEM INPUT
238
TELEPHONE INPUT
236

FIG. 2

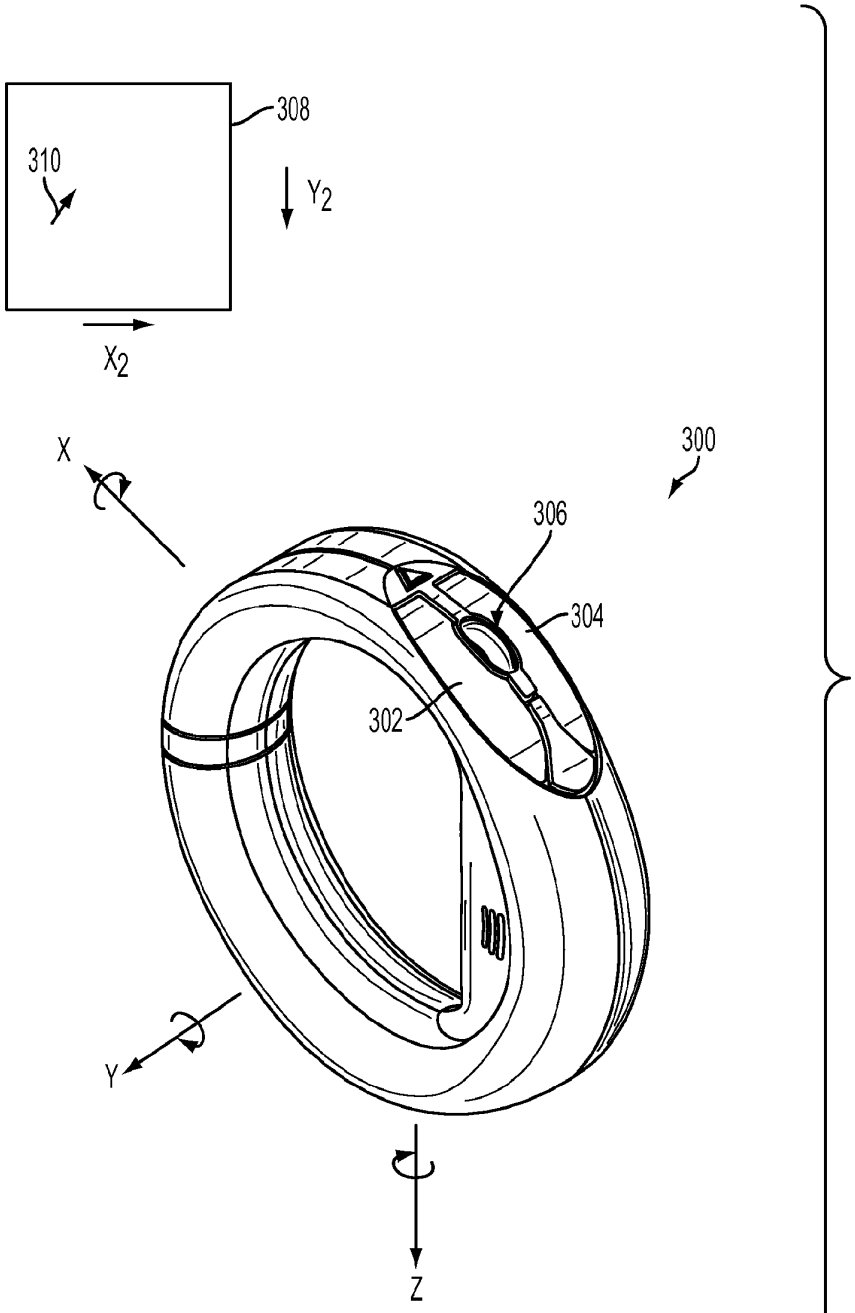


FIG. 3A

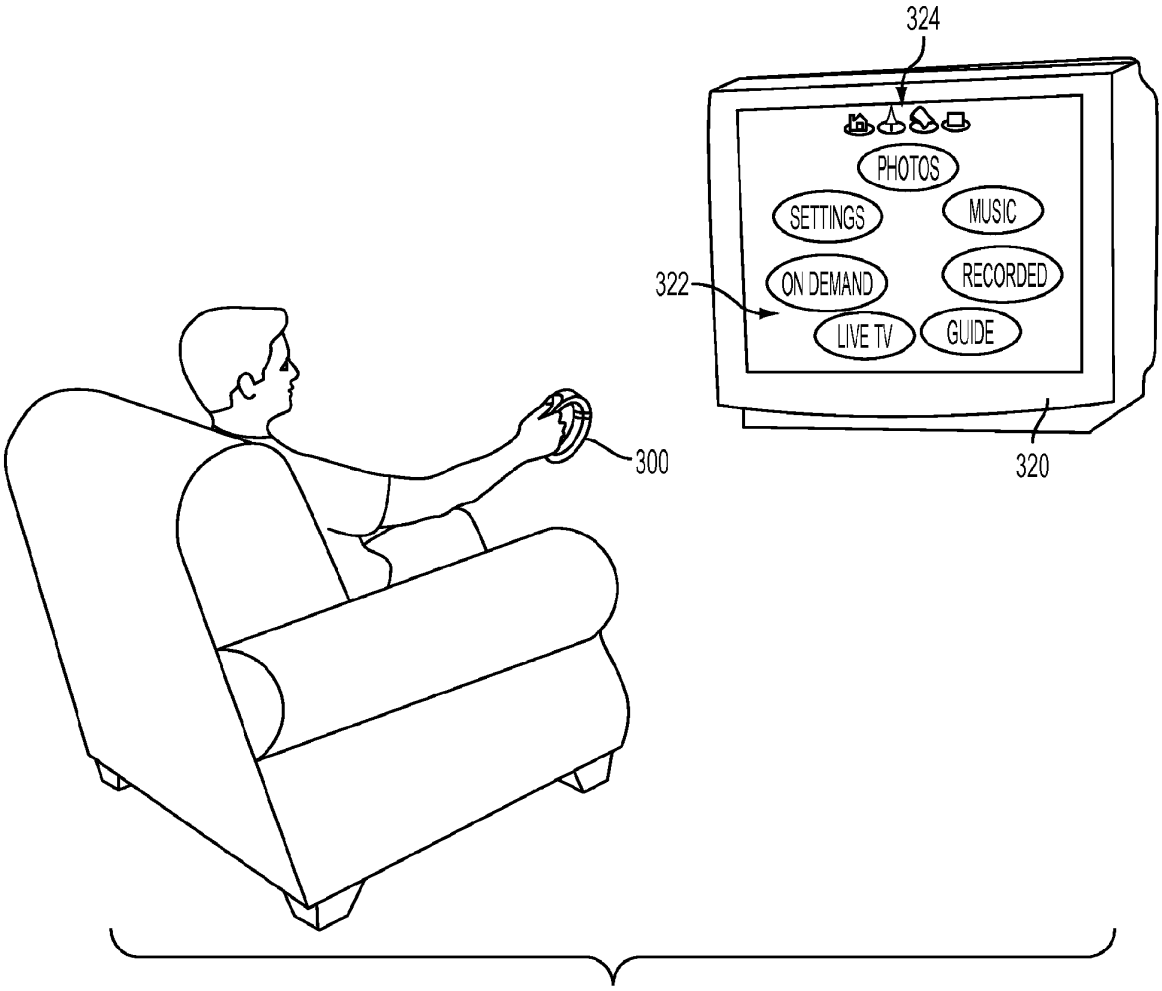

324
PHOTOS
SETTINGS
MUSIC
322
ON DEMAND
RECORDED
LIVE TV
GUIDE
300
320

FIG. 3B

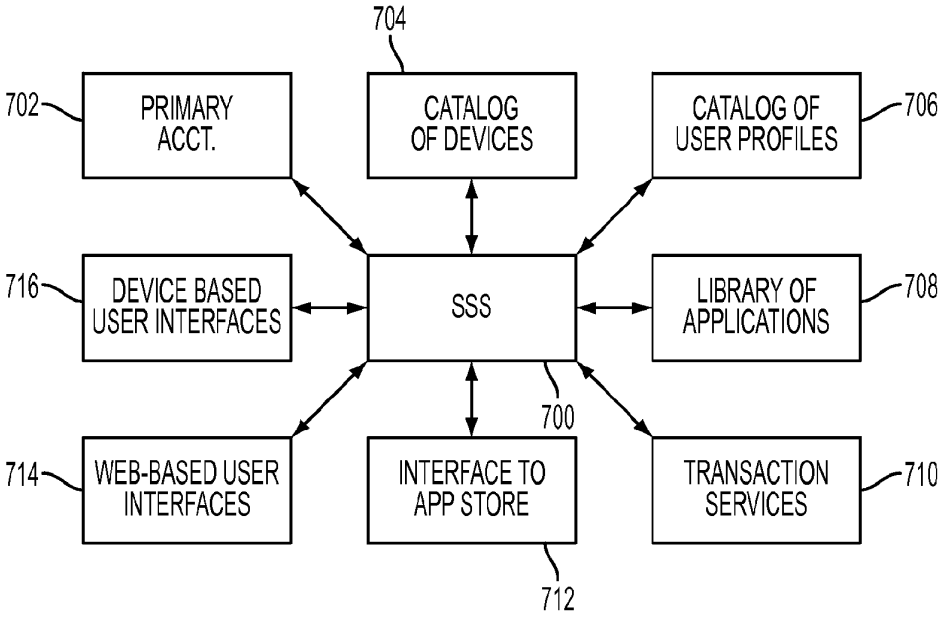

704
702
PRIMARY ACCT.
CATALOG OF DEVICES
CATALOG OF USER PROFILES
706
716
DEVICE BASED USER INTERFACES
SSS
LIBRARY OF APPLICATIONS
708
700
714
WEB-BASED USER INTERFACES
INTERFACE TO APP STORE
TRANSACTION SERVICES
710
712

FIG. 4

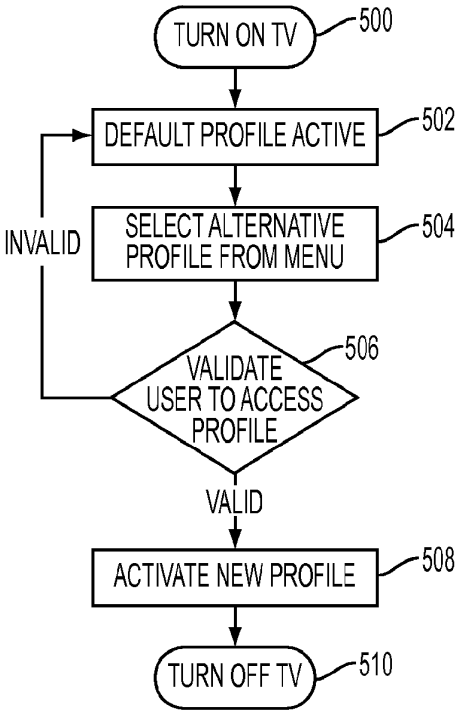

TURN ON TV
500
DEFAULT PROFILE ACTIVE
502
SELECT ALTERNATIVE PROFILE FROM MENU
504
INVALID
VALIDATE USER TO ACCESS PROFILE
506
VALID
ACTIVATE NEW PROFILE
508
TURN OFF TV
510

FIG. 5

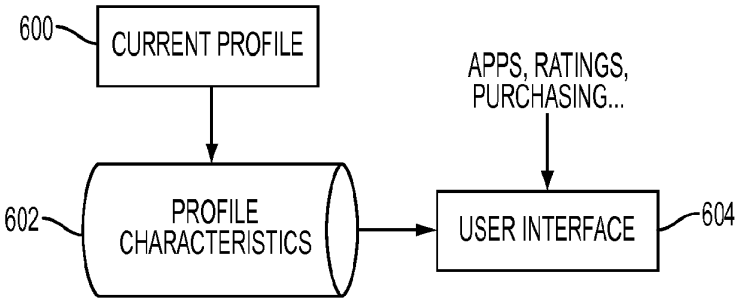

600
CURRENT PROFILE
APPS, RATINGS, PURCHASING...
602
PROFILE CHARACTERISTICS
USER INTERFACE
604

FIG. 6

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
8 March 2012 (08.03.2012)

PCT

(10) International Publication Number
WO 2012/030024 A1

(51) International Patent Classification:
H04N 21/431 (2011.01) *H04N 21/45* (2011.01)

(21) International Application Number:
PCT/KR2010/009046

(22) International Filing Date:
17 December 2010 (17.12.2010)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/379,372 1 September 2010 (01.09.2010) US
61/379,367 1 September 2010 (01.09.2010) US
61/379,363 1 September 2010 (01.09.2010) US
10-2010-0086149 2 September 2010 (02.09.2010) KR
10-2010-0086153 2 September 2010 (02.09.2010) KR
10-2010-0086152 2 September 2010 (02.09.2010) KR

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

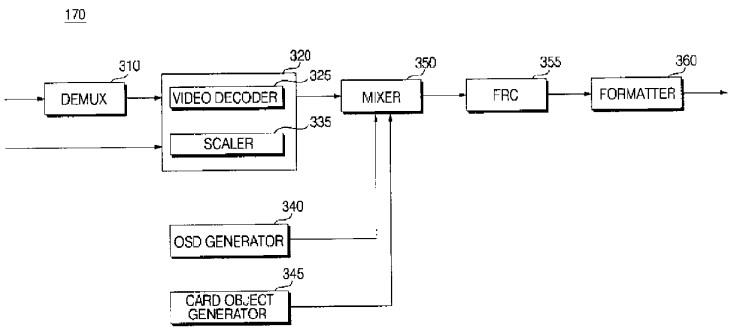
(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

(54) **Title**: IMAGE DISPLAY APPARATUS AND METHOD FOR OPERATING THE SAME

[Fig. 10]



(57) **Abstract**: An image display apparatus for receiving and processing a broadcast signal and a method for operating the same are disclosed. The method includes displaying a home screen including a plurality of card objects, displaying a broadcast image and a favorite channel object representing favorite channels in a broadcast card object representing a broadcast image among the plurality of card objects, and displaying a favorite channel list including favorite channel items on the display, upon selection of the favorite channel object.

WO 2012/030024 A1

Description

Title of Invention: IMAGE DISPLAY APPARATUS AND METHOD FOR OPERATING THE SAME

Technical Field

[1] The present invention relates to an image display apparatus and a method for operating the same, and more particularly, to an image display apparatus and a method for operating the same, which increase user convenience.

Background Art

[2] An image display apparatus has a function of displaying images to a user. The image display apparatus can display a broadcast program selected by the user on a display from among broadcast programs transmitted from broadcasting stations. The recent trend in broadcasting is a worldwide shift from analog broadcasting to digital broadcasting.

[3] As it transmits digital audio and video signals, digital broadcasting offers many advantages over analog broadcasting, such as robustness against noise, less data loss, ease of error correction, and the ability to provide high-definition, clear images. Digital broadcasting also allows interactive viewer services, compared to analog broadcasting.

Disclosure of Invention

Technical Problem

[4] Therefore, the present invention has been made in view of the above problems, and it is an object of the present invention to provide an image display apparatus and a method for operating the same, which can increase user convenience.

[5] It is another object of the present invention to provide an image display apparatus and a method for operating the same, which can provide various user interfaces.

Solution to Problem

[6] In accordance with an aspect of the present invention, the above and other objects can be accomplished by the provision of a method for operating an image display apparatus that receives and processes a broadcast signal, including displaying a home screen including a plurality of card objects, displaying a broadcast image and a favorite channel object representing favorite channels in a broadcast card object representing a broadcast image among the plurality of card objects, and displaying a favorite channel list including favorite channel items on the display, upon selection of the favorite channel object.

[7] In accordance with another aspect of the present invention, there is provided a method for operating an image display apparatus that receives and processes a broadcast signal, including displaying a favorite channel object representing favorite

channels on a display, generating a favorite channel card object using a pre-stored favorite channel list by a card object generator, upon selection of the favorite channel object, and displaying the favorite channel card object on a home screen including a plurality of card objects.

[8] In accordance with a further aspect of the present invention, there is provided an image display apparatus for receiving and processing a broadcast image, including a display for displaying a home screen including a plurality of card objects, a user input interface for receiving an input for selecting a favorite channel object representing favorite channels, displayed on the home screen, and a controller for controlling display of a favorite channel list including favorite channel items on the display, upon selection of the favorite channel object.

Advantageous Effects of Invention

[9] As is apparent from the above description of the embodiments of the present invention, since a favorite channel list is displayed on a home screen, a user can easily identify favorite channels and thus user convenience is increased.

[10] Upon selection of a favorite channel object on the home screen, this favorite channel list is displayed. Therefore, the user can easily access the favorite channel list.

[11] As a broadcast image of a program airing on a channel is displayed by selecting a channel item indicating the channel in a displayed channel list, user convenience is further increased.

[12] When a cursor moves on the channel list or a channel item is selected from the channel list, channel items are sorted differently in the channel list to thereby allow the user for search for a channel.

[13] A favorite channel card object including thumbnail images for favorite channels is displayed on the home screen, which allows the user to easily identify favorite channels. Accordingly, user convenience is increased.

[14] Since channel information and thumbnail images of channels are displayed together, the channel information can be readily identified.

[15] Upon selection of a thumbnail image in the favorite channel card object, a broadcast image of a channel corresponding to the thumbnail image can be displayed fullscreen or displayed in a broadcast card object. Hence, the user can easily watch the broadcast image.

[16] Upon selection of a card object name in the favorite channel card object, a channel list screen including a favorite channel list is displayed so that the user can easily identify favorite channels. Other channel lists such as an all channel list or a recent channel list can also be displayed, thereby increasing user convenience.

[17] The image display apparatus provides a variety of UIs. Therefore, user convenience

is further increased.

Brief Description of Drawings

[18] The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

[19] FIG. 1 illustrates the overall configuration of a broadcasting system including an image display apparatus according to an embodiment of the present invention;

[20] FIG. 2 illustrates the overall configuration of a broadcasting system including an image display apparatus according to another embodiment of the present invention;

[21] FIG. 3 is a diagram illustrating a signal flow for an operation for attaching to a Service Provider (SP) and receiving channel information from the SP in the image display apparatus illustrated in FIG. 1 or 2 according to an embodiment of the present invention;

[22] FIG. 4 illustrates an example of data used in the operation illustrated in FIG. 3;

[23] FIG. 5 is a detailed block diagram of the image display apparatus illustrated in FIG. 1 or 2 according to an embodiment of the present invention;

[24] FIG. 6 is a detailed block diagram of the image display apparatus illustrated in FIG. 1 or 2 according to another embodiment of the present invention;

[25] FIGS. 7 and 8 are block diagrams illustrating either of the image display apparatuses separately as a set-top box and a display device according to embodiments of the present invention;

[26] FIG. 9 illustrates an operation for communicating with third devices in either of the image display apparatuses according to an embodiment of the present invention;

[27] FIG. 10 is a block diagram of a controller illustrated in FIG. 6;

[28] FIG. 11 illustrates a platform architecture for either of the image display apparatuses according to an embodiment of the present invention;

[29] FIG. 12 illustrates a platform architecture for either of the image display apparatuses according to another embodiment of the present invention;

[30] FIG. 13 illustrates a method for controlling either of the image display apparatuses in a remote controller according to an embodiment of the present invention;

[31] FIG. 14 is a detailed block diagram of the remote controller in either of the image display apparatuses according to an embodiment of the present invention;

[32] FIG. 15 illustrates a UI in either of the image display apparatuses according to an embodiment of the present invention;

[33] FIG. 16 illustrates a UI in either of the image display apparatuses according to another embodiment of the present invention;

[34] FIG. 17 illustrates a UI in either of the image display apparatuses according to

another embodiment of the present invention;

[35] FIG. 18 illustrates a UI in either of the image display apparatuses according to a further embodiment of the present invention;

[36] FIG. 19 is a flowchart illustrating a method for operating an image display apparatus according to an embodiment of the present invention;

[37] FIGS. 20 to 33 are views referred to for describing various examples of the method for operating an image display apparatus, illustrated in FIG. 19;

[38] FIG. 34 is a flowchart illustrating a method for operating an image display apparatus according to another embodiment of the present invention;

[39] FIGS. 35 to 55 are views referred to for describing various examples of the method for operating an image display apparatus, illustrated in FIG. 34;

[40] FIG. 56 is a flowchart illustrating a method for operating an image display apparatus according to a further embodiment of the present invention; and

[41] FIGS. 57 to 69 are views referred to for describing various examples of the method for operating an image display apparatus, illustrated in FIG. 56.

Best Mode for Carrying out the Invention

[42] Embodiments of the present invention will be described below with reference to the attached drawings.

[43] The terms "module" and "unit" used to signify components are used herein to help the understanding of the components and thus they should not be considered as having specific meanings or roles. Accordingly, the terms "module" and "unit" may be used interchangeably.

[44] An image display apparatus as set forth herein is an intelligent image display apparatus equipped with a computer support function in addition to a broadcast reception function, for example. Thus the image display apparatus may have user-friendly interfaces such as a handwriting input device, a touch screen, or a pointing device. Further, because the image display apparatus supports wired or wireless Internet, it is capable of e-mail transmission/reception, Web browsing, banking, gaming, etc. by connecting to the Internet or a computer. To implement these functions, the image display apparatus may operate based on a standard general-purpose Operating System (OS).

[45] Various applications can be freely added to or deleted from, for example, a general-purpose OS kernel in the image display apparatus according to the present invention. Therefore, the image display apparatus may perform a number of user-friendly functions. The image display apparatus may be a network TV, a Hybrid broadcast broadband TV (HbbTV), a smart TV, etc. for example. The image display apparatus is applicable to a smart phone, as needed.

[46] Embodiments of the present invention will be described in detail with reference to the attached drawings, but it should be understood that they are merely illustrative of the present invention and should not be interpreted as limiting the scope of the present invention.

[47] In addition, although the terms used in the present invention are selected from generally known and used terms, some of the terms mentioned in the description of the present invention, the detailed meanings of which are described in relevant parts of the description herein, have been selected by the applicant at his or her discretion. Furthermore, the present invention must be understood, not simply by the actual terms used but by the meanings of each term lying within.

[48] FIG. 1 illustrates the overall configuration of a broadcasting system including an image display apparatus according to an embodiment of the present invention.

[49] Referring to FIG. 1, the broadcasting system may include a Content Provider (CP) 10, a Service Provider (SP) 20, a Network Provider (NP) 30, and a Home Network End Device (HNED) 40. The HNED 40 corresponds to, for example, a client 100 which is an image display apparatus according to an embodiment of the present invention. As stated before, the image display apparatus may be a network TV, a smart TV, an Internet Protocol TV (IPTV), etc.

[50] The CP 10 creates and provides content. The CP 10 may be, for example, a terrestrial broadcaster, a cable System Operator (SO) or Multiple System Operator (MSO), a satellite broadcaster, or an Internet broadcaster, as illustrated in FIG. 1.

[51] Besides broadcast content, the CP 10 may provide various applications, which will be described later in detail.

[52] The SP 20 may provide content received from the CP 10 in a service package. For instance, the SP 20 may package first terrestrial broadcasting, second terrestrial broadcasting, cable broadcasting, satellite broadcasting, Internet broadcasting, and applications and provide the package to users.

[53] The SP 20 may unicast or multicast a service to the client 100. Unicast is a form of transmission in which information is sent from only one transmitter to only one receiver. In other words, unicast transmission is point-to-point, involving two nodes only. In an example of unicast transmission, upon receipt of a request for data from a receiver, a server transmits the data to only one receiver. Multicast is a type of transmission or communication in which a transmitter transmits data to a group of receivers. For example, a server may transmit data to a plurality of pre-registered receivers at one time. For multicast registration, the Internet Group Management Protocol (IGMP) may be used.

[54] The NP 30 may provide a network over which a service is provided to the client 100. The client 100 may construct a home network and receive a service over the home

network.

[55] Content transmitted in the above-described broadcasting system may be protected through conditional access or content protection. CableCard and Downloadable Conditional Access System (DCAS) are examples of conditional access or content protection.

[56] The client 100 may also transmit content over a network. In this case, the client 100 serves as a CP and thus the CP 10 may receive content from the client 100. Therefore, an interactive content service or data service can be provided.

[57] FIG. 2 illustrates the overall configuration of a broadcasting system including an image display apparatus according to another embodiment of the present invention.

[58] Referring to FIG. 2, the image display apparatus 100 according to another embodiment of the present invention is connected to a broadcast network and the Internet. The image display apparatus 100 is, for example, a network TV, a smart TV, an HbbTV, etc.

[59] The image display apparatus 100 includes, for example, a broadcast interface 101, a section filter 102, an Application Information Table (AIT) filter 103, an application data processor 104, a broadcast data processor 111, a media player 106, an IP processor 107, an Internet interface 108, and a runtime module 109.

[60] The image display apparatus 100 receives AIT data, real-time broadcast content, application data, and stream events through the broadcast interface 101. The real-time broadcast content may be referred to as linear Audio/Video (A/V) content.

[61] The section filter 102 performs section filtering on the four types of data received through the broadcast interface 101, and outputs the AIT data to the AIT filter 103, the linear A/V content to the broadcast data processor 111, and the stream events and application data to the application data processor 104.

[62] Meanwhile, the image display apparatus 100 receives non-linear A/V content and application data through the Internet interface 108. The non-linear A/V content may be, for example, a Content On Demand (CoD) application.

[63] The non-linear A/V content and the application data are transmitted to the media player 106 and the runtime module 109, respectively.

[64] The runtime module 109 includes, for example, an application manager and a browser as illustrated in FIG. 2. The application manager controls the life cycle of an interactive application using the AIT data, for example. The browser displays and processes the interactive application.

[65] FIG. 3 is a diagram illustrating a signal flow for an operation for attaching to an SP and receiving channel information from the SP in the image display apparatus illustrated in FIG. 1 or 2. Needless to say, the operation illustrated in FIG. 3 is an embodiment, which should not be interpreted as limiting the scope of the present

invention.

[66] Referring to FIG. 3, an SP performs an SP Discovery operation (S301) and the image display apparatus transmits a Service Provider Attachment Request signal to the SP (S302). Upon completion of attachment to the SP, the image display apparatus receives provisioning information from the SP (S303). Further, the image display apparatus receives Master System Information (SI) Tables, Virtual Channel Map Tables, Virtual Channel Description Tables, and Source Tables from the SP(S304 to S307).

[67] More specifically, SP Discovery is a process by which SPs that provide IPTV services search for Service Discovery (SD) servers having information about the offerings of the SPs.

[68] In order to receive information about the SD servers, an SD server address list can be detected, for example, using three methods, specifically use of an address preset in the image display apparatus or an address manually set by a user, Dynamic Host Configuration Protocol (DHCP)-based SP Discovery, and Domain Name System Service (DNS SRV)-based SP Discovery. The image display apparatus accesses a specific SD server using the SD server address list obtained through one of the above three methods and receives a SP Discovery record from the specific SD server. The Service Provider Discovery record includes information needed to perform Service Discovery on an SP basis. The image display apparatus then starts a Service Discovery operation using the SP Discovery record. These operations can be performed in a push mode or a pull mode.

[69] The image display apparatus accesses an SP attachment server specified by an SP attachment locator included in the SP Discovery record and performs a registration procedure (or a service attachment procedure).

[70] Further, after accessing an authentication service server of an SP specified by an SP authentication locator and performing an authentication procedure, the image display apparatus may perform a service authentication procedure.

[71] After service attachment is successfully performed, a server may transmit data in the form of a provision information table to the image display apparatus.

[72] During service attachment, the image display apparatus may include an Identifier (ID) and location information thereof in data and transmit the data to the service attachment server. Thus the service attachment server may specify a service that the image display apparatus has subscribed to based on the ID and location information. In addition, the service attachment server provides, in the form of a provisioning information table, address information from which the image display apparatus can obtain Service Information (SI). The address information corresponds to access information about a Master SI Table. This method facilitates provision of a customized service to each subscriber.

[73] The SI is divided into a Master SI Table record for managing access information and version information about a Virtual Channel Map, a Virtual Channel Map Table for providing a list of services in the form of a package, a Virtual Channel Description Table that contains details of each channel, and a Source Table that contains access information about actual services.

[74] FIG. 4 illustrates an example of data used in the signal flow illustrated in FIG. 3.

[75] FIG. 4 is a detailed diagram of FIG. 3, illustrating a relationship among data in the SI.

[76] Referring to FIG. 4, a Master SI Table contains information about the location and version of each Virtual Channel MAP.

[77] Each Virtual Channel MAP is identified by its Virtual Channel MAP identifier. VirtualChannelMAPVersion specifies the version number of the Virtual Channel MAP. If any of the tables connected to the Master SI Table in the arrowed direction is modified, the versions of the modified table and overlying tables thereof (up to the Master SI Table) are incremented. Accordingly, a change in any of the SI tables can be readily identified by monitoring the Master SI Table.

[78] For example, when the Source Table is changed, the version of the Source Table is incremented and the version of the Virtual Channel Description Table that references the Source Table is also incremented. In conclusion, a change in any lower table leads to a change in its higher tables and, eventually, a change in the Master SI Table.

[79] One Master SI Table may exist for each SP. However, in the case where service configurations differ for regions or subscribers (or subscriber groups), an SP may have a plurality of Master SI Tables in order to provide a customized service on a region, subscriber or subscriber group basis. Thus it is possible to provide a customized service to a subscriber according to a region in which the subscriber is located and subscriber information regarding the subscriber.

[80] A Virtual Channel Map Table may contain a list of one or more virtual channels. A Virtual Channel Map includes not details of the channels but information about the locations of the details of the channels. In the Virtual Channel Map Table, VirtualChannelDescriptionLocation specifies the location of a Virtual Channel Description Table that provides virtual channel descriptions.

[81] The Virtual Channel Description Table contains the details of the virtual channels. The Virtual Channel Description Table can be accessed using VirtualChannelDescriptionLocation of the Virtual Channel Map Table.

[82] A Source Table provides information necessary to access actual services (e.g. IP addresses, ports, AV Codecs, transmission protocols, etc.) on a service basis.

[83] The above-described Master SI Table, the Virtual Channel Map Table, the Virtual Channel Description Table and the Source Table are delivered in four logically

separate flows, in a push mode or a pull mode. For version management, the Master SI Table may be multicast and thus a version change can be monitored by receiving a multicast stream of the Master SI Table.

[84] FIG. 5 is a detailed block diagram of the image display apparatus illustrated in FIG. 1 or 2 according to an embodiment of the present invention. The structure of the image display apparatus in FIG. 5 is purely exemplary and should not be interpreted as limiting the scope of the present invention.

[85] Referring to FIG. 5, an image display apparatus 700 includes a network interface 701, a Transmission Control Protocol/Internet Protocol (TCP/IP) manager 702, a service delivery manager 703, a Demultiplexer (DEMUX) 705, a Program Specific Information (PSI) & (Program and System Information Protocol (PSIP) and/or SI) decoder 704, a display A/V and On Screen Display (OSD) module 708, a service control manager 709, a service discovery manager 710, a metadata manager 712, an SI & metadata DataBase (DB) 711, a User Interface (UI) manager 714, and a service manager 713.

[86] The network interface 701 transmits packets to and receives packets from a network. Specifically, the network interface 701 receives services and content from an SP over the network.

[87] The TCP/IP manager 702 is involved in packet reception and transmission of the image display apparatus 700, that is, packet delivery from a source to a destination. The TCP/IP manager 702 classifies received packets according to appropriate protocols and outputs the classified packets to the service delivery manager 705, the service discovery manager 710, the service control manager 709, and the metadata manager 712.

[88] The service delivery manager 703 controls received service data. For example, when controlling real-time streaming data, the service delivery manager 703 may use the Real-time Transport Protocol/Real-time Transport Control Protocol (RTP/RTCP). If real-time streaming data is transmitted over RTP/RTCP, the service delivery manager 703 parses the received real-time streaming data using RTP and outputs the parsed real-time streaming data to the DEMUX 705 or stores the parsed real-time streaming data in the SI & metadata DB 711 under the control of the service manager 713. In addition, the service delivery manager 703 feeds back network reception information to a server that provides the real-time streaming data service using RTCP.

[89] The DEMUX 705 demultiplexes a received packet into audio data, video data and PSI data and outputs the audio data, video data and PSI data to the audio decoder 706, the video decoder 707, and the PSI & (PSIP and/or SI) decoder 704, respectively.

[90] The PSI & (PSIP and/or SI) decoder 704 decodes SI such as PSI. More specifically, the PSI & (PSIP and/or SI) decoder 704 decodes PSI sections, PSIP sections or SI

sections received from the DEMUX 705.

[91] The PSI & (PSIP and/or SI) decoder 704 constructs an SI DB by decoding the received sections and stores the SI DB in the SI & metadata DB 711.

[92] The audio decoder 706 and the video decoder 707 decode the audio data and the video data received from the DEMUX 705 and output the decoded audio and video data to a user through the display A/V and OSD module 708.

[93] The UI manager 714 and the service manager 713 manage the overall state of the image display apparatus 700, provide UIs, and manage other managers.

[94] The UI manager 714 provides a Graphical User Interface (GUI) in the form of an OSD and performs a reception operation corresponding to a key input received from the user. For example, upon receipt of a key input signal regarding channel selection from the user, the UI manager 714 transmits the key input signal to the service manager 713.

[95] The service manager 713 controls managers associated with services, such as the service delivery manager 703, the service discovery manager 710, the service control manager 709, and the metadata manager 712.

[96] The service manager 713 also makes a channel map and selects a channel using the channel map according to the key input signal received from the UI manager 714. The service manager 713 sets the audio/video Packet ID (PID) of the selected channel based on SI about the channel received from the PSI & (PSIP and/or SI) decoder 704.

[97] The service discovery manager 710 provides information necessary to select an SP that provides a service. Upon receipt of a channel selection signal from the service manager 713, the service discovery manager 710 detects a service based on the channel selection signal.

[98] The service control manager 709 takes charge of selecting and control services. For example, if a user selects live broadcasting, like a conventional broadcasting service, the service control manager selects and controls the service using Internet Group Management Protocol (IGMP) or Real-Time Streaming Protocol (RTSP). If the user selects Video on Demand (VoD), the service control manager 709 selects and controls the service. RTSP supports trick mode for real-time streaming. Further, the service control manager 709 may initialize and manage a session through an IP Multimedia Control (IMC) gateway using IP Multimedia Subsystem (IMS) and Session Initiation Protocol (SIP). The protocols are given by way of example and thus other protocols are also applicable according to other embodiments.

[99] The metadata manager 712 manages metadata related to services and stores the metadata in the SI & metadata DB 711.

[100] The SI & metadata DB 711 stores the SI decoded by the PSI & (PSIP and/or SI) decoder 704, the metadata managed by the metadata manager 712, and the information

required to select an SP, received from the service discovery manager 710. The SI & metadata DB 711 may store setup data for the system.

[101] The SI & metadata DB 711 may be constructed in a Non-Volatile RAM (NVRAM) or a flash memory.

[102] An IMS gateway 705 is a gateway equipped with functions needed to access IMS-based IPTV services.

[103] FIG. 6 is a detailed block diagram of the image display apparatus illustrated in FIG. 1 or 2 according to another embodiment of the present invention.

[104] Referring to FIG. 6, an image display apparatus 100 according to another embodiment of the present invention includes a broadcasting receiver 105, an external device interface 135, a memory 140, a user input interface 150, a controller 170, a display 180, an audio output unit 185, a power supply 190, and a camera module (not shown). The broadcasting receiver 105 may include a tuner 110, a demodulator 120 and a network interface 130. As needed, the broadcasting receiver 105 may be configured so as to include only the tuner 110 and the demodulator 120 or only the network interface 130.

[105] The tuner 110 selects a Radio Frequency (RF) broadcast signal corresponding to a channel selected by a user from among a plurality of RF broadcast signals received through an antenna and downconverts the selected RF broadcast signal into a digital Intermediate Frequency (IF) signal or an analog baseband A/V signal.

[106] More specifically, if the selected RF broadcast signal is a digital broadcast signal, the tuner 110 downconverts the selected RF broadcast signal into a digital IF signal DIF. On the other hand, if the selected RF broadcast signal is an analog broadcast signal, the tuner 110 downconverts the selected RF broadcast signal into an analog baseband A/V signal, CVBS/SIF. That is, the tuner 110 may be a hybrid tuner capable of processing not only digital broadcast signals but also analog broadcast signals. The analog baseband A/V signal CVBS/SIF may be directly input to the controller 170.

[107] The tuner 110 may be capable of receiving RF broadcast signals from an Advanced Television Systems Committee (ATSC) single-carrier system or from a Digital Video Broadcasting (DVB) multi-carrier system.

[108] The tuner 110 may sequentially select a number of RF broadcast signals corresponding to all broadcast channels previously stored in the image display apparatus 100 by a channel add function from a plurality of RF signals received through the antenna and may downconvert the selected RF broadcast signals into IF signals or baseband A/V signals.

[109] The demodulator 120 receives the digital IF signal DIF from the tuner 110 and demodulates the digital IF signal DIF.

[110] For example, if the digital IF signal DIF is an ATSC signal, the demodulator 120

may perform 8-Vestigal SideBand (VSB) demodulation on the digital IF signal DIF. The demodulator 120 may also perform channel decoding. For channel decoding, the demodulator 120 may include a Trellis decoder (not shown), a de-interleaver (not shown) and a Reed-Solomon decoder (not shown) so as to perform Trellis decoding, de-interleaving and Reed-Solomon decoding.

[111] For example, if the digital IF signal DIF is a DVB signal, the demodulator 120 performs Coded Orthogonal Frequency Division Multiple Access (COFDMA) demodulation upon the digital IF signal DIF. The demodulator 120 may also perform channel decoding. For channel decoding, the demodulator 120 may include a convolution decoder (not shown), a de-interleaver (not shown), and a Reed-Solomon decoder (not shown) so as to perform convolution decoding, de-interleaving, and Reed-Solomon decoding.

[112] The demodulator 120 may perform demodulation and channel decoding on the digital IF signal DIF, thereby obtaining a stream signal TS. The stream signal TS may be a signal in which a video signal, an audio signal and a data signal are multiplexed. For example, the stream signal TS may be an MPEG-2 TS in which an MPEG-2 video signal and a Dolby AC-3 audio signal are multiplexed. An MPEG-2 TS may include a 4-byte header and a 184-byte payload.

[113] In order to properly handle not only ATSC signals but also DVB signals, the demodulator 120 may include an ATSC demodulator and a DVB demodulator.

[114] The stream signal TS may be input to the controller 170 and thus subjected to demultiplexing and A/V signal processing. The processed video and audio signals are output to the display 180 and the audio output unit 185, respectively.

[115] The external device interface 135 may serve as an interface between an external device and the image display apparatus 100. For interfacing, the external device interface 135 may include an A/V Input/Output (I/O) unit (not shown) and/or a wireless communication module (not shown).

[116] The external device interface 135 may be connected to an external device such as a Digital Versatile Disk (DVD) player, a Blu-ray player, a game console, a camera, a camcorder, or a computer (e.g., a laptop computer), wirelessly or by wire. Then, the external device interface 135 externally receives video, audio, and/or data signals from the external device and transmits the received input signals to the controller 170. In addition, the external device interface 135 may output video, audio, and data signals processed by the controller 170 to the external device. In order to receive or transmit audio, video and data signals from or to the external device, the external device interface 135 includes the A/V I/O unit (not shown) and/or the wireless communication module (not shown).

[117] The A/V I/O unit of the external device interface 135 may include a Universal Serial

Bus (USB) port, a Composite Video Banking Sync (CVBS) port, a Component port, a Super-video (S-video) (analog) port, a Digital Visual Interface (DVI) port, a High-Definition Multimedia Interface (HDMI) port, a Red-Green-Blue (RGB) port, and a D-sub port.

[118] The wireless communication module of the external device interface 135 may perform short-range wireless communication with other electronic devices. For short-range wireless communication, the wireless communication module may use Bluetooth, Radio-Frequency IDentification (RFID), Infrared Data Association (IrDA), Ultra WideBand (UWB), ZigBee, and Digital Living Network Alliance (DLNA).

[119] The external device interface 135 may be connected to various set-top boxes through at least one of the above-described ports and may thus receive data from or transmit data to the various set-top boxes.

[120] The external device interface 135 may receive applications or an application list from an adjacent external device and provide the applications or the application list to the controller 170 or the memory 140.

[121] The network interface 130 serves as an interface between the image display apparatus 100 and a wired/wireless network such as the Internet. The network interface 130 may include an Ethernet port for connection to a wired network. The wireless communication module of the external signal I/O unit 128 may wirelessly access the Internet. For connection to wireless networks, the network interface 130 may use Wireless Local Area Network (WLAN) (i.e., Wi-Fi), Wireless Broadband (WiBro), World Interoperability for Microwave Access (WiMax), and High Speed Downlink Packet Access (HSDPA).

[122] The network interface 130 may transmit data to or receive data from another user or electronic device over a connected network or another network linked to the connected network. Especially, the network interface 130 may transmit data stored in the image display apparatus 100 to a user or electronic device selected from among users or electronic devices pre-registered with the image display apparatus 100.

[123] The network interface 130 may access a specific Web page over a connected network or another network linked to the connected network. That is, the network interface 130 may access a specific Web page over a network and transmit or receive data to or from a server. Additionally, the network interface 130 may receive content or data from a CP or an NP. Specifically, the network interface 130 may receive content such as movies, advertisements, games, VoD files, and broadcast signals, and information related to the content from a CP or an NP. Also, the network interface 130 may receive update information about firmware and update files of the firmware from the NP. The network interface 130 may transmit data over the Internet or to the CP or the NP.

[124] The network interface 130 may selectively receive a desired application among open

applications over a network.

[125] In an embodiment of the present invention, when a game application is executed in the image display apparatus 100, the network interface 130 may transmit data to or receive data from a user terminal connected to the image display apparatus 100 through a network. In addition, the network interface 130 may transmit specific data to or receive specific data from a server that records game scores.

[126] The memory 140 may store various programs necessary for the controller 170 to process and control signals, and may also store processed video, audio and data signals.

[127] The memory 140 may temporarily store a video, audio and/or data signal received from the external device interface 135 or the network interface 130. The memory 140 may store information about broadcast channels by the channel-add function.

[128] The memory 140 may store applications or a list of applications received from the external device interface 135 or the network interface 130.

[129] The memory 140 may store a variety of platforms which will be described later.

[130] In an embodiment of the present invention, when the image display apparatus 100 executes a game application, the memory 140 may store user-specific information and game play information about a user terminal used as a game controller.

[131] The memory 140 may include, for example, at least one of a flash memory-type storage medium, a hard disk-type storage medium, a multimedia card micro-type storage medium, a card-type memory (e.g. a Secure Digital (SD) or eXtreme Digital (XD) memory), a Random Access Memory (RAM), or a Read-Only Memory (ROM) such as an Electrically Erasable and Programmable Read Only Memory. The image display apparatus 100 may reproduce content stored in the memory 140 (e.g. video files, still image files, music files, text files, and application files) to the user.

[132] While the memory 140 is shown in FIG. 6 as configured separately from the controller 170, to which the present invention is not limited, the memory 140 may be incorporated into the controller 170, for example.

[133] The user input interface 150 transmits a signal received from the user to the controller 170 or transmits a signal received from the controller 170 to the user.

[134] For example, the user input interface 150 may receive various user input signals such as a power-on/off signal, a channel selection signal, and a screen setting signal from a remote controller 200 or may transmit a signal received from the controller 170 to the remote controller 200, according to various communication schemes, for example, RF communication and IR communication.

[135] For example, the user input interface 150 may provide the controller 170 with user input signals or control signals received from local keys (not shown), such as inputs of a power key, a channel key, and a volume key, and setting values.

[136] Also, the user input interface 150 may transmit a control signal received from a sensor unit (not shown) for sensing a user gesture to the controller 170 or transmit a signal received from the controller 170 to the sensor unit. The sensor unit may include a touch sensor, a voice sensor, a position sensor, a motion sensor, etc.

[137] The controller 170 may demultiplex the stream signal TS received from the tuner 110, the demodulator 120, or the external device interface 135 into a number of signals and process the demultiplexed signals into audio and video data.

[138] The video signal processed by the controller 170 may be displayed as an image on the display 180. The video signal processed by the controller 170 may also be transmitted to an external output device through the external device interface 135.

[139] The audio signal processed by the controller 170 may be output to the audio output unit 185. Also, the audio signal processed by the controller 170 may be transmitted to the external output device through the external device interface 135.

[140] While not shown in FIG. 6, the controller 170 may include a DEMUX and a video processor, which will be described later with reference to FIG. 10.

[141] In addition, the controller 170 may provide overall control to the image display apparatus 100. For example, the controller 170 may control the tuner 110 to select an RF broadcast signal corresponding to a user-selected channel or a pre-stored channel.

[142] The controller 170 may control the image display apparatus 100 according to a user command received through the user input interface 150 or according to an internal program. Especially the controller 170 may access a network and download an application or application list selected by the user to the image display apparatus 100 over the network.

[143] For example, the controller 170 controls the tuner 110 to receive a channel selected according to a specific channel selection command received through the user input interface 150 and processes a video, audio and/or data signal of the selected channel. The controller 170 outputs the processed video or audio signal along with information about the user-selected channel to the display 180 or the audio output unit 185.

[144] In another example, the controller 170 outputs a video or audio signal received from an external device such as a camera or a camcorder through the external device interface 135 to the display 180 or the audio output unit 185 according to an external device video playback command received through the external device interface 150.

[145] The controller 170 may control the display 180 to display images. For instance, the controller 170 may control the display 180 to display a broadcast image received from the tuner 110, an external input image received through the external device interface 135, an image received through the network interface 130, or an image stored in the memory 140. The image displayed on the display 180 may be a Two-Dimensional (2D) or Three-Dimensional (3D) still image or moving picture.

[146] The controller 170 may control content playback. The content may include any content stored in the image display apparatus 100, received broadcast content, and external input content. The content includes at least one of a broadcast image, an external input image, an audio file, a still image, a Web page, or a text file.

[147] Upon receipt of a go-to-home input, the controller 170 may control display of the home screen on the display 180 in an embodiment of the present invention.

[148] The home screen may include a plurality of card objects classified according to content sources. The card objects may include at least one of a card object representing a thumbnail list of broadcast channels, a card object representing a broadcast program guide, a card object representing a program reservation list or a program recording list, or a card object representing a media list of a device connected to the image display apparatus 100. The card objects may further include at least one of a card object representing a list of connected external devices or a card object representing a call-associated list.

[149] The home screen may further include an application menu with at least one application that can be executed.

[150] Upon receipt of a card object move input, the controller 170 may control movement of a card object corresponding to the card object move input on the display 180, or if the card object is not displayed on the display 180, the controller 170 may control display of the card object on the display 180.

[151] When a card object is selected from among the card objects on the home screen, the controller 170 may control display of an image corresponding to the selected card object on the display 180.

[152] The controller 170 may control display of an input broadcast image and an object representing information about the broadcast image in a card object representing broadcast images. The broadcast image may be fixed in size through lock setting.

[153] The controller 170 may control display of a set-up object for at least one of image setting, audio setting, screen setting, reservation setting, setting of a pointer of the remote controller, or network setting on the home screen.

[154] The controller 170 may control display of a log-in object, a help object, or an exit object on a part of the home screen.

[155] The controller 170 may control display of an object representing the total number of available card objects or the number of card objects displayed on the display 180 among all card objects, on a part of the home screen.

[156] If one of the card objects displayed on the display 180 is selected, the controller 170 may fullscreen the selected card object to cover the entirety of the display 180.

[157] Upon receipt of an incoming call at a connected external device or the image display apparatus 100, the controller 170 may control focusing-on or shift of a call-related card

object among the plurality of card objects.

[158] If an application view menu item is selected, the controller 170 may control display of applications or a list of applications that are available in the image display apparatus or downloadable from an external network.

[159] The controller 170 may control installation and execution of an application downloaded from the external network along with various UIs. Also, the controller 170 may control display of an image related to the executed application on the display 180, upon user selection.

[160] In an embodiment of the present invention, when the image display apparatus 100 provides a game application, the controller 170 may control assignment of player IDs to specific user terminals, creation of game play information by executing the game application, transmission of the game play information to the user terminals through the network interface 130, and reception of the game play information at the user terminals.

[161] The controller 170 may control detection of user terminals connected to the image display apparatus 100 over a network through the network interface 130, display of a list of the detected user terminals on the display 180 and reception of a selection signal indicating a user terminal selected for use as a user controller from among the listed user terminals through the user input interface 150.

[162] The controller 170 may control output of a game play screen of the game application, inclusive of player information about each user terminal and game play information, through the display 180.

[163] The controller 170 may determine the specific signal received from a user terminal through the network interface 130 as game play information and thus control the game play information to be reflected in the game application in progress.

[164] The controller 170 may control transmission of the game play information about the game application to a specific server connected to the image display apparatus 100 over a network through the network interface 130.

[165] As another embodiment, upon receipt of information about a change in the game play information from the server through the network interface 130, the controller 170 may control output of a notification message in a predetermined area of the display 180.

[166] The image display apparatus 100 may further include a channel browsing processor (not shown) for generating thumbnail images corresponding to channel signals or external input signals.

[167] The channel browsing processor may extract some of the video frames of each of stream signals TS received from the demodulator 120 or stream signals received from the external device interface 135 and display the extracted video frames on the display 180 as thumbnail images. The thumbnail images may be directly output to the

controller 170 or may be output after being encoded. Also, it is possible to encode the thumbnail images into a stream and output the stream to the controller 170. The controller 170 may display a thumbnail list including a plurality of received thumbnail images on the display 180. The thumbnail images may be updated sequentially or simultaneously in the thumbnail list. Therefore, the user can readily identify the content of broadcast programs received through a plurality of channels.

[168] The display 180 may convert a processed video signal, a processed data signal, and an OSD signal received from the controller 170 or a video signal and a data signal received from the external device interface 135 into RGB signals, thereby generating driving signals.

[169] The display 180 may be various types of displays such as a Plasma Display Panel (PDP), a Liquid Crystal Display (LCD), an Organic Light-Emitting Diode (OLED) display, a flexible display, and a 3D display.

[170] The display 180 may also be a touch screen that can be used not only as an output device but also as an input device.

[171] The audio output unit 185 may receive a processed audio signal (e.g., a stereo signal, a 3.1-channel signal or a 5.1-channel signal) from the controller 170 and output the received audio signal as sound. The audio output unit 185 may employ various speaker configurations.

[172] To sense a user gesture, the image display apparatus 100 may further include the sensor unit (not shown) that has at least one of a touch sensor, a voice sensor, a position sensor, and a motion sensor, as stated before. A signal sensed by the sensor unit may be output to the controller 170 through the user input interface 150.

[173] The image display apparatus 100 may further include the camera unit (not shown) for capturing images of a user. Image information captured by the camera unit may be input to the controller 170.

[174] The controller 170 may sense a user gesture from an image captured by the camera unit or a signal sensed by the sensor unit, or by combining the captured image and the sensed signal.

[175] The power supply 190 supplies power to the image display apparatus 100. Particularly, the power supply 190 may supply power to the controller 170, the display 180, and the audio output unit 185, which may be implemented as a System On Chip (SOC).

[176] For supplying power, the power supply 190 may include a converter (not shown) for converting Alternating Current (AC) into Direct Current (DC). If the display 180 is configured with, for example, a liquid crystal panel having a plurality of backlight lamps, the power supply 190 may further include an inverter (not shown) capable of performing Pulse Width Modulation (PWM) for luminance change or dimming

driving.

[177] The remote controller 200 transmits a user input to the user input interface 150. For transmission of user input, the remote controller 200 may use various communication techniques such as Bluetooth, RF communication, IR communication, UWB and ZigBee.

[178] In addition, the remote controller 200 may receive a video signal, an audio signal or a data signal from the user input interface 150 and output the received signals visually, audibly or as vibrations.

[179] The above-described image display apparatus 100 may be a fixed digital broadcast receiver capable of receiving at least one of ATSC (8-VSB) broadcast programs, DVB-T (COFDM) broadcast programs, and ISDB-T (BST-OFDM) broadcast programs.

[180] The block diagram of the image display apparatus 100 illustrated in FIG. 6 is purely exemplary. Depending upon the specifications of the image display apparatus 100 in actual implementation, the components of the image display apparatus 100 may be combined or omitted or new components may be added. That is, two or more components are incorporated into one component or one component may be configured as separate components, as needed. In addition, the function of each block is described for the purpose of describing the embodiment of the present invention and thus specific operations or devices should not be construed as limiting the scope and spirit of the present invention.

[181] Unlike the configuration illustrated in FIG. 6, the image display apparatus 100 may be configured so as to receive and playback video content through the network interface 130 or the external device interface 135, without the tuner 100 and the de-modulator 120.

[182] The image display apparatus 100 is an example of image signal processing apparatus that processes a stored image or an input image. Other examples of the image signal processing apparatus include a set-top box without the display 180 and the audio output unit 185, a DVD player, a Blu-ray player, a game console, and a computer. The set-top box will be described later with reference to FIGS. 7 and 8.

[183] FIGS. 7 and 8 are block diagrams illustrating either of the image display apparatuses separately as a set-top box and a display device according to embodiments of the present invention.

[184] Referring to FIG. 7, a set-top box 250 and a display device 300 may transmit or receive data wirelessly or by wire.

[185] The set-top box 250 may include a network interface 255, a memory 258, a signal processor 260, a user input interface 263, and an external device interface 265.

[186] The network interface 255 serves as an interface between the set-top box 250 and a wired/wireless network such as the Internet. The network interface 255 may transmit

data to or receive data from another user or another electronic device over a connected network or over another network linked to the connected network.

[187] The memory 258 may store programs necessary for the signal processor 260 to process and control signals and temporarily store a video, audio and/or data signal received from the external device interface 265 or the network interface 255. The memory 258 may also store platforms illustrated in FIGS. 11 and 12, as described later.

[188] The signal processor 260 processes an input signal. For example, the signal processor 260 may demultiplex or decode an input video or audio signal. For signal processing, the signal processor 260 may include a video decoder or an audio decoder. The processed video or audio signal may be transmitted to the display device 300 through the external device interface 265.

[189] The user input interface 263 transmits a signal received from the user to the signal processor 260 or a signal received from the signal processor 260 to the user. For example, the user input interface 263 may receive various control signals such as a power on/off signal, an operation input signal, and a setting input signal through a local key (not shown) or the remote controller 200 and output the control signals to the signal processor 260.

[190] The external device interface 265 serves as an interface between the set-top box 250 and an external device that is connected wirelessly or by wire, particularly the display device 300, for signal transmission or reception. The external device interface 265 may also interface with an external device such as a game console, a camera, a camcorder, and a computer (e.g. a laptop computer), for data transmission or reception.

[191] The set-top box 250 may further include a media input unit for media playback. The media input unit may be a Blu-ray input unit, for example. That is, the set-top box 250 may include a Blu-ray player. After signal processing such as demultiplexing or decoding in the signal processor 260, a media signal from a Blu-ray disk may be transmitted to the display device 300 through the external device interface 265 so as to be displayed on the display device 300.

[192] The display device 300 may include a tuner 270, an external device interface 273, a demodulator 275, a memory 278, a controller 280, a user input interface 283, a display 290, and an audio output unit 295.

[193] The tuner 270, the demodulator 275, the memory 278, the controller 280, the user input interface 283, the display 290, and the audio output unit 295 are identical respectively to the tuner 110, the demodulator 120, the memory 140, the controller 170, the user input interface 150, the display 180, and the audio output unit 185 illustrated in FIG. 6 and thus a description thereof is not provided herein.

[194] The external device interface 273 serves as an interface between the display device

300 and a wireless or wired external device, particularly the set-top box 250, for data transmission or reception.

[195] Hence, a video signal or an audio signal received through the set-top box 250 is output through the display 290 or the audio output unit 295 through the controller 280.

[196] Referring to FIG. 8, the configuration of the set-top box 250 and the display device 300 illustrated in FIG. 8 is similar to that of the set-top box 250 and the display device 300 illustrated in FIG. 7, except that the tuner 270 and the demodulator 275 reside in the set-top box 250, not in the display device 300. Thus the following description is given focusing on such difference.

[197] The signal processor 260 may process a broadcast signal received through the tuner 270 and the demodulator 275. The user input interface 263 may receive a channel selection input, a channel store input, etc.

[198] FIG. 9 illustrates an operation for communicating with third devices in either of the image display apparatuses according to an embodiment of the present invention. The image display apparatus illustrated in FIG. 9 may be one of the afore-described image display apparatuses according to the embodiments of the present invention.

[199] Referring to FIG. 9, the image display apparatus 100 may communicate with a broadcasting station 210, a network server 220, or an external device 230.

[200] The image display apparatus 100 may receive a broadcast signal including a video signal from the broadcasting station 210. The image display apparatus 100 may process the audio and video signals of the broadcast signal or the data signal of the broadcast signal, suitably for transmission from the image display apparatus 100. The image display apparatus 100 may output images or sound based on the processed video or audio signal.

[201] Meanwhile, the image display apparatus 100 may communicate with the network server 220. The network server 200 is capable of transmitting signals to and receiving signals from the image display apparatus 100 over a network. For example, the network server 220 may be a portable terminal that can be connected to the image display apparatus 100 through a wired or wireless base station. In addition, the network server 200 may provide content to the image display apparatus 100 over the Internet. A CP may provide content to the image display apparatus 100 through the network server 220.

[202] The image display apparatus 100 may communicate with the external device 230. The external device 230 can transmit and receive signals directly to and from the image display apparatus 100 wirelessly or by wire. For instance, the external device 230 may be a media memory device or a player. That is, the external device 230 may be any of a camera, a DVD player, a Blu-ray player, a PC, etc.

[203] The broadcasting station 210, the network server 220 or the external device 230 may

transmit a signal including a video signal to the image display apparatus 100. The image display apparatus 100 may display an image based on the video signal included in the received signal. Also, the image display apparatus 100 may transmit a signal received from the broadcasting station 210 or the network server 220 to the external device 230 and may transmit a signal received from the external device 230 to the broadcasting station 210 or the network server 220. That is, the image display apparatus 100 may transmit content included in signals received from the broadcasting station 210, the network server 220, and the external device 230, as well as playback the content immediately.

[204] FIG. 10 is a block diagram of the controller illustrated in FIG. 6.

[205] Referring to FIG. 10, the controller 170 may include a DEMUX 310, a video processor 320, an OSD generator 340, a card object generator 345, a mixer 350, a Frame Rate Converter (FRC) 355, and a formatter 360 according to an embodiment of the present invention. The controller 170 may further include an audio processor (not shown) and a data processor (not shown).

[206] The DEMUX 310 demultiplexes an input stream. For example, the DEMUX 310 may demultiplex an MPEG-2 TS into a video signal, an audio signal, and a data signal. The input stream signal may be received from the tuner 110, the demodulator 120 or the external device interface 135.

[207] The video processor 320 may process the demultiplexed video signal. For video signal processing, the video processor 320 may include a video decoder 325 and a scaler 335.

[208] The video decoder 325 decodes the demultiplexed video signal and the scaler 335 scales the resolution of the decoded video signal so that the video signal can be displayed on the display 180.

[209] The video decoder 325 may be provided with decoders that operate based on various standards.

[210] If the demultiplexed video signal is, for example, an MPEC-2 encoded video signal, the video signal may be decoded by an MPEC-2 decoder.

[211] On the other hand, if the video signal is an H.264-encoded DMB or DVB-handheld (DVB-H) signal, the video signal may be decoded by an H.264 decoder.

[212] The video signal decoded by the video processor 320 is provided to the mixer 350.

[213] The OSD generator 340 generates an OSD signal autonomously or according to user input. For example, the OSD generator 340 may generate signals by which a variety of information is displayed as images or text on the display 180, according to control signals received from the user input interface 150. The OSD signal may include various data such as a UI, a variety of menu screens, widgets, icons, etc.

[214] For example, the OSD generator 340 may generate a signal by which subtitles are

displayed for a broadcast image or Electronic Program Guide (EPG)-based broadcasting information.

[215] The card object generator 345 may generate a plurality of card objects displayed on the home screen according to go-to-home input. The card object generator 345 may be included in the controller 170. While not shown in FIG. 10, the card object generator 345 may be included in the OSD generator 340 of the controller 170 or may be configured as a separate GPU. The plurality of card objects generated from the card object generator may be transmitted to and displayed on the display 180.

[216] The mixer 350 may mix the decoded video signal with the OSD signal and output the mixed signal to the formatter 360. As the decoded broadcast video signal or the external input signal is mixed with the OSD signal, an OSD may be overlaid on the broadcast image or the external input image.

[217] The FRC 355 may change the frame rate of an input image. For example, a frame rate of 60Hz is converted into a frame rate of 120 or 240Hz. When the frame rate is to be changed from 60Hz to 120Hz, a first frame is inserted between the first frame and a second frame, or a predicted third frame is inserted between the first and second frames. If the frame rate is to be changed from 60Hz to 240Hz, three identical frames or three predicted frames are inserted between the first and second frames. It is also possible to maintain the frame rate of the input image without frame rate conversion.

[218] The formatter 360 changes the format of the signal received from the FRC 355 to be suitable for the display 180. For example, the formatter 360 may convert a received signal into an RGB data signal. The RGB signal may be output in the form of a Low Voltage Differential Signal (LVDS) or mini-LVDS.

[219] The audio processor (not shown) of the controller 170 may process the demultiplexed audio signal. For audio signal processing, the audio processor may have a plurality of decoders.

[220] If the demultiplexed audio signal is a coded audio signal, the audio processor of the controller 170 may decode the audio signal. For example, the demultiplexed audio signal may be decoded by an MPEG-2 decoder, an MPEG-4 decoder, an Advanced Audio Coding (AAC) decoder, or an AC-3 decoder.

[221] The audio processor of the controller 170 may also adjust the bass, treble or volume of the audio signal.

[222] The data processor (not shown) of the controller 170 may process the data signal obtained by demultiplexing the input stream signal. For example, if the data signal is an encoded signal such as an EPG which includes broadcasting information specifying the start time, end time, etc. of scheduled broadcast TV or radio programs, the controller 170 may decode the data signal. Examples of an EPG include ATSC-Program and System Information Protocol (PSIP) information and DVB-Service In-

formation (SI).

[223] ATSC-PSIP information or DVB-SI may be included in the header of a TS, i.e., a 4-byte header of an MPEG-2 TS.

[224] The block diagram of the controller 170 illustrated in FIG. 10 is an embodiment of the present invention. Depending upon the specifications of the controller 170, the components of the controller 170 may be combined, or omitted. Or new components are added to the controller 170.

[225] FIG. 11 illustrates a platform architecture for either of the image display apparatuses according to an embodiment of the present invention and FIG. 12 illustrates a platform architecture for either of the image display apparatuses according to another embodiment of the present invention.

[226] A platform for either of the image display apparatuses may have OS-based software to implement the above-described various operations according to an embodiment of the present invention.

[227] Referring to FIG. 11, a platform for either of the image display apparatuses is a separate type according to an embodiment of the present invention. The platform may be designed separately as a legacy system platform 400 and a smart system platform 405. An OS kernel 410 may be shared between the legacy system platform 400 and the smart system platform 405.

[228] The legacy system platform 400 may include a stack of a driver 420, middleware 430, and an application layer 450 on the OS kernel 410.

[229] On the other hand, the smart system platform 405 may include a stack of a library 435, a framework 440, and an application layer 455 on the OS kernel 410.

[230] The OS kernel 410 is the core of an operating system. When the image display apparatus is driven, the OS kernel 410 may be responsible for operation of at least one of hardware drivers, security protection for hardware and processors in the image display apparatus, efficient management of system resources, memory management, hardware interfacing by hardware abstraction, multi-processing, or scheduling associated with the multi-processing. Meanwhile, the OS kernel 410 may further perform power management.

[231] The hardware drivers of the OS kernel 410 may include, for example, at least one of a display driver, a Wi-Fi driver, a Bluetooth driver, a USB driver, an audio driver, a power manager, a binder driver, or a memory driver.

[232] Alternatively or additionally, the hardware drivers of the OS kernel 410 may be drivers for hardware devices within the OS kernel 410. The hardware drivers may include a character device driver, a block device driver, and a network device driver. The block device driver may need a buffer for buffering data on a block basis, because data is transmitted on a block basis. The character device driver may not need a buffer

since data is transmitted on a basic data unit basis, that is, on a character basis.

[233] The OS kernel 410 may be implemented based on any of various OSs such as Unix (Linux), Windows, etc. The OS kernel 410 may be a general-purpose open OS kernel which can be implemented in other electronic devices.

[234] The driver 420 is interposed between the OS kernel 410 and the middleware 430. Along with the middleware 430, the driver 420 drives devices for operations of the application layer 450. For example, the driver 420 may include a driver(s) for a microcomputer, a display module, a Graphic Processing Unit (GPU), the FRC, a General-Purpose Input/Output (GPIO) pin, a High-Definition Multimedia Interface (HDMI), a System Decoder (SDEC) or DEMUX, a Video Decoder (VDEC), an Audio Decoder (ADEC), a Personal Video Recorder (PVR), and/or an Inter-Integrated Circuit (I2C). These drivers operate in conjunction with the hardware drivers of the OS kernel 410.

[235] In addition, the driver 420 may further include a driver for the remote controller 200, especially a pointing device to be described below. The remote controller driver may reside in the OS kernel 410 or the middleware 430, instead of the driver 420.

[236] The middleware 430 resides between the OS kernel 410 and the application layer 450. The middleware 430 may mediate between different hardware devices or different software programs, for data transmission and reception between the hardware devices or the software programs. Therefore, the middleware 430 can provide standard interfaces, support various environments, and enable interaction between tasks conforming to heterogeneous communication protocols.

[237] Examples of the middleware 430 in the legacy system platform 400 may include Multimedia and Hypermedia information coding Experts Group (MHEG) and Advanced Common Application Platform (ACAP) as data broadcasting-related middleware, PSIP or SI middleware as broadcasting information-related middleware, and DLNA middleware as peripheral device communication-related middleware.

[238] The application layer 450 that runs atop the middleware 430 in the legacy system platform 400 may include, for example, UI applications associated with various menus in the image display apparatus. The application layer 450 may allow editing and updating over a network by user selection. With use of the application layer 450, the user may enter a desired menu among various UIs by manipulating the remote controller 210 while viewing a broadcast program.

[239] The application layer 450 may further include at least one of a TV guide application, a Bluetooth application, a reservation application, a Digital Video Recorder (DVR) application, and a hotkey application.

[240] In the smart system platform 405, the library 435 is positioned between the OS kernel 410 and the framework 440, forming the basis of the framework 440. For example, the library 435 may include Secure Socket Layer (SSL) being a security-

related library, WebKit being a Web engine-related library, c library (libc), and Media Framework being a media-related library specifying, for example, a video format and an audio format. The library 435 may be written in C or C++. Also, the library 435 may be exposed to a developer through the framework 440.

[241] The library 435 may include a runtime 437 with a core Java library and a Virtual Machine (VM). The runtime 437 and the library 435 form the basis of the framework 440.

[242] The VM may be a virtual machine that enables concurrent execution of a plurality of instances, that is, multi-tasking. For each application of the application layer 455, a VM may be allocated and executed. For scheduling or interconnection between instances, the binder driver (not shown) of the OS kernel 410 may operate.

[243] The binder driver and the runtime 437 may connect Java applications to C-based libraries.

[244] The library 435 and the runtime 437 may correspond to the middleware 430 of the legacy system platform 400.

[245] In the smart system platform 405, the framework 440 includes programs on which applications of the application layer 455 are based. The framework 440 is compatible with any application and may allow component reuse, movement or exchange. The framework 440 may include supporting programs and programs for interconnecting different software components. For example, the framework 440 may include an activity manager related to activities of applications, a notification manager, and a CP for abstracting common information between applications. This framework 440 may be written in Java.

[246] The application layer 455 on top of the framework 440 includes a variety of programs that are executed and displayed in the image display apparatus. The application layer 455 may include, for example, a core application that is a suit having at least one solution of e-mail, Short Message Service (SMS), calendar, map, or browser. The application layer 455 may be written in Java.

[247] In the application layer 455, applications may be categorized into user-undeletable applications 465 stored in the image display apparatus 100 that cannot be modified and user-installable or user-deletable applications 475 that are downloaded from an external device or a network and stored in the image display apparatus.

[248] With the applications of the application layer 455, a variety of functions such as Internet telephony, VoD, Web album, Social Networking Service (SNS), Location-Based Service (LBS), map service, Web browsing, and application search may be performed through network access. In addition, other functions such as gaming and schedule management may be performed by the applications.

[249] Referring to FIG. 12, a platform for the image display apparatus according to another

embodiment of the present invention is an integrated type. The integrated platform may include an OS kernel 510, a driver 520, middleware 530, a framework 540, and an application layer 550.

[250] Compared to the separate-type platform illustrated in FIG. 11, the integrated-type platform is characterized by the absence of the library 435 and the application layer 550 being an integrated layer. The driver 520 and the framework 540 correspond to the driver 420 and the framework 440 of FIG. 5, respectively.

[251] The library 435 of FIG. 11 may be incorporated into the middleware 530. That is, the middleware 530 may include both the legacy system middleware and the image display system middleware. As described before, the legacy system middleware includes MHEG or ACAP as data broadcasting-related middleware, PSIP or SI middleware as broadcasting information-related middleware, and DLNA middleware as peripheral device communication-related middleware, whereas the image display system middleware includes SSL as a security-related library, WebKit as a Web engine-related library, libc, and Media Framework as a media-related library. The middleware 530 may further include the afore-described runtime.

[252] The application layer 550 may include a menu-related application, a TV guide application, a reservation application, etc. as legacy system applications, and e-mail, SMS, a calendar, a map, and a browser as image display system applications.

[253] In the application layer 550, applications may be categorized into user-undeletable applications 565 that are stored in the image display apparatus and user-installable or user-deletable applications 575 that are downloaded from an external device or a network and stored in the image display apparatus.

[254] Based on the afore-described platforms illustrated in FIGS. 11 and 12, a variety of Application Programming Interfaces (APIs) and Software Development Kits (SDKs) necessary to develop applications may be opened. APIs may be implemented functions that provide connectivity to specific sub-routines, for execution of the functions within a program. Or APIs may be implemented programs.

[255] For example, sources related to hardware drivers of the OS kernel 410, such as a display driver, a WiFi driver, a Bluetooth driver, a USB driver or an audio driver, may be opened. Related sources within the driver 420 such as a driver for a microcomputer, a display module, a GPU, an FRC, an SDEC, a VDEC, an ADEC or a pointing device may be opened. In addition, sources related to PSIP or SI middleware as broadcasting information-related middleware or sources related to DLNA middleware may be opened.

[256] Such various open APIs allow developers to create applications executable in the image display apparatus 100 or applications required to control operations of the image display apparatus 100 based on the platforms illustrated in FIGS. 11 and 12.

[257] The platforms illustrated in FIGS. 11 and 12 may be general-purpose ones that can be implemented in many other electronic devices as well as in image display apparatuses. The platforms may be stored or loaded in the memory 140, the controller 170, or any other processor (not shown). To execute applications, an additional application processor (not shown) may be further provided.

[258] FIG. 13 illustrates a method for controlling either of the image display apparatuses using a remote controller according to an embodiment of the present invention.

[259] FIG. 13(a) illustrates a pointer 205 representing movement of the remote controller 200 displayed on the display 180.

[260] The user may move or rotate the remote controller 200 up and down, side to side (FIG. 13(b)), and back and forth (FIG. 13(c)). Since the pointer 205 moves in accordance with the movement of the remote controller 200, the remote controller 200 may be referred to as a pointing device.

[261] Referring to FIG. 13(b), if the user moves the remote controller 200 to the left, the pointer 205 moves to the left on the display 180. A sensor of the remote controller 200 detects the movement of the remote controller 200 and transmits motion information corresponding to the result of the detection to the image display apparatus. Then, the image display apparatus determines the movement of the remote controller 200 based on the motion information received from the remote controller 200, and calculates the coordinates of a target point to which the pointer 205 should be shifted in accordance with the movement of the remote controller 200 based on the result of the determination. The image display apparatus then displays the pointer 205 at the calculated coordinates.

[262] Referring to FIG. 13(c), while pressing a predetermined button of the remote controller 200, the user moves the remote controller 200 away from the display 180. Then, a selected area corresponding to the pointer 205 may be zoomed in on and enlarged on the display 180. On the contrary, if the user moves the remote controller 200 toward the display 180, the selection area corresponding to the pointer 205 is zoomed out and thus contracted on the display 180. The opposite case is possible. That is, when the remote controller 200 moves away from the display 180, the selection area may be zoomed out and when the remote controller 200 approaches the display 180, the selection area may be zoomed in.

[263] With the predetermined button pressed in the remote controller 200, the up, down, left and right movements of the remote controller 200 may be ignored. That is, when the remote controller 200 moves away from or approaches the display 180, only the back and forth movements of the remote controller 200 are sensed, while the up, down, left and right movements of the remote controller 200 are ignored. Unless the predetermined button is pressed in the remote controller 200, the pointer 205 moves in ac-

cordance with the up, down, left or right movement of the remote controller 200.

[264] The speed and direction of the pointer 205 may correspond to the speed and direction of the remote controller 200.

[265] The pointer 205 is an object displayed on the display 180 in correspondence with the movement of the remote controller 200. Therefore, the pointer 205 may have various shapes other than the arrow illustrated in FIG. 13. For example, the pointer 205 may be a dot, a cursor, a prompt, a thick outline, etc. The pointer 205 may be displayed across a plurality of points, such as a line and a surface, as well as at a single point on horizontal and vertical axes.

[266] FIG. 14 is a detailed block diagram of the remote controller in either of the image display apparatuses according to an embodiment of the present invention.

[267] Referring to FIG. 14, the remote controller 200 may include a wireless communication module 225, a user input unit 235, a sensor unit 240, an output unit 250, a power supply 260, a memory 270, and a controller 280.

[268] The wireless communication module 225 transmits signals to and/or receives signals from either of the afore-described image display apparatuses according to the embodiments of the present invention, herein, the image display apparatus 100.

[269] The wireless communication module 225 may include an RF module 221 for transmitting RF signals to and/or receiving RF signals from the image display apparatus 100 according to an RF communication standard. The wireless communication module 225 may also include an IR module 223 for transmitting IR signals to and/or receiving IR signals from the image display apparatus 100 according to an IR communication standard.

[270] The remote controller 200 transmits motion information representing the movement of the remote controller 200 to the image display apparatus 100 through the RF module 221 in this embodiment. The remote controller 200 may also receive signals from the image display apparatus 100 through the RF module 221. As needed, the remote controller 200 may transmit commands such as a power on/off command, a channel switch command, or a volume change command to the image display apparatus 100 through the IR module 223.

[271] The user input unit 235 may include a keypad, a plurality of buttons, a touchpad and/or a touch screen. The user may enter commands to the image display apparatus 100 by manipulating the user input unit 235. If the user input unit 235 includes a plurality of hard buttons, the user may input various commands to the image display apparatus 100 by pressing the hard buttons. Alternatively or additionally, if the user input unit 235 includes a touch screen displaying a plurality of soft keys, the user may input various commands to the image display apparatus 100 by touching the soft keys. The user input unit 235 may also include various input tools other than those set forth herein,

such as a scroll key and/or a jog wheel, which should not be construed as limiting the present invention.

[272] The sensor unit 240 may include a gyro sensor 241 and/or an acceleration sensor 243. The gyro sensor 241 may sense the movement of the remote controller 200, for example, in X-, Y-, and Z-axis directions, and the acceleration sensor 243 may sense the speed of the remote controller 200. The sensor unit 240 may further include a distance sensor for sensing the distance between the remote controller 200 and the display 180.

[273] The output unit 250 may output a video and/or audio signal corresponding to manipulation of the user input unit 235 or corresponding to a signal received from the image display apparatus 100. The user may easily identify whether the user input unit 235 has been manipulated or whether the image display apparatus 100 has been controlled, based on the video and/or audio signal output by the output unit 250.

[274] The output unit 250 may include a Light Emitting Diode (LED) module 351 which is turned on or off whenever the user input unit 235 is manipulated or whenever a signal is received from or transmitted to the image display apparatus 100 through the wireless communication module 225, a vibration module 253 which generates vibrations, an audio output module 255 which outputs audio data, and/or a display module 257 which outputs video data.

[275] The power supply 260 supplies power to the remote controller 200. If the remote controller 200 is kept stationary for a predetermined time or longer, the power supply 260 may, for example, reduce or shut off supply of power to the spatial remote controller 200 in order to save power. The power supply 260 may resume power supply if a predetermined key on the spatial remote controller 200 is manipulated.

[276] The memory 270 may store various types of programs and application data necessary to control or drive the remote controller 200. The spatial remote controller 200 may wirelessly transmit signals to and/or receive signals from the image display apparatus 100 over a predetermined frequency band with the aid of the RF module 221. The controller 280 of the remote controller 200 may store information regarding the frequency band used for the remote controller 200 to wirelessly transmit signals to and/or wirelessly receive signals from the paired image display apparatus 100 in the memory 270, for later use.

[277] The controller 280 provides overall control to the remote controller 200. The controller 280 may transmit a signal corresponding to a key manipulation detected from the user input unit 235 or a signal corresponding to motion of the spatial remote controller 200, as sensed by the sensor unit 240, to the image display apparatus 100.

[278] FIGS. 15 to 18 illustrate UIs in either of the image display apparatuses according to embodiments of the present invention.

[279] Referring to FIG. 15, an application list available from a network is displayed on the display 180. A user may access a CP or an NP directly, search for various applications, and download the applications from the CP or the NP.

[280] Specifically, FIG. 15(a) illustrates an application list 610 available in a connected server, displayed on the display 180. The application list 610 may include an icon representing each application and a brief description of the application. Because each of the image display apparatuses according to the embodiments of the present invention is capable of full browsing, it may enlarge the icons or descriptions of applications received from the connected server on the display 180. Accordingly, the user can readily identify applications, which will be described later.

[281] FIG. 15(b) illustrates selection of one application 620 from the application list 610 using the pointer 205 of the remote controller 200. Thus, the selected application 620 may be easily downloaded.

[282] FIG. 16 illustrates an application list available in the image display apparatus, displayed on the display 180. Referring to FIG. 16(a), when the user selects an application list view menu by manipulating the remote controller 200, a list of applications 660 stored in the image display apparatus is displayed on the display 180. While only icons representing the applications are shown in FIG. 16, the application list 660 may further include brief descriptions of the applications, like the application list 610 illustrated in FIG. 15. Therefore, the user can readily identify the applications.

[283] FIG. 16(b) illustrates selection of one application 670 from the application list 660 using the pointer 205 of the remote controller 200. Thus, the selected application 670 may be easily executed.

[284] While it is shown in FIGS. 15 and 16 that the user selects a desired application by moving the pointer 205 using the remote controller 200, the application may be selected in many other ways. For example, the user may select a specific application using a cursor displayed on the display 180 by a combined input of a local key and an OK key in the remote controller 200.

[285] In another example, if the remote controller 200 has a touch pad, the pointer 205 moves on the display 180 according to touch input of the touch pad. Thus the user may select a specific menu using the touch-based pointer 205.

[286] FIG. 17 illustrates a Web page displayed on the display 180. Specifically, FIG. 17(a) illustrates a Web page 710 with a search window 720, displayed on the display 180. The user may enter a character into the search window 720 by use of character keys (not shown) of a keypad displayed on a screen, character keys (not shown) provided as local keys, or character keys (not shown) of the remote controller 200.

[287] FIG. 17(b) illustrates a search result page 730 having search results matching a keyword entered into the search window 720. Since the image display apparatuses

according to the embodiments of the present invention are capable of fully browsing a Web page, the user can easily read the Web page.

[288] FIG. 18 illustrates another Web page displayed on the display 180. Specifically, FIG. 18(a) illustrates a mail service page 810 including an ID input window 820 and a password input window 825, displayed on the display 180. The user may enter a specific numeral and/or text into the ID input window 820 and the password input window 825 using a keypad (not shown) displayed on the mail service page 810, character keys (not shown) provided as local keys, or character keys (not shown) of the remote controller 200. Hence, the user can log in to a mail service.

[289] FIG. 18(b) illustrates a mail page 830 displayed on the display 180, after log-in to the mail service. For example, the mail page 830 may contains items "read mail", "write mail", "sent box", "received box", "recycle bin", etc. In the "received box" item, mail may be ordered by sender or by title.

[290] The image display apparatuses according to the embodiments of the present invention are capable of full browsing when displaying a mail service page. Therefore, the user can use the mail service conveniently.

[291] FIG. 19 is a flowchart illustrating a method for operating an image display apparatus according to an embodiment of the present invention and FIGS. 20 to 33 are views referred to for describing various examples of the method for operating an image display apparatus, illustrated in FIG. 19.

[292] Referring to FIG. 19, it is determined whether a go-to-home input has been received (S1910). Upon receipt of a go-to-home input, a home screen including a card object area and an application menu area is displayed (S1915).

[293] Specifically, the controller 170 determines whether a go-to-home input has been received through input of a local key (not shown) or manipulation of the remote controller 200. The go-to-home input may be generated when the image display apparatus is powered on or wakes from standby mode, or when a local key (not shown) or a home key or menu key of the remote controller 200 is manipulated.

[294] Upon receipt of the go-to-home input, the controller 170 may control display of a home screen including a plurality of card objects and an application menu on the display 180. The plurality of card objects and the application menu may be sequentially displayed.

[295] On the home screen, the card object area may include a plurality of card objects classified according to content sources. For example, the card objects may be a card object for displaying a broadcast image, a card object for providing a CP list, and a card object for providing a list of applications. The card objects will be described later with reference to FIGS. 20 to 67.

[296] These card objects may be generated in a card object generator 345 of the image

display apparatus 100. The card object generator 345 may be included in the OSD generator 340 of the controller 170 or may be configured as a separate GPU. The plurality of card objects generated from the card object generator 345 may be transmitted to and displayed on the display 180.

[297] On the home screen, the application menu area includes a plurality of application menu items, particularly mandatory application menu items and optional application menu items set by the user. The application menu is an application compact-view menu, which may include a view more menu item for a fullscreen-view function. The application menu will be described later with reference to FIGS. 20 to 67.

[298] The application menu may be generated in an application menu generator (not shown) of the image display apparatus 100. The application menu generator may be included in the OSD generator 340 of the controller 170 or may be configured as a separate GPU. The application menu generated from the application menu generator may be transmitted to and displayed on the display 180.

[299] A favorite channel object representing favorite channels may be displayed on the home screen. Especially, the favorite channel object may be included in the card object that displays a broadcast image among the plurality of card objects. The favorite channel object will be described later with reference to FIGS. 20 to 67.

[300] As stated before, the display 180 may display the home screen, when the image display apparatus is powered on or a home key is input. The configuration of the home screen allows the user to easily select a desired service, thus increasing user convenience.

[301] It is then determined whether the favorite channel object has been selected (S1920). Upon selection of the favorite channel object, a favorite channel list is displayed on the home screen (S1925).

[302] Specifically, the controller 170 determines whether the favorite channel object has been selected through input of a local key (not shown) or manipulation of the remote controller 200, with the home screen displayed on the display 180. Upon selection of the favorite channel object, the controller 170 may control display of a favorite channel list. For example, the favorite channel list may be displayed in the card object for displaying a broadcast image, and also along with an on-going broadcast image. This operation will be described later with reference to FIGS. 21, 22, 23 and 24.

[303] Subsequently, it is determined whether a specific channel item has been selected from the favorite channel list (S1930). Upon selection of a specific channel item, a broadcast image of a program airing on a channel indicated by the selected channel item is displayed on the display 180 (S1935).

[304] Specifically, with the favorite channel list displayed on the home screen, the controller 170 determines whether a specific channel item has been selected from the

favorite channel list through input of a local key (not shown) or manipulation of the remote controller 200. Upon selection of a specific channel item, the controller 170 controls display of a broadcast image of a program airing on a channel indicated by the selected channel item. For example, the broadcast image may be displayed in the card object for displaying a broadcast image, or may be displayed fullscreen on the display 180, which will be described later with reference to FIGS. 26, 27 and 23.

[305] It is then determined whether a predetermined time has elapsed without input of a local key or manipulation of the remote controller 200 or a move input has been received a plurality of times successively (S1940). If the predetermined time has elapsed without input of the local key or manipulation of the remote controller 200 or the consecutive move inputs have been received, the favorite channel list disappears from the display 180 (S1945).

[306] Specifically, with the home screen displayed on the display 180, the controller 170 determines whether a predetermined time has elapsed without input of a local key (not shown) or manipulation of the remote controller 200 or move inputs have been received successively. If the predetermined time has elapsed without input of the local key or manipulation of the remote controller 200 or the successive move inputs have been received, the controller 170 controls termination of displaying the favorite channel list. This operation will be described later in detail with reference to FIGS. 28 and 29.

[307] As described before, if the image display apparatus 100 is a set-top box without the display 180, the operation method illustrated in FIG. 19 may amount to output of data for displaying an image or a screen on the display 180.

[308] For example, the controller 170 determines whether a go-to-home input has been received in step S1910. Upon receipt of the go-to-home input, the controller 170 may output data needed to display a home screen including a card object area and an application menu area. The display 180, which is separately configured, may display the home screen using the data.

[309] In the same manner, steps S1925, S1935 and S1945 may be performed as the process of outputting data for displaying an image or a screen on the display 180.

[310] FIG. 20 illustrates an exemplary home screen displayed on the display 180.

[311] The home screen configuration illustrated in FIG. 20A may be an example of a default screen configuration for a smart TV. The home screen may be set as an initial screen that is displayed when the image display apparatus is powered on or wakes from standby mode, or as a default screen that is displayed when a local key (not shown) or a home key of the remote controller 200 is manipulated.

[312] Referring to FIG. 20, a card object area and an application menu area may be defined in a home screen 2000.