Title: METHOD AND APPARATUS FOR CALCULATING ALTITUDE BASED ON BAROMETRIC AND GPS MEASUREMENTS

Abstract: A system and method for providing access to gambling resources is provided. A GeoBio Indicator (GBI) reads biometric information from a user and obtains positional information for the location of the GBI. The biometric information read from the user is compared with stored biometric information. The positional information for the location of the GBI is compared to a set of geographic locations wherein gambling is legal. If the biometric information matches and the GBI is located in a geographic location where gambling is legal, access to gambling resources is allowed.

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

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RELATED APPLICATIONS


BACKGROUND OF THE INVENTION

Embodiments of the present invention generally relate to providing access to gaming systems. More specifically, the present invention generally relates to a gaming system that includes a positional indication for a user to aid in the authentication of the user’s position and a biometric reader to aid in identification of the user.

Electronic gaming machines (EGMs) have existed for decades. An EGM is a generic term for any electronic or electromechanical game that operates by chance and that rewards a player with game award credits. Typical EGMs include simulated reel slot machines, video poker, bingo, keno, blackjack and lottery. Typical EGMs are coin operated. That is, a player wishing to wager inserts a coin(s) into the EGM in
order to play. Additionally, many EGMs are capable of receiving paper money in exchange for an opportunity to play.

Over the years, EGMs were developed that were capable of accepting substitutes for money. As gaming flourished, EGM operators sought to increase the efficiency of game play. For example, instead of using money to wager on an EGM, the use of credit cards was considered as a basis for activating game play. That is, a credit card could be used to insert credits into the machine. However, some laws within the United States limit, or even prohibit, the use of credit cards for paying off gaming debt. Thus, credit cards may not be a viable option for game play on an EGM due to legal restrictions.

Some gaming systems utilize casino debt cards. Typically, a player pre-pays for a debit card at the cashier’s desk, or from a vending machine. The card is then inserted into an EGM, which electronically reads the amount paid for the EGM and deducts the cost of game play from the card. If a player wins, additional funds are added to the debit card. At the end of game play, the debit card is “sold” to an operator for cash.

Tickets or vouchers are also used for gaming. In this case, an EGM is wired to accept a ticket/voucher. Through a variety of methods, the monetary value of the ticket is transferred to the EGM. Unfortunately, however, the tickets/vouchers, much like cash, may be lost, stolen or destroyed. Additionally, if the EGM runs out of paper to print the tickets/vouchers, the system typically requires an attendant to insert more paper into the machine. Thus, additional time and resources are needed to maintain the ticket/voucher EGM. Also, the tickets/vouchers typically must be stored
after redemption. While the ticket/voucher method may be used with EGMs, the system typically is not conducive to table games, such as blackjack or poker.

Additionally, many casinos and other gaming locations issue player cards that are used to store information regarding game play frequency. The casino typically awards, or “comps,” players for predetermined levels of play. Typically, the player cards are used in conjunction with gaming tokens or cash. That is, in order to play, a player still inserts money, tokens, or representative media into the EGM, while also inserting the player card into a separate card receptacle.

A network based “casino” style gaming system is composed of many distributed components that share security concerns to prevent cheating. In a traditional casino game, the slot machine or EGM is a self-contained unit that houses all components of play and the gaming public is largely anonymous. The slot machine maintains the game logic in either a wheel format or in a PROM format, the payout tables for the game results, the cash in functions, the cash out functions, and the payout or jackpot functions. The traditional slot machine discourages cheating by the anonymous public through physical means e.g. a strong physical structure that is very difficult to break into and through process methods e.g. the PROM’s which contain the game play is very carefully tracked and are spot checked for possible manipulation through a CRC check. These methods for preventing cheating are very limited in a network based gaming system. A network system, especially on that utilizes a public network such as the Internet, cannot rely on such security methods for insuring a good game result and good game payouts. Different kinds of security measures are needed.
Further, beginning with its introduction on the World Wide Web in the summer of 1995, Internet gambling has grown to over a $1 billion-a-year industry, with more than 150 online casinos operating at any one time, most of them outside the U.S. Current U.S. federal law and most state laws prohibit any form of online casino gambling. However, because casino gambling is one of the most highly regulated industries in the nation as well as one of the more lucrative, the debate over legalized Internet gambling is heated and polarized between those who believe it is a social evil and those who believe it is a profitable industry that can be beneficial to both casinos and government (through taxation) as long as it can be well regulated.

Several states, including Nevada and New Jersey have begun to look at ways to legalize, regulate, and tax internet gambling. However, two of the chief concerns that arise when looking to this form of legislation are first, how can a state and its casino operators prevent underage gambling on the Internet, and secondly, how can a state and its casino operators ensure that the person gambling is physically located in a jurisdiction that allows internet gambling. For example, Nevada Gaming Commission Chairman, Brian Sandoval has said that he believes legalization is inevitable, but that “State regulators should wait until software is advanced enough to block minors and problem gamblers.”

Player identification has long been a key issue in casino operations for purposes as wide and varied as player tracking and marketing, access to player accounts, taxation and reporting, creation of daily player loss limits, and the prevention of financial abuses, money laundering, and fraud. The most common form of player identification in use today is the player’s club card, a magnetic stripe card that carries an electronic record of the player’s account number.
However, the use of a magnetic stripe card with a player identification number does not provide any guarantee that the player using the card is the player who was originally assigned the card; it simply grants access to the player’s account number. Additionally, the integrity of magnetic stripe cards is easily compromised because the cards are subject to corruption, the data stored on them is not secure, and the amount of data on the card is limited.

In order to increase the level of security, some casinos require the input of a Personal Identification Number (PIN) number along with the use of a player’s card to more positively identify the player, just as today’s bank ATMs require such a PIN number. Yet even this increased level of security cannot guarantee positive identification – a PIN number can be visually stolen or verbally transferred.

Because casino gambling is currently restricted to inside the walls of a casino or other gaming establishment, such as a tavern or a riverboat, casinos have never before needed to question where the wagering is taking place. However, with the advent of Internet gambling, the location of the person placing the wagers may not be as readily ascertainable, yet may be of great interest.

Thus, a need has long been felt for a gaming system that provides a positional indication for use in authenticating a user. A need has especially been felt for such a system for use with Internet gambling.
BRIEF SUMMARY OF THE INVENTION

The present invention includes a GeoBio Indicator (GBI) for use in providing access to gambling resources. The GBI may be located at a user’s personal computer (PC). The GBI obtains biometric information from a user and obtains positional information for the location of the GBI. The biometric information read by the GBI is then compared with stored biometric information, the may be read from a smart card, for example. The positional information is then compared with at least one set of geographic coordinates representing a geographic locality wherein gambling is legal. If the biometric information matches and the GBI is located in a locality the permits gambling, then access to gambling resources is allowed.

BRIEF DESCRIPTION OF SEVERAL VIEWS OF THE DRAWINGS

Figure 1 illustrates an interactive internet gaming infrastructure according to an embodiment of the present invention.

Figure 2 illustrates a GeoBio Indicator (GBI) according to a preferred embodiment of the present invention.

Figure 3 illustrates a logical flow of the GBI physical location authentication process 300 according to a preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Figure 1 illustrates an interactive internet gaming infrastructure 100 according to an embodiment of the present invention. The gaming infrastructure includes a home user personal computer 110 including a GeoBio indicator 112, a modem 115, an
internet service provider (ISP) 120, a firewall 125, an identification/authentication server 130, a GPS registered jurisdiction server 135, a game server 140, a backend firewall 145, and a backend system 150.

The present invention specifically targets the identification and location of the person initializing and playing a distributed network gaming system. This invention utilizes positive identification through the means of biometrics, a smart card reader, and a location system utilizing the Global Positioning System signals, for example, in order to approve an individual for a game session in which real monetary values are gambled. The below discussion is presenting in terms of a home user gambling over the internet, but the various embodiments of the present invention may be implemented over any distributed network.

In operation, a user accesses the user's personal computer 110 at home, for example. The personal computer 110 includes a USB connection to support communication with the GeoBio indicator as discussed further with regard to the Figures below. Although the connection between the personal computer 110 and the GeoBio indicator 112 may be of virtually any type, including serial and parallel connections, the USB connection may be preferred due to its speed and versatility.

When the user attempts to access the gambling resources, the user's biometric, smart card, and GPS information is determined by the GeoBio indicator 112 and send to the personal computer 110 as further described below. The user's information then passes to the ISP 120 through the modem 115. As labeled, the modem 115 may be of any type including dial-up, ISDN line, cable modem, DSL, etc. The user information is then sent from the ISP 120 through the firewall 125 to the
identification/authentication server 130. The firewall 125 provides a security system for blocking outside server access. At the identification/authentication server 130, the user information is parsed to identify the user and determine authentication for the user as further described below.

The registered jurisdiction server 135 may determine a listing of registered jurisdictions and send the listing of registered jurisdictions to the personal computer 110 to allow the personal computer to perform a local comparison of the GPS signals and the registered jurisdictions, as further described below. Additionally, other user data may be sent to the game server 140 via a customer key exchange. The other user data may be used to access accounts links to a specific user, for example.

The game server 140 controls the actual game play for the user. For example, the game server 140 sends the game display or game draw to the personal computer 110 to be displayed for the user. Actual wins and losses are recorded through interaction of the game server 140 with the backend accounting and analysis system 150. Also, as shown in Figure 1, data traveling between the game server 140 and the backend accounting system 150 passes through the backend firewall 145. Game results and accounting information are received by the backend accounting system 150 and stored in individual user accounts. The backend accounting system 150 may also provide various analysis and control functions. For example, the backend accounting system 150 may be used to implement daily user limits or special user bonusing. Additionally, the backend accounting system 150 may provide regulatory and tax reporting.
The internet gaming infrastructure 100 is preferably used to provide distributed network gambling, such as internet-based gambling, to authorized users. However, in addition to serving users over the internet, the internet gaming infrastructure may be deployed over a distributed network such as a casino or in individual hotel rooms of a casino.

Figure 2 illustrates a GeoBio Indicator (GBI) 200 according to a preferred embodiment of the present invention. The GBI 200 includes a Global Positioning System (GPS) sensor 210 having an antenna 212, a smart card reader/writer 215, a biometric scanner 220, a Random Access Memory (RAM) 225 having program flash memory 230, a power supply conditioner 235, a computer I/O 240, an electrically erasable programmable read-only memory (EEPROM) 245, and a central processing unit (CPU) 250.

The power supply conditioner 235 provides for the regulation of the power supply provided to the GBI 200 and also includes hold up circuitry. The computer I/O 240 is preferably an USB connection as shown in Figure 1. The GPS sensor 210 may be, for example, any of a variety of commercially available GPS sensors, preferably with an integrated antenna 212. The smart card reader 215 also may be any of a variety of commercially available smart card readers, or may be some other type of reader for reading a user token. For example, the user token readers popularized by the Mobil SpeedPass may also be employed. The biometric scanner 220 may also be any of a variety of commercially available biometric scanners.

As mentioned above, the GPS registered jurisdiction server 135 includes a listing of all jurisdictions that allow gambling. Once a jurisdiction has decided to
allow gambling, the physical location of the jurisdiction may then be determined by the GPS registered jurisdiction server 135 or simply deposited into the GPS registered jurisdiction server 135. The GPS registered jurisdiction server 135 may then determine a matrix of locations which allow gambling and express this matrix in terms of the GPS signal. For example, the GPS registered jurisdiction server 135 may define localities allowing gambling by expressing the geometric extent of the localities at a matrix of three or more points on the surface of the earth. Any GPS reading arising from a GBI positioned within the locality expressed by the matrix may be permitted access to gambling resources. As may be envisioned, a large number of intersecting and/or non-intersecting localities, such as Nevada localities or localities representing federal waterways or reservations, may be expressed in this way. Additionally, by maintaining the matrix of legalized jurisdictions in a single location, easy updating of the listing of legalized jurisdictions may be performed.

Once the matrix of legalized jurisdictions is generated by the GPS registered jurisdiction server 135, the matrix is sent to the GBI 200 and stored in the EEPROM 245. For example, the GBI 200 may be shipped with an initial matrix of legalized jurisdictions already written to the EEPROM 245. The matrix of legalized jurisdictions may then be updates as expressed below. Alternatively, the GBI may be shipped without any matrix and the matrix may be downloaded from the GPS registered jurisdiction server 135 during the initial registration of the GBI 200.

In order to update the matrix stored in the EEPROM 245, each matrix is associated with a matrix identifier, such as the date of generation of the matrix. Then, each time a user accesses gambling resources, the identification/authorization server may compare matrix identifier for the matrix stored in the EEPROM 245 to the matrix
identifier for the latest matrix stored in the GPS registered jurisdiction server 135. If the matrix stored in the EEPROM 245 at the GBI 200 has an identifier that does not match with the identifier of the matrix stored in the GPS registered jurisdiction server 135, the matrix at the GBI 200 may be replaced with the new matrix from the GPS registered jurisdiction server 135. Updates of matrices may also take place periodically or on an as-needed basis.

The smart card may be supplied with various information regarding the user including the user’s biometric information. The smartcard reader/writer 215 may then read the user’s biometric information from the smartcard for comparison with biometric information from the biometric scanner 220. Additionally, the biometric information from the smart card and the biometric information from the biometric scanner 220 may be sent to the identification/authentication server 130 for a second comparison to provide a secondary confirmation of identity.

In operation, the program flash memory 230 holds the instructional programming for the CPU 250, and preferably loads instructional programming into the CPU 250 at power-up.

Upon activation of a game request by a user, the user’s biometric data is sampled by the biometric scanner 220 onboard the GBI 200. The biometric data received by the biometric scanner 220 is compared with stored biometric information to confirm the identity of the user.

For example, biometric information may be stored on a smart card. The user’s smart card may be read by the smart card reader/writer 215 to extract stored biometric information. The extracted biometric information may then be compared with the
biometric information received from the biometric scanner 220 to confirm the identity of the user. Alternatively, the biometric data for the user may be stored in the EEPROM 245 or the RAM 225. The stored biometric data may then be retrieved and compared to biometric information received from the biometric scanner 220.

If the biometric information received from the biometric scanner 220 matches the stored biometric information, the CPU 250 of the GBI 200 sends the results of the biometric scan through the computer I/O 240 to the personal computer 110 and over the intermediate devices to the identification/authentication server 130. The identification/authentication server 130 then performs a secondary authorization.

If the biometric information received from the biometric scanner 220 does not match the stored biometric information at either the primary or secondary authorization steps, access to gambling resources is denied.

If the user’s biometric information is approved in both the primary and secondary authorization steps, the GBI 200 then proceeds to verify that the location of the GBI 200 is in a jurisdiction that allows gambling. That is, the CPU 250 accesses the GPS 210 and retrieves the current location of the GBI 200 from the GPS 210. The CPU 250 then compares the location information from the CPS 210 to the matrix of legalized jurisdiction that has been previously stored in the EEPROM 245 at the GBI 200. If the location of the GBI 200 is within one of the legalized jurisdictions stored in the EEPROM 245, then access to gambling resources is allowed.

Additionally, as mentioned above, before attempting to verify that the location of the GBI 200 is within a legalized jurisdiction, the GBI 200 may send the identifier of its matrix to the identification/authentication server 130 for comparison with the
matrix stored in the GPS registered jurisdiction server 135. If a new matrix is available at the GPS registered jurisdiction server 135, the new matrix is downloaded into the GBI 200. The location of the GBI 200 is then compared to the new matrix.

Figure 3 illustrates a logical flow of the GBI 200 physical location authentication process 300 according to a preferred embodiment of the present invention. First, GPS data is received from one or more GPS satellites 310 by an embedded GBI antenna 312. The GPS signal then passes through an RFI converter 315 to an embedded logic engine 320. The embedded logic engine 320 operates on the received GPS signal to determine the position of the GBI. The positional information from the embedded logic engine 320 is then passed to an embedded GBI location authentication engine 325. The embedded GBI location authentication engine 325 compares the positional information from the embedded logic engine 320 with the positional information representing the matrix of localities allowing gambling. The matrix of localities allowing gambling is retrieved from the GBI non-volatile memory 330.

As described above, if the position of the GBI received from the embedded logic engine 320 falls within one of the localities that permit gambling, the GBI permits access to gambling resources if the biometric identification of the user has already been accomplished. If the user has not yet been identified, the GBI then proceeds identifying the user using the user's biometric, preferably a fingerprint. As mentioned above, the user's biometric is sampled at the GBI and compared to the stored biometric information at the GBI (which may be retrieved from a smart card). If the biometric information matches, the biometric information is then sent to the
secured database for biometric authentication 360 for a secondary authentication. If both authentications are successful, then the user has been identified.

Once the user has been identified and the location of the GBI in a locality permitting gambling has been confirmed, the user is permitted access to gambling resources. That is, the user’s personal computer is allowed to communicate with the gaming server 370 and gambling may commence.

As mentioned above, although both the biometric identification and the location verification are performed, the order of the biometric identification and the location identification may be reversed. Additionally, the GBI may be alternately configured to perform only a single biometric identification instead of performing a primary and secondary authorization, if only lesser security is needed.

While the invention has been described with reference to certain embodiments, it will be understood by those skilled in the art that various changes may be made and equivalents may be substituted without departing from the scope of the invention. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the invention without departing from its scope. Therefore, it is intended that the invention not be limited to the particular embodiment disclosed, but that the invention will include all embodiments falling within the scope of the appended claims.
CLAIMS

1. A system for providing access to gambling resources including:
   a system for verifying the identity of a user by using a biometric identifier; and
   a system for verifying the location of a user within a locality that permits gambling.

2. The system of claim 1 wherein said system for verifying the identity of a user by using a biometric identifier includes a biometric scanner for reading a biometric identifier from a user.

3. The system of claim 2 wherein said system for verifying the identity of a user compares a biometric identifier received from said biometric scanner with a stored biometric identifier.

4. The system of claim 3 further including a memory for storing a biometric identifier.

5. The system of claim 3 further including a smart card reader and wherein said stored biometric identifier is retrieved from said smart card reader.

6. The system of claim 5 wherein said biometric is a fingerprint.
7. The system of claim 1 wherein said system for verifying the location of a user within a locality that permits gambling includes a global positioning system (GPS) for determining the location of said user.

8. The system of claim 6 further including a memory storing at least one set of geographic coordinates representing at least one locality wherein gambling is permitted.

9. The system of claim 7 further including a processor for comparing the location of said user from said GPS system with said at least one set of geographic coordinates representing at least one locality wherein gambling is permitted.

10. The system of claim 8 wherein said at least one set of geographic coordinates representing at least one locality wherein gambling is permitted stored in said memory is replaced with a new set of geographic coordinates representing at least one locality wherein gambling is permitted.

11. The system of claim 9 wherein said new set of geographic coordinates representing at least one locality wherein gambling is permitted is received from a centralized server.

12. A system for providing access to gaming resources including:

   a biometric scanner for retrieving a retrieved biometric from a user;

   a positional sensor sensing the position of said CPU;
a memory storing at least one set of geographic coordinates representing a geographic locality; and

a CPU for comparing said retrieved biometric with a stored biometric and comparing said position with said at least one set of geographic coordinates, said CPU permitting access to gaming resources when said retrieved biometric matches said stored biometric and said position is within said at least one set of geographic coordinates.

13. The system of claim 12 further including a smart card reader and wherein said stored biometric is received from a smart card read by said smart card reader.

14. The system of claim 12 further including a memory storing a stored biometric.

15. The system of claim 12 wherein said biometric identifier is a fingerprint.

16. The system of claim 12 wherein said positional sensor is a GPS sensor.

17. The system of claim 12 wherein said at least one set of geographic coordinates representing a geographic locality stored in said memory is replaced with a new set of geographic coordinates.

18. The system of claim 17 wherein said new set of geographic coordinates is received from a centralized server.
19. A method for providing access to gaming resources including the steps of:

retrieving biometric information from a user;

comparing said biometric information retrieved from said user to stored biometric information;

retrieving positional information for said user;

comparing said positional information for said user with stored positional information; and

providing access to gaming resources when said biometric information retrieved from said user matches said stored biometric information and said positional information for said user matches said stored positional information.

20. The method of claim 19 further including the step of updating said stored positional information.
FIG. 1

Physical View of Overall Interactive Gaming Infrastructure

USB Connection

110
Home User
Personal Computer

115
Internet Service Provider (ISP)

Modern, Dial Out, ISDN, Cable Modem, DSL, etc.

120
Firewall (Security system for blocking outside server access)

125
Customer Key exchange

Game Draw to Customer

140
Game Server

145
Firewall

Game Results and accounting information to back end system

150
Backend Accounting and Analysis System
FIG. 2

Antenna

Global Positioning System Sensor

EEPROM

Power Supply Conditioner and Hold up Circuitry

Program Flash holds program for Micro Controller. RAM holds fingerprint data for analysis operation. Controller directly Smart Card reader/writer and GPS signaling. EEPROM holds encrypting key and legal jurisdiction array.

Smart Card Reader/Writer

Biometric Scanner

Micro Controller or Central Processing Unit

Computer I/O

Random Access Memory (RAM)

Program Flash Memory
Upon activation of a game request, biometric data is taken by onboard GBI processing unit. This data is compared against what is stored on the memory or smart card. If biometric result sets matches, the GBI sends biometric result scan over the network to the authentication server for secondary authorization. After secondary authorization occurs, comparison of on board GBI matrix of legalized jurisdictions to secured legalized jurisdictions database takes place. If the onboard GBI data does not match server data, server data overwrites remote data with new data and tag codes. The GBI confirms that device is within the legal jurisdictions by comparing GPS signaling with embedded location codes from the flash memory.