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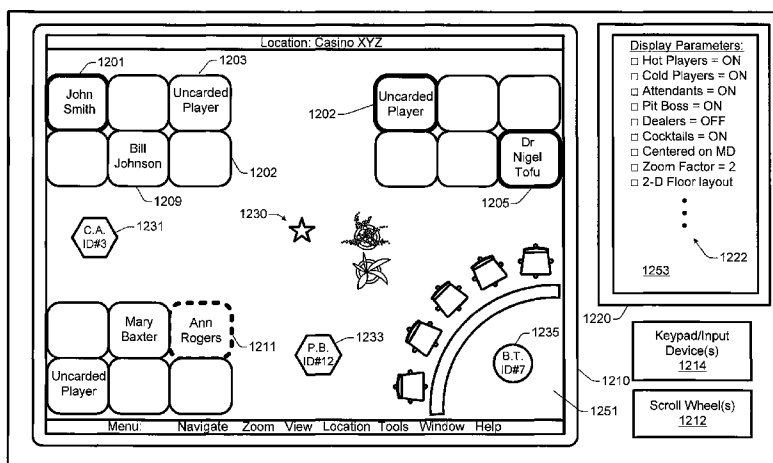
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(54) Title: MOBILE DEVICE FOR PROVIDING FILTERED CASINO INFORMATION BASED ON REAL TIME DATA



(57) Abstract: A technique is disclosed for displaying filtered casino-related information on a mobile device. In one implementation aspects of the inventions may be embodied in a mobile device which includes at least one interface operable to provide a wireless communication link to other network device in a casino data network. According to various embodiments, casino information relating to various casino activities may be acquired by the mobile device and/or other devices in the casino network. Geolocation information relating to a current location of the mobile device may also be acquired. A first set of filter parameters may be identified and/or generated for use in generating filtered casino information. Filtered casino information may be generated by applying the first set of filter parameters and geolocation information to the acquired casino information. At least a portion of the filtered information may be displayed to a user via a display at the mobile device.

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MOBILE DEVICE FOR PROVIDING FILTERED CASINO INFORMATION BASED ON REAL TIME DATA

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RELATED APPLICATION DATA

Priority claimed under 35 U.S.C. §120 to U.S. patent application serial number 10/723,375 (Attorney Docket No. IGT1P304/AC043) entitled "MOBILE DATA ACCESS", by Atkinson, Keith W. et al., filed on November 25, 2003, which claims
10 benefit of U.S. provisional application 60/439,084, filed Jan. 8, 2003; and which also claims benefit of U.S. provisional application 60/477,644, filed June 12, 2003. Each of these applications is herein incorporated by reference in its entirety for all purposes.

Priority claimed under 35 U.S.C. §120 to U.S. patent application serial number 10/755,202 (Attorney Docket No. IGT1P303/AC034) entitled "SYSTEM FOR
15 REALTIME GAME NETWORK TRACKING", by Atkinson, filed on January 8, 2004, which claims benefit of U.S. provisional application 60/439,084, filed Jan. 8, 2003; and which also claims benefit of U.S. provisional application 60/477,644, filed June 12, 2003. Each of these applications is herein incorporated by reference in its entirety for all purposes.

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BACKGROUND OF THE INVENTION

TECHNICAL FIELD

This disclosure relates to networked gaming devices, and, more specifically, to a technique for acquiring, analyzing, and displaying information relating to casino
25 gaming activities on a mobile display system.

BACKGROUND

Gaming systems are becoming ever larger and more complex. Geographically, a gaming system may comprise hundreds of linked or unlinked gaming devices within a single casino. In addition, the systems may now span multiple properties, with gaming
30 machines over a wide geographic area connected to one another or associated with the same system.

Today's gaming systems may have a variety of features or functions which make the system very complex. Of course, the operational components of a gaming system are likely to include a large number of gaming machines, table games, keno stations, cashier workstations, auditor workstation, accounting workstations, and many other
5 related system elements. These system elements are likely to be connected to a host computer via a network. Via this connection, information may be transmitted to each gaming machine or other device and information may be transmitted from each gaming machine or device. This information may comprise a wide variety of information, such as security information and gaming machine activity information.

10 Each gaming machine may also be associated with a player tracking network. This network may include the same communication links and host computer. However, this portion of the system is specially adapted to perform such functions as receiving player identification, such as by a player tracking card inserted into a card reader at the gaming machine, and tracking of player game play information. This information may
15 include coin in and coin out information from the gaming machine.

A gaming machine may also be associated with a progressive network or system. Here, a group of gaming machines are associated, and amounts wagered may be placed in a common pool which can be won playing any one of the machines associated with the progressive system.

20 A gaming machine may also be provided with a communication link to a financial system. This system or function includes components arranged to permit a player to use a credit card or similar form of credit associated with an outside financial institution for providing credit for playing the gaming machine.

A gaming machine may also be associated with a cashless transaction system,
25 such as International Game Technology's EZ-PAY™ system. Such a system includes components arranged to print tickets representing monetary value in lieu of dispensing actual currency or coin.

The complexity and size of these gaming systems creates a number of difficulties. For example, it is desirable to be able to determine, in real-time, the
30 location of a specific gaming machine and obtain information regarding its operation. It is surprisingly difficult to locate a particular gaming machine, given the size of the machine. However, in a large casino with thousands of machines, and considering that

the layout of the casino may be changed with some frequency, the location of a particular machine is often somewhat difficult to determine.

It is also often difficult to access desired real-time information regarding real-time casino activities such as, for example: player activities/locations, employee activities/locations, gaming machine locations/activities, etc. For example, the information regarding a particular machine, such as information regarding player activities, security, cashless transactions and the like may be found in different data files and with different computers or host arranged to implement the various functions or systems with which the gaming machine is associated.

10 The due to the existing factors which contribute to the difficulty in obtaining and/or accessing desired real-time information relating to casino activities, it is often difficult for a casino operator (e.g., owner, manager, employee, etc.) stationed on the casino floor to stay informed of current conditions or activities in the casino which may affect that particular casino operator. As a result, the casino operator may miss one or more opportunities to timely perform one or more tasks which otherwise could have performed in a timely manner had the operator had real-time access to information relating to such opportunities.

In light of the above, there exists a general need for facilitating the acquiring, analyzing, and displaying of real-time information relating to casino gaming activities on a mobile display system.

SUMMARY OF THE INVENTION

Various aspects of at least one embodiment are directed to different methods, devices, systems, and computer program products for displaying filtered casino-related information on a mobile device. In one implementation aspects of the inventions may be embodied in a mobile device which includes at least one interface operable to provide a wireless communication link to other network device in a casino data network. According to various embodiments, casino information relating to various casino activities may be acquired by the mobile device and/or other devices in the casino network. Geolocation information relating to a current location of the mobile device may also be acquired. A first set of filter parameters may be identified and/or generated for use in generating filtered casino information. Filtered casino information

may be generated by applying the first set of filter parameters and geolocation information to the acquired casino information. At least a portion of the filtered information may be displayed to a user via a display at the mobile device. According to a specific embodiment, at least a portion of the filtered information may be generated
5 based upon a current location of the mobile device. In one implementation, the displayed filtered information may include a first graphical user interface (GUI) adapted to display a graphical representation of a portion of an actual gaming environment. Additionally, in at least one embodiments, the acquired casino information may include real-time data relating to casino gaming activities.

10 According to specific embodiments, the filtered information displayed at the mobile device may include a first graphical user interface (GUI) adapted to display representations of objects which are within a predetermined distance from the mobile device. The first graphical user interface (GUI) may be further adapted to not display representations of objects which are not within a predetermined distance from the
15 mobile device.

According to various implementations, various types of filter parameters may be used for generating customized, filtered information to be displayed at the mobile device. Examples of such filter parameters may include: filter parameters relating to casino gaming machine data, filter parameters relating to casino player tracking data,
20 filter parameters relating to casino employee data, filter parameters relating to casino gaming system alerts, filter parameter relating to casino gaming events, etc.

In at least one embodiment, a graphical representation of a selected portion of a physical gaming environment may be generated. The graphical representation may include graphical objects representing one or more physical components of the gaming
25 environment. A first portion of the graphical representation may be displayed at one or more displays of the mobile device. In one implementation, the first portion of the graphical representation may include one or more displayed objects representing one or more of the physical components which are located in the selected portion of the of the gaming environment. Further in at least one implementation, the first portion of the
30 graphical representation may include one or more displayed objects representing one or more portions of an actual physical environment of the selected gaming environment. Examples of such objects may include: gaming machines; game tables; players; casino

employees; walls; hallways; fixtures; lights; signage; doors; flooring; type of flooring; floor coverings; floor covering designs; wall coverings; etc.

Additional objects, features and advantages of the various aspects will become apparent from the following description of its preferred embodiments, which
5 description should be taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 illustrates one example of a portion of a gaming environment 100 which may be used for implementing various aspects of at least one embodiment.

Figure 2 is a block diagram of a gaming terminal data repository (GTDR) 200
10 connected via one or more network interface(s) 208 to a gaming network 5 which, for example, may include gaming devices (e.g., gaming terminals) and/or other devices located within a casino.

Figure 3 is a simplified block diagram of an exemplary gaming machine 300 in accordance with a specific embodiment.

15 Figure 4 shows a block diagram illustrating components of a gaming system 400 which may be used for implementing various aspects of at least one embodiment.

Figure 5 is a simplified block diagram of an exemplary mobile device 500 in accordance with a specific embodiment.

Figure 6 shows a block diagram of system portion 600 which may be used for
20 implementing various aspects of at least one embodiment.

Figure 7 shows a flow diagram of a Data Processing Procedure 700 in accordance with a specific embodiment.

Figures 8-19 illustrate various examples of features of the mobile device of at least one embodiment in which different types of filtered and/or customized
25 information are displayed in accordance with specific embodiments.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

One or more different inventions may be described in the present application. Further, for one or more of the invention(s) described herein, numerous embodiments may be described in this patent application, and are presented for illustrative purposes
30 only. The described embodiments are not intended to be limiting in any sense. One or more of the invention(s) may be widely applicable to numerous embodiments, as is

readily apparent from the disclosure. These embodiments are described in sufficient detail to enable those skilled in the art to practice one or more of the invention(s), and it is to be understood that other embodiments may be utilized and that structural, logical, software, electrical and other changes may be made without departing from the scope of the one or more of the invention(s). Accordingly, those skilled in the art will recognize that the one or more of the invention(s) may be practiced with various modifications and alterations. Particular features of one or more of the invention(s) may be described with reference to one or more particular embodiments or figures that form a part of the present disclosure, and in which are shown, by way of illustration, specific
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embodiments of one or more of the invention(s). It should be understood, however, that such features are not limited to usage in the one or more particular embodiments or figures with reference to which they are described. The present disclosure is neither a literal description of all embodiments of one or more of the invention(s) nor a listing of features of one or more of the invention(s) that must be present in all embodiments.

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Headings of sections provided in this patent application and the title of this patent application are for convenience only, and are not to be taken as limiting the disclosure in any way.

Devices that are in communication with each other need not be in continuous communication with each other, unless expressly specified otherwise. In addition,
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devices that are in communication with each other may communicate directly or indirectly through one or more intermediaries.

A description of an embodiment with several components in communication with each other does not imply that all such components are required. To the contrary, a variety of optional components are described to illustrate the wide variety of possible
25
embodiments of one or more of the invention(s).

Further, although process steps, method steps, algorithms or the like may be described in a sequential order, such processes, methods and algorithms may be configured to work in alternate orders. In other words, any sequence or order of steps that may be described in this patent application does not, in and of itself, indicate a
30
requirement that the steps be performed in that order. The steps of described processes may be performed in any order practical. Further, some steps may be performed simultaneously despite being described or implied as occurring non-simultaneously

(e.g., because one step is described after the other step). Moreover, the illustration of a process by its depiction in a drawing does not imply that the illustrated process is exclusive of other variations and modifications thereto, does not imply that the illustrated process or any of its steps are necessary to one or more of the invention(s),
5 and does not imply that the illustrated process is preferred.

When a single device or article is described, it will be readily apparent that more than one device/article (whether or not they cooperate) may be used in place of a single device/article. Similarly, where more than one device or article is described (whether or not they cooperate), it will be readily apparent that a single device/article may be used
10 in place of the more than one device or article.

The functionality and/or the features of a device may be alternatively embodied by one or more other devices that are not explicitly described as having such functionality/features. Thus, other embodiments of one or more of the invention(s) need not include the device itself.

15 At least one embodiment will now be described in detail with reference to a few preferred embodiments thereof as illustrated in the accompanying drawings. In the following description, numerous specific details are set forth in order to provide a thorough understanding of at least one embodiment. It will be apparent, however, to one skilled in the art, that at least one embodiment may be practiced without some or all
20 of these specific details. In other instances, well known process steps and/or structures have not been described in detail in order to not obscure various inventive aspects.

One aspect of at least one embodiment relates to a method and apparatus for graphically representing a at least a portion of a casino gaming environment on a mobile device, including details regarding specific components of the environment. In
25 the following description, numerous specific details are set forth in order to provide a more thorough description of at least one embodiment. It will be apparent, however, to one skilled in the art, that at least one embodiment may be practiced without these specific details. In other instances, well-known features have not been described in detail so as not to obscure the invention.

30 According to different implementations, the gaming environment, or portions thereof, may be rendered and displayed as two-dimensional and/or three-dimensional graphical representations of the arrangement or layout of the physical environment,

such as a casino structure. In one embodiment, the representation includes images or graphical representations of the components of the environment in the surrounding physical environment, i.e. presenting the gaming environment in "virtual" format. The components may comprise individual gaming machines, table games and other gaming devices such as cashier workstations, accounting workstations and other components. A further aspect of the invention comprises a method and apparatus for providing information regarding individual components of the gaming environment from or in the graphical representation.

Figure 1 illustrates one example of a portion of a gaming environment 100 which may be used for implementing various aspects of at least one embodiment. As illustrated in the example of Figure 1, gaming environment 100 may comprise a gaming system 22 located in a physical environment (not shown). In one embodiment, the physical environment includes at least a portion of a physical structure, such as casino, housing one or more components of the gaming system 22.

The gaming system 22 includes a plurality of gaming system devices 24 or components. The gaming system devices 24 may include gaming machines 25, such as those known as video or slot machines. The devices 24 may also include "table" games 27 such as Blackjack and Roulette. The gaming devices 24 may also include components or devices such as player tracking card readers 29, coin counters and the like, which devices or components may be linked or associated with other devices. The devices or components may also comprise computers or servers and communication equipment, cashier and accounting workstations and a wide variety of other elements.

In one embodiment, the gaming system 22 may include a variety of sub-systems. These sub-systems may be partially or fully independent of one another or may be related. In one embodiment, each system may be included or be part of a network.

In one embodiment, the gaming system 22 may include a game presentation/operation system which includes at least one game server 26. The game server 26 may comprise a computing device including a processor and a memory. The game server 26 may be adapted to perform a variety of functions. This functionality may be implemented by software and/or hardware of the server 26. In one embodiment, the game server 26 may be arranged to provide information or instructions to the one or more gaming devices 24 or individual gaming system components. The

information may comprise game code and control data. In one embodiment, the game server 26 may also be arranged to accept information from the gaming devices 24 or components. For example, the game sever 26 may accept information regarding the status of operation of a particular gaming system device 24 (such as "normal" or
5 "malfunction").

In one embodiment, the game server 26 is part of a network which includes a communication link between the game server 26 and selected gaming system device(s) 24 and/or other component(s) with which communication is desired. A communication interface may be associated with the game server 26 and each device or component for
10 facilitating the communication. The communication interfaces may have a variety of architectures and utilize a variety of protocols such as IEEE-1394 (FireWire™) or Ethernet in the case where the communication link is a wired link, or a wireless link utilizing a wireless protocol such as 802.11, Bluetooth™, Radio Frequency (RF), Infrared, etc. The communication links may transmit electrical, electromagnetic or
15 optical signals which carry digital data streams or analog signals representing various types of information.

In one embodiment, such as when the gaming device 24 comprises a gaming machine 25, the device may include a master gaming controller which controls the functions of game operation. The communication interface may be associated with the
20 master gaming controller, permitting data to be transmitted between the game server 26 and the master gaming controller.

In one embodiment, the gaming system 22 may include a player tracking system which includes at least one player tracking server 28. The player tracking server 28 may also comprise a computing device including a processor and a memory. The
25 player tracking server 28 is preferably adapted to perform player tracking functions, as is well known in the art. For example, the player tracking server 28 may store information regarding the identities of players and information regarding the game play of those players. This information may include time of play, coin in/coin out or other monetary transaction data, and in an arrangement where players are awarded points
30 based on play, a player's point total.

Once again, the player tracking system includes a network comprising a communication link provided between the player tracking server 28 one or more of the

gaming devices 24 having a player tracking function or other components of the gaming system 22 associated with the system. In one embodiment, such as where the gaming device 24 comprises a gaming machine, the device may include a management interface board which controls a card reader. The management interface board may be arranged
5 to receive data from the master gaming controller of the gaming system device 24. A communication interface is associated with the management interface board, permitting data to be transmitted between the player tracking server 28 and the management interface board.

In the case of table games and the like, a card reader 29 may be associated with,
10 such as located near, the table. A player may utilize the card reader to identify themselves. Information regarding play of the table game may be input through an input device by a dealer, coin counter or the like, and this information may be transmitted to the player tracking server 28.

In one embodiment, the gaming system 22 may include an accounting system
15 which includes at least one accounting server 30. The accounting server 30 may comprise a computing device including a processor and a memory. The accounting server 30 is preferably adapted to perform financial related functions, such as track financial transactions such as bets and payouts, and perform reconciliations with monies collected from the gaming system devices 24, such as gaming machines 25,
20 tables games 27 and the like. The accounting server 30 may be associated with a wide variety of devices, including individual gaming system devices 24 and other servers. Once again, a communication link is preferably provided between the accounting server 30 and each device with which communications is desired.

In one embodiment, the gaming system 22 may include a progressive award
25 system which includes at least one progressive server 32. The progressive sever 32 may comprise a computing device including a processor and a memory. The progressive server 32 may be adapted to generate progressive award information. In one arrangement, the progressive server 32 may obtain information regarding amounts bet at specific gaming system devices 24, such as gaming machines 25 or table games 27.
30 Utilizing this information, a progressive jackpot award amount may be generated and updated. The information may be transmitted to one or more displays 34 associated with participating devices 24. Once again, a communication link is preferably provided

between the progressive server 32 and each device with which communications is desired. For example, a link may be provided between the progressive server 32 and accounting server 30 for providing payout information to the accounting server 30.

It will be appreciated that the communications links between the various components may be separate and distinct or may be commonly used. It will also be appreciated that one or more of the functions or applications described above may be consolidated, such as at a common server or host. Further, other components for implementing other functionality may be provided. For example, a variety of computing devices, such as user stations, may be connected to the various systems. Printers and other peripheral devices may also be connected to each network or system.

As is known in the art, such a gaming system 22 is generally located at least partially in one or more physical gaming environments, such as a casino. The casino may include publicly accessible game areas where certain of the gaming system devices 24, such as gaming machines and table games are located, as well as secure areas where the servers and other components are located.

In a preferred embodiment of the invention, a virtual information host 36 is associated with or comprises a portion of the gaming system 22. In one embodiment, the host 36 comprises a computing device which includes a processor, memory and a display. One embodiment of the host 36 is described in greater detail below. The virtual information host 36 may be one or more devices separate from devices performing other functions of the system 22, or may be integrated with existing devices.

In a preferred embodiment, the virtual information host 36 is adapted to perform functions relating to acquiring, managing, rendering, generating and/or displaying real-time and/or non real-time casino gaming system or "gaming environment" graphical information and information regarding one or more components of the gaming system or environment. Such functionality may also include the generation of at least one graphical user interface on at least one mobile device (e.g., 31) which is configured or designed to graphically display information (e.g., real-time casino information) relating to selected aspects of casino activity. Examples of different graphical user interface which may be displayed on the mobile device are illustrated in Figures 8-19 of the drawings.

As illustrated in the example of Figure 1, gaming system 22 may also include one or more mobile devices 31 configured or designed to communicate, via one or more wireless links 111, with various components of the gaming environment 100 such as, for example: information systems (e.g., virtual information host 36); player tracking systems; accounting systems; employee management systems; location positioning systems (e.g., GPS system 33); game servers; surveillance systems; security systems; communications systems; gaming systems (e.g., gaming machines 25, game table devices; other mobile devices; etc); etc.

FIGURE 2 is a block diagram of a gaming terminal data repository (GTDR) 200 connected via one or more network interface(s) 208 to a gaming network 5 which, for example, may include gaming devices (e.g., gaming terminals) and/or other devices located within a casino. The GTDR 200 may provide the management and download tools necessary to manage all of the information associated with a particular gaming terminal or groups of gaming terminals and manage access to this data for a particular user or set of users. An operator using the GTDR 200, with the appropriate access privileges, may define various parameters that trigger the download to the gaming terminal of information and programs such as game software components. The GTDR 200 may connect with an existing network interface system, such as a cashless system within the casino, may communicate directly with gaming terminals or may use combinations of both methods to facilitate information downloading and data collection.

The gaming terminals (e.g., 218, 220, 222) may include gaming machines such as video and mechanical slot machines and or gaming terminals providing video game play for games such as bingo games, keno games and lottery games. The gaming terminals may be located in many different venues such as casinos, stores, restaurants, bars and boats where the venues may be owned and operated by different gaming entities. For instance, gaming terminal 218 may be located in a casino owned by a first gaming entity, gaming terminal 220 may be located in a store on a route with multiple different stores owned by a second gaming entity and gaming terminal 222 may be located on a floating casino owned by a third gaming entity.

The gaming terminals 218, 220 and 222 may send game transaction information, such as coin-in and coin-out, game software component information, such as the

versions of software residing on each gaming terminal and the version of a game being played, and player tracking information, such as the identity of a player playing a game on the gaming machine. The gaming terminals 218, 200 and 222 may send and may receive information directly from the GTDR 200 or the gaming terminals may communicate with the GTDR 200 via an intermediate device such as a cashless system server. Information received from the gaming terminals may be archived in the gaming terminal database 210 on the GTDR. In addition, the GTDR 200 may poll various servers such as bonus game servers, cashless system servers, progressive game servers for gaming information that may stored in the gaming terminal database 210.

10 The GTDR 200 may communicate with the gaming terminals, 218, 220 and 222 and other remote gaming devices, such as portable computers, printers, personal digital assistants and computers located at various gaming venues, using the network interface(s) 208. The network interface(s) 208 may include a wireless network interface 211 and/or a wired network interface 213. The GTDR 200 may utilize a firewall 209 to prevent unauthorized access to data stored in the GTDR 200. Access firewalls may provided by CISCO Systems (San Jose, California).

The GTDR 200 stores gaming information, such as gaming transaction information, game software components and game software component information, in a partitioned gaming terminal database 210. In one embodiment, the information stored in the gaming terminal database may be partitioned according to gaming entities. For instance, gaming information from a first gaming entity be may stored in a first partition of the gaming terminal database 212, gaming information from a second gaming entity may be stored in a second partition 214 and gaming information from a third gaming entity may be in a third partition 216. The number of partitions may vary and is not limited to the three partitions described in the present example. In at least one alternate embodiment, the information stored in the gaming terminal database may not be partitioned according to gaming entities.

The gaming terminal database 210 may be a hard drive, CD-Read/Write drive or any other storage medium or combinations of storage mediums appropriate for storing large amounts of game information. The large amount data and variety of game programs on each gaming terminal may be managed using the data and program management tools of the GTDR 200. Each game program may comprise of plurality of

game software components. In Fig. 2, each of the items may be associated with a particular gaming terminal or associated with a type of gaming terminal. The items may be organized in a database structure of some type which may be extended to a large number of gaming terminals. Many different types of database structures are possible.

5 Some examples of database structures which may be utilized are described in the text “Database Management Systems,” R. Ramakrishnan, McGraw-Hill, which is incorporated herein by reference in its entirety and for all purposes.

The associations between gaming terminal database elements and the gaming terminals may be managed and leveraged with specific GTDR 200 tools that utilize
10 information that may be stored in the data repository such as within a database structure of some type. For instance, the system may be used to establish relationships between users, terminal information, site information, and gaming terminals. With a given set of relationships established using the system, the casino operator may then identify the configuration desired of a particular gaming terminal or groups of gaming terminals. An
15 example of the structure, relationships and types of information that may be stored in a data partition 216 for a particular gaming entity is shown in the FIG. 2. The example is used for illustrative purposes as many different structures are possible and additional gaming information may be stored in the database 210.

The GTDR 200 may receive various types of game transaction information from
20 gaming terminals connected in some manner to the GTDR 200. The game transaction information may be used to determine the relative performance of different games and gaming terminals. The game transaction information may be stored in a relational database allowing search and queries of various different data categories 260. The data categories may be specify various data relationships. For instance, game transaction
25 information, such as coin-in, coin-out, and amount bet per game, may be stored according to specific games as game data 248. The game data may be a composite of game data obtained from multiple gaming terminals operating at different locations. Many data fields may be associated with the game data such as the time, game version, location, gaming terminal and player, and stored as a data record. The data fields may
30 be utilized by analysis tools residing in the GTDR 200 to generate various information relationships such as game performance as a function of time, game performance as a

function of location, game performance as a function of game version and game performance as a function of player.

The data categories 260 may be used to store commonly accessed data combinations to minimize analysis times. Many different combinations of game transaction information and other game information for various groups of gaming terminals may be stored in the gaming terminal database 210 as a queryable database. Other examples of game data categories may include: 1) gaming terminal data 250, which may be a history of game performance on a particular gaming terminal for all of its past configuration, 2) player data 252, which may be a composite of a player's game play on many different gaming terminals, 3) route data 254 which may be a composite of gaming terminal information for a group of gaming terminals on a route comprising a number of gaming venues such as stores and 4) venue data 255 which may be a composite of terminal information for a groups of gaming terminals at a particular venue such as a casino, a subset of gaming terminals within a casino, a store or a restaurant. Again many types of data categories may be possible. The number of potential data categories may depend on the number of fields associated with each data record obtained from a gaming terminal and a processing power of the GTDR 200 because too many data categories may result in a degradation of search performance on the GTDR 200.

The processor and memory 206 on the GTDR 200 may be used to execute a number of analysis tools 270 (e.g. gaming repository applications) residing in each data partition, including 212, 214 and 216 in the gaming terminal database 210. The gaming repository applications 270 as well as the game transaction information and game software components stored in the gaming terminal database 210, may be proprietary and in some cases may not be shared by different gaming entities. The analysis tools 270 may utilize a number of user interfaces such as graphics tools for presenting data generated in each application. For instance, an interface may display the current game software components on a gaming terminal as highlighted in a list of game software components available on the gaming terminal. These interfaces may be viewed on displays, including 202, or remote computers which are connected to the GTDR 200.

The gaming repository applications 270 may include: 1) data analysis applications 272, which may be used to establish data categories and various

relationships between data categories, 2) version management tools 273, which may be used to identify the game software components on a particular gaming terminal and then update one or more game software components by downloading game software components from the GTDR 200, 3) configuration and scheduling tools 274, which
5 may be used to automatically configure one or more gaming terminals according to one or more scheduled update triggers, 4) query configuration application, which may be used to design query relationships in the database that are suited to a particular users needs and 5) report generation applications for formatting game transaction information. The gaming repository application 270 are not limited to these applications
10 and many types of gaming repository applications are possible.

Data from the various applications executed on the GTDR 200 may be shared and utilized by other applications. For instance, the data analysis tools 272 may be used to establish relationships between game versions, game transaction information, site information and gaming terminal information. The relationships may be utilized by the
15 configuration application 274 to establish configurations for one or more gaming terminals. The configuration application may identify the current set of game software components used for game play on a particular gaming terminal and then compare the identified software components with game software components required for a new game configuration (e.g. a plurality of game software components are used to present a
20 game presentation on each game presentation). The result of the comparison may be a list of game software components that need to be updated on the gaming terminal to enable the new game configuration. The configuration management tool 274, which is executed by the processor 206, may then download the game software components required for the new game configuration to the gaming terminal via the network
25 interface 208. A similar process may be used by the software version management to update versions of software residing on one or more gaming terminals.

The scheduling tools may be used to automatically update the configurations of one or more gaming terminals according to a number of update triggers. Updates might be triggered at certain times, such as hourly, daily or weekly, according to player input,
30 or according to game performance. For instance, when a game is performing poorly on a gaming terminal, game software components to enable a new version of the game being played or a different game may be downloaded to the gaming terminals connected

to the GTDR 200. The gaming performance of the gaming terminals may be monitored by the GTDR 200 so that the download may be performed automatically. As another example, different paytables may be downloaded to different gaming terminals at specific times of the day to encourage game play during off-peak hours or increase profits during peak hours. Yet another example, the GTDR may download new game software components to a particular gaming terminal being utilized by a particular player. The download may occur as a result of a data analysis indicating personal game playing preferences of a particular player such as liking particular sounds or graphics. The download may occur automatically without being initiated by the player or may be initiated by the player.

Figure 3 is a simplified block diagram of an exemplary gaming machine 300 in accordance with a specific embodiment. As illustrated in the embodiment of Figure 3, gaming machine 300 includes at least one processor 310, at least one interface 306, and memory 316.

In one implementation, processor 310 and master gaming controller 312 are included in a logic device 313 enclosed in a logic device housing. The processor 310 may include any conventional processor or logic device configured to execute software allowing various configuration and reconfiguration tasks such as, for example: a) communicating with a remote source via communication interface 306, such as a server that stores authentication information or games; b) converting signals read by an interface to a format corresponding to that used by software or memory in the gaming machine; c) accessing memory to configure or reconfigure game parameters in the memory according to indicia read from the device; d) communicating with interfaces, various peripheral devices 322 and/or I/O devices 311; e) operating peripheral devices 322 such as, for example, card reader 325 and paper ticket reader 327; f) operating various I/O devices such as, for example, display 335, key pad 330 and a light panel 316; etc. For instance, the processor 310 may send messages including configuration and reconfiguration information to the display 335 to inform casino personnel of configuration progress. As another example, the logic device 313 may send commands to the light panel 337 to display a particular light pattern and to the speaker 339 to project a sound to visually and aurally convey configuration information or progress.

Light panel 337 and speaker 339 may also be used to communicate with authorized personnel for authentication and security purposes.

Peripheral devices 322 may include several device interfaces such as, for example: card reader 325, bill validator/paper ticket reader 327, hopper 329, etc. Card reader 325 and bill validator/paper ticket reader 327 may each comprise resources for handling and processing configuration indicia such as a microcontroller that converts voltage levels for one or more scanning devices to signals provided to processor 310. In one embodiment, application software for interfacing with peripheral devices 322 may store instructions (such as, for example, how to read indicia from a portable device) in a memory device such as, for example, non-volatile memory, hard drive or a flash memory.

The gaming machine 300 also includes memory 316 which may include, for example, volatile memory (e.g., RAM 309), non-volatile memory 319 (e.g., disk memory, FLASH memory, EPROMs, etc.), unalterable memory (e.g., EPROMs 308), etc. The memory may be configured or designed to store, for example: 1) configuration software 314 such as all the parameters and settings for a game playable on the gaming machine; 2) associations 318 between configuration indicia read from a device with one or more parameters and settings; 3) communication protocols allowing the processor 310 to communicate with peripheral devices 322 and I/O devices 311; 4) a secondary memory storage device 315 such as a non-volatile memory device, configured to store gaming software related information (the gaming software related information and memory may be used to store various audio files and games not currently being used and invoked in a configuration or reconfiguration); 5) communication transport protocols (such as, for example, TCP/IP, USB, Firewire, IEEE1394, Bluetooth, IEEE 802.11x (IEEE 802.11 standards), hiperlan/2, HomeRF, etc.) for allowing the gaming machine to communicate with local and non-local devices using such protocols; etc. Typically, the master gaming controller 312 communicates using a serial communication protocol. A few examples of serial communication protocols that may be used to communicate with the master gaming controller include but are not limited to USB, RS-232 and Netplex (a proprietary protocol developed by IGT, Reno, NV).

A plurality of device drivers 342 may be stored in memory 316. Example of different types of device drivers may include device drivers for gaming machine

components, device drivers for peripheral components 322, etc. Typically, the device drivers 342 utilize a communication protocol of some type that enables communication with a particular physical device. The device driver abstracts the hardware implementation of a device. For example, a device drive may be written for each type of card reader that may be potentially connected to the gaming machine. Examples of communication protocols used to implement the device drivers 259 include Netplex 260, USB 265, Serial 270, Ethernet 275, Firewire 285, I/O debouncer 290, direct memory map, serial, PCI 280 or parallel. Netplex is a proprietary IGT standard while the others are open standards. According to a specific embodiment, when one type of a particular device is exchanged for another type of the particular device, a new device driver may be loaded from the memory 316 by the processor 310 to allow communication with the device. For instance, one type of card reader in gaming machine 300 may be replaced with a second type of card reader where device drivers for both card readers are stored in the memory 316.

15 In some embodiments, the gaming machine 300 may also include various authentication and/or validation components 344 which may be used for authenticating/validating specified gaming machine components such as, for example, hardware components, software components, firmware components, information stored in the gaming machine memory 316, etc. Examples of various authentication and/or validation components are described in U.S. Patent No. 6,620,047, entitled, "ELECTRONIC GAMING APPARATUS HAVING AUTHENTICATION DATA SETS," incorporated herein by reference in its entirety for all purposes.

25 In some embodiments, the software units stored in the memory 316 may be upgraded as needed. For instance, when the memory 316 is a hard drive, new games, game options, various new parameters, new settings for existing parameters, new settings for new parameters, device drivers, and new communication protocols may be uploaded to the memory from the master gaming controller 104 or from some other external device. As another example, when the memory 316 includes a CD/DVD drive including a CD/DVD designed or configured to store game options, parameters, and settings, the software stored in the memory may be upgraded by replacing a first CD/DVD with a second CD/DVD. In yet another example, when the memory 316 uses one or more flash memory 319 or EPROM 308 units designed or configured to store

games, game options, parameters, settings, the software stored in the flash and/or EPROM memory units may be upgraded by replacing one or more memory units with new memory units which include the upgraded software. In another embodiment, one or more of the memory devices, such as the hard-drive, may be employed in a game software download process from a remote software server.

In some embodiments, the gaming machine 300 may also include a geolocation module 346, and a wireless communication module 348. In one implementation, the geolocation module 746 may be configured or designed to acquire, generate and/or provide geolocation or positional information to/from external devices such as, for example, other gaming machines, remote server(s), mobile device(s), etc. For example, in one implementation, the gaming machine 300 may transmit geolocation information to a mobile device in order to allow the mobile device to determine its location on the casino floor relative to the gaming machine. In at least one implementation communication between the mobile device and the gaming machine may be implemented via a wireless interface using the wireless communication module 348. In one implementation, the wireless communication module 348 may be configured or designed to communicate using one or more wireless interfaces/protocols such as, for example: 802.11 (WiFi), 802.15 (including Bluetooth™), 802.16 (WiMax), 802.22, Cellular standards such as CDMA, CDMA2000, WCDMA, Radio Frequency (e.g., RFID), Infrared, Near Field Magnetics, etc.

It will be apparent to those skilled in the art that other memory types, including various computer readable media, may be used for storing and executing program instructions pertaining to the operation of at least one embodiment. Because such information and program instructions may be employed to implement the systems/methods described herein, at least one embodiment relates to machine-readable media that include program instructions, state information, etc. for performing various operations described herein. Examples of machine-readable media include, but are not limited to, magnetic media such as hard disks, floppy disks, and magnetic tape; optical media such as CD-ROM disks; magneto-optical media such as floptical disks; and hardware devices that are specially configured to store and perform program instructions, such as read-only memory devices (ROM) and random access memory (RAM). The invention may also be embodied in a carrier wave traveling over an

appropriate medium such as airwaves, optical lines, electric lines, etc. Examples of program instructions include both machine code, such as produced by a compiler, and files including higher level code that may be executed by the computer using an interpreter.

5 Additional details about other gaming machine architectures, features and/or components are described, for example, in U.S. Patent Application Serial No. 10/040,239, entitled, "GAME DEVELOPMENT ARCHITECTURE THAT DECOUPLES THE GAME LOGIC FROM THE GRAPHICS LOGIC," and published on April 24, 2003 as U.S. Patent Publication No. 20030078103, incorporated herein by
10 reference in its entirety for all purposes.

According to specific embodiments, at least some embodiments of various gaming devices, gaming machines, and/or gaming systems described herein (including, for example, various handheld or mobile devices described herein), may be implemented with special features and/or additional circuitry that differentiate such
15 gaming devices, gaming machines, and/or gaming systems from general-purpose computers (e.g., desktop PC's and laptops). For example, gaming machines are highly regulated to ensure fairness and, in many cases, gaming machines are operable to dispense monetary awards of multiple millions of dollars. Therefore, to satisfy security and regulatory requirements in a gaming environment, hardware and software
20 architectures may be implemented in gaming machines that differ significantly from those of general-purpose computers. For purposes of illustration, a description of gaming machines relative to general-purpose computing machines and some examples of the additional (or different) components and features found in gaming machines are described below. It is noted that such description may also be applicable for describing
25 differences between general-purpose computing devices/systems, and gaming devices/systems described herein.

At first glance, one might think that adapting PC technologies to the gaming industry would be a simple proposition because both PCs and gaming machines employ microprocessors that control a variety of devices. However, because of such reasons as
30 1) the regulatory requirements that are placed upon gaming machines, 2) the harsh environment in which gaming machines operate, 3) security requirements and 4) fault tolerance requirements, adapting PC technologies to a gaming machine can be quite

difficult. Further, techniques and methods for solving a problem in the PC industry, such as device compatibility and connectivity issues, might not be adequate in the gaming environment. For instance, a fault or a weakness tolerated in a PC, such as security holes in software or frequent crashes, may not be tolerated in a gaming machine because in a gaming machine these faults can lead to a direct loss of funds from the gaming machine, such as stolen cash or loss of revenue when the gaming machine is not operating properly.

For the purposes of illustration, a few differences between PC systems and gaming systems will be described. A first difference between gaming machines and common PC based computers systems is that gaming machines are designed to be state-based systems. In a state-based system, the system stores and maintains its current state in a non-volatile memory, such that, in the event of a power failure or other malfunction the gaming machine will return to its current state when the power is restored. For instance, if a player was shown an award for a game of chance and, before the award could be provided to the player the power failed, the gaming machine, upon the restoration of power, would return to the state where the award is indicated. As anyone who has used a PC, knows, PCs are not state machines and a majority of data is usually lost when a malfunction occurs. This requirement affects the software and hardware design on a gaming machine.

A second important difference between gaming machines and common PC based computer systems is that for regulation purposes, the software on the gaming machine used to generate the game of chance and operate the gaming machine has been designed to be static and monolithic to prevent cheating by the operator of gaming machine. For instance, one solution that has been employed in the gaming industry to prevent cheating and satisfy regulatory requirements has been to manufacture a gaming machine that can use a proprietary processor running instructions to generate the game of chance from an EPROM or other form of non-volatile memory. The coding instructions on the EPROM are static (non-changeable) and must be approved by a gaming regulators in a particular jurisdiction and installed in the presence of a person representing the gaming jurisdiction. Any changes to any part of the software required to generate the game of chance, such as adding a new device driver used by the master gaming controller to operate a device during generation of the game of chance can

require a new EPROM to be burnt, approved by the gaming jurisdiction and reinstalled on the gaming machine in the presence of a gaming regulator. Regardless of whether the EPROM solution is used, to gain approval in most gaming jurisdictions, a gaming machine must demonstrate sufficient safeguards that prevent an operator or player of a gaming machine from manipulating hardware and software in a manner that gives them an unfair and some cases an illegal advantage. The gaming machine should have a means to determine if the code it will execute is valid. If the code is not valid, the gaming machine must have a means to prevent the code from being executed. The code validation requirements in the gaming industry affect both hardware and software designs on gaming machines.

A third important difference between gaming machines and common PC based computer systems is the number and kinds of peripheral devices used on a gaming machine are not as great as on PC based computer systems. Traditionally, in the gaming industry, gaming machines have been relatively simple in the sense that the number of peripheral devices and the number of functions the gaming machine has been limited. Further, in operation, the functionality of gaming machines were relatively constant once the gaming machine was deployed, i.e., new peripherals devices and new gaming software were infrequently added to the gaming machine. This differs from a PC where users will go out and buy different combinations of devices and software from different manufacturers and connect them to a PC to suit their needs depending on a desired application. Therefore, the types of devices connected to a PC may vary greatly from user to user depending in their individual requirements and may vary significantly over time.

Although the variety of devices available for a PC may be greater than on a gaming machine, gaming machines still have unique device requirements that differ from a PC, such as device security requirements not usually addressed by PCs. For instance, monetary devices, such as coin dispensers, bill validators and ticket printers and computing devices that are used to govern the input and output of cash to a gaming machine have security requirements that are not typically addressed in PCs. Therefore, many PC techniques and methods developed to facilitate device connectivity and device compatibility do not address the emphasis placed on security in the gaming industry.

To address some of the issues described above, a number of hardware/software components and architectures are utilized in gaming machines that are not typically found in general purpose computing devices, such as PCs. These hardware/software components and architectures, as described below in more detail, include but are not
5 limited to watchdog timers, voltage monitoring systems, state-based software architecture and supporting hardware, specialized communication interfaces, security monitoring and trusted memory.

For example, a watchdog timer is normally used in International Game Technology (IGT) gaming machines to provide a software failure detection mechanism.
10 In a normally operating system, the operating software periodically accesses control registers in the watchdog timer subsystem to “re-trigger” the watchdog. Should the operating software fail to access the control registers within a preset timeframe, the watchdog timer will timeout and generate a system reset. Typical watchdog timer circuits include a loadable timeout counter register to enable the operating software to
15 set the timeout interval within a certain range of time. A differentiating feature of the some preferred circuits is that the operating software cannot completely disable the function of the watchdog timer. In other words, the watchdog timer always functions from the time power is applied to the board.

IGT gaming computer platforms preferably use several power supply voltages to
20 operate portions of the computer circuitry. These can be generated in a central power supply or locally on the computer board. If any of these voltages falls out of the tolerance limits of the circuitry they power, unpredictable operation of the computer may result. Though most modern general-purpose computers include voltage monitoring circuitry, these types of circuits only report voltage status to the operating
25 software. Out of tolerance voltages can cause software malfunction, creating a potential uncontrolled condition in the gaming computer. Gaming machines of the present assignee typically have power supplies with tighter voltage margins than that required by the operating circuitry. In addition, the voltage monitoring circuitry implemented in IGT gaming computers typically has two thresholds of control. The first threshold
30 generates a software event that can be detected by the operating software and an error condition generated. This threshold is triggered when a power supply voltage falls out of the tolerance range of the power supply, but is still within the operating range of the

circuitry. The second threshold is set when a power supply voltage falls out of the operating tolerance of the circuitry. In this case, the circuitry generates a reset, halting operation of the computer.

One standard method of operation for IGT slot machine game software is to use a state machine. Different functions of the game (bet, play, result, points in the graphical presentation, etc.) may be defined as a state. When a game moves from one state to another, critical data regarding the game software is stored in a custom non-volatile memory subsystem. This is critical to ensure the player's wager and credits are preserved and to minimize potential disputes in the event of a malfunction on the gaming machine.

In general, the gaming machine does not advance from a first state to a second state until critical information that allows the first state to be reconstructed has been stored. This feature allows the game to recover operation to the current state of play in the event of a malfunction, loss of power, etc that occurred just prior to the malfunction. In at least one embodiment, the gaming machine is configured or designed to store such critical information using atomic transactions.

Generally, an atomic operation in computer science refers to a set of operations that can be combined so that they appear to the rest of the system to be a single operation with only two possible outcomes: success or failure. As related to data storage, an atomic transaction may be characterized as series of database operations which either all occur, or all do not occur. A guarantee of atomicity prevents updates to the database occurring only partially, which can result in data corruption.

In order to ensure the success of atomic transactions relating to critical information to be stored in the gaming machine memory before a failure event (e.g., malfunction, loss of power, etc.), it is preferable that memory be used which includes one or more of the following criteria: direct memory access capability; data read/write capability which meets or exceeds minimum read/write access characteristics (such as, for example, at least 5.08Mbytes/sec (Read) and/or at least 38.0Mbytes/sec (Write)). Devices which meet or exceed the above criteria may be referred to as "fault-tolerant" memory devices, whereas it is which the above criteria may be referred to as "fault non-tolerant" memory devices.

Typically, battery backed RAM devices may be configured or designed to function as fault-tolerant devices according to the above criteria, whereas flash RAM and/or disk drive memory are typically not configurable to function as fault-tolerant devices according to the above criteria. Accordingly, battery backed RAM devices are typically used to preserve gaming machine critical data, although other types of non-volatile memory devices may be employed. These memory devices are typically not used in typical general-purpose computers.

Thus, in at least one embodiment, the gaming machine is configured or designed to store critical information in fault-tolerant memory (e.g., battery backed RAM devices) using atomic transactions. Further, in at least one embodiment, the fault-tolerant memory is able to successfully complete all desired atomic transactions (e.g., relating to the storage of gaming machine critical information) within a time period of 200 milliseconds (ms) or less. In at least one embodiment, the time period of 200 ms represents a maximum amount of time for which sufficient power may be available to the various gaming machine components after a power outage event has occurred at the gaming machine.

As described previously, the gaming machine may not advance from a first state to a second state until critical information that allows the first state to be reconstructed has been atomically stored. This feature allows the game to recover operation to the current state of play in the event of a malfunction, loss of power, etc that occurred just prior to the malfunction. After the state of the gaming machine is restored during the play of a game of chance, game play may resume and the game may be completed in a manner that is no different than if the malfunction had not occurred. Thus, for example, when a malfunction occurs during a game of chance, the gaming machine may be restored to a state in the game of chance just prior to when the malfunction occurred. The restored state may include metering information and graphical information that was displayed on the gaming machine in the state prior to the malfunction. For example, when the malfunction occurs during the play of a card game after the cards have been dealt, the gaming machine may be restored with the cards that were previously displayed as part of the card game. As another example, a bonus game may be triggered during the play of a game of chance where a player is required to make a number of selections on a video display screen. When a malfunction has occurred after the player

has made one or more selections, the gaming machine may be restored to a state that shows the graphical presentation at the just prior to the malfunction including an indication of selections that have already been made by the player. In general, the gaming machine may be restored to any state in a plurality of states that occur in the
5 game of chance that occurs while the game of chance is played or to states that occur between the play of a game of chance.

Game history information regarding previous games played such as an amount wagered, the outcome of the game and so forth may also be stored in a non-volatile memory device. The information stored in the non-volatile memory may be detailed
10 enough to reconstruct a portion of the graphical presentation that was previously presented on the gaming machine and the state of the gaming machine (e.g., credits) at the time the game of chance was played. The game history information may be utilized in the event of a dispute. For example, a player may decide that in a previous game of chance that they did not receive credit for an award that they believed they won. The
15 game history information may be used to reconstruct the state of the gaming machine prior, during and/or after the disputed game to demonstrate whether the player was correct or not in their assertion. Further details of a state based gaming system, recovery from malfunctions and game history are described in U.S. patent no. 6,804,763, titled
"High Performance Battery Backed RAM Interface", U.S. patent no. 6,863, 608, titled
20 "Frame Capture of Actual Game Play," U.S. application no. 10/243,104, titled, "Dynamic NV-RAM," and U.S. application no. 10/758,828, titled, "Frame Capture of Actual Game Play," each of which is incorporated by reference and for all purposes.

Another feature of gaming machines, such as IGT gaming computers, is that they often include unique interfaces, including serial interfaces, to connect to specific
25 subsystems internal and external to the gaming machine. The serial devices may have electrical interface requirements that differ from the "standard" EIA serial interfaces provided by general-purpose computers. These interfaces may include, for example, Fiber Optic Serial, optically coupled serial interfaces, current loop style serial interfaces, etc. In addition, to conserve serial interfaces internally in the gaming
30 machine, serial devices may be connected in a shared, daisy-chain fashion where multiple peripheral devices are connected to a single serial channel.

The serial interfaces may be used to transmit information using communication protocols that are unique to the gaming industry. For example, IGT's Netplex is a proprietary communication protocol used for serial communication between gaming devices. As another example, SAS is a communication protocol used to transmit
5 information, such as metering information, from a gaming machine to a remote device. Often SAS is used in conjunction with a player tracking system.

IGT gaming machines may alternatively be treated as peripheral devices to a casino communication controller and connected in a shared daisy chain fashion to a single serial interface. In both cases, the peripheral devices are preferably assigned
10 device addresses. If so, the serial controller circuitry must implement a method to generate or detect unique device addresses. General-purpose computer serial ports are not able to do this.

Security monitoring circuits detect intrusion into an IGT gaming machine by monitoring security switches attached to access doors in the gaming machine cabinet.
15 Preferably, access violations result in suspension of game play and can trigger additional security operations to preserve the current state of game play. These circuits also function when power is off by use of a battery backup. In power-off operation, these circuits continue to monitor the access doors of the gaming machine. When power is restored, the gaming machine can determine whether any security violations occurred
20 while power was off, e.g., via software for reading status registers. This can trigger event log entries and further data authentication operations by the gaming machine software.

Trusted memory devices and/or trusted memory sources are preferably included in an IGT gaming machine computer to ensure the authenticity of the software that may
25 be stored on less secure memory subsystems, such as mass storage devices. Trusted memory devices and controlling circuitry are typically designed to not enable modification of the code and data stored in the memory device while the memory device is installed in the gaming machine. The code and data stored in these devices may include authentication algorithms, random number generators, authentication keys,
30 operating system kernels, etc. The purpose of these trusted memory devices is to provide gaming regulatory authorities a root trusted authority within the computing environment of the gaming machine that can be tracked and verified as original. This

may be accomplished via removal of the trusted memory device from the gaming machine computer and verification of the secure memory device contents is a separate third party verification device. Once the trusted memory device is verified as authentic, and based on the approval of the verification algorithms included in the trusted device, 5 the gaming machine is enabled to verify the authenticity of additional code and data that may be located in the gaming computer assembly, such as code and data stored on hard disk drives. A few details related to trusted memory devices that may be used in at least one embodiment described herein are described in U.S. patent no. 6,685,567 from U.S. patent application no. 09/925,098, filed August 8, 2001 and titled "Process 10 Verification," which is incorporated herein in its entirety and for all purposes.

In at least one embodiment, at least a portion of the trusted memory devices/sources may correspond to memory which cannot easily be altered (e.g., "unalterable memory") such as, for example, EPROMS, PROMS, Bios, Extended Bios, and/or other memory sources which are able to be configured, verified, and/or 15 authenticated (e.g., for authenticity) in a secure and controlled manner.

According to a specific implementation, when a trusted information source is in communication with a remote device via a network, the remote device may employ a verification scheme to verify the identity of the trusted information source. For example, the trusted information source and the remote device may exchange 20 information using public and private encryption keys to verify each other's identities. In another embodiment of at least one embodiment described herein, the remote device and the trusted information source may engage in methods using zero knowledge proofs to authenticate each of their respective identities.

Gaming devices storing trusted information may utilize apparatus or methods to 25 detect and prevent tampering. For instance, trusted information stored in a trusted memory device may be encrypted to prevent its misuse. In addition, the trusted memory device may be secured behind a locked door. Further, one or more sensors may be coupled to the memory device to detect tampering with the memory device and provide some record of the tampering. In yet another example, the memory device storing 30 trusted information might be designed to detect tampering attempts and clear or erase itself when an attempt at tampering has been detected.

Additional details relating to trusted memory devices/sources are described in US Patent Application Serial No. 11/078,966, entitled "Secured Virtual Network in a Gaming Environment", naming Nguyen et al. as inventors, filed on March 10, 2005, herein incorporated in its entirety and for all purposes.

5 Mass storage devices used in a general purpose computer typically enable code and data to be read from and written to the mass storage device. In a gaming machine environment, modification of the gaming code stored on a mass storage device is strictly controlled and would only be enabled under specific maintenance type events with electronic and physical enablers required. Though this level of security could be
10 provided by software, IGT gaming computers that include mass storage devices preferably include hardware level mass storage data protection circuitry that operates at the circuit level to monitor attempts to modify data on the mass storage device and will generate both software and hardware error triggers should a data modification be attempted without the proper electronic and physical enablers being present. Details
15 using a mass storage device that may be used with at least one embodiment described herein are described, for example, in U.S. Patent 6,149,522, herein incorporated by reference in its entirety for all purposes.

Figure 4 shows a block diagram illustrating components of a gaming system 400 which may be used for implementing various aspects of at least one embodiment. In
20 Figure 4, the components of a gaming system 400 for providing game software licensing and downloads are described functionally. The described functions may be instantiated in hardware, firmware and/or software and executed on a suitable device. In the system 400, there may be many instances of the same function, such as multiple game play interfaces 411. Nevertheless, in Figure 4, only one instance of each function
25 is shown. The functions of the components may be combined. For example, a single device may comprise the game play interface 411 and include trusted memory devices or sources 409.

The gaming system 400 may receive inputs from different groups/entities and output various services and or information to these groups/entities. For example, game
30 players 425 primarily input cash or indicia of credit into the system, make game selections that trigger software downloads, and receive entertainment in exchange for their inputs. Game software content providers provide game software for the system

and may receive compensation for the content they provide based on licensing agreements with the gaming machine operators. Gaming machine operators select game software for distribution, distribute the game software on the gaming devices in the system 400, receive revenue for the use of their software and compensate the gaming machine operators. The gaming regulators 430 may provide rules and regulations that must be applied to the gaming system and may receive reports and other information confirming that rules are being obeyed.

In the following paragraphs, details of each component and some of the interactions between the components are described with respect to Figure 4. The game software license host 401 may be a server connected to a number of remote gaming devices that provides licensing services to the remote gaming devices. For example, in other embodiments, the license host 401 may 1) receive token requests for tokens used to activate software executed on the remote gaming devices, 2) send tokens to the remote gaming devices, 3) track token usage and 4) grant and/or renew software licenses for software executed on the remote gaming devices. The token usage may be used in utility based licensing schemes, such as a pay-per-use scheme.

In another embodiment, a game usage-tracking host 415 may track the usage of game software on a plurality of devices in communication with the host. The game usage-tracking host 415 may be in communication with a plurality of game play hosts and gaming machines. From the game play hosts and gaming machines, the game usage tracking host 415 may receive updates of an amount that each game available for play on the devices has been played and on amount that has been wagered per game. This information may be stored in a database and used for billing according to methods described in a utility based licensing agreement.

The game software host 402 may provide game software downloads, such as downloads of game software or game firmware, to various devices in the game system 400. For example, when the software to generate the game is not available on the game play interface 411, the game software host 402 may download software to generate a selected game of chance played on the game play interface. Further, the game software host 402 may download new game content to a plurality of gaming machines via a request from a gaming machine operator.

In one embodiment, the game software host 402 may also be a game software configuration-tracking host 413. The function of the game software configuration-tracking host is to keep records of software configurations and/or hardware configurations for a plurality of devices in communication with the host (e.g.,
5 denominations, number of paylines, paytables, max/min bets). Details of a game software host and a game software configuration host that may be used with at least one embodiment are described in co-pending U.S. patent no. 6,645,077, by Rowe, entitled, "Gaming Terminal Data Repository and Information System," filed December 21, 2000, which is incorporated herein in its entirety and for all purposes.

10 A game play host device 403 may be a host server connected to a plurality of remote clients that generates games of chance that are displayed on a plurality of remote game play interfaces 411. For example, the game play host device 403 may be a server that provides central determination for a bingo game play played on a plurality of connected game play interfaces 411. As another example, the game play host device
15 403 may generate games of chance, such as slot games or video card games, for display on a remote client. A game player using the remote client may be able to select from a number of games that are provided on the client by the host device 403. The game play host device 403 may receive game software management services, such as receiving downloads of new game software, from the game software host 402 and may receive
20 game software licensing services, such as the granting or renewing of software licenses for software executed on the device 403, from the game license host 401.

In particular embodiments, the game play interfaces or other gaming devices in the gaming system 400 may be portable devices, such as electronic tokens, cell phones, smart cards, tablet PC's and PDA's. The portable devices may support wireless
25 communications and thus, may be referred to as wireless mobile devices. The network hardware architecture 416 may be enabled to support communications between wireless mobile devices and other gaming devices in gaming system. In one embodiment, the wireless mobile devices may be used to play games of chance.

The gaming system 400 may use a number of trusted information sources.
30 Trusted information sources 404 may be devices, such as servers, that provide information used to authenticate/activate other pieces of information. CRC values used to authenticate software, license tokens used to allow the use of software or product

activation codes used to activate to software are examples of trusted information that might be provided from a trusted information source 404. Trusted information sources may be a memory device, such as an EPROM, that includes trusted information used to authenticate other information. For example, a game play interface 411 may store a
5 private encryption key in a trusted memory device that is used in a private key-public key encryption scheme to authenticate information from another gaming device.

When a trusted information source 404 is in communication with a remote device via a network, the remote device will employ a verification scheme to verify the identity of the trusted information source. For example, the trusted information source
10 and the remote device may exchange information using public and private encryption keys to verify each other's identities. In another embodiment, the remote device and the trusted information source may engage in methods using zero knowledge proofs to authenticate each of their respective identities. Details of zero knowledge proofs that may be used with at least one embodiment are described in US publication no.
15 2003/0203756, by Jackson, filed on April 25, 2002 and entitled, "Authentication in a Secure Computerized Gaming System," which is incorporated herein in its entirety and for all purposes.

Gaming devices storing trusted information might utilize apparatus or methods to detect and prevent tampering. For instance, trusted information stored in a trusted
20 memory device may be encrypted to prevent its misuse. In addition, the trusted memory device may be secured behind a locked door. Further, one or more sensors may be coupled to the memory device to detect tampering with the memory device and provide some record of the tampering. In yet another example, the memory device storing trusted information might be designed to detect tampering attempts and clear or erase
25 itself when an attempt at tampering has been detected.

The gaming system 400 of may include devices 406 that provide authorization to download software from a first device to a second device and devices 407 that provide activation codes or information that allow downloaded software to be activated. The devices, 406 and 407, may be remote servers and may also be trusted information
30 sources. One example of a method of providing product activation codes that may be used with at least one embodiment is describes in previously incorporated U.S. patent no. 6,264,561.

A device 406 that monitors a plurality of gaming devices to determine adherence of the devices to gaming jurisdictional rules 408 may be included in the system 400. In one embodiment, a gaming jurisdictional rule server may scan software and the configurations of the software on a number of gaming devices in communication with the gaming rule server to determine whether the software on the gaming devices is valid for use in the gaming jurisdiction where the gaming device is located. For example, the gaming rule server may request a digital signature, such as CRC's, of particular software components and compare them with an approved digital signature value stored on the gaming jurisdictional rule server.

Further, the gaming jurisdictional rule server may scan the remote gaming device to determine whether the software is configured in a manner that is acceptable to the gaming jurisdiction where the gaming device is located. For example, a maximum bet limit may vary from jurisdiction to jurisdiction and the rule enforcement server may scan a gaming device to determine its current software configuration and its location and then compare the configuration on the gaming device with approved parameters for its location.

A gaming jurisdiction may include rules that describe how game software may be downloaded and licensed. The gaming jurisdictional rule server may scan download transaction records and licensing records on a gaming device to determine whether the download and licensing was carried out in a manner that is acceptable to the gaming jurisdiction in which the gaming device is located. In general, the game jurisdictional rule server may be utilized to confirm compliance to any gaming rules passed by a gaming jurisdiction when the information needed to determine rule compliance is remotely accessible to the server.

Game software, firmware or hardware residing a particular gaming device may also be used to check for compliance with local gaming jurisdictional rules. In one embodiment, when a gaming device is installed in a particular gaming jurisdiction, a software program including jurisdiction rule information may be downloaded to a secure memory location on a gaming machine or the jurisdiction rule information may be downloaded as data and utilized by a program on the gaming machine. The software program and/or jurisdiction rule information may used to check the gaming device software and software configurations for compliance with local gaming jurisdictional

rules. In another embodiment, the software program for ensuring compliance and jurisdictional information may be installed in the gaming machine prior to its shipping, such as at the factory where the gaming machine is manufactured.

5 The gaming devices in game system 400 may utilize trusted software and/or trusted firmware. Trusted firmware/software is trusted in the sense that is used with the assumption that it has not been tampered with. For instance, trusted software/firmware may be used to authenticate other game software or processes executing on a gaming device. As an example, trusted encryption programs and authentication programs may be stored on an EPROM on the gaming machine or encoded into a specialized
10 encryption chip. As another example, trusted game software, i.e., game software approved for use on gaming devices by a local gaming jurisdiction may be required on gaming devices on the gaming machine.

In at least one embodiment, the devices may be connected by a network 416
15 with different types of hardware using different hardware architectures. Game software can be quite large and frequent downloads can place a significant burden on a network, which may slow information transfer speeds on the network. For game-on-demand services that require frequent downloads of game software in a network, efficient downloading is essential for the service to viable. Thus, in at least one embodiment, network efficient devices 410 may be used to actively monitor and maintain network
20 efficiency. For instance, software locators may be used to locate nearby locations of game software for peer-to-peer transfers of game software. In another example, network traffic may be monitored and downloads may be actively rerouted to maintain network efficiency.

One or more devices in at least one embodiment may provide game software
25 and game licensing related auditing, billing and reconciliation reports to server 412. For example, a software licensing billing server may generate a bill for a gaming device operator based upon a usage of games over a time period on the gaming devices owned by the operator. In another example, a software auditing server may provide reports on game software downloads to various gaming devices in the gaming system 400 and
30 current configurations of the game software on these gaming devices.

At particular time intervals, the software auditing server 412 may also request software configurations from a number of gaming devices in the gaming system. The

server may then reconcile the software configuration on each gaming device. In one embodiment, the software auditing server 412 may store a record of software configurations on each gaming device at particular times and a record of software download transactions that have occurred on the device. By applying each of the recorded game software download transactions since a selected time to the software configuration recorded at the selected time, a software configuration is obtained. The software auditing server may compare the software configuration derived from applying these transactions on a gaming device with a current software configuration obtained from the gaming device. After the comparison, the software-auditing server may generate a reconciliation report that confirms that the download transaction records are consistent with the current software configuration on the device. The report may also identify any inconsistencies. In another embodiment, both the gaming device and the software auditing server may store a record of the download transactions that have occurred on the gaming device and the software auditing server may reconcile these records.

There are many possible interactions between the components described with respect to Figure 4. Many of the interactions are coupled. For example, methods used for game licensing may affect methods used for game downloading and vice versa. For the purposes of explanation, details of a few possible interactions between the components of the system 400 relating to software licensing and software downloads have been described. The descriptions are selected to illustrate particular interactions in the game system 400. These descriptions are provided for the purposes of explanation only and are not intended to limit the scope of at least one embodiment.

Figure 5 is a simplified block diagram of an exemplary mobile device 500 in accordance with a specific embodiment. As illustrated in the example of Figure 5, mobile device 500 may include a variety of components, modules and/or systems for providing functionality relating to one or more aspects of at least one embodiment. For example, as illustrated in Figure 5, mobile device 500 may include one or more of the following:

- At least one processor 510. In at least one implementation, the processor(s) 510 may include functionality similar to processor(s) 310 of Figure 3.

- Memory 516, which, for example, may include volatile memory (e.g., RAM), non-volatile memory (e.g., disk memory, FLASH memory, EPROMs, etc.), unalterable memory, and/or other types of memory. In at least one implementation, the memory 516 may include functionality similar to memory 316 of Figure 3.
5
- Interface(s) 506 which, for example, may include wired interfaces and/or wireless interfaces. In at least one implementation, the interface(s) 506 may include functionality similar to interface(s) 306 of Figure 3.
- Device driver(s) 542. In at least one implementation, the device driver(s) 542 may include functionality similar to device driver(s) 342 of Figure 3.
10
- At least one power source 543. In at least one implementation, the power source may include at least one mobile power source for allowing the mobile device to operate in a mobile environment.
- Authentication/validation components 544 which, for example, may be used for authenticating and/or validating local hardware and/or software components and/or hardware/software components residing at a remote device. In at least one implementation, the authentication/validation component(s) 543 may include functionality similar to authentication/validation component(s) 344 of Figure 3.
15
- Geolocation module 546 which, for example, may be configured or designed to acquire geolocation information from remote sources and use the acquired geolocation information to determine information relating to a relative and/or absolute position of the mobile device. For example, in one implementation, the geolocation module 546 may be adapted to receive GPS signal information for use in determining the position or location of the mobile device. In another implementation, the geolocation module 546 may be adapted to receive multiple wireless signals from multiple remote devices (e.g., gaming machines, servers, wireless access points, etc.) and use the signal information to compute position/location information relating to the position or location of the mobile device.
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25
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- Wireless communication module(s) 545. In one implementation, the wireless communication module 545 may be configured or designed to communicate with external devices using one or more wireless interfaces/protocols such as, for example, 802.11 (WiFi), 802.15 (including Bluetooth™), 802.16 (WiMax), 802.22, Cellular standards such as CDMA, CDMA2000, WCDMA, Radio Frequency (e.g., RFID), Infrared, Near Field Magnetics, etc.
- User Identification module 547. In one implementation, the User Identification module may be adapted to determine the identity of the current user or owner of the mobile device. For example, in one embodiment, the current user may be required to perform a log in process at the mobile device in order to access one or more features. Alternatively, the mobile device may be adapted to automatically determine the identity of the current user based upon one or more external signals such as, for example, an RFID tag or badge worn by the current user which provides a wireless signal to the mobile device for determining the identity of the current user. In at least one implementation, various security features may be incorporated into the mobile device to prevent unauthorized users from accessing confidential or sensitive information.
- Information filtering module(s) 549.
- One or more display(s) 535.
- One or more user I/O Device(s) 530 such as, for example, keys, buttons, scroll wheels, cursors, touchscreen interfaces, audio command interfaces, etc.
- Audio system 539 which, for example, may include speakers, microphones, wireless transmitter/receiver devices for enabling wireless audio and/or visual communication between the mobile device 500 and remote devices (e.g., radios, telephones, computer systems, etc.). For example, in one implementation, the audio system may include componentry for enabling the mobile device to function as a cell phone or two-way radio device.

- Magnetic strip reader 525, which, for example, may be configured or designed to read information from magnetic strips such as those on credit cards, player tracking cards, etc.
- Optical scanner 527, which, for example, may be configured or designed to read information such as text, barcodes, etc.
- Camera 529 which, for example, may be configured or designed to record still images (e.g., digital snapshots) and/or video images.
- Other types of peripheral devices 531 which may be useful to the users of such mobile devices, such as, for example: PDA functionality; memory card reader(s); fingerprint reader(s); image projection device(s); ticket reader(s); etc.

According to a specific embodiment, the mobile device of at least one embodiment may be adapted to implement at least a portion of the features associated with the mobile game service system described in U.S. Patent Application Serial Number 10/115,164, which is now U.S. Patent No. 6,800,029, issued October 5, 2004, (previously incorporated by reference in its entirety). For example, in one embodiment, the mobile device 500 may be comprised of a hand-held game service user interface device (GSUID) and a number of input and output devices. The GSUID is generally comprised of a display screen which may display a number of game service interfaces. These game service interfaces are generated on the display screen by a microprocessor of some type within the GSUID. Examples of a hand-held GSUID which may accommodate the game service interfaces are manufactured by Symbol Technologies, Incorporated of Holtsville, New York.

The game service interfaces may be used to provide a variety of game service transactions and gaming operations services. The game service interfaces, including a login interface, an input/output interface, a transaction reconciliation interface, a ticket validation interface, a prize services interfaces, a food services interface, an accommodation services interfaces, a gaming operations interfaces, a multi-game/multi-denomination meter data transfer interface, etc. Each interface may be accessed via a main menu with a number of sub-menus that allow a game service representative to access the different display screens relating to the particular interface. Using the different display screens within a particular interface, the game service representative

may perform various operations needed to provide a particular game service. For example, the login interface may allow the game service representative to enter a user identification of some type and verify the user identification with a password. When the display screen is a touch screen, the user may enter the user/operator identification information on a display screen comprising the login interface using the input stylus and/or using the input buttons. Using a menu on the display screen of the login interface, the user may select other display screens relating to the login and registration process. For example, another display screen obtained via a menu on a display screen in the login interface may allow the GSUID to scan a finger print of the game service representative for identification purposes or scan the finger print of a game player.

The user identification information and user validation information may allow the game service representative to access all or some subset of the available game service interfaces available on the GSUID. For example, certain users, after logging into the GSUID (e.g. entering a user identification and a valid user identification information), may be able to access the food services interface, accommodation services interface, or gaming operation services interface and perform a variety of game services enabled by these game service interfaces. While other users may be only be able to access the award ticket validation interface and perform EZ pay ticket validations.

Using the input/output interface, a user of the GSUID may be able to send and receive game service transaction information from a number of input mechanisms and output mechanisms. The input/output interface may allow the GSUID user to select, from a list of devices stored in a memory on the GSUID, a device from which the GSUID may input game service transaction information or output game service transaction information. For example, the GSUID may communicate with a ticket reader that reads game service transaction information from bar-coded tickets. The bar-codes may be read using a bar-code reader of some type. The bar-coded tickets may contain bar-code information for awards, prizes, food services, accommodation services and EZ pay tickets. Additionally, the bar-coded tickets may contain additional information including player tracking information that relate the ticket to a specific game player. The information on a ticket is not necessarily in bar-code format and may be in any format readable by a particular ticket reader. As another example, the GSUID

may input information from a card reader that reads information from magnetic striped cards or smart cards. The cards may contain player tracking information or other information regarding the game playing habits of the user presenting the card.

The GSUID may output game service transaction information to a number of
5 devices. For example, to print a receipt, the GSUID may output information to a printer. In this game service transaction, the GSUID may send a print request to the printer and receive a print reply from the printer. The printer may be a large device at some fixed location or a portable device carried by the game service representative. As
10 another example, the output device may be a card reader that is able to store information on a magnetic card or smart card. Other devices which may accept input or output from the GSUID are personal digital assistants, microphones, keyboard, storage devices, gaming machines and remote transaction servers.

The GSUID may communicate with the various input mechanisms and output mechanisms using both wire and wire-less communication interfaces. For example, the
15 GSUID may be connected to a ticket reader by a wire connection of some type. However, the GSUID may communicate with a remote transaction server via a wire-less communication interface including a spread spectrum cellular network communication interface. An example of a spread spectrum cellular network communication interface is Spectrum 24 offered by Symbol Technologies of Holtsville,
20 New York, which operates between about 2.4 and 2.5 Gigahertz. As another example, the GSUID may communicate with the printer via an infra-red wire-less communication interface. The information communicated using the wire-less communication interfaces may be encrypted to provide security for certain game service transactions such as
25 validating a ticket for a cash pay out. Some devices may accommodate multiple communication interfaces. For example, a gaming machine may contain a wire-less communication interface for communication with the GSUID or a port where a cable from the GSUID may be connected to the gaming machine.

Another type of game service interface that may be stored on the GSUID is an award ticket validation interface. One embodiment of the award ticket interface may
30 accommodate the EZ pay ticket voucher system and validate EZ pay tickets as previously described. However, when other ticket voucher systems are utilized, the award ticket validation interface may be designed to interface with the other ticket

voucher systems. Using the award ticket validation interface, a game service representative may read information from a ticket presented to the game service representative by a game player using the ticket reader and then validate and pay out an award indicated on the ticket.

5 Typically, the award ticket contains game service transaction information which may be verified against information stored on a remote transaction server. To validate the ticket may require a number of game service transactions. For example, after the obtaining game service transaction information from the award ticket, the GSUID may send a ticket validation request to the remote transaction server using the spread
10 spectrum communication interface and receive a ticket validation reply from the remote server. In particular, the validation reply and the validation request may be for an EZ pay ticket. After the award ticket has been validated, the GSUI may send a confirmation of the transaction to the remote server. In other embodiments, the award ticket interface may be configured to validate award information from a smart card or
15 some other portable information device or validate award information directly from a gaming machine.

As game service transactions are completed, game service transaction information may be stored on a storage device. The storage device may be a remote storage device or a portable storage device. The storage device may be used as a back-
20 up for auditing purpose when the memory on the GSUID fails and may be removable from the GSUID.

Another type of game service interface that may be stored on the GSUID is a prize service interface. As an award on a gaming machine, a game player may receive a ticket that is redeemable for merchandise including a bike, a computer or luggage.
25 Using the prize service interface, the game service representative may validate the prize service ticket and then check on the availability of certain prizes. For example, when the prize service ticket indicates the game player has won a bicycle, the game service representative may check whether the prize is available in a nearby prize distribution center. The GSUID may validate the prize ticket and check on the availability of
30 certain prizes by communicating with a remote prize server. Further, the game service representative may have the prize shipped to a game player's home or send a request to have the prize sent to a prize distribution location. The game service transactions

needed to validate the prize ticket including a prize validation request and a prize validation reply, check on the availability of prizes and order or ship a prize may be implemented using various display screens located within the prize interface. The different prize screens in the prize service interface may be accessed using a menu
5 located on each screen of the prize service interface. In other embodiments, the prize service interface may be configured to validate prize information from a smart card or some other portable information device or validate award information directly from a gaming machine.

Another type of game service interface that may be stored on the GSUID is a
10 food service interface. As an award on a gaming machine or as compensation for a particular amount of game play, a game player may receive a ticket that is redeemable for a food service including a free meal, a free drink or other food prizes. Using the food service interface, the game service representative may validate the food service ticket and then check on the availability of certain prizes. For example, when the game
15 player has received an award ticket valid for a free meal, the food service interface may be used to check on the availability of a dinner reservation and make a dinner reservation. As another example, the GSUID may be used to take a drink order for a player at a gaming machine. The GSUID may validate the food service ticket and check on the availability of certain food awards by communicating with a remote food
20 server. The game service transactions needed to validate the food ticket, check on the availability of food services, request a food service and receive a reply to the food service request may be implemented using various display screens located within the food service interface. These display screens may be accessed using a menu located on each screen of the food service interface. In other embodiments, the food service
25 interface may be configured to validate food service information from a smart card or some other portable information device.

Another type of game service interface that may be stored on the GSUID is an accommodation service interface. As an award on a gaming machine or as
30 compensation for a particular amount of game play, a game player may receive a ticket that is redeemable for a accommodation service including a room upgrade, a free night's stay or other accommodation prize. Using the accommodation service interface, the game service representative may validate the accommodation service ticket and then

check on the availability of certain accommodation prizes. For example, when the game player has received an award ticket valid for a room upgrade, the accommodation service interface may be used to check on the availability of a room and make a room reservation. As another example, the GSUID may be used to order a taxi or some other
5 form of transportation for a player at a gaming machine preparing to leave the game playing area. The game playing area may be a casino, a hotel, a restaurant, a bar or a store.

The GSUID may validate the accommodation service ticket and check on the availability of certain accommodation awards by communicating with a remote
10 accommodation server. The game service transactions needed to validate the accommodation ticket, check on the availability of accommodation services, request an accommodation service and receive a reply to the accommodation service request may be implemented using various display screens located within the accommodation service interface. These display screens may be accessed using a menu located on each
15 screen of the accommodation service interface. In other embodiments, the accommodation service interface may be configured to validate accommodation service information from a smart card or some other portable information device.

Another type of game service interface that may be stored on the GSUID is a gaming operations service interface. Using the gaming service interface on the GSUID,
20 a game service representative may perform a number of game service transactions relating to gaming operations. For example, when a game player has spilled a drink in the game playing area, a game service representative may send a request to maintenance to have someone clean up the accident and receive a reply from maintenance regarding their request. The maintenance request and maintenance reply may be sent and
25 received via display screens selected via a menu on the screens of the gaming operations service interface. As another example, when a game service representative observes a damaged gaming machine such as a broken light, the game service representative may send a maintenance request for the gaming machine using the GSUID.

30 Another type of game service interface that may be stored on the GSUID is a transaction reconciliation interface. Typically, the GSUID contains a memory storing game service transaction information. The memory may record the type and time when

particular game service transactions are performed. At certain times, the records of the game service transactions stored within the GSUID may be compared with records stored at an alternate location. For example, for an award ticket validation, each time an award ticket is validated and paid out, a confirmation is sent to a remote server.

5 Thus, information regarding the award tickets, which were validated and paid out using the GSUID, should agree with the information regarding transactions by the GSUID stored in the remote server. The transaction reconciliation process involves using the transaction reconciliation interface to compare this information.

Another type of game service interface that may be stored on the GSUID is a voice interface. Using the spread spectrum cellular network incorporated into the

10 GSUID, a game service representative may use the GSUID as a voice communication device. This voice interface may be used to supplement some of the interfaces previously described. For example, when a game player spills a drink the game service representative may send maintenance request and receive a maintenance reply using the

15 voice interface on the GSUID. As another example, when a game player requests to validate a food service such as free meal, the game service representative may request a reservation at a restaurant using the voice interface on the GSUID.

Yet another game service interface that may be provided by the GSUID is a gaming device performance or metering data transfer interface. As mentioned, the

20 GSUID preferably contains memory to record any wireless transfer of performance or metering data from the gaming device. More preferably, this wireless data transfer interface is particularly suitable for metering data in gaming devices which support mutli-game platforms with multi-denomination inputs. For example, in a multi-game gaming device, which typically includes separate denomination meters for each game of

25 the multiple games, a single gaming maintenance personnel is capable of downloading this metering data quickly and efficiently into the GSUID for subsequent data processing.

In addition to the features described above, the mobile device of at least one embodiment may also include additional functionality for displaying, in real-time,

30 filtered information to the user based upon a variety of criteria such as, for example, geolocation information, casino data information, player tracking information, etc.

Figure 6 shows a block diagram of system portion 600 which may be used for implementing various aspects of at least one embodiment. As illustrated in the example of Figure 6, system portion 600 may include at least one mobile device (MD) 630 which is configured or designed to display filtered information to a user. According to
5 different embodiments, the filtered information may be acquired from a variety of information sources such as, for example one or more of the following:

- Casino layout database(s) 602 which include information relating to casino floor layouts and/or physical environments.
- Casino employee database(s) 604 which include information relating to
10 casino employees and/or agents (such as, for example, employee names/ID, contact info, job types, work schedules, current locations, current status (e.g., active/inactive), etc.).
- Player tracking database(s) 606 which include information relating to various players or patrons of the casino (such as, for example, names,
15 contact info, personal preferences, game play history, etc.)
- Real-time gaming or play data 608 which, for example, may be obtained from real-time game play information provided by one or more gaming machines on the casino floor. Some examples include: player wagering information, jackpot information, bonus game information, game play data,
20 cash in/cash out information, etc.
- Gaming machine status information 612 which, for example, may include real-time and/or non real-time information relating to the status of various gaming machine components, systems, modules, peripheral devices, etc. Some examples include information relating to: hopper status information,
25 error information, security alerts, peripheral device(s) status information, etc.
- Geolocation data 610 which, for example, may information relating to a current position or location of the MD and/or user of the MD. In one implementation, geolocation data may be acquired using external signals such as GPS signals, cellular telephone signals, wireless networking signals,
30 radio frequency signals, and/or other types of local and/or global positioning signals. In at least one implementation, the geolocation data may be

generated by using multiple wireless signals from multiple remote devices (e.g., gaming machines, servers, wireless access points, etc.) to compute current position/location information relating to the position or location of the mobile device.

- 5 • Other information which may be useful for implementing at least one of the features of at least one embodiment.

As illustrated in the example of Figure 6, the various information may be processed by one or more filter processes (622) which may be adapted to use one or more filter parameters to generate filtered information to be displayed at the mobile
10 device 630. According to different embodiments, different filter processes may be implemented at different devices or systems of the gaming network such as, for example: mobile device(s), gaming machine(s), server(s), and/or any combination thereof. For example, in one implementation the mobile device 630 may be adapted to acquire desired information from one or more sources, and to apply one or more filter
15 processes to generate filtered information to be displayed on one or more displays of the mobile device. In a different implementation, a remote server (e.g., 620) may be adapted to acquire desired information from one or more sources, and to apply one or more filter processes to generate filtered information. The filtered information may then be transmitted via a wireless interface to the mobile device 630 for display to the
20 user. In yet another implementation, one or more gaming machines may be adapted to apply one or more filter processes to locally generated information (e.g., real-time game play data, player data, gaming machine status information, etc.) to generate filtered information. The filtered information may then be transmitted via a wireless interface to the mobile device 630 for display to the user.

25 In one implementation, the filter process(es) may be adapted to utilize the geolocation data 610 in order to generate filtered information which is customized based on the relative location/position of the mobile device (and/or user) on the casino floor. For example, the filtered information may include identification of “hot” players or premier players within a predetermined radius of the mobile device’s current
30 location. Alternatively, the filtered information may include information relating to specific drop locations in need of servicing within a predetermined radius of the mobile device’s current location.

In at least one implementation, the filtered and/or customized information which is displayed on the mobile device may automatically and/or dynamically change based upon the identity and/or privileges of the current user who is operating the mobile device. For example, in one implementation, the mobile device may be adapted to store employee profile information which, for example, may include information relating to casino employees or other persons such as, for example: employee name, employee ID, job description/responsibilities, access privileges, work schedule, etc. Additionally, the mobile device may be adapted to store customized, preconfigured filter parameters which are linked to each respective employee in the employee profile database. Upon determining the identity of the current user operating the mobile device, the customized, preconfigured filter parameters for the current user may be accessed and subsequently used during the information filter processing to generate appropriate filtered and/or customized information which is relevant to the current user. Thus, for example, if the current user is a casino host who's job responsibilities include identifying and greeting "hot" players (e.g., players who are betting and/or winning large amounts) and/or VIP players on the casino floor, the mobile device may use the current user's ID to automatically and a dynamically configure itself to display filtered information which includes identification of "hot" players and VIP players who are currently within a predetermined radius of the mobile device's current location. Alternatively, if the current user is a casino attendant who's job responsibilities include servicing gaming machine hoppers and verifying jackpot payoffs, the mobile device may use the current user's ID to automatically and a dynamically configure itself to display filtered information which includes identification of gaming machines within a predetermined radius of the mobile device's current location which are in need of hopper servicing or drops, and/or which currently require jackpot verification.

In an alternate implementation, the filtered and/or customized information displayed on the mobile device may be acquired without necessarily requiring that the mobile device generate geolocation data relating to its current location. For example, in one embodiment, the mobile device may be adapted to communicate, via a wireless interface, only with gaming machines or other devices on the casino floor which the mobile device believes are within a predetermined proximity to the mobile device. The mobile device may also be adapted to receive, via a wireless interface, information from

gaming machines or other devices on the casino floor which are within a predefined range of the mobile device. For example, current implementations of Bluetooth™ technology allow a Bluetooth™ enabled device to communicate with other Bluetooth™ enabled devices which are within a 10 meter radius. Using such technology, the mobile device may be adapted to receive wireless information from gaming machines or other devices on the casino floor which are within a predetermined proximity (e.g., within 10 meters) of the mobile device. However, in at least one implementation, the mobile device will not receive wireless information from gaming machines or other devices on the casino floor which are outside the predetermined proximity.

Figure 7 shows a flow diagram of a Data Processing Procedure 700 in accordance with a specific embodiment. According to different embodiments, selected portions of the Data Processing Procedure 700 may be implemented at different devices or systems of the gaming network such as, for example, gaming machines, server(s), mobile device(s), and/or any combination thereof. In at least one implementation, the Data Processing Procedure 700 may be used for acquiring and generating the filtered and/or customized information which is to be displayed on a mobile device of at least one embodiment.

At 702, a current user of the mobile device (MD) is identified. In one implementation, the identification of the current user may be implemented via the User Identification module (547, Figure 5). In one implementation, the User Identification module may be adapted to determine the identity of the current user or operator of the mobile device. For example, in one embodiment, the current user may be required to perform a log in process at the mobile device in order for the user to access one or more features of the MD. Alternatively, the MD may be adapted to automatically determine the identity of the current user based upon one or more external signals such as, for example, an RFID tag or badge worn by the current user which provides a wireless signal to the mobile device for determining the identity of the current user.

According to a specific embodiment, once the current user of the MD has been identified, a determination may then be made (704) as to the various types of information to be acquired or accessed for use in generating the filtered and/or customized information to be displayed to the user via the MD. In one implementation, such a determination may involve accessing profile information relating to the

identified user in order to facilitate the determination of which types of information will be relevant to the identified user. Such information may include, for example: information relating to casino floor layouts and/or physical environments; information relating to casino employees and/or agents; information relating to various players or patrons of the casino; information relating to real-time gaming or play data; gaming machine status information; real time directions to another area of the casino; real time alerts; messages from other MD users or casino management; staff schedules; etc.

As shown at 706, the desired information may then be acquired for example, by accessing one or more data sources such as those described, for example, in Figure 6 of the drawings. Additionally, if desired, geolocation information relating to the current position or location of the MD may also be acquired and/or determined (710).

At 712, one or more filter parameters may be identified for use in generating the filtered and/or customized information. In at least one implementation, the selection of the specific filter parameters to be used may be based, at least in part, upon the identity and/or privileges of the current user who is operating the mobile device. For example, in one implementation, the mobile device may be adapted to store employee profile information as well as customized, preconfigured filter parameters which may be associated with specific parameters relating to the employee profile information. According to one embodiment, upon determining the identity of the current user operating the mobile device, the customized, preconfigured filter parameters associated with the current user may be accessed and subsequently used during the information filter processing to generate appropriate filtered and/or customized information which is relevant to the current user. Examples of such filter parameters may include, for example: physical proximity parameters (e.g., display relevant data which is within 50 feet of current MD position); path selection criteria (e.g., shortest available path, line of sight, as crow flies, etc.); parameters relating to the current user's job description (e.g., casino host, pit boss, security, maintenance, drops, casino attendant, gaming regulator, player, waiter/waitress, security staff, etc.); game play parameters; player parameters; information type parameters (e.g., display only selected types of information; do not display specified types of information; etc.); user selected parameters; time parameters (e.g. display machines that are scheduled for maintenance this week); etc.

As shown at 714, filtered and/or customized information may then be generated, for example, by applying the selected filter parameters and/or geolocation data to the acquired relevant information. According to different embodiments, different filter processes may be implemented at different devices or systems of the gaming network
5 such as, for example: mobile device(s), gaming machine(s), server(s), and/or any combination thereof.

Once the desired filtered and/or customized information has been generated, the filtered and/or customized information may be displayed (716) to the current user via one or more displays of the MD. Additionally, the displayed information may be
10 updated (718) based on a variety of conditions such as, for example: at scheduled and/or periodic intervals; upon demand (e.g., by the user, casino management, the player hitting an attendant button on the device, etc.); upon the occurrence of once or more predetermined events; upon the detection of a change in the information being displayed; upon the detection of a change in real-time data being displayed; upon the
15 detection of a change in position or location of the MD; upon the detection of a change in the filter parameter selection; in response to user input; etc.

In at least one implementation, the MD may be adapted to dynamically modify (720) the format, type, scope and/or amount of information displayed based on user input or user interaction. For example, the MD may provide the user with a graphical
20 interface for allowing the user to select the type and degree of filtered information to be displayed.

Figures 8-19 illustrate various examples of features of the mobile device of at least one embodiment in which different types of filtered and/or customized information are displayed in accordance with specific embodiments.

25 Figure 8 shows a specific embodiment of a mobile device 800 which may be used for implementing various aspects of at least one embodiment. As illustrated in the example of Figure 8, mobile device 800 may include a primary display 810 and one or more auxiliary displays 806. Additionally, as illustrated in the example of Figure 8, mobile device 800 may include one or more user input devices (e.g., 802, 804) such as,
30 for example, keys, buttons, scroll wheels, jog wheels, touch screens, cursors, joysticks, touchpads, etc.

In the example of Figure 8, there is provided a graphical user interface 811 which may be displayed on one or more of the displays of the mobile device (e.g., 810). In a preferred embodiment of the invention, the graphical user interface 811 is associated with at least one main application but capable of displaying information associated with one or more sub-applications or functions.

In one embodiment, the graphical user interface 811 is arranged to display information provided by an application or function which generates casino environment image information. In addition, in one or more embodiments, the graphical user interface 811 is arranged to display information provided from other applications or functions, and particularly those associated with individual functions or systems of a casino. These other applications or functions may be player tracking, casino accounting, security and the like.

In a preferred embodiment, the graphical user interface 811 includes a main window 40. The main window 40 may comprise a variety of elements having a variety of shapes and sizes. In general, the main window 40 comprises an element displayed on or by a device, such as a video screen.

In a preferred embodiment, when displayed, the main window 40 provides a gaming system environment information and permits interaction with an application executed by or function being performed by the mobile device 800 and, as described below, one or more other devices. In the embodiment illustrated, the main window 40 includes a display area 42, one or more menu elements 44 and one or more control or navigation icons 46.

In one implementation, graphical information regarding or representing a gaming environment is illustrated in the display area 42. The display area 42 preferably comprises a portion or field of the main window 40. This display area 42 portion of the main window 40 may be referred to as the data panel, window or viewport.

According to different embodiments, the information which is displayed in the display area 42 comprises a two-dimensional or three-dimensional representation of a gaming environment. The specific embodiment illustrated in Figure 8 corresponds to a three-dimensional gaming environment representation. By gaming environment, it is meant the physical arrangement of components of the gaming system along with the related physical environment in which that system or its components reside. This

environmental information may include, but is not limited to, the components of the gaming system, the physical arrangement of the components of the gaming system, and one or more portions of the physical environment in which the system is located, including the relationship of the components to the environment.

5 One example of such information is illustrated in Figure 8. As illustrated, the information includes the representation of one or more of the gaming system devices 24 (as described above, the term gaming system device includes, but is not limited to, any component of the gaming system, including electronic, electromechanical, mechanical or other devices, elements or structures). These representations preferably comprise
10 images, either actual images such as photographic information in digital form, or generated representations, of the gaming system devices 24 of the system 22. Preferably, if not an actual image of the gaming system device 24, the representation portrays information useful in identifying the gaming system device 24, such as the particular type of gaming system device. By "type" it is meant slot type machine, video
15 type machine, table game, server, workstation or the like. In addition, the representation may more particularly identify the device 24, such as by particular game or manufacturer.

In a preferred embodiment, the representation of each gaming system device 24 is illustrated in a location on the display relative to all other gaming system devices 24
20 which represent the actual relative locations of the gaming system devices 24 of the gaming system 22 being portrayed in their actual physical environment.

In one embodiment, one or more aspects of the actual physical environment in which the components of the gaming system 22 are located is displayed. For example, a representation of a casino which is housing the gaming system 22 may be displayed.
25 Once again, the aspects of the casino or other physical environment are preferably illustrated in relative and representative form to the actual physical environment, including size, relative location and the like.

An example of a portrayal of an actual gaming environment is illustrated in Figure 8. As illustrated, the gaming system includes gaming system devices such as gaming machines 49a, b, c arranged in a first bank 50 of gaming devices. An isle 53
30 separates the first bank 50 of gaming devices from a second bank 54 of gaming devices. An isle 54 also separates the first bank 50 of gaming devices from a number of other

gaming devices including a Blackjack table 56 and a Roulette wheel 58. Again, these displayed images correspond to an actual (in this case, exemplary) physical gaming environment.

Preferably, the information which is displayed to the user aids the user in correlating the illustrated information with the actual physical environment. A wide variety of information may be displayed to aid this function. For example, referring to Figure 8, the information which is illustrated preferably includes details regarding the physical environment of the gaming system 22, which details aid the user of the mobile device in identifying the corresponding physical location of the individual components or devices of the system. This detail may include the illustration of casino walls, hallways, isles, significant fixtures such as light fixtures and signage, doors and the like. The detail may also include information such as the type of flooring, including reproduction of carpet designs, wall covering and a variety of other information.

Preferably, a variety of functions are provided for manipulating the information which is displayed in the display area 42. In one embodiment, a selector 59 is provided for selecting elements in the window 40. This selector 59 may comprise, as is known in the art, a mouse pointer or as illustrated, a hand with pointed finger. The selector 59 may be guided by a mouse, track-ball or a wide variety of other user input devices. Other means may be provided for selecting elements, such as by a menu or selection buttons, screen icons, etc,

As described, a plurality of navigation elements 46 may be provided. In one embodiment, the navigation elements 46 comprise directional arrows 60a, b, c, d, e, f, g, h, i. Selection of one of these arrows 60a-i preferably results in the display of information regarding an area of the gaming environment which is available in the direction of the arrow. For example, if a user selects the arrow 60d, then the field of view is shifted to the right. Information regarding the gaming system and related environment which lies in this direction is thus displayed in replacement of the information regarding the current location. In one embodiment, selection of a particular arrow 60 results in a predetermined distance of movement.

In addition, functions may be performed via menu selections. As illustrated, the menu 44 includes a number of menu elements. In one embodiment, the menu elements

comprise "open machine" 62, "navigate" 64, "zoom" 66, "view" 67, "location" 68, "tools" 70, "window" 72, and "help" 74.

Upon selecting one of the menu selections, one or more functions associated with that selection may be presented to the user. These functions or selections may be
5 illustrated in a hierarchical or other menu format. With respect to the "open machine" 62 selection, a user may be provided with a number of sub-selections, such as "open accounting," "open security," "open operating data" and the like. Each one of these sub-selections preferably results in the generation or display of certain information regarding a gaming system device which is illustrated in the display area 42, which
10 device and information corresponds to an actual gaming system device of the gaming system 22.

With respect to the "navigate" 64 selection, a user may be provided with sub-selections such as "move right," "move left," "move up," "move down," and the like. Other selections may be provided, such as a user's selection of a specifically designated
15 area.

With respect to the "zoom" 66 selection, a user may be provided with sub-selections such as "zoom in," "zoom out," "percentage zoom," "zoom to specified radius" (e.g., zoom to a radius of 30 feet from the current location of the mobile device), etc. Such selections may be used to change the magnitude of the size of
20 displayed information. For example, "zoom out" preferably causes the scale of the displayed elements to reduce or become smaller, such that a larger representative area of the gaming environment is displayed in the display area 42. The "zoom in" features preferably causes the scale of the displayed elements to increase or become larger, such that a smaller representative area of the gaming environment is displayed in the display
25 area 42.

With respect to the "view" 67 selection, a user may be provided with a number of sub-selections such as "camera view" or "archive view." As described below, using such features a user may obtain a photographic image of a particular component or live video feed from a camera including the component within its field of view.
30

With respect to the "location" 68 selection, a user may be provided with options for the display of specific areas of a gaming environment. These locations may be pre-designated, such as "entrance" or the like.

With respect to the "tools" 70 selection, a user may be provided with a variety of function options such as changing the color of displayed information, contrast, importing and exporting of information, saving of data and the like.

5 With respect to the "window" 72 option, a user may be provided with options such as sizing of the window, closing or reducing the window 40. The user may also be provided with the option of making the display area 42 a full screen (i.e. no borders displayed). The user may also be provided with the option of changing the format of information displayed in the window 40, such as adding visible tool bars, changing the style of the navigation elements, and adding or removing information bars or areas. For
10 example, in one embodiment, a "location" bar 73 may be displayed in the window 40. The "location" bar 73 may display information regarding the information of the location of the graphical components which are presently illustrated in the display area 42, such as the name of the casino and more detailed mapping information.

With respect to the "help" 74 selection, a user may be provided with a variety of
15 help functions. These functions may include an index of help topics.

In one embodiment, the various functions which are provided by the menu 44 are enabled by software and/or hardware. For example, the mobile device 800 may include computer executable code arranged to "zoom" the information which is displayed in the display area 42. The mobile device may also be adapted to
20 dynamically modify the filtered and/or customized information displayed, based on user input or user interaction. A variety of other menu selections may be provided, as is known. For example, menu selections may include "print" for printing displayed information.

In one or more embodiments, one or more of the elements which are displayed
25 in the display area 42, such as represented gaming system devices, may comprise a container element. In general, a container element is an element which contains other elements or information. One or more of the elements displayed in the display area 42 may comprise application initiating elements. Application initiating elements comprise elements which, when selected, cause an application to be initiated or run.

30 In one embodiment, when a particular displayed element is selected, data associated with that element is displayed. The information which is displayed is dependent upon the element which is selected. For example, if the selected element is

the gaming machine or table game, then information regarding the physical gaming machine or gaming table to which the displayed element corresponds is displayed. If the selected element is a progressive meter 75, then information regarding that device is displayed.

5 The manner by which the information is generated and displayed may vary. As described, the displayed element may comprise a container with which information is associated. For example, a displayed gaming system device may be configured similar to a file folder in a computer-based application window. Data from other applications or elements may be associated with the container so that when the container is selected,
10 the associated information is accessible, accessed or displayed.

 In another embodiment, the selection of a display element causes an underlying function or application to be initiated. Preferably, this function or application is arranged to generate and then display information associated with the display element. For example, upon selecting a particular gaming system device, an application may be
15 initiated which polls various of the devices of the gaming system, such as servers or hosts, for information regarding that device.

 The information may be displayed in a wide variety of manners. In one embodiment, the information may be displayed in a new window 76 which has characteristics separate from the main window 40. For example, the new window 76
20 may be moved, re-sized, and closed independent of the main window 40. In another embodiment, the information may be displayed in the main window 40.

 In one embodiment, a user may be required to select by a menu or by touching the appropriate area on the display. In another embodiment, information may be presented when the selector 59 is moved over a particular element or as the user
25 navigates through the virtual environment. For example, a window may automatically open and present information regarding a component positioned under the selector 59 or when touched by the user in a touch-display format.

 The type of information which may be displayed may vary. In one embodiment, the information may comprise one or more selectable elements themselves, such as a
30 menu of selections for the user. In another embodiment, specific information may be automatically configured and displayed. Such an arrangement is illustrated in Figure 8. As illustrated, a variety of information may be displayed regarding the selected device.

In the case of a gaming system device 24, the information may include the identification of the device, such as by serial number or other identifier. The information may include the location of the device. As described below, in an instance where the graphical gaming system information is arranged based upon predetermined grid arrangement
5 which is correspondingly associated with the physical environment of the gaming system, then grid coordinates (i.e. 26:28 as illustrated) may be displayed.

The information may include a wide variety of information obtained from the actual gaming system device 24 which corresponds to the graphical representation. The information may also come from other sources, such as the individual servers or hosts.
10 For example, accounting information such as total coins (or money) in and coins (or money) paid out by the gaming system device during periods of time may be displayed. Other information such as the operating status of the gaming system device and specific information about operating software may be provided from the gaming system device 24 via the game server 26.

15 The graphical user interface 811 may be configured in a wide variety of manners. For example, the navigation element, menu elements and the like may comprise text, buttons, symbols or take other forms. These elements, such as the arrows 60, menu elements and the like may have a variety of shapes and sizes.

In one embodiment, the display may be touch sensitive, allowing a user to select
20 a display element directly. In such event, the various elements such as navigation arrows 60 and menu elements may be arranged as buttons which are sized for selection by the finger-tip touch of a user.

In one or more embodiments, one or more external windows (not shown) or other elements may be associated with the graphical user interface 811. Such windows
25 or elements may be associated with, but not form a portion of, the main window 40 or its components. In one or more embodiments, the element may comprise a window in which information may be displayed, or may comprise a button, or panel including information, or other graphical elements having a variety of forms and configurations. In one embodiment, such an external window may be associated with an entirely
30 different application from that which the graphical user interface 811 is associated. In another embodiment, a window may be displayed which is associated with an element of the graphical user interface 811.

In accordance with at least one embodiment, there is provided a method of configuring a graphical user interface, such as the graphical user interface 811 described above. One embodiment of the invention comprises displaying a graphical representation of at least a portion of a gaming environment comprising a physical gaming system and its associated environment, and displaying filtered and/or customized information regarding one or more components of that gaming system.

A variety of other methods are contemplated as within the scope of the invention, and the steps may of the methods of the invention may be performed in a variety of sequences. In one embodiment, the method includes the step of generating a graphical user interface and displaying generated graphical gaming environment or gaming system information using the interface, such as in the display area of the interface. The method also includes the steps of accepting input from a user, such as for effecting navigation or requesting information regarding a particular displayed element.

In one embodiment, each gaming system device 24 or component is uniquely identifiable, and a graphical representation of a component is uniquely associated with an identified physical component. When a user selects a particular graphically represented gaming system device, a request for information regarding that gaming system device from a server or host is made by using the identifier for that device. This identifier may comprise a machine I.D., serial number or the like.

A variety of other embodiments of the invention are contemplated. In one embodiment of the invention, the mobile device 800 may be provided with a communication link to one or more cameras, such as casino security cameras. If desired, a user of the graphical user interface may be permitted to view the physical device to which the graphical representation corresponds using information from such a camera or cameras. As described above, a "view" 67 menu selection may be provided. By selecting a particular element in the display area 42 and the "view" selection, actual photographic information of the component in the physical environment may be presented to the user.

In one embodiment, when the user selects the "view" option, the mobile device 800 is arranged to obtain photographic information. Such information may be obtained from a particular camera or cameras through a communication link directly with the

camera(s), or through a centralized security or other monitoring system through which data feeds from the one or more cameras is provided. The information may also comprise an archived image of the component.

For example, in one implementation, a camera or other image collection device
5 may be configured to collect image information regarding one or more gaming system devices 24 and/or activities and objects (including players). By selecting the "view" 67
menu selection, a user may be permitted to select a particular camera, gaming system device 24 and/or area for which collected image information is desired. This image
information may then be displayed to the user. The image information may comprise
10 individual frame or streaming video information.

The photographic information may be displayed in a variety of manners. In one embodiment, the information is displayed in a new window located in the display area 42, in similar manner to the window 76. In one embodiment, the image information may be stored by the user. For example, when particular image information is selected,
15 the user may utilize a "store" feature (such as provided in a sub-menu) to store the information for later use.

Of course, a wide variety of information may be provided to the user who is viewing the graphical user interface 811. For example, audio or audio and video information from the physical gaming environment may be provided.

20 The various components or elements of the graphical user interface 811 may be arranged in a variety of configurations. In general, it is desired, however, that the interface 811 provide a user with a consolidated "picture" of one or more portions of the gaming system and be capable of providing specific information regarding one or more components of that gaming system. In this regard, the gaming environment which is
25 depicted may be referred to as a "virtual casino" in that it represents the casino in computer generated/presented format.

While it is preferred that the gaming system be represented in a three-dimensional form, other formats may be provided. In one embodiment, the gaming system may be represented in a two-dimensional format. In another embodiment, the
30 gaming system may be represented using actual images of the gaming environment. For example, photographs may be taken of each gaming device 24 and the image of each particular gaming machine may be displayed in the represented environment with

its photograph or other image. In another embodiment, live video information may be displayed to represent the environment. Other information may be imposed upon that image information to aid the user in identifying features and obtaining information. Alternatively, the image information may be imposed over a template, whereby when
5 the user selects a particular displayed element, such as a particular gaming machine, the selection results in selection of the gaming machine as identified by its underlying template.

According to different embodiments, the graphical user interface 811 may also include an icon 98 representing a current position of location of the mobile device
10 relative to other objects in the displayed gaming environment. In one implementation, the mobile device icon 98 may remain in a fixed position (e.g., in the center) of the graphical user interface 811 while other objects of the displayed gaming environment may automatically and dynamically change as the position of the mobile device changes. In an alternate embodiment, the mobile device icon 98 does not remain in a
15 fixed position on the graphical user interface 811, and the user is able to scroll, pan, or otherwise change the portion of gaming environment which is being displayed.

In one embodiment of the invention, information regarding activities or events located remote from the user are displayed in real-time to the user. When a user selects a particular gaming system device 24, information regarding that device is displayed to
20 the user in real time. For example, when a user selects a particular gaming machine 59, as illustrated in Figure 8, information which is being generated by the gaming machine 59 is preferably provided to the user as it is generated. This information may comprise, for example, player events such as a player's input of a player card, coins in and coins out, and a wide variety of other information, such as identification of a game currently
25 being played, results of games and the like.

In another embodiment, as also described, the user may obtain historical information. As illustrated in Figure 8, such information may comprise information previously generated or information which was generated from previously generated information, such as actual win or hold percentage over time, coins in and coins out
30 over time, number of games played over time, and similar information.

It will be appreciated that one or more components of a gaming environment or system may be located in more than one geographic location. For example,

International Game Technology's MEGABUCKS™. system includes gaming system devices which are located in multiple casinos. In an embodiment of the invention, it is contemplated that the system may be modeled or represented in similar manner to that described above. In such an embodiment, at one "zoom" level, an overview graphical representation of the system may be provided, such as one in which all of the casinos having such machines are illustrated. A user may then select a particular casino or location and another level of information, such as a casino level detail as illustrated in Figure 1 may be illustrated.

In this regard, the method and apparatus of the invention is not limited to presentation of information regarding a single gaming system or a portion of a gaming system at only a single location. It is contemplated that a user may be presented information regarding gaming systems at different casinos or a gaming system spread among or including multiple casinos. In such an embodiment, as described above, the user may be provided with a means for selecting the particular portion or area of the gaming system or the particular gaming system or casino property which the user would like information about. In an embodiment such as where the gaming system is distributed among multiple casinos or locations, the mobile device 800 may communicate with gaming system devices 24 at the individual casinos.

In one or more embodiments, means other than arrows or the like may be provided for changing the illustrated information or otherwise "navigating" the information. In one embodiment, navigation may be permitted using the selector 59. For example, as a user moves the selector 59 (such as with a track-ball) over the displayed gaming system information, the displayed information may "move" as well. For example, in the embodiment illustrated in Figure 8, if a user were to move the selector 59 towards the area marked "elevators," this portion of the displayed area would move towards the bottom of the display area 42, and additional information above that area would be displayed.

As noted, a variety of information regarding individual gaming system devices or components may be presented. This information may include device or structural data such as serial number, manufacturer and the like. The information may also include operational data, such as power on/off, malfunction and the like. The information may also include game-related information, such as amounts bet and

awarded, percentage hold and the like. In one or more embodiments, the statistics from more than one gaming system device may be aggregated, such as by selecting an entire bank of gaming machines or a group of table games.

In one embodiment, graphical representations of players (e.g., 99) may be included. For example, in the event information is received that a particular gaming machine is in play by a player, the graphical representation of the environment may be updated to add a graphical representation of a player at that particular gaming machine. Likewise, graphical representation of players and dealers may be illustrated with respect to table games. In this manner, a user of the system may easily identify the gaming system devices which are current in use from those which are not.

In a preferred embodiment of the invention, as illustrated in Figure 8, a user may obtain information regarding players and/or other persons or devices in the gaming environment such as, for example, casino employees, service technicians, gaming regulators, gaming machines, other mobile devices, etc. In one embodiment, the user may select a player (e.g., 99) to obtain information regarding that player. Information may be obtained whether the identity of the player is known or not. For example, if the identity of the player is not known, the gaming machine may still provide information that a player is playing. In that event, a graphical representation (or actual image, such as obtained from a camera) of the player may be provided. When the user selects that representation, information may be displayed, such as collected and generated information regarding the time play began, coins in and coins out and the like.

As described above, a player may identify themselves by using a player tracking card or the like. In such an event, the user may obtain specific information regarding the player and the player's activities, such as tracked by a player tracking server (see, e.g., Figure 1). This information may comprise any of the wide variety of information which is known to be collected or generated with such a system, such as the name of the player, bonus or awards points accrued to the player or the like, as illustrated in Figure 8.

In this embodiment, a user may obtain information which allows the user to make decisions regarding the player. For example, by viewing the historical and/or real time play of a player as illustrated in Figure 8, the user may elect to award the player a

special bonus, such as a bonus number of accrued points which the player may utilized for free game play or prizes, as is known in the art of player rewards programs. In one embodiment, menu features may be provided for permitting the user to perform such functions, such as via the graphical user interface 811. In one embodiment, such actions may be transmitted over the gaming system (e.g., 22, Figure 1) back to the player, so that the player is made aware of the award.

In a similar manner, a user may obtain information regarding other persons. For example, a user may obtain information regarding a dealer at a Blackjack table 56. A dealer may be required to log in when they begin dealing at a particular table 56. Further, equipment may be used, as described, for tracking game play, including bets and amounts paid at the table. By selection upon the representation of the dealer, the user may obtain information such as the identity of the dealer, their time at the table and related information.

In one or more embodiments, other options may be provided for manipulating the graphical information. For example, in one embodiment, a user may be permitted to move graphical elements, such as individual gaming system devices (such as representations of gaming machines or table games). In this manner, a user may be permitted to reconfigure the virtual gaming environment or casino and visually inspect the new configuration. This information may be useful in changing the actual physical environment/arrangement of the system.

For example, a user may utilize the graphical representation to reconfigure the gaming environment. For example, a casino may wish to reconfigure their gaming floor, such as by moving one or more gaming machines. A user may obtain a visual representation of the gaming floor as reconfigured by moving the representations of the gaming system devices 24. In one embodiment, the user may "drop and drag" the representations, or may use input commands to effect the movement.

In one embodiment, once one or more of the representations of the gaming devices 24 have been moved, reconfiguration information may be generated and output. This information may comprise, for example, the identification of moved devices and their new locations, such as in coordinate or other form. Technicians or workers may then utilize those instructions to move the physical devices to their intended locations.

In another embodiment, the physical gaming devices may be moved and then the system of the invention may utilize input information to change the represented environment. For example, technicians may input new location information for moved devices, and the system may then utilize that information to generate a new graphical representation for use by the user. In this manner, the representation is always accurate of the true environment.

In one embodiment, the user may be permitted to interact with individual gaming system device by sending information, such as control instructions, to the device. For example, a technician may query a device using the system and then send information to the device, such as a reset code. A user may also use the system to update control code, such as gaming machine game code using the system. In this arrangement, information or instructions are provided the virtual information host to the one or more devices.

In one embodiment, a user may cause information to be transmitted to a gaming system device for use by a technician or similar party. For example, a user may obtain information regarding a particular gaming machine using the interface and determine that the gaming machine should be reconfigured. The user may cause a work ticket to be printed from a ticket printer or dispenser at that gaming machine for use by the technician. Such work tickets may also be printed to provide trouble-shooting or similar information to a technician or other party at the gaming system device. Alternatively, the user of the mobile device may transmit a wireless message to an appropriate entity (e.g., service technician who also has a mobile device), to cause at least a portion of desired information to be displayed on the display of the receiving entity.

In general, the graphical user interface and system permit a party to obtain information regarding gaming system devices and transmit information to those devices. Advantageously, the interface provides a convenient means for recognizing and utilizing the information.

A variety of methods have been described above which, as indicated, may be implemented via the mobile device 800. For example, embodiments of the invention can be implemented as computer software in the form of computer readable code executed on a general purpose computer or other electronic device, or in the form of

bytecode class files executable within a Java™ runtime environment running on such a computer/device, or in the form of bytecodes running on a processor (or devices enabled to process bytecodes) existing in a distributed environment (e.g., one or more processors on a network).

5 Figure 9 shows a specific embodiment of a mobile device 900 which may be used for implementing various aspects of at least one embodiment. As illustrated in the example of Figure 9, mobile device 900 may include a primary display 910 and one or more auxiliary displays 920. Additionally, as illustrated in the example of Figure 9, mobile device 900 may include one or more user input devices (e.g., 912, 914).

10 In the example of Figure 9, there is provided a graphical user interface 951 within the primary display 910. In one embodiment, the graphical user interface 951 is arranged to display information provided by an application or function which generates casino environment image information. In addition, in one or more embodiments, the graphical user interface 951 is arranged to display information provided from other
15 applications or functions, and particularly those associated with individual functions or systems of a casino.

 In a preferred embodiment, the graphical user interface (GUI) 951 includes a main window adapted to display a variety of objects having a variety of shapes and sizes. In a preferred embodiment, when displayed, the main window may be adapted to
20 provide gaming system environment information for facilitating interaction with an application executed by or function being performed by the mobile device 900 and/or one or more other devices.

 As shown in the example of Figure 9, GUI 951 may be adapted to display a two-dimensional or three-dimensional representation of a gaming environment. The
25 specific embodiment illustrated in Figure 9 corresponds to a two-dimensional gaming environment representation. In at least one implementation, the representation of the gaming environment displayed in GUI 951 may include information which has been filtered and/or customized based on a variety of different filter parameters such as those described herein and/or other filter parameters which are commonly know to one
30 having ordinary skill in the art. For example, as illustrated in the example of Figure 9, the information displayed in GUI 951 may include:

- Objects representing individual gaming machines and/or banks of gaming machines (e.g., 906, 908).
- Objects representing game tables (e.g., 902) and/or other non-electronic game play stations.
- 5 • Labels (e.g., 904a-f) for use in identifying different objects displayed in GUI 951.
- Objects representing mobile devices (e.g., 930).
- Objects representing persons in the gaming environment (not shown) such as, for example, players, casino employees, etc.
- 10 • Objects representing physical features of the gaming environment (e.g., plants 911, chairs and bar 914).
- Information (e.g., 901) relating to the location or portion of the of the gaming environment being displayed.
- Menu Information (e.g., 903) adapted to provide the user with access to
15 different features and functionalities provided by the mobile device 900.

As illustrated in the example of Figure 9, at least a portion of the different filter parameters may be displayed to the user, for example, via auxiliary display 920 and GUI 953. Thus, for example, as shown at 922, the user is provided with information relating to enabled and/or disabled filter parameters which are being used (or not being
20 used) for generating the filtered information displayed in GUI 951. In this particular example, the displayed filter parameters shown at 922 indicate the following with regard to the information displayed in GUI 951:

- The information displayed within GUI 951 is dynamically and automatically
25 modified based on the current position of the mobile device (indicated by icon 930), which, in this example, is positioned in the center of GUI 951. According to a specific embodiment, as the user moves around the casino floor with the mobile device, the mobile device icon 930 will remain in the center of GUI 951 while the positions of other objects displayed in GUI 951 will automatically and dynamically change to reflect their current positions
30 relative to the mobile device.

- The information displayed within GUI 951 has been filtered to show only a portion of the casino gaming environment which is within an approximate radius of 30 feet from the current position of the mobile device.
- The information displayed within GUI 951 is rendered as a 2-dimensional representation of the gaming environment.
- A “Display Labels” feature is enabled to allow label information (e.g., 904a-f) to be included in the information displayed in GUI 951.
- A “Display Persons” feature has been disabled, which prevents information relating to persons located in the displayed gaming environment (e.g., players, casino employees, etc.) from being displayed or represented in GUI 951.
- The portion of the gaming environment displayed in GUI 951 corresponds to a relative Zoom Factor of 3. In the examples illustrated in Figures 9-19, it is assumed that a relatively lower Zoom Factor value results in a more “zoomed in” view of the gaming environment, as compared to a relatively higher Zoom Factor value which results in a more “zoomed out” view of the gaming environment.

In at least one implementation, at least a portion of the filter parameters may be selected and/or configured by the user. For example, in one implementation, the user may select the displayed “Modify Display Features” button 924 to activate a GUI (not shown) which enables the user to select, modify, activate and/or deactivate desired parameters associated with the information being displayed on primary display 910 and/or auxiliary display(s) 920.

Figure 10 shows an alternate embodiment of a mobile device 1000 which may be used for implementing various aspects of at least one embodiment. The mobile device embodiment of Figure 10 is similar to that of Figure 9. However, as shown in Figure 10, the display parameters at 1022 indicate that a “user scrollable” feature has been enabled to allow the user to scroll, pan, navigate, or otherwise change the portion of gaming environment being displayed in GUI 1051. In this embodiment, the information displayed within GUI 1051 is not centered on the current position of the mobile device (indicated by icon 930). Rather, in one implementation, the mobile device may be adapted to display a fixed portion of the gaming environment in GUI

1051, and to display the current position of the mobile device (e.g., 1030) relative to the displayed portion of gaming environment. As the user moves around the casino floor with the mobile device, the position of icon 1030 (representing the mobile device) will dynamically change to reflect its current position relative to other displayed objects of
5 the gaming environment.

Additionally, in at least one implementation, the mobile device may be adapted to allow the user to scroll, pan, navigate or otherwise change the portion of gaming environment being displayed in GUI 1051 via at least one user input device. For example, using navigation buttons, the user may navigate across different sections of
10 the casino to view desired portions of the casino floor and/or other regions of the casino. According to a specific embodiment, if the mobile device is not within the selected portion of gaming environment being displayed in GUI 1051, additional may be included in GUI 1051 to indicate, for example, the relative direction and distance to the mobile device.

15 Figure 11 shows an alternate embodiment of a mobile device 1100 which may be used for implementing various aspects of at least one embodiment. As shown in Figure 11, the portion of gaming environment displayed in GUI 1151 is set to a different zoom level in order to display more of the surrounding area, as compared, for example, to GUI 1051 of Figure 10.

20 In at least one implementation, the representation of the gaming environment displayed in GUI 1151 may include information which has been filtered and/or customized based on a variety of different filter parameters such as those described herein and/or other filter parameters which are commonly know to one having ordinary skill in the art. For example, as illustrated in the example of Figure 11, the information
25 displayed in GUI 1151 may include:

- Objects representing individual gaming machines and/or banks of gaming machines (e.g., 1106, 1108).
 - Objects representing game tables (e.g., craps tables 1104, blackjack tables 1102) and/or other non-electronic game play stations.
 - Labels for use in identifying different objects displayed in GUI 1151.
 - Objects representing mobile devices (e.g., 1130, 1133, 1131).
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At least a portion of the different filter parameters may be displayed to the user, for example, via auxiliary display 1120 and GUI 1153. Thus, for example, as shown at 1122, the user is provided with information relating to enabled and/or disabled filter parameters which are being used (or not being used) for generating the filtered information displayed in GUI 1151. In this particular example, the displayed filter parameters shown at 1122 indicate the following with regard to the information displayed in GUI 1151:

- The information displayed within GUI 1151 represents a fixed portion of the gaming environment corresponding to “Sector 8” of the casino floor. In this embodiment, the mobile device is adapted to display a fixed portion of the gaming environment in GUI 1151, and to display the current position of the mobile device (e.g., 1130) relative to the displayed portion of gaming environment. As the user moves around the casino floor with the mobile device, the position of icon 1130 (representing the mobile device 1100) will dynamically change to reflect its current position relative to other displayed objects of GUI 1151.
- The information displayed within GUI 1151 is rendered as a 2-dimensional representation of the gaming environment.
- A “Display Labels” feature is enabled to allow label information to be included in the information displayed in GUI 1151.
- A “Display Other MDs” feature has been enabled, which allows information relating to other MDs (e.g., 1131, 1133) to be displayed or represented in GUI 1151.
- A “Display Persons” feature has been disabled, which prevents information relating to persons located in the displayed gaming environment (e.g., players, casino employees, etc.) from being displayed or represented in GUI 1151.
- The portion of the gaming environment displayed in GUI 1151 corresponds to a relative Zoom Factor of 5.

In at least one implementation, at least a portion of the filter parameters may be selected and/or configured by the user. For example, in one implementation, the user may select the displayed “Modify Display Features” button 1124 to activate a GUI (not

shown) which enables the user to select, modify, activate and/or deactivate desired parameters associated with the information being displayed on primary display 1110 and/or auxiliary display(s) 1120.

Figure 12 shows an alternate embodiment of a mobile device 1200 which may be used for implementing various aspects of at least one embodiment.

In at least one implementation, the representation of the gaming environment displayed in GUI 1251 may include information which has been filtered and/or customized based on a variety of different filter parameters such as those described herein and/or other filter parameters which are commonly known to one having ordinary skill in the art. For example, as illustrated in the example of Figure 12, the information displayed in GUI 1251 may include:

- Objects and/or text representing persons and/or players in the gaming environment, such as, for example, players (e.g., 1201, 1203, 1209, etc.), casino employees (e.g., Casino Attendant (C.A) 1231, Pit Boss (P.B.) 1233, Bar Tender (B.T.) 1235, etc.), etc.
- Labels for use in identifying different objects displayed in GUI 1251.
- Objects representing mobile devices (e.g., 1230).

At least a portion of the different filter parameters may be displayed to the user, for example, via auxiliary display 1220 and GUI 1253. Thus, for example, as shown at 1222, the user is provided with information relating to enabled and/or disabled filter parameters which are being used (or not being used) for generating the filtered information displayed in GUI 1251. In this particular example, the displayed filter parameters shown at 1222 indicate the following with regard to the information displayed in GUI 1251:

- The information displayed within GUI 1251 has been modified to highlight or otherwise identify “Hot Players” (e.g., 1201, 1202, 1205) and/or “Cold Players” (e.g., 1211) in the displayed gaming environment which meet predetermined criteria, conditions, and/or rules. For example, one display property/filter may be implemented to identify players in the vicinity of the mobile device who have wagered more than \$500 within the past hour. In one implementation, such identified players may be represented in GUI 1251 using a particular icon, object, color and/or shape. Another display

property/filter may be implemented to identify players in a selected region of the casino who may need assistance and/or education in game play or wagering. In one implementation, such identified players may be represented in GUI 1251 using a different icon, object, color and/or shape. Additionally, as shown in the example of Figure 12, anonymous or uncarded players (e.g., 1202) may also be identified and/or highlighted which meet the specified filter criteria.

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- The information displayed within GUI 1251 has been modified to identify selected casino employees (e.g., 1231, 1233, 1235) who are located in the displayed gaming environment. For example, as illustrated in the example of Figure 12, GUI 1251 has been adapted to display representations of Casino Attendants, Pit Bosses, Cocktail Hostesses, and has been further adapted to not display representations of Dealers.
- The information displayed within GUI 1251 is centered around the current position of the mobile device, represented as object 1230 in GUI 1251.
- The information displayed within GUI 1251 is rendered as a 2-dimensional representation of the gaming environment.
- The portion of the gaming environment displayed in GUI 1251 corresponds to a relative Zoom Factor of 2.

In at least one implementation, at least a portion of the filter parameters may be selected and/or configured by the user. For example, in one implementation, the user may select one or more of the displayed filter parameters (e.g., by tapping the touchscreen on the box icon associated with the filter parameter to be modified) to activate a GUI (not shown) which enables the user to select, modify, activate and/or deactivate the selected filter parameter(s) associated with the display of information on primary display 1210 and/or auxiliary display(s) 1220.

In an alternate embodiment as shown, for example, in Figure 18, auxiliary display 1820 may be used for displaying additional information relating to one or more selected objects of the gaming environment. For example, it is assumed in the example of Figure 18 that the user desires to view additional information relating to a particular player (e.g., John Smith) at gaming machine 1802. According to different embodiments, the user may select desired objects displayed in GUI 1851 via different

input mechanisms such as, for example, cursors (e.g., 1804), touchscreens, keypads, etc. In at least one implementation, when the user selects a particular object (e.g., object 1802), the object may be highlighted, and additional information relating to the selected object may be displayed, for example, on primary display 1810 and/or auxiliary display 1820. In the example of Figure 18, additional information relating to the selected player, John Smith, is displayed at auxiliary display 1820. Such additional information may include, for example: player profile information (e.g., player name, player tracking ID, address, contact information, photo, etc.); player membership information; player preference information; player tracking information (e.g., arrival dates, departure dates, games played, etc.); session information (e.g., length of current gaming session); coins, cash, and/or credits wagered; coins, cash, and/or credits won; money the player has spent at casino owned stores; etc.

In at least one implementation, the mobile device 1800 may also be adapted to allow the user to view additional information about other selected persons and/or devices which may be displayed in the gaming environment such as, for example: casino employees (e.g., dealers, attendants, hosts, security, maintenance, cocktails, drops, pit bosses, etc.); vendors; mobile devices; security devices; gaming devices; etc. Depending upon the characteristics of the object which has been selected by the user, various detailed information relating to the selected object may be displayed on primary display 1210 and/or auxiliary display(s) 1220. Such detailed information may include, for example:

- Employee profile information;
- Employee work schedule information;
- Employee contact information;
- Position/location information relating to the selected object(s);
- Communication information (e.g., type of wireless communication interface, signal strength, etc.);
- Gameplay statistics for each game type, or machine, or user;
- Player information;
- etc.

Figure 13 shows an alternate embodiment of a mobile device 1300 which may be used for implementing various aspects of at least one embodiment.

In at least one implementation, the representation of the gaming environment displayed in GUI 1351 may include information which has been filtered and/or customized based on a variety of different filter parameters such as those described herein and/or other filter parameters which are commonly known to one having ordinary skill in the art. For example, as illustrated in the example of Figure 13, the information displayed in GUI 1351 may include information relating to desired characteristics associated with gaming machines and/or other objects in the displayed gaming environment. For example, as shown in Figure 13, representations of individual gaming machines (e.g., 1311, 1303, etc.) may be displayed which include information relating to the identity of the gaming machine(s) (e.g., 1302), and/or various information relating to the status of the gaming machine(s). Such gaming machine status information may include one or more of the following: hopper status information; drop box status information (e.g., 1304); game play information; jackpot information; bonus game information; machine settings (e.g. volume, display settings); meter information; etc.

At least a portion of the different filter parameters may be displayed to the user, for example, via auxiliary display 1320 and GUI 1353. Thus, for example, as shown at 1322, the user is provided with information relating to enabled and/or disabled filter parameters relating to the filtered/customized information displayed in GUI 1351. In this particular example, the displayed filter parameters shown at 1322 indicate the following with regard to the information displayed in GUI 1351:

- The information displayed within GUI 1351 has been modified to include drop box status information (e.g., 1304). As shown in the example of Figure 13, the drop box status information includes a value which provides an estimate of used (or remaining) drop box capacity.
- The information displayed within GUI 1351 has been modified to highlight or otherwise identify gaming machines which require drop box servicing. For example, in one implementation, a gaming machine may be highlighted (e.g., as shown at 1301, 1303, and 1305), if its corresponding drop box capacity value (e.g., 1304) exceeds 80%.
- The information displayed within GUI 1351 has been modified to not include objects representing casino employees or players.

- The information displayed within GUI 1351 is “user scrollable” for allowing a user to scroll, pan, navigate, or otherwise change the portion of gaming environment being displayed in GUI 1351. Additionally, as illustrated in Figure 13, the user may chose to re-center the displayed gaming environment on the current location of the mobile device (represented at 5 1330) by clicking or selecting the “Re-Center on MD” button 1324.

In at least one implementation, at least a portion of the filter parameters may be selected and/or configured by the user. For example, in one implementation, the user may select one or more of the displayed filter parameters (e.g., by tapping the 10 touchscreen on the box icon associated with the filter parameter to be modified) to activate a GUI (not shown) which enables the user to select, modify, activate and/or deactivate the selected filter parameter(s) associated with the display of information on primary display 1310 and/or auxiliary display(s) 1320.

In an alternate embodiment as shown, for example, in Figure 19, auxiliary 15 display 1920 may be used for displaying additional information relating to one or more selected objects of the gaming environment. For example, it is assumed in the example of Figure 19 that the user desires to view additional information relating to Gaming Machine ID# 1710 (object 1902). According to different embodiments, the user may select desired objects displayed in GUI 1951 via different input mechanisms such as, 20 for example, cursors (e.g., 1904), touchscreens, keypads, etc. In at least one implementation, when the user selects a particular object (e.g., object 1902), the object may be highlighted, and additional information relating to the selected object may be displayed, for example, on primary display 1910 and/or auxiliary display 1920. In the example of Figure 19, the additional information relating to selected gaming machine 25 ID# 1710 is displayed in auxiliary display 1920. Such additional information may include, for example: total coins, cash, and/or credits in; total coins, cash, and/or credits paid out; relative coins, cash, and/or credits returned to player; drop box status; game play information (e.g., current game being played, available games, etc.); machine settings (e.g. volume, display settings); meter information; etc.

30 Further, in at least one implementation, the mobile device 1900 may be adapted to allow the user to initiate a variety of other actions and/or responses based upon the information displayed to the user via the mobile device. For example, as shown in

Figure 19, an interface (e.g., GUI button 1922) may be provided for allowing the user to remotely disable the selected gaming machine (or other selected device). Additionally, as shown in Figure 19, another interface (e.g., GUI button 1923) may be provided for allowing the user to notify a casino attendant (and/or other persons and/or remote systems) about one or more conditions relating to the selected gaming machine (or other selected device).

Figure 14 shows an alternate embodiment of a mobile device 1400 which may be used for implementing various aspects of at least one embodiment. As shown in the example of Figure 14, GUI 1451 includes customized/filtered information (e.g., 1403) for providing instructions/directions to allow the user to navigate to a selected object (e.g., person, device, general area of the casino and/or other object) in the casino. For example, it is assumed in the example of Figure 14 that desires to the mobile device to determine and display the shortest route (by foot) to gaming machine 1401, based upon the current position of the user (1430). In this particular example, the mobile device 1400 may be adapted to display textual and/or graphical navigation/routing information (e.g., 1403) relating to the shortest route (by foot) from mobile device 1430 to gaming machine 1401. Additionally, as illustrated in Figure 14, the destination location or object (e.g., 1401) may be highlighted or otherwise identified for reference purposes.

Additionally, as shown at 1422, the user is provided with information relating to enabled and/or disabled filter parameters which are being used (or not being used) for generating the filtered information displayed in GUI 1451. In this particular example, the displayed filter parameters shown at 1422 indicate the following with regard to the information displayed in GUI 1451:

- The information displayed within GUI 1451 includes navigation and/or routing information for facilitating the user in navigating regions of the casino.
- The displayed navigation and/or routing information represents a relatively “shortest path” which the user may use to get to the desired destination from the user’s present location. In at least one implementation, such navigation and/or routing information may be generated using one or more navigation and/or routing filtering parameters such as, for example: line-of-sight filter parameters (e.g., for displaying objects which are within a direct line of sight

from the user's current position), path selection filter parameters (e.g., shortest walking path, fastest path, etc.).

In at least one implementation, at least a portion of the filter parameters may be selected and/or configured by the user. For example, in one implementation, the user
5 may select the displayed "Update Route" button 1426 in order to obtain updated navigation and/or routing information. Additionally, as shown in Figure 14, GUI 1451 may also include descriptive information (e.g., 1402) which describes at least a portion of the information being displayed.

Figure 15 shows an alternate embodiment of a mobile device 1500 which may
10 be used for implementing various aspects of at least one embodiment.

In at least one implementation, the representation of the gaming environment displayed in GUI 1551 may include information which has been filtered and/or customized based on a variety of different filter parameters such as those described herein and/or other filter parameters which are commonly know to one having ordinary
15 skill in the art. For example, as illustrated in the example of Figure 15, the information displayed in GUI 1551 may include information relating to desired characteristics associated with gaming machines (e.g., 1515), players (e.g., 1513), devices (e.g., 1535), game tables (e.g., 1502, 1504) and/or other objects in the displayed gaming environment. For example, as shown in Figure 15, representations of individual game
20 tables (e.g., 1502, 1504, etc.) may be displayed which include information relating the gaming activities being conducted at such game tables. Such gaming activity information may include one or more of the following: game table ID; type of game; betting limits; casino employee information (e.g., dealer, croupier, etc.); betting information; financial information (e.g., monies wagered, amounts collected, amounts
25 paid out, etc.); game play information; player tracking information; timestamp information; game scheduling information (e.g. keno); etc. Additionally, as shown in Figure 15, representations of individual casino employees (e.g., casino croupiers 1531, 1533) may also be displayed.

According to at least one implementation, the mobile device may be adapted to
30 display a second GUI (e.g., GUI 1553) which may also present filtered/customized information to the user. For example, as shown in the embodiment of Figure 15, auxiliary display 1520 is adapted to display GUI 1553 which includes a graphical

representation of a casino gaming environment. In this particular example, the casino gaming environment represented in GUI 1553 corresponds to an overhead “overview map” of a portion of a casino floor. As illustrated, the overview map illustrated in GUI 1553 includes box 1525 which corresponds to that portion of the casino floor which is
5 illustrated in greater detail in GUI 1551 of primary display 1510. Additionally, GUI 1553 includes representations of other portions of the casino floor which are adjacent to the portion of the casino floor represented within box 1525. Such visual information allows of the user to quickly determine his or her current position relative to other regions/objects of the casino floor which are not displayed within primary display 1510.
10 In at least one implementation, the mobile device may be adapted to swap, rotate, and/or otherwise modify the GUIs displayed on the primary and auxiliary displays in response to appropriate input from the user.

Figures 16 and 17 show alternate embodiments of mobile devices which may be used for implementing various aspects of at least one embodiment. In the examples of
15 Figures 16 and 17, the mobile devices of at least one embodiment have been adapted to include communication and/or messaging functionality for permitting wireless voice and/or data communication with other devices. In at least one implementation, the mobile device of at least one embodiment may be adapted to include functionality for enabling the mobile device to be used as a wireless telephone device, a two-way radio
20 device, a text messaging device, an email device, and/or any combination thereof.

In the embodiment of Figure 16, it is assumed that a wireless text message has been sent from Mobile Device 12 (1622) to the mobile device 1600 of Figure 16. In one implementation, the mobile device at 1600 may be adapted to automatically display information relating to the identity and/or location (e.g., 1622) of the
25 device/user which sent the message. In addition, the mobile device may be configured to generate audio, visual, and or tactile (e.g., vibrate) cues to alert the user of mobile device 1600 that a message has been received.

Upon receiving the message, mobile device of 1600 may process and display the received message to the user via display 1610 and/or display 1620, for example. For
30 example, as illustrated in Figure 16, a pop-up window may appear within GUI 1651 for displaying information (e.g., 1607) relating to the received message. The pop-up window may also display other customized features or objects (e.g., buttons 1603,

1605) for allowing the user to initiate one or more actions based upon the received message. In one implementation, the customized features/objects which are displayed to the user may be dynamically determined based upon information relating to the received message such as, for example: message content, time/date, location, type of
5 device which sent the message, information relating to a person or entity which sent the message, etc.

For example, in one implementation, the user of mobile device 1600 may select the Reply button 1605 in order to compose a reply message to be sent to Mobile Device 12. An example of this is illustrated in Figure 17 of the drawings.

10 In the example of Figure 17, it is assumed that the user of mobile device 1700 desires to compose a message to be sent to Mobile Device 12. According to one embodiment, the mobile device 1700 may be adapted to display a "Compose Message" window 1711 to the user in order facilitate the user in composing, generating and/or sending a message to one or more selected remote device(s). Additionally, as
15 illustrated in the embodiment of Figure 17, a user input window (e.g., 1740) may be displayed to the user for facilitating the user in composing, generating and/or sending the message. In this particular embodiment, the user input window 1740 includes an electronic touchscreen keyboard for facilitating the user in composing a text message. In at least one implementation, the user may also be presented with an option for
20 inserting preset or preconfigured messages. Further, it will be appreciated that alternate embodiments may include other types of user input devices such as, for example, a keyboard, key pad, voice-to-text component and/or other types of suitable user input devices.

According to at least one implementation, the mobile device may be adapted to
25 display a second GUI (e.g., GUI 1753) which may also present filtered/customized information to the user. For example, as shown in the embodiment of Figure 17, auxiliary display 1720 is adapted to display GUI portion 1722 which enables the user to select and/or view various types of information such as, for example: messaging information (e.g., inbox, outbox, missed alerts, etc.), drop service information, gaming
30 information (e.g., jackpots, bonus games, etc.), security information, etc. Additionally, as shown in the embodiment of Figure 17, auxiliary display 1720 may be adapted to display GUI portion 1724 which enables the user to view a message digest or message

log. In at least one implementation, the information displayed in auxiliary display 1720 may be automatically and dynamically customized and/or filtered based upon specified parameters such as, for example, the current position or geolocation of the mobile device 1700 and/or user.

- 5 It will be appreciated that the features and/or functionalities of the mobile devices described herein represent only an exemplary portion of a wide variety of features and/or functionalities which may be available using one or more of the techniques described herein. In addition to the features/functionalities of the mobile devices described above, other embodiments of the mobile device of at least one
- 10 embodiment may include one or more of the following features and/or functionalities:
- Functionality for enabling notification of alerts from a pager (or other device) to the mobile device. For example, if a particular casino employee is not answering a page, an alert may automatically be sent to the mobile device currently being used by the appropriate supervisor.
 - 15 • Functionality for enabling receipt of notification of desired events and/or for initiating responses to selected events such as, for example:
 1. Change light button pushed more than n times (where n may be configured).
 2. Excessive hopper fills.
 - 20 3. Illegal door open.
 4. Ticket printer out of paper.
 5. Hopper empty.
 6. Jackpot pending.
 7. Validator not working - notice for repair
 - 25 • Functionality for enabling selection of desired gaming machine event(s) and/or for tracking issues or problematic gaming machines.
 - Functionality for enabling issue of Player Club Cards from the mobile device.
 - Functionality for enabling issue of Player Comps from the mobile device.
 - 30 • Functionality for enabling Casino Host to identify and obtain additional information about important persons and/or other selected persons on the gaming floor.

- Functionality for enabling the tracking of casino employee activities, and to generate and/or transmit instructions to such employees in real time.
- Functionality for accepting and paying out funds for a gaming session.
- Functionality for enabling communication between MD users.
- 5 • Functionality for displaying and modifying player tracking information, and monitoring player statistics.

Additional details relating to various aspects of gaming technology are described in at least the following references, each of which is incorporated herein by reference in its entirety for all purposes:

10 U.S. Patent Application Serial Number 09/746,944, which is now U.S. Patent No. 6,645,077, issued November 11, 2003 (Attorney Docket No. IGT1P042/P-392) entitled "GAMING TERMINAL DATA REPOSITORY AND INFORMATION DISTRIBUTION SYSTEM", by Richard E. Rowe, filed on December 21, 2000;

15 U.S. Provisional Patent Application No. 60/242,046, filed October 19, 2000, naming Richard E. Rowe as inventor, and titled "GAMING TERMINAL DATA REPOSITORY AND INFORMATION DISTRIBUTION SYSTEM";

20 U.S. Patent Application Serial No. 10/259,998 (Attorney Docket No. IGTP129X1/P-714CIP) entitled "METHOD AND APPARATUS FOR GRAPHICALLY PORTRAYING GAMING ENVIRONMENT AND INFORMATION REGARDING COMPONENTS THEREOF" by Foss et al., filed on September 26, 2002;

25 U.S. Patent Application Ser. No. 09/965,785, filed Sep. 27, 2001, entitled "METHOD AND APPARATUS FOR GRAPHICALLY PORTRAYING GAMING ENVIRONMENT AND INFORMATION REGARDING COMPONENTS THEREOF";

U.S. Patent Application Serial Number 10/115,164, which is now U.S. Patent No. 6,800,029, issued October 5, 2004, (Attorney Docket No. IGT1P032X1/P-267CIP2) entitled "GAMING ENVIRONMENT INCLUDING PORTABLE TRANSACTION DEVICES", by Rowe et al.;

30 U.S. Patent Application Ser. No. 09/544,884, filed April 7, 2000, and entitled "WIRELESS GAMING ENVIRONMENT";

U.S. Patent Application No. 09/921,489 (Atty. Docket No. IGT1P060/P-568), filed August 3, 2001, which is now U.S. Patent No. 6,908,387, entitled PLAYER TRACKING COMMUNICATION MECHANISMS IN A GAMING MACHINE, by inventors HEDRICK et al.;

5 U.S. Patent Application No. 10/246,373 (Atty. Docket No. IGT1P060X1/P-568CIP), filed September 16, 2002, entitled PLAYER TRACKING COMMUNICATION MECHANISMS IN A GAMING MACHINE, by inventors HEDRICK et al.;

10 U.S. Patent Application No. 10/661,404 (Atty. Docket No. IGT1P060X2/P-568CIP2), filed September 11, 2003, entitled WIRELESS INPUT/OUTPUT AND PERIPHERAL DEVICES ON A GAMING MACHINE, by inventors Silva et al.;

U.S. Patent Application No. 10/903,024 (Atty. Docket No. IGT1P060X3/P-568CIP3), filed July 30, 2004, entitled PLAYER TRACKING COMMUNICATION MECHANISMS IN A GAMING MACHINE, by inventors HEDRICK et al.; and

15 U.S. Patent Application No. 11/094,943 (Atty. Docket No. IGT1P060X4/P-568CIP4), filed March 30, 2005, entitled PLAYER TRACKING COMMUNICATION MECHANISMS IN A GAMING MACHINE, by inventors HEDRICK et al.

Other Embodiments

Various aspects of at least one embodiment are directed to different methods, devices, systems, and computer program products for displaying filtered casino-related information on a mobile device. At least some embodiments may include a mobile device which includes at least one interface operable to provide a wireless communication link to other network device in a casino data network. According to various embodiments, casino information relating to various casino activities may be acquired by the mobile device and/or other devices in the casino network. Geolocation information relating to a current location of the mobile device may also be acquired. A first set of filter parameters may be identified and/or generated for use in generating filtered casino information. Filtered casino information may be generated by applying the first set of filter parameters and geolocation information to the acquired casino information. At least a portion of the filtered information may be displayed to a user via a display at the mobile device. According to a specific embodiment, at least a

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portion of the filtered information may be generated based upon a current location of the mobile device. In one implementation, the displayed filtered information may include a first graphical user interface (GUI) adapted to display a graphical representation of a portion of an actual gaming environment. Additionally, in at least
5 one embodiments, the acquired casino information may include real-time data relating to casino gaming activities.

According to specific embodiments, the filtered information displayed at the mobile device may include a first graphical user interface (GUI) adapted to display representations of objects which are within a predetermined distance from the mobile
10 device. The first graphical user interface (GUI) may be further adapted to not display representations of objects which are not within a predetermined distance from the mobile device.

According to various implementations, various types of filter parameters may be used for generating customized, filtered information to be displayed at the mobile
15 device. Examples of such filter parameters may include: filter parameters relating to casino gaming machine data, filter parameters relating to casino player tracking data, filter parameters relating to casino employee data, filter parameters relating to casino gaming system alerts, filter parameter relating to casino gaming events, etc.

In at least one embodiment, a graphical representation of a selected portion of a
20 physical gaming environment may be generated. The graphical representation may include graphical objects representing one or more physical components of the gaming environment. A first portion of the graphical representation may be displayed at one or more displays of the mobile device. In one implementation, the first portion of the graphical representation may include one or more displayed objects representing one or
25 more of the physical components which are located in the selected portion of the of the gaming environment. Further in at least one implementation, the first portion of the graphical representation may include one or more displayed objects representing one or more portions of an actual physical environment of the selected gaming environment. Examples of such objects may include: gaming machines; game tables; players; casino
30 employees; walls; hallways; fixtures; lights; signage; doors; flooring; type of flooring; floor coverings; floor covering designs; wall coverings; etc.

In at least one embodiment, the displayed filtered information may include a first graphical user interface (GUI) adapted to display a graphical representation of a portion of an actual gaming environment. In at least one embodiment, the acquired casino information may include real-time data relating to casino gaming activities. In at least one embodiment, the displayed filtered information may include a first graphical user interface (GUI) adapted to display representations of objects which are within a predetermined distance from the mobile device, and the first graphical user interface (GUI) may be adapted to not display representations of objects which are not within a predetermined distance from the mobile device. In at least one embodiment, the first set of filter parameters may include a first filter parameter relating to casino gaming machine data, and at least one embodiment may be operable to generate, using the first filter parameter and the geolocation information, a first portion of filtered information, and display the first portion of filtered information on the first display. In one embodiment, the first portion of filtered information may include information relating to a first portion of casino gaming machine data which has been selected based on the geolocation information. In at least one embodiment, the first portion of casino gaming machine data may include gaming machine drop box status information. In at least one embodiment, the first set of filter parameters may include a first filter parameter relating to casino player tracking data, and at least one embodiment may be operable to generate, using the first filter parameter and the geolocation information, a first portion of filtered information, and display the first portion of filtered information on the first display. In one embodiment, the first portion of filtered information may include information relating to a first portion of casino player tracking data which has been selected based on the geolocation information. In one embodiment, the first portion of casino player tracking data may include player status information. In at least one embodiment, the first set of filter parameters may include a first filter parameter relating to casino employee data, and at least one embodiment may be operable to generate, using the first filter parameter and the geolocation information, a first portion of filtered information, and display the first portion of filtered information on the first display. In one embodiment, the first portion of filtered information may include information relating to a first portion of casino employee data which has been selected based on the geolocation information. In at least one embodiment, the first set of filter parameters

may include a first filter parameter relating to casino gaming system alerts, and at least one embodiment may be operable to generate, using the first filter parameter and the geolocation information, a first portion of filtered information, and display the first portion of filtered information on the first display. In one embodiment, the first portion of filtered information may include information relating to a first portion of casino gaming system alerts which has been selected based on the geolocation information. In at least one embodiment, the first set of filter parameters may include a first filter parameter relating to casino gaming events, and at least one embodiment may be operable to generate, using the first filter parameter and the geolocation information, a first portion of filtered information, and display the first portion of filtered information on the first display. In one embodiment, the first portion of filtered information may include information relating to a first portion of casino gaming events which have been selected based on the user identity information. In at least one embodiment the mobile device may be adapted to generate at least a portion of the filtered information. At least one embodiment may include a first server which may be operable to generate at least a portion of the filtered information and/or to transmit, via a wireless interface, filtered information to the mobile device for display to the user.

At least one embodiment may be operable to: identify a gaming system, the gaming system including a plurality of physical components which actually exist in three-dimensional space, the plurality of components each having a relative position in the gaming system with respect to each other; generate a graphical representation of a first portion of the gaming system, said graphical representation including graphical objects representing one or more of the physical components of said gaming system; and display, in a first window of the graphical user interface, a first portion of the graphical representation; wherein the first portion of the graphical representation may include one or more displayed objects representing one or more of the physical components which are located in the first portion of the gaming system; and wherein the first portion of the graphical representation may include one or more displayed objects representing one or more portions of an actual physical environment of the first portion of the gaming system, the physical environment including at least one of: gaming machine; game table; player; and casino employee.

At least one embodiment may be operable to identify a gaming system, the gaming system including a plurality of physical components which actually exist in three-dimensional space, the plurality of components each having a relative position in the gaming system with respect to each other; generate a graphical representation of a first portion of the gaming system, said graphical representation including graphical objects representing one or more of the physical components of said gaming system; and display, in a first window of the graphical user interface, a first portion of the graphical representation; wherein the first portion of the graphical representation may include one or more displayed objects representing one or more of the physical components which are located in the first portion of the gaming system. In one embodiment, the first portion of the graphical representation may include one or more displayed objects representing one or more portions of an actual physical environment of the first portion of the gaming system, the physical environment including at least one of: walls, hallways, fixtures, lights, signage, doors, flooring, type of flooring, floor coverings, floor covering designs, and wall coverings.

Although several preferred embodiments of this invention have been described in detail herein with reference to the accompanying drawings, it is to be understood that the invention is not limited to these precise embodiments, and that various changes and modifications may be effected therein by one skilled in the art without departing from the scope of spirit of the invention as defined in the appended claims.

IT IS CLAIMED

1. A system for displaying filtered casino-related information on a mobile device, the system comprising:
 - a plurality of gaming devices, including a first gaming device; and
 - 5 a first mobile device including a first processor, memory, at least one wireless communication interface, and a first display;
 - the system being operable to:
 - acquire casino information relating to casino activities;
 - acquire geolocation information relating to a current location of the first mobile
 - 10 device;
 - determine a first set of filter parameters to be used for generating filtered information;
 - generate filtered information by applying the first set of filter parameters and geolocation information to the acquired casino information; and
 - 15 display at least a portion of the filtered information to a user via the first display.
2. The system of claim 1 wherein at least a portion of the filtered information is generated based upon a current location of the first mobile device.
- 20 3. The system of claim wherein the displayed filtered information includes a first graphical user interface (GUI) operable to display a graphical representation of a portion of an actual gaming environment.
4. The system of claim 1 wherein the acquired casino information includes
- 25 real-time data relating to casino gaming activities.
5. The system of claim 1:
 - wherein the displayed filtered information includes a first graphical user interface (GUI) operable to display representations of objects which are within a
 - 30 predetermined distance from the first mobile device; and

the first graphical user interface (GUI) being further operable to not display representations of objects which are not within a predetermined distance from the first mobile device.

5 6. The system of claim 1 wherein the first set of filter parameters includes a first filter parameter relating to casino gaming machine data, the system being further operable to:

 generate, using the first filter parameter and the geolocation information, a first portion of filtered information, the first portion of filtered information including
10 information relating to a first portion of casino gaming machine data which has been selected based on the geolocation information; and

 display the first portion of filtered information on the first display.

 7. The system of claim 6 wherein the first portion of casino gaming
15 machine data includes gaming machine drop box status information.

 8. The system of claim 1 wherein the first set of filter parameters includes a first filter parameter relating to casino player tracking data, the system being further operable to:

20 generate, using the first filter parameter and the geolocation information, a first portion of filtered information, the first portion of filtered information including information relating to a first portion of casino player tracking data which has been selected based on the geolocation information; and

 display the first portion of filtered information on the first display.

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 9. The system of claim 6 wherein the first portion of casino player tracking data includes player status information.

 10. The system of claim 1 wherein the first set of filter parameters includes a
30 first filter parameter relating to casino employee data, the system being further operable to:

generate, using the first filter parameter and the geolocation information, a first portion of filtered information, the first portion of filtered information including information relating to a first portion of casino employee data which has been selected based on the geolocation information; and

5 display the first portion of filtered information on the first display.

11. The system of claim 1 wherein the first set of filter parameters includes a first filter parameter relating to casino gaming system alerts, the system being further operable to:

10 generate, using the first filter parameter and the geolocation information, a first portion of filtered information, the first portion of filtered information including information relating to a first portion of casino gaming system alerts which has been selected based on the geolocation information; and

display the first portion of filtered information on the first display.

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12. The system of claim 1 wherein the first set of filter parameters includes a first filter parameter relating to casino gaming events, the system being further operable to:

20 determine a user identity of a user who is currently operating the first mobile device;

generate, using the first filter parameter and the user identity information, a first portion of filtered information, the first portion of filtered information including information relating to a first portion of casino gaming events which have been selected based on the user identity information; and

25 display the first portion of filtered information on the first display.

13. The system of claim 1 wherein the first mobile device is operable to generate at least a portion of the filtered information.

30 14. The system of claim 1 further comprising:
a first server;

the first server being operable to generate at least a portion of the filtered information; and

the first server being operable to transmit, via a wireless interface, filtered information to the first mobile device for display to the user.

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15. The system of claim 1 being further operable to:

generate a graphical representation of a first portion of a gaming system, the gaming system including a plurality of physical components which actually exist in three-dimensional space, the plurality of components each having a relative position in the gaming system with respect to each other, said graphical representation including graphical objects representing one or more of the physical components of said gaming system; and

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display, in a first window of the graphical user interface, a first portion of the graphical representation;

15

wherein the first portion of the graphical representation includes one or more displayed objects representing one or more of the physical components which are located in the first portion of the gaming system;

wherein the first portion of the graphical representation includes one or more displayed objects representing one or more portions of an actual physical environment of the first portion of the gaming system, the physical environment including at least one of: gaming machine; game table; player; and casino employee.

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16. The system of claim 1 being further operable to:

generate a graphical representation of a first portion of a gaming system, the gaming system including a plurality of physical components which actually exist in three-dimensional space, the plurality of components each having a relative position in the gaming system with respect to each other, said graphical representation including graphical objects representing one or more of the physical components of said gaming system; and

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display, in a first window of the graphical user interface, a first portion of the graphical representation;

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wherein the first portion of the graphical representation includes one or more displayed objects representing one or more of the physical components which are located in the first portion of the gaming system.

- 5 17. The system of claim 16 wherein the first portion of the graphical representation includes one or more displayed objects representing one or more portions of an actual physical environment of the first portion of the gaming system, the physical environment including at least one of: walls, hallways, fixtures, lights, signage, doors, flooring, type of flooring, floor coverings, floor covering designs, and wall coverings.

10

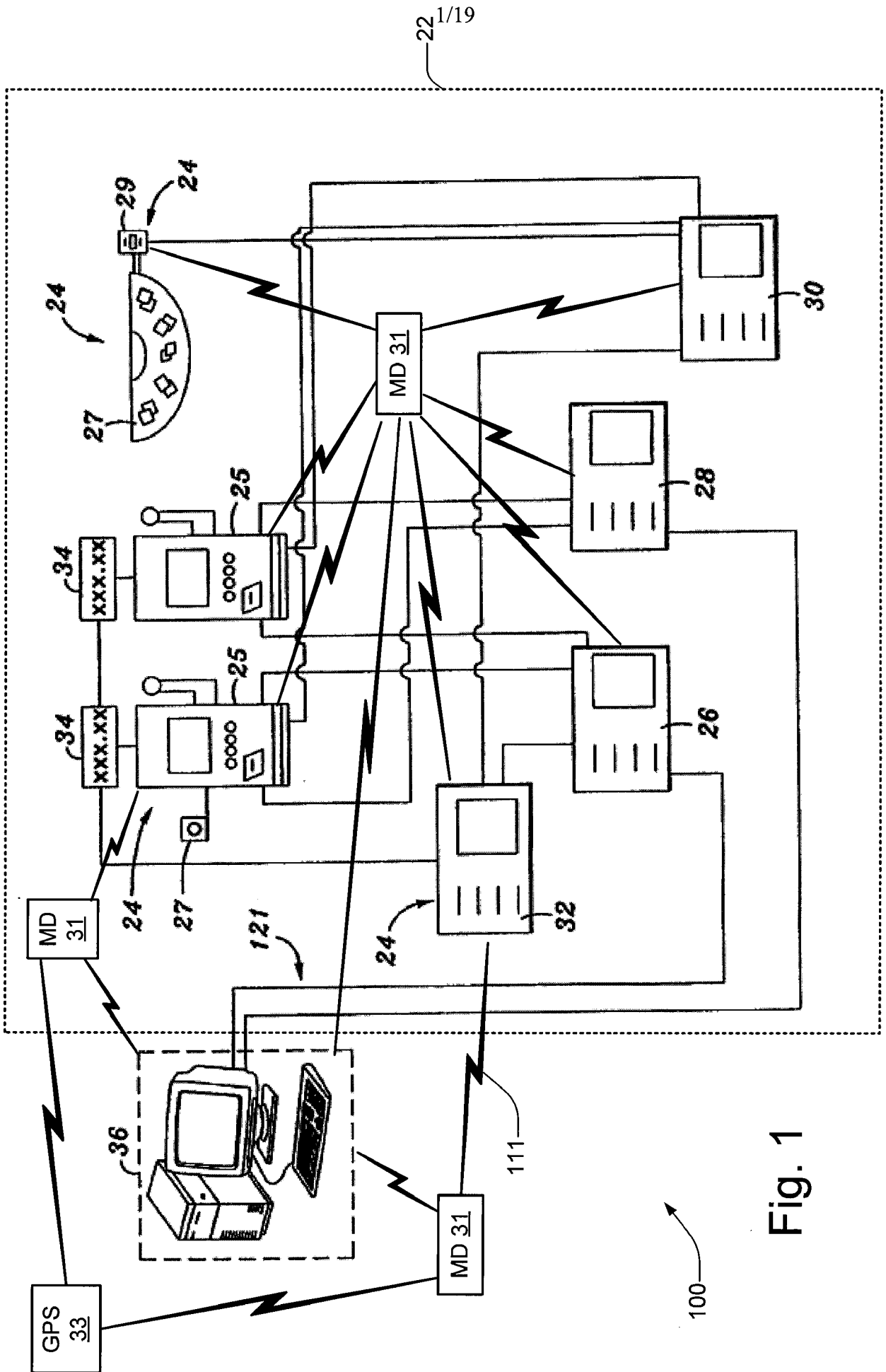


Fig. 1

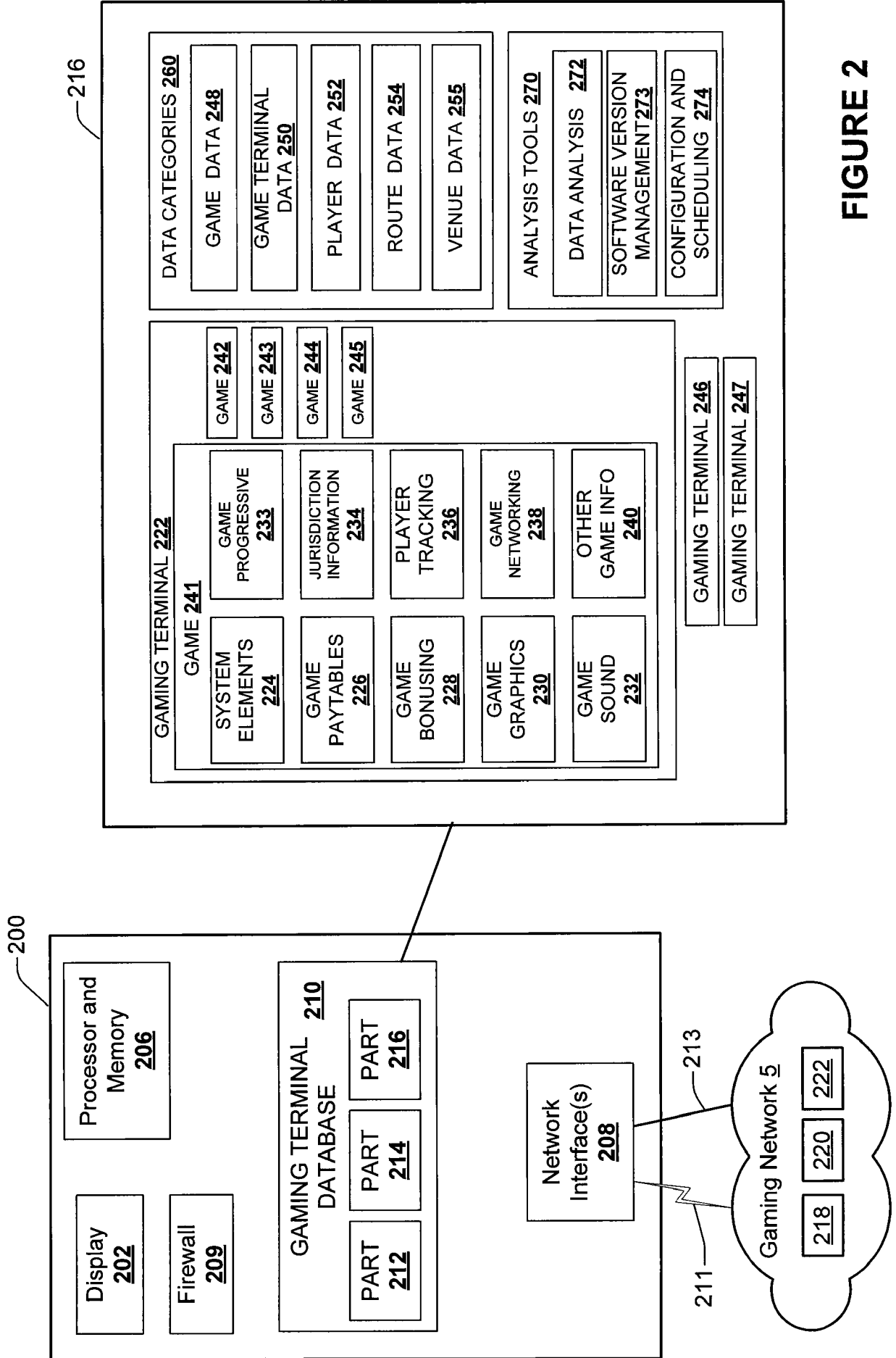
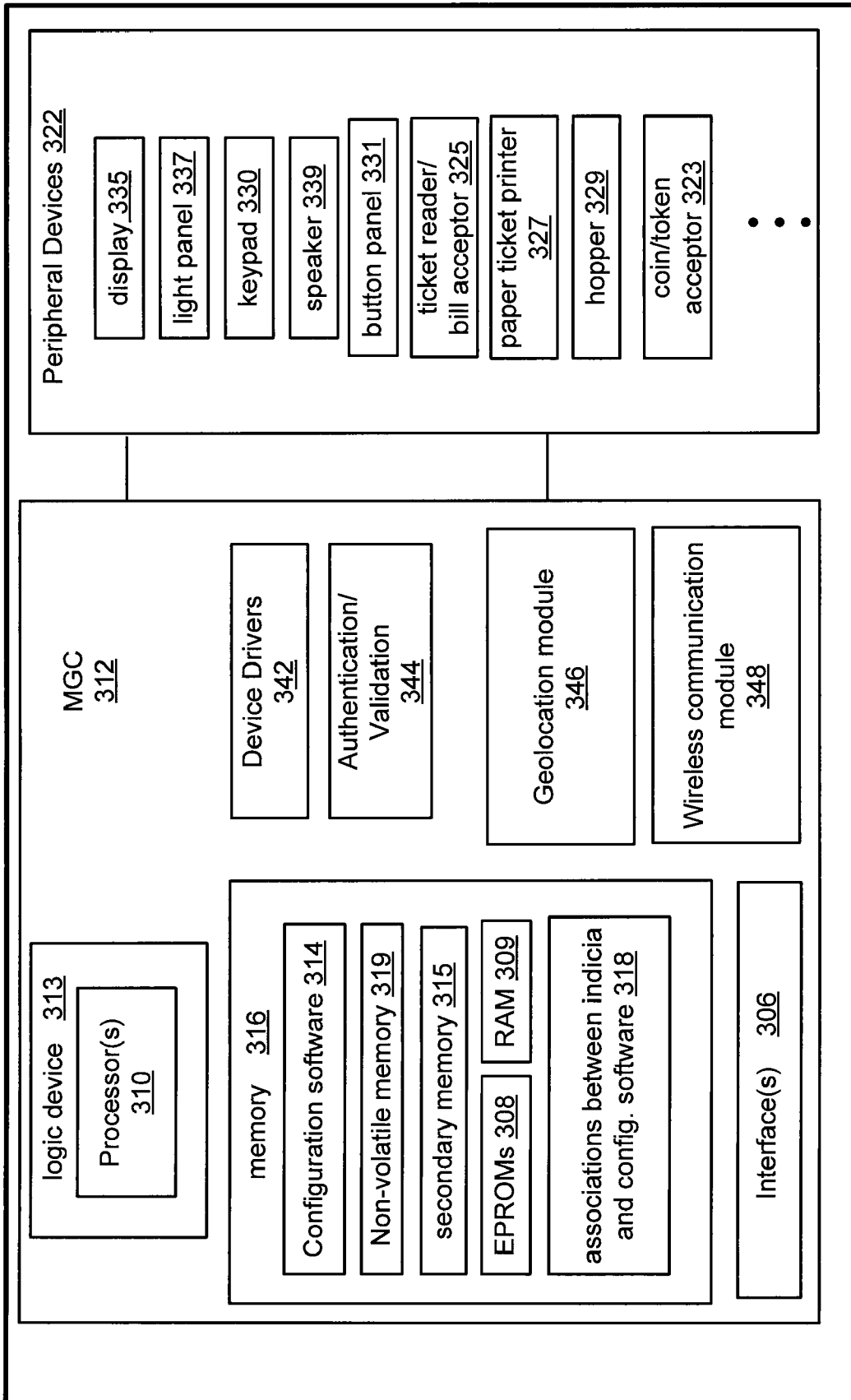


FIGURE 2



300 → FIG. 3

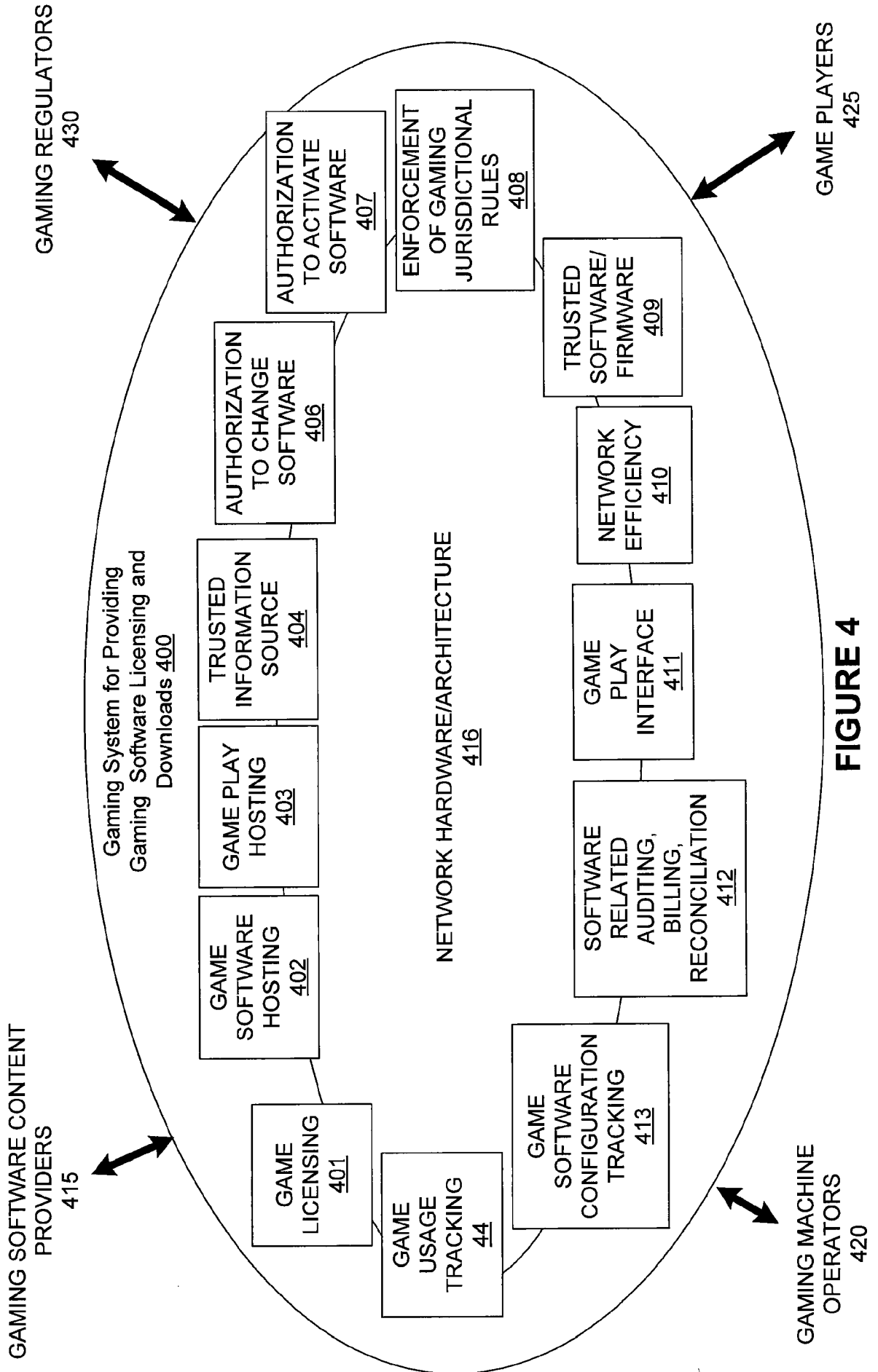
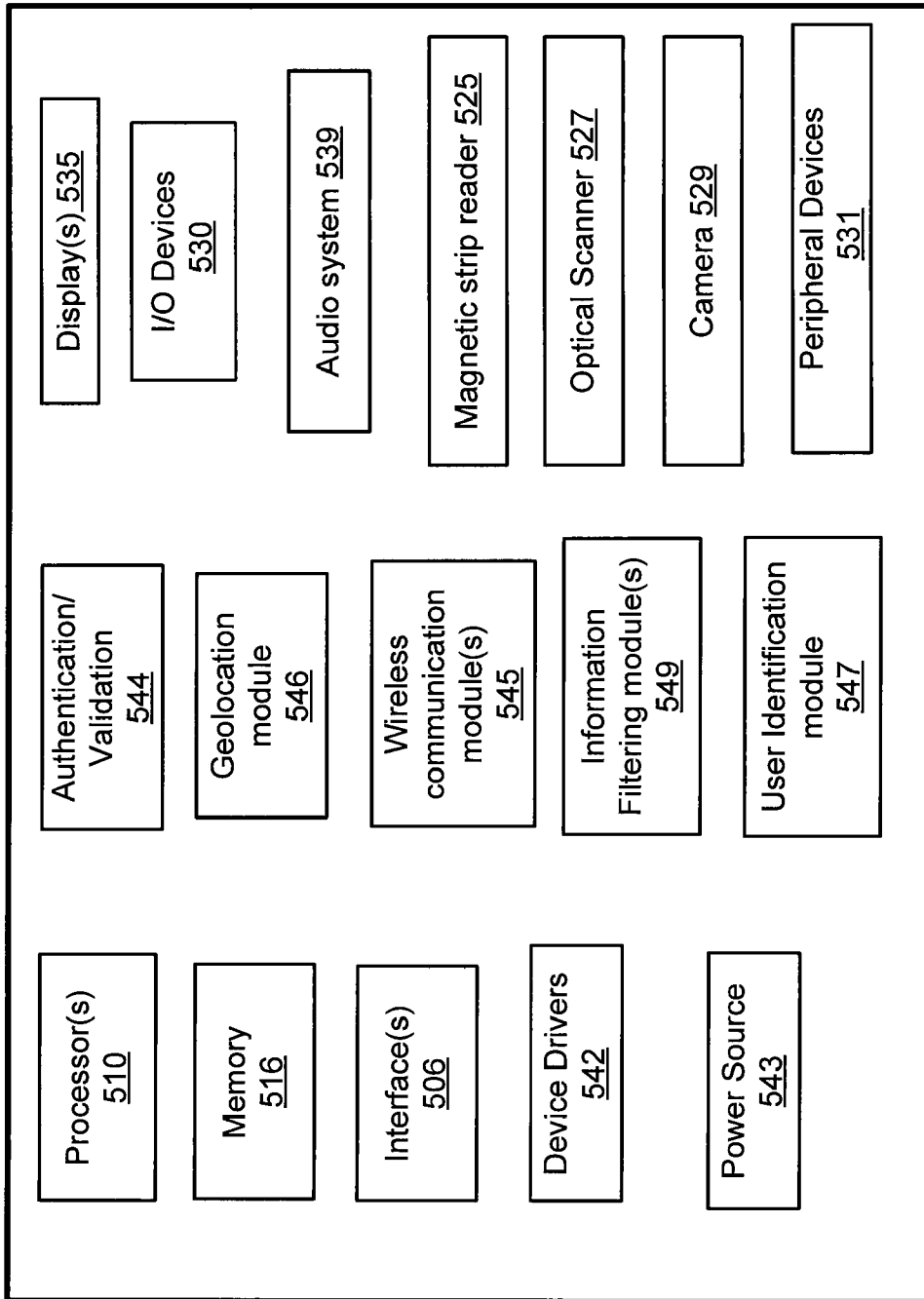


FIGURE 4



↖ 500

FIG. 5

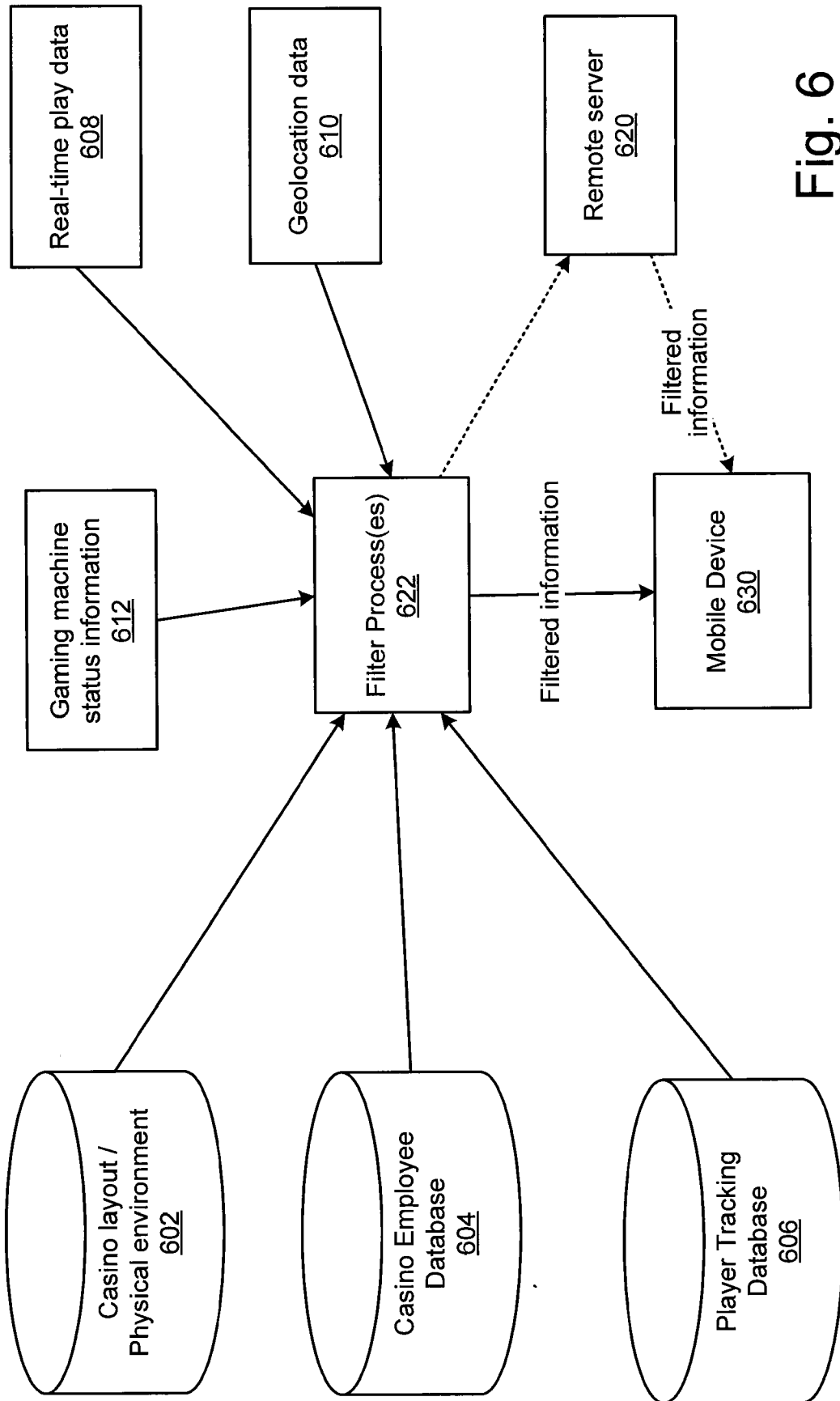


Fig. 6

600

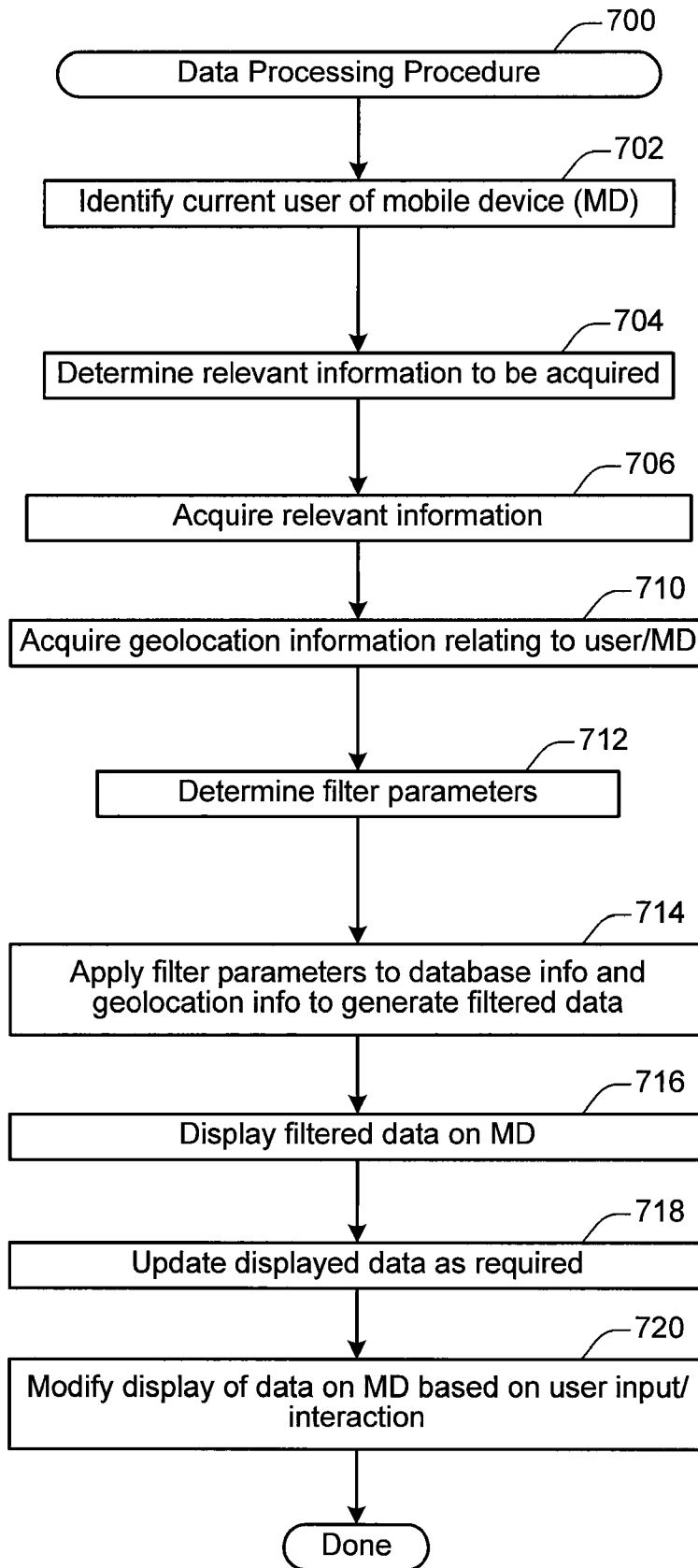


Fig. 7

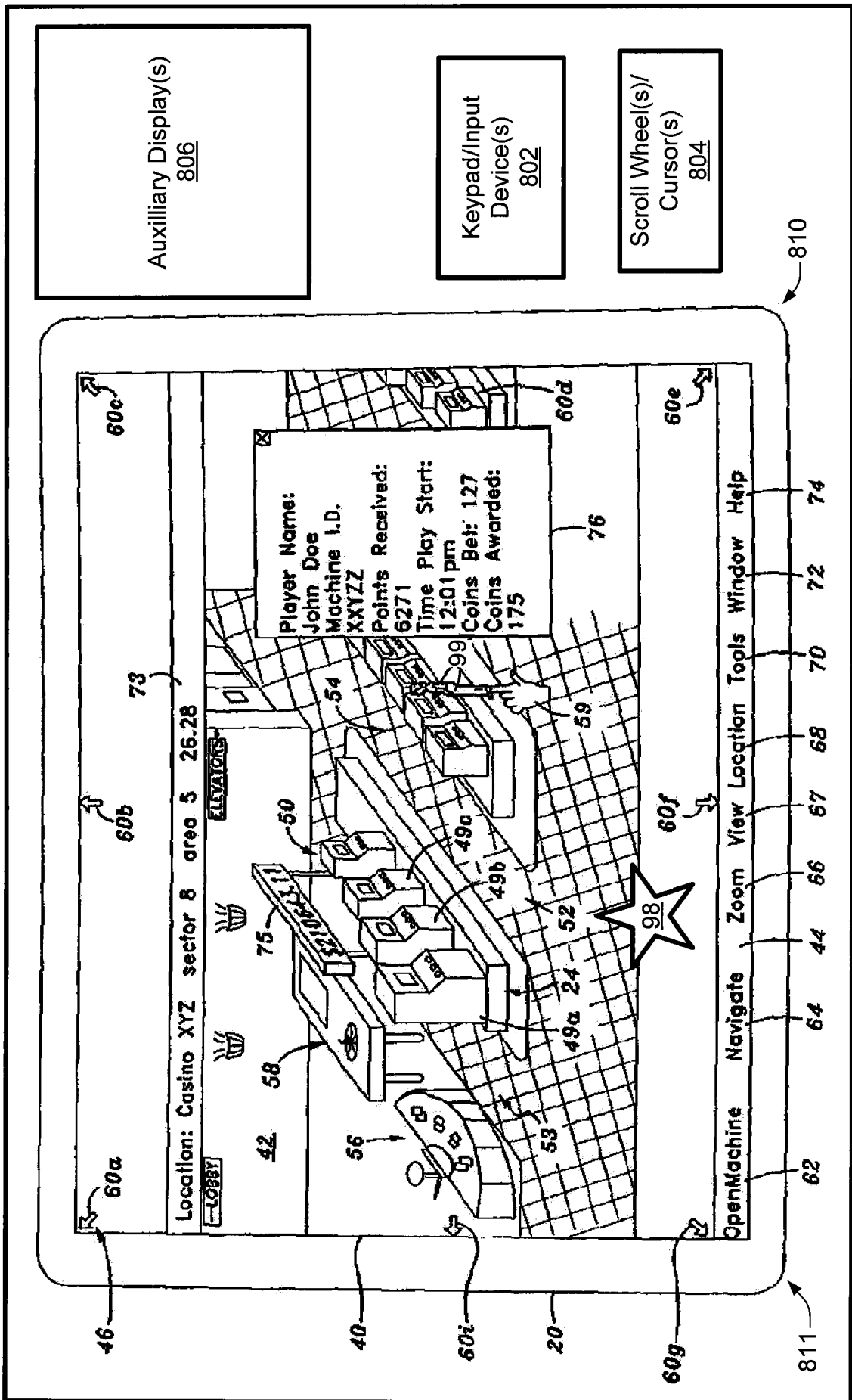
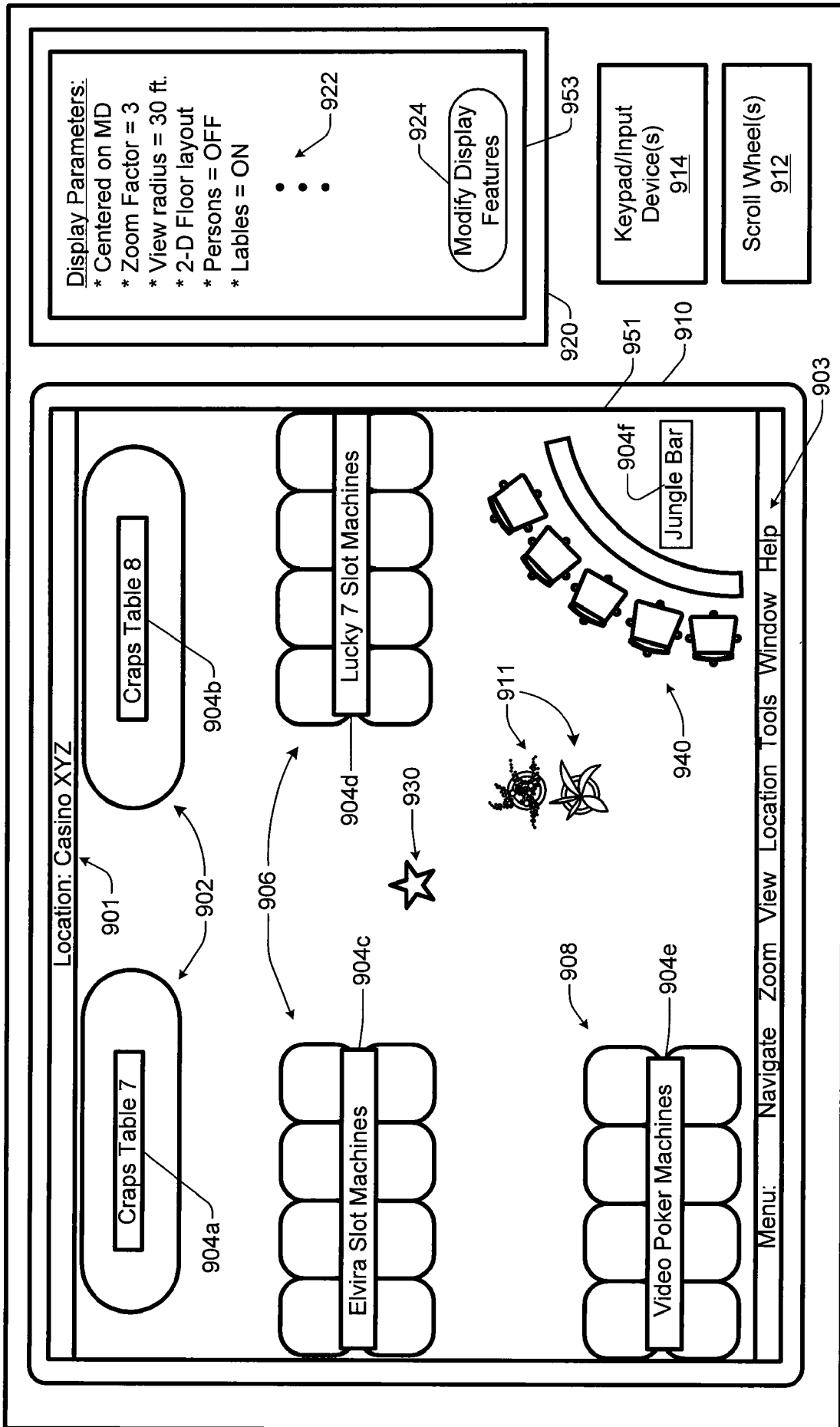


Fig. 8



900 Fig. 9

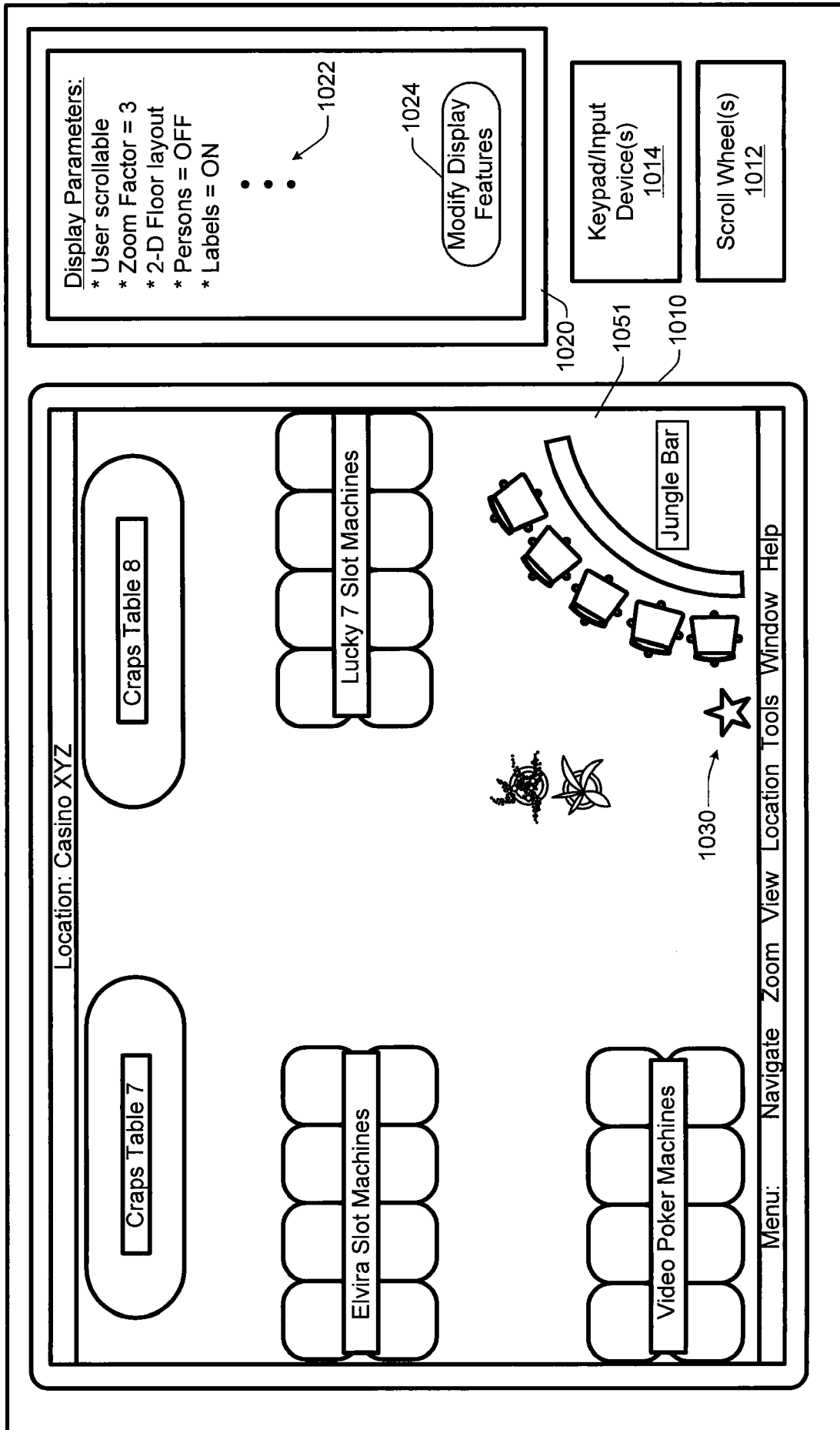
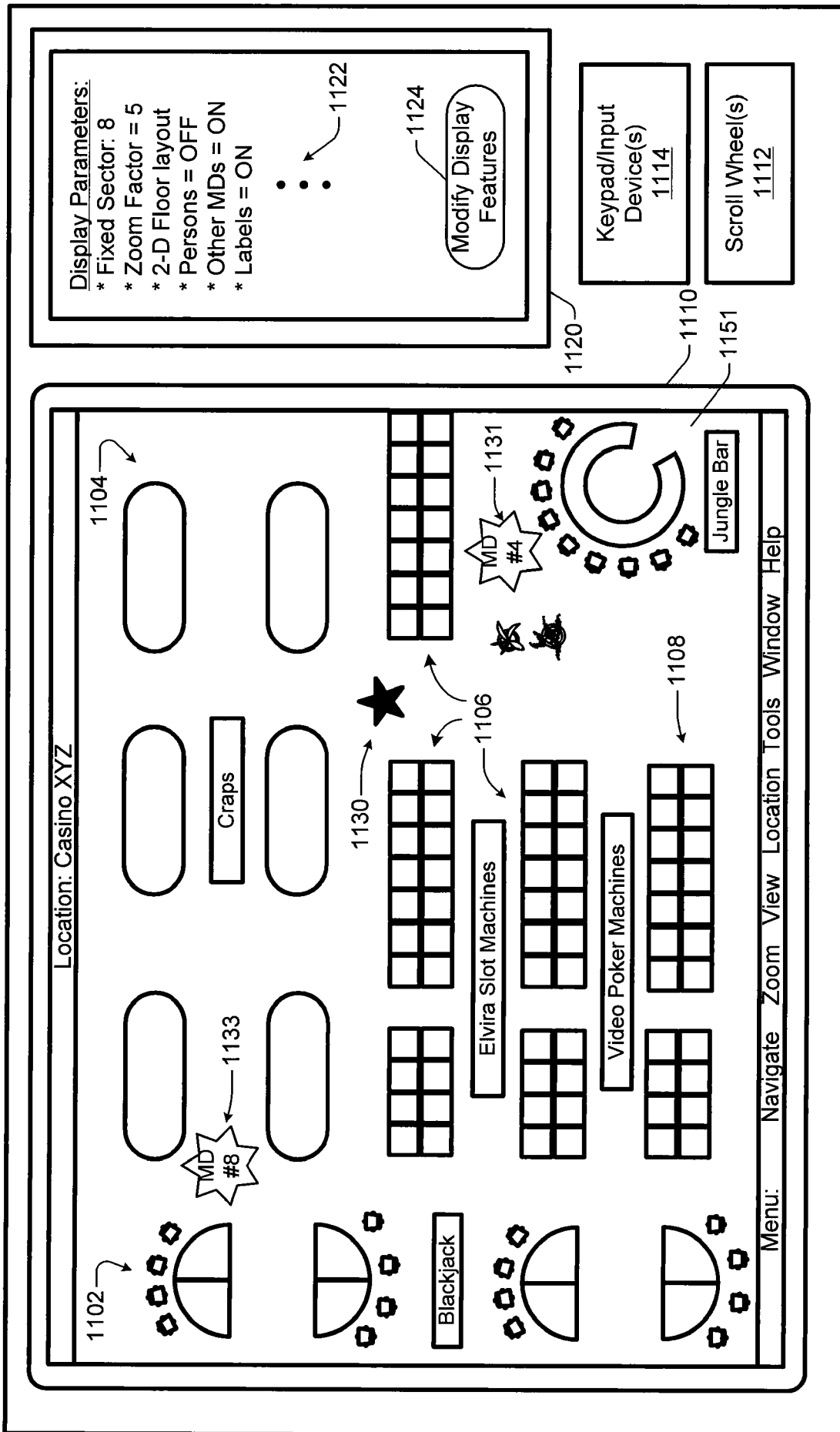
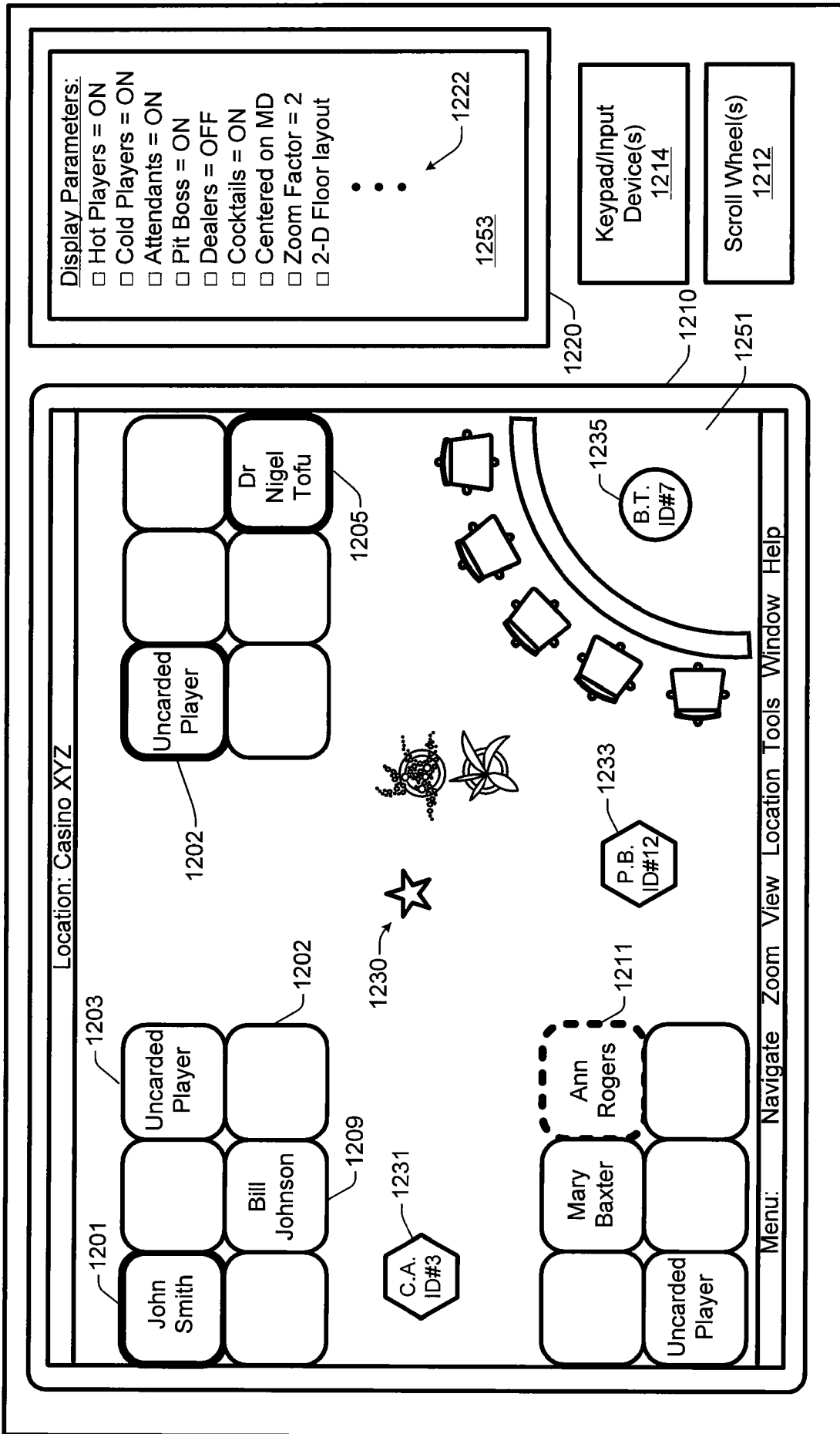


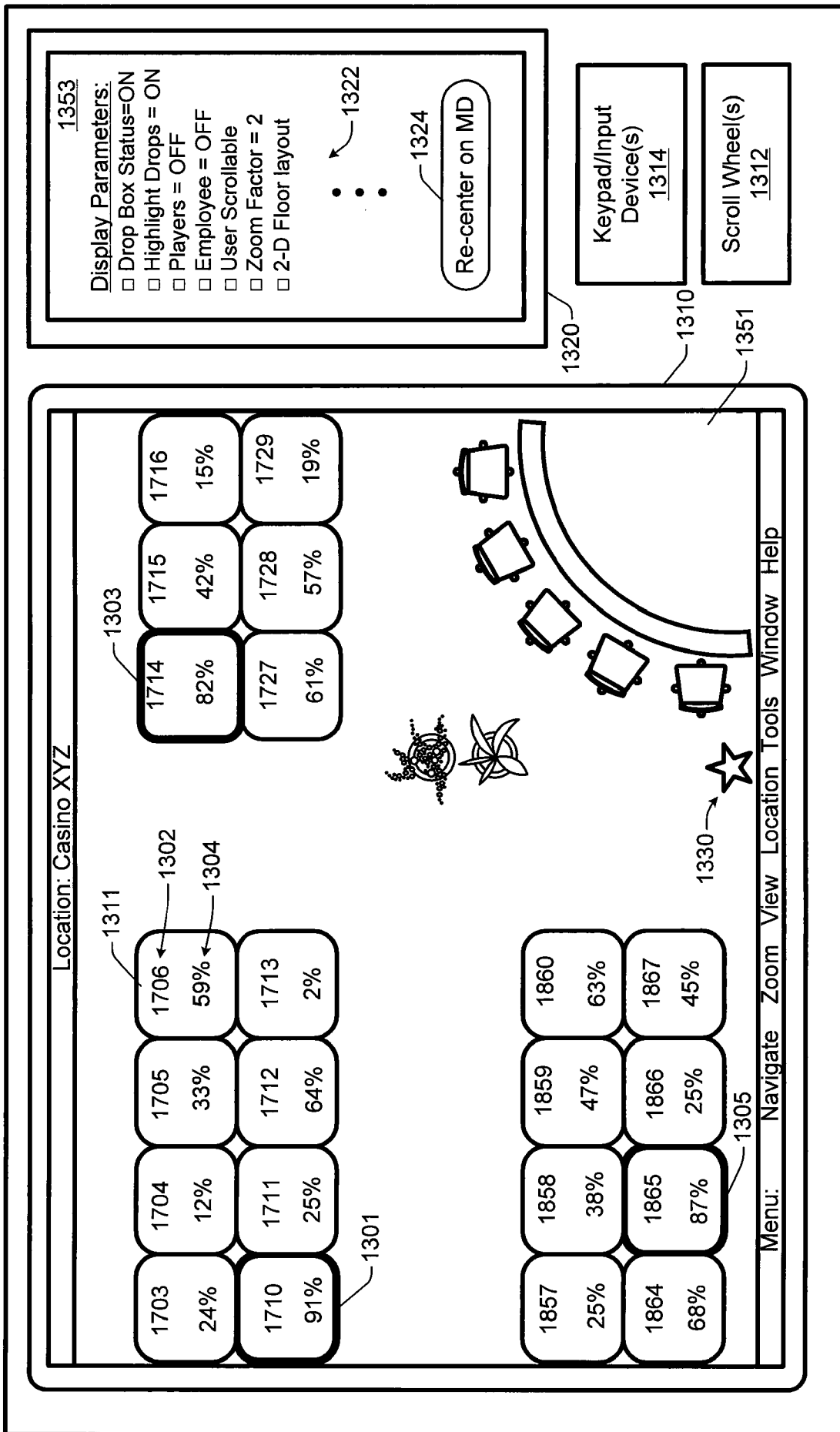
Fig. 10



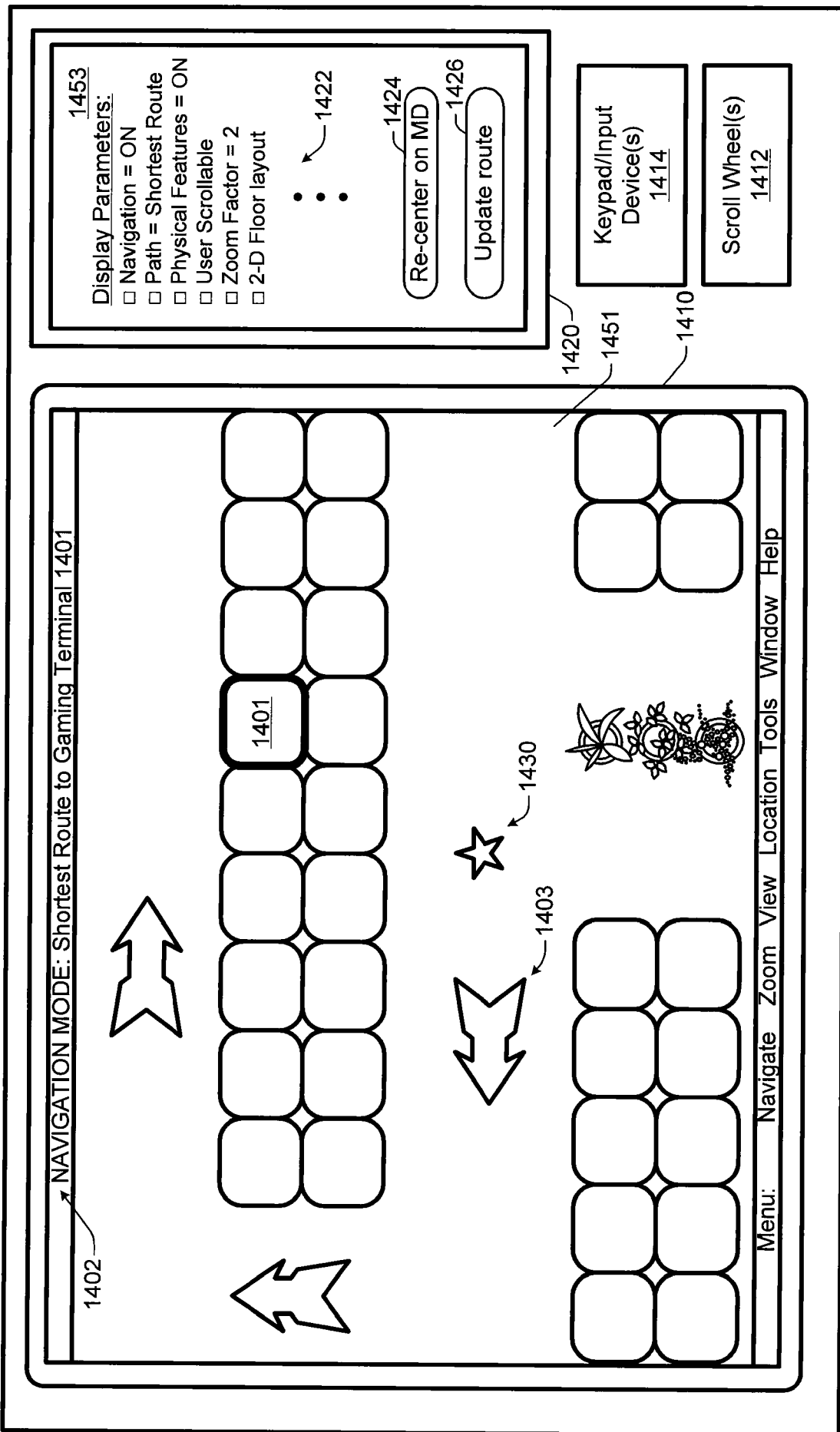
1100 Fig. 11



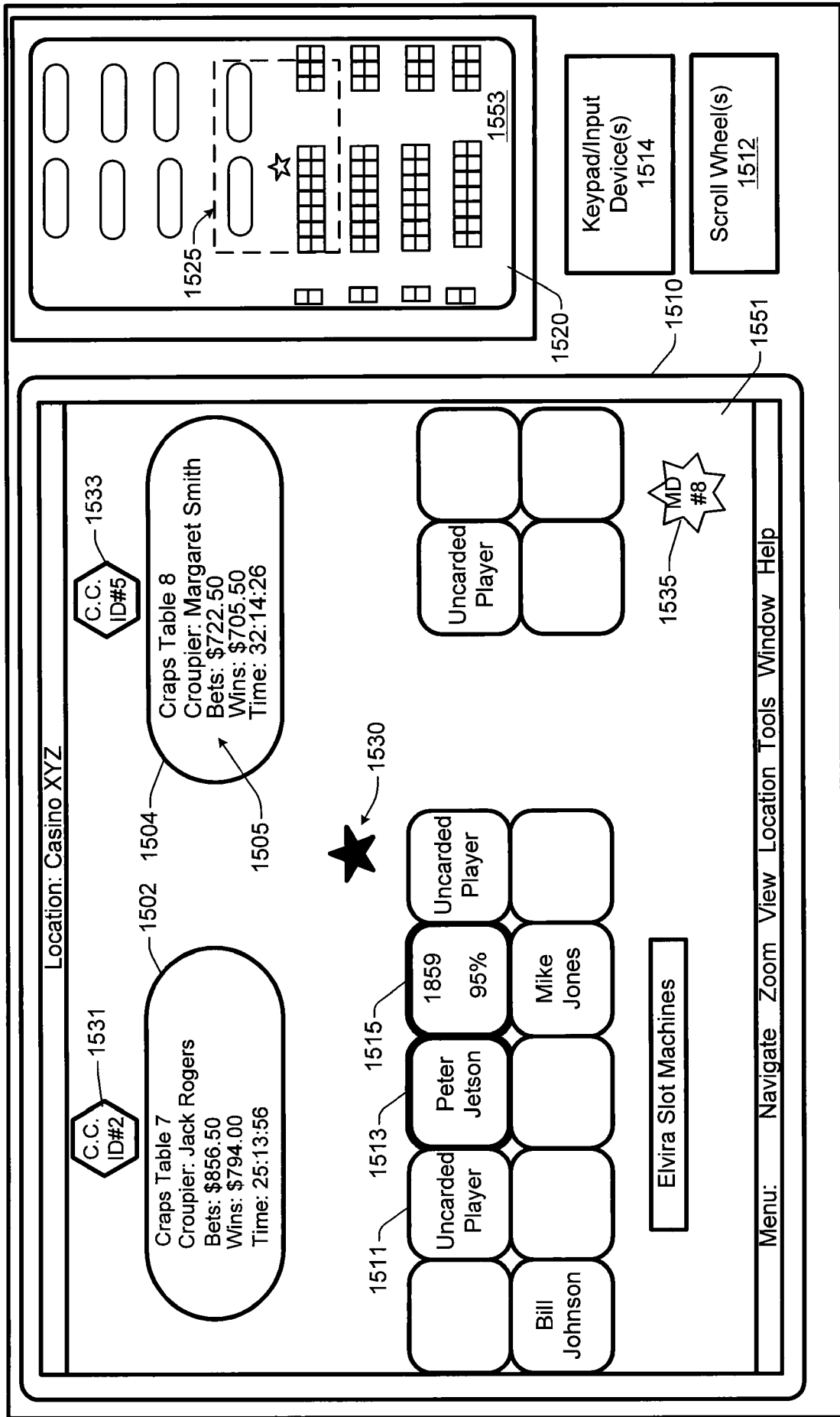
1200 Fig. 12



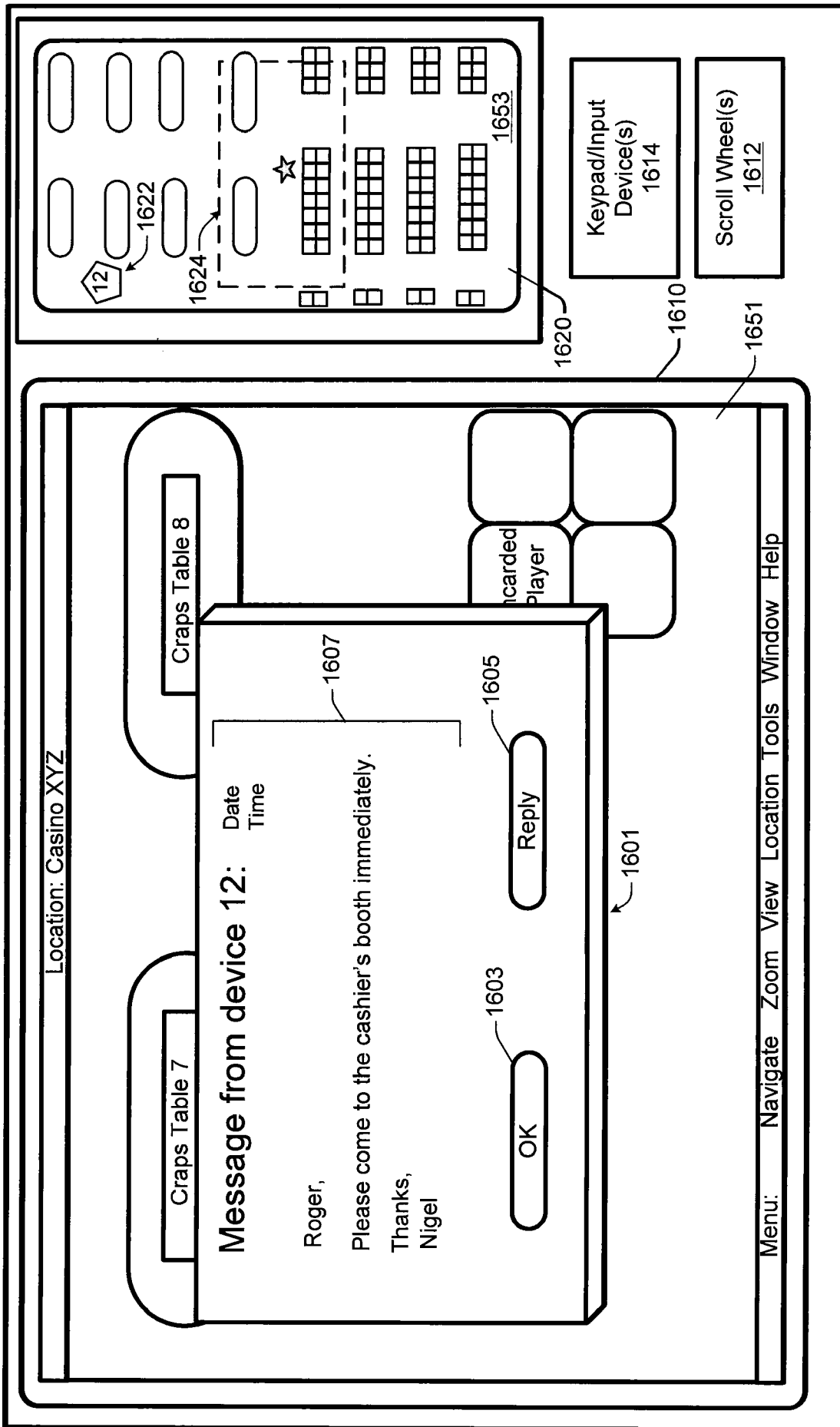
1300 Fig. 13



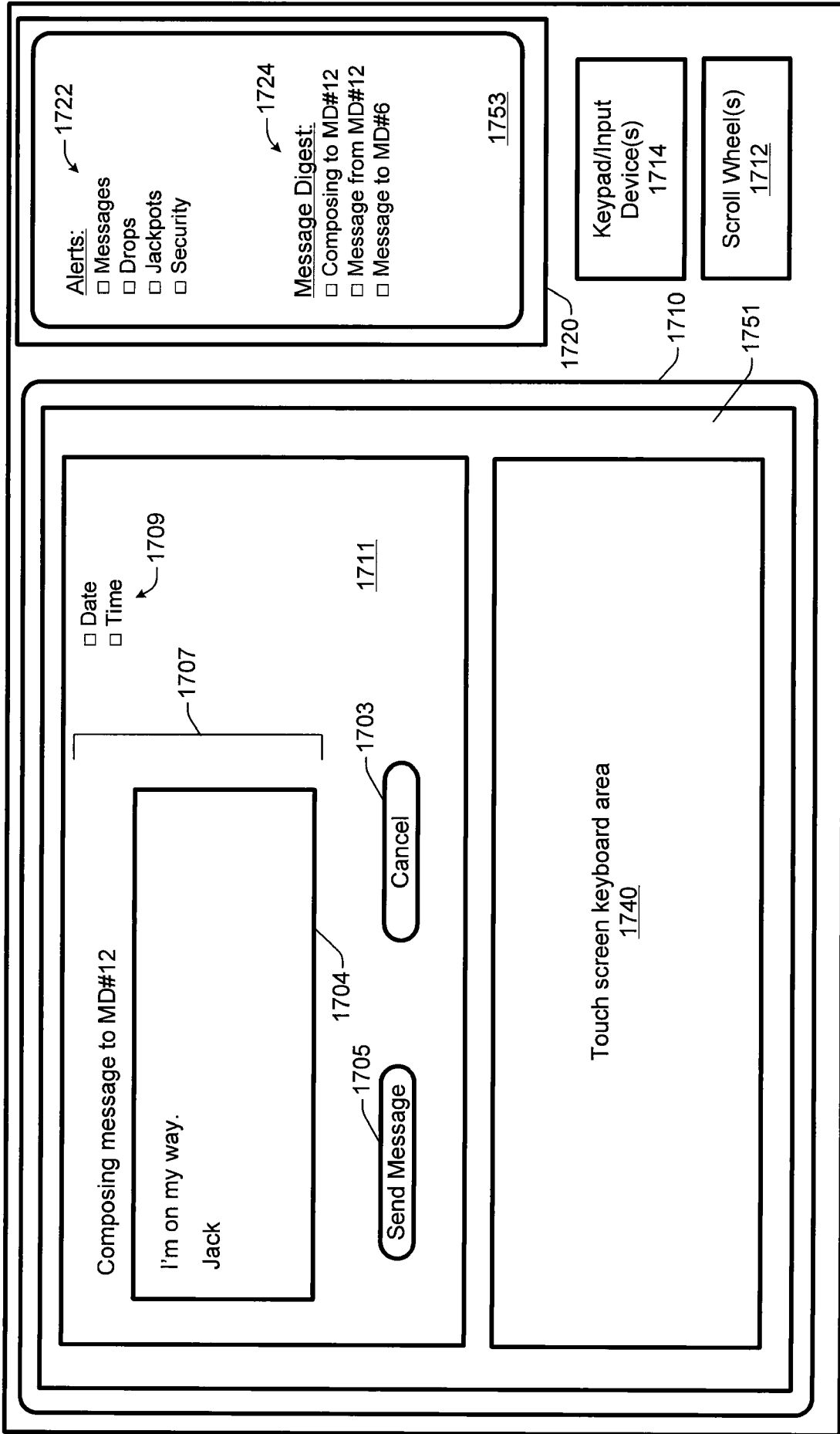
1400 Fig. 14



1500 Fig. 15



1600 Fig. 16



1700 Fig. 17

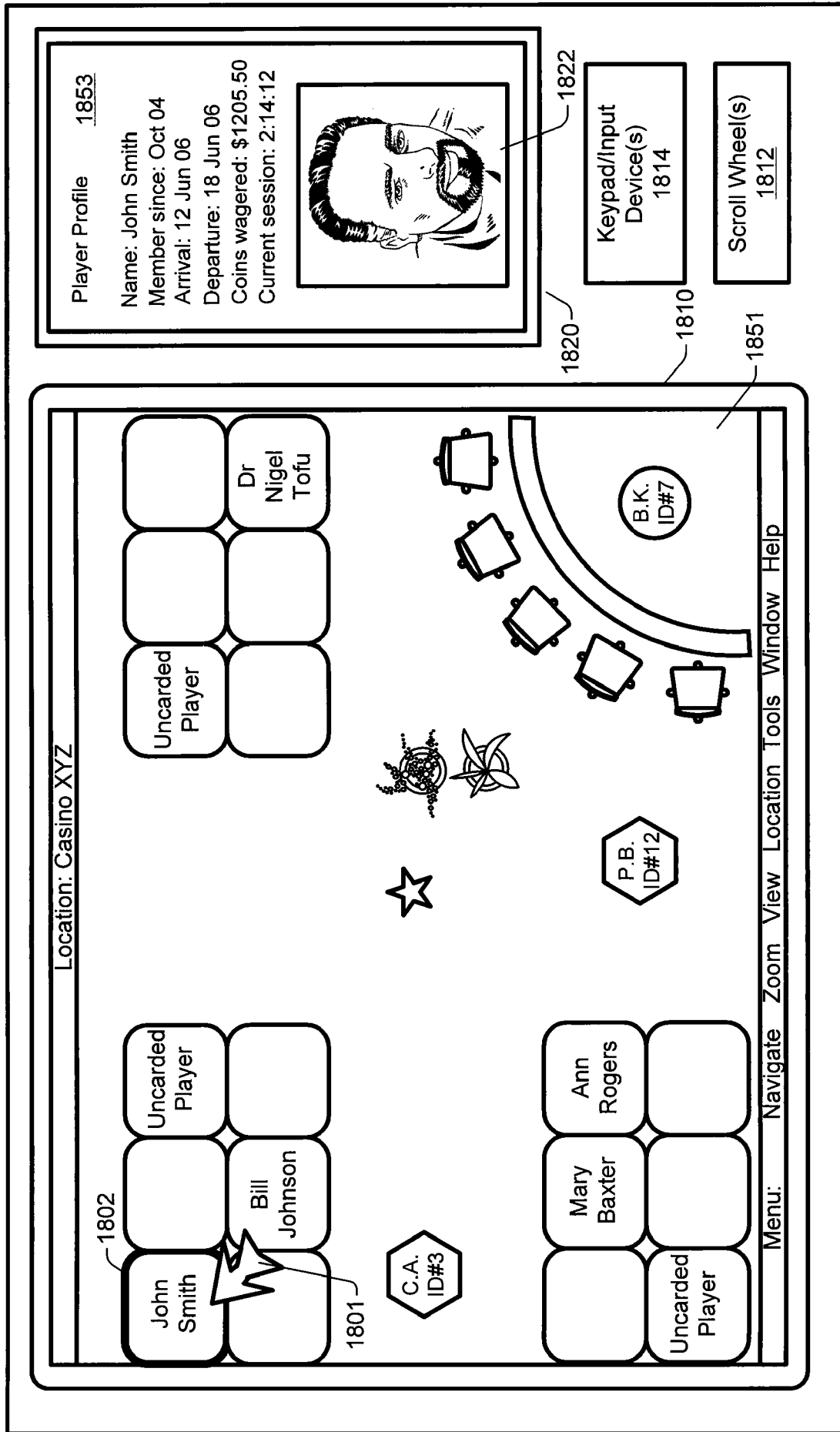
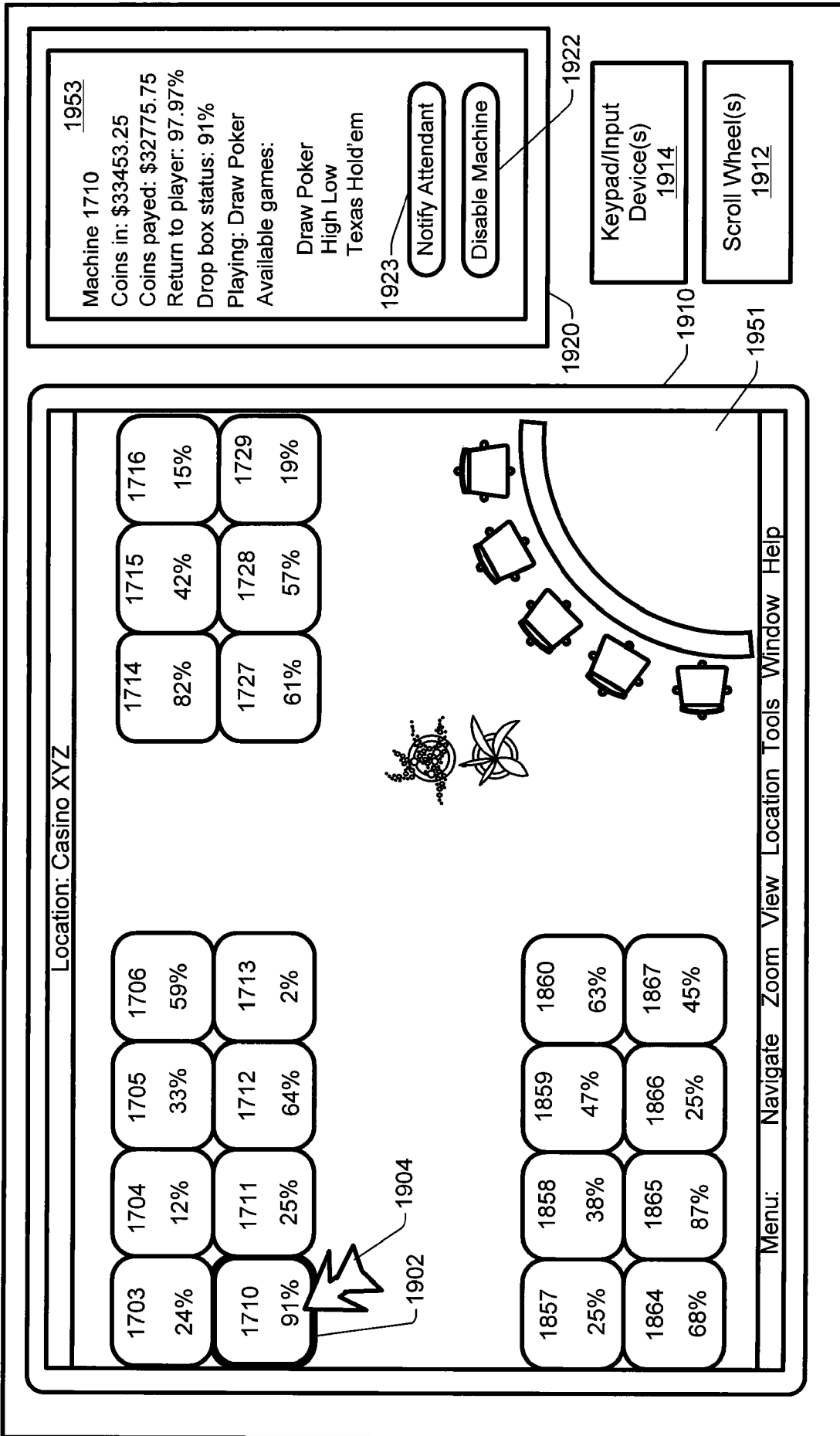


Fig. 18



1900 Fig. 19