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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
12 October 2023 (12.10.2023)

WIPO | PCT

(10) International Publication Number
WO 2023/196722 A3

(51) International Patent Classification:
G07F 17/32 (2006.01) *G06N 20/00* (2019.01)
A63F 13/00 (2014.01)

(21) International Application Number:
PCT/US2023/063915

(22) International Filing Date:
08 March 2023 (08.03.2023)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
17/712,298 04 April 2022 (04.04.2022) US

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:
— *as to the identity of the inventor (Rule 4.17(i))*

Published:
— *with international search report (Art. 21(3))*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(88) Date of publication of the international search report:
09 November 2023 (09.11.2023)

(54) Title: REAL TIME ACTION OF INTEREST NOTIFICATION SYSTEM

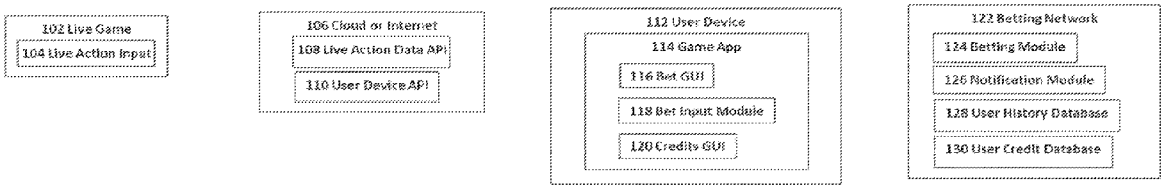

Fig. 1

(57) Abstract: A method of identifying characteristics of wagers available on individual actions of a sporting event that are highly correlated with a user's history of wagers made and wagers viewed or has preselected specific wager options to be notified about. The user interacts with a betting platform through a mobile application that displays all of the live actions available to be wagered upon, and the odds of those wagers. The user's interaction with the application is recorded, along with their wagering decision, wagering amount, and a plurality of action characteristics, such as teams involved, down and distance, weather, etc., and examined for correlations. As the betting platform receives a new live action available to be wagered on, it compares the characteristics of the new action to the user's history and will notify the user of the new action if it is highly correlated with their past interest.

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REAL TIME ACTION OF INTEREST NOTIFICATION SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present patent application claims benefit and priority to U.S. Patent Application No. 17/712,298 filed on April 4, 2022, which is hereby incorporated by reference into the present disclosure.

FIELD

[0002] Embodiments of the present disclosure is generally related to online betting platforms for single action wagering on sporting events.

BACKGROUND

[0003] The subject matter discussed in the background section should not be assumed to be prior art merely as a result of its mention in the background section. Similarly, a problem mentioned in the background section or associated with the subject matter of the background section should not be assumed to have been previously recognized in the prior art. The subject matter in the background section merely represents different approaches, which in and of themselves may also correspond to implementations of the claimed technology.

[0004] Play by play wagering happens very rapidly and there are often multiple events occurring simultaneously, such as Sunday afternoons during American football season, when as many as a dozen games are occurring simultaneously. With a forty second play clock, there is very little time to determine which wager or wagers a user is interested in, understand the odds and make a decision

based on the available information. If a user cannot easily identify which wagers they are interested in, the operators of the betting platform will lose revenue.

SUMMARY

[0005] A method, system, and apparatus for providing notifications to a user of a wager of interest to them in a wagering game. In one embodiment, a method can include retrieving, by a server, characteristics of a live action from a live event, comparing the live action characteristics to characteristics of other actions a user has expressed interest in, determining if any characteristics of the live action are correlated with a historical interest or a preselected option of the user, applying at least one filter to activity of the user based upon a second characteristic of the live action, determining if any two characteristics of the live action are correlated with the historical interest of the user, outputting a notification of the live action when it is correlated to the historical interest of the user.

[0006] In another embodiment, a computer implemented method for providing notifications in a game program may be provided. The computer implemented method can include displaying a notification that one or more wagers for wagering in a real time event in a wagering game correlated to a historical interest of a user of a wagering game are available on a user device; displaying the one or more wagers in the real time event correlated to the historical interest of the user; displaying information about a play in the live event; and displaying results of a wager from the one or more real time wagers.

BRIEF DESCRIPTIONS OF THE DRAWINGS

[0007] The accompanying drawings illustrate various embodiments of systems, methods, and embodiments of various other aspects of the disclosure. Any person with ordinary skills in the art will appreciate that the illustrated element boundaries (e.g. boxes, groups of boxes, or other shapes) in the figures represent one example of the boundaries. It may be that in some examples one element may be designed as multiple elements or that multiple elements may be designed as one element. In some examples, an element shown as an internal component of one element may be implemented as an external component in another, and vice versa. Furthermore, elements may not be drawn to scale. Non-limiting and non-exhaustive descriptions are described with reference to the following drawings. The components in the figures are not necessarily to scale, emphasis instead being placed upon illustrating principles.

[0008] FIG. 1 illustrates a real time action of interest notification system, according to an embodiment.

[0009] FIG. 2 illustrates a betting module, according to an embodiment.

[0010] FIG. 3 illustrates a notification module, according to an embodiment.

[0011] FIG. 4 illustrates a user history database, according to an embodiment.

DETAILED DESCRIPTION

[0012] Aspects of the present invention are disclosed in the following description and related figures directed to specific embodiments of the invention. Those of ordinary skill in the art will recognize that alternate embodiments may be devised without departing from the spirit or the scope of the claims. Additionally, well-known elements of exemplary embodiments of the invention will not be described in detail or will be omitted so as not to obscure the relevant details of the invention

[0013] As used herein, the word exemplary means serving as an example, instance, or illustration. The embodiments described herein are not limiting but rather are exemplary only. It should be understood that the described embodiments are not necessarily to be construed as preferred or advantageous over other embodiments. Moreover, the terms embodiments of the invention, embodiments, or invention do not require that all embodiments of the invention include the discussed feature, advantage, or mode of operation.

[0014] Further, many of the embodiments described herein are described in terms of sequences of actions to be performed by, for example, elements of a computing device. It should be recognized by those skilled in the art that specific circuits can perform the various sequence of actions described herein (e.g., application-specific integrated circuits (ASICs)) and/or by program instructions executed by at least one processor. Additionally, the sequence of actions described herein can be embodied entirely within any form of computer-readable storage medium such that execution of the sequence of actions enables the processor to perform the functionality described herein. Thus, the various aspects of the present invention may be embodied in several different forms, all of which have been contemplated to be within the scope of the claimed subject matter. In addition, for each of the embodiments described herein, the corresponding form of any such embodiments may be described herein as, for example, a computer configured to perform the described action.

[0015] With respect to the embodiments, a summary of the terminology used herein is provided.

[0016] An action refers to a specific play or specific movement in a sporting event. For example, an action may determine which players were involved during a sporting event. In some embodiments, an action may be a throw, shot, pass, swing, kick, hit performed by a participant in

a sporting event. In some embodiments, an action may be a strategic decision by a participant in the sporting event, such as a player, coach, management, etc. In some embodiments, an action may be a penalty, foul, or type of infraction occurring in a sporting event. In some embodiments, an action may include the participants of the sporting event. In some embodiments, an action may include beginning events of sporting events, for example, opening tips, coin flips, opening pitch, national anthem singers, etc. In some embodiments, a sporting event may be football, hockey, basketball, baseball, golf, tennis, soccer, cricket, rugby, MMA, boxing, swimming, skiing, snowboarding, horse racing, car racing, boat racing, cycling, wrestling, Olympic sport, eSports, etc. Actions can be integrated into the embodiments in a variety of manners.

[0017] A "bet" or "wager" is to risk something, usually a sum of money, against someone else's or an entity based on the outcome of a future event, such as the results of a game or event. It may be understood that non-monetary items may be the subject of a "bet" or "wager" as well, such as points or anything else that can be quantified for a "wager" or "bet." A bettor refers to a person who bets or wagers. A bettor may also be referred to as a user, client, or participant throughout the present invention. A "bet" or "wager" could be made for obtaining or risking a coupon or some enhancements to the sporting event, such as better seats, VIP treatment, etc. A "bet" or "wager" can be made for a certain amount or for a future time. A "bet" or "wager" can be made for being able to answer a question correctly. A "bet" or "wager" can be made within a certain period of time. A "bet" or "wager" can be integrated into the embodiments in a variety of manners.

[0018] A "book" or "sportsbook" refers to a physical establishment that accepts bets on the outcome of sporting events. A "book" or "sportsbook" system enables a human working with a computer to interact, according to a set of both implicit and explicit rules, in an electronically powered domain to place bets on the outcome of a sporting event. An added game refers to an event

not part of the typical menu of wagering offerings, often posted as an accommodation to patrons. A "book" or "sportsbook" can be integrated into the embodiments in a variety of manners.

[0019] To "buy points" means a player pays an additional price (more money) to receive a half-point or more in the player's favor on a point spread game. Buying points means you can move a point spread, for example, up to two points in your favor. "Buy points" can be integrated into the embodiments in a variety of manners.

[0020] The "price" refers to the odds or point spread of an event. To "take the price" means betting the underdog and receiving its advantage in the point spread. "Price" can be integrated into the embodiments in a variety of manners.

[0021] "No action" means a wager in which no money is lost or won, and the original bet amount is refunded. "No action" can be integrated into the embodiments in a variety of manners.

[0022] The "sides" are the two teams or individuals participating in an event: the underdog and the favorite. The term "favorite" refers to the team considered most likely to win an event or game. The "chalk" refers to a favorite, usually a heavy favorite. Bettors who like to bet big favorites are called "chalk eaters" (often a derogatory term). An event or game in which the sportsbook has reduced its betting limits, usually because of weather or the uncertain status of injured players, is referred to as a "circled game." "Laying the points or price" means betting the favorite by giving up points. The term "dog" or "underdog" refers to the team perceived to be most likely to lose an event or game. A "longshot" also refers to a team perceived to be unlikely to win an event or game. "Sides," "favorite," "chalk," "circled game," "laying the points price," "dog," and "underdog" can be integrated into the embodiments in a variety of manners.

[0023] The "money line" refers to the odds expressed in terms of money. With money odds, whenever there is a minus (-), the player "lays" or is "laying" that amount to win (for example, $100); where there is a plus (+), the player wins that amount for every $100 wagered. A "straight bet" refers to an individual wager on a game or event that will be determined by a point spread or money line. The term "straight-up" means winning the game without any regard to the "point spread"; a "money-line" bet. "Money line," "straight bet," "straight-up" can be integrated into the embodiments in a variety of manners.

[0024] The "line" refers to the current odds or point spread on a particular event or game. The "point spread" refers to the margin of points by which the favored team must win an event to "cover the spread." To "cover" means winning by more than the "point spread." A handicap of the "point spread" value is given to the favorite team so bettors can choose sides at equal odds. "Cover the spread" means that a favorite wins an event with the handicap considered, or the underdog wins with additional points. To "push" refers to when the event or game ends with no winner or loser for wagering purposes, a tie for wagering purposes. A "tie" is a wager in which no money is lost or won because the teams' scores were equal to the number of points in the given "point spread." The "opening line" means the earliest line posted for a particular sporting event or game. The term "pick" or "pick 'em" refers to a game when neither team is favored in an event or game. "Line," "cover the spread," "cover," "tie," "pick," and "pick-em" can be integrated into the embodiments in a variety of manners.

[0025] To "middle" means to win both sides of a game, wagering on the "underdog" at one point spread and the favorite at a different point spread and winning both sides. For example, if the player bets the underdog +4 ½ and the favorite -3 ½ and the favorite wins by 4, the player has middled

the book and won both bets. "Middle" can be integrated into the embodiments in a variety of manners.

[0026] Digital gaming refers to any type of electronic environment that can be controlled or manipulated by a human user for entertainment purposes. A system that enables a human and a computer to interact according to a set of both implicit and explicit rules in an electronically powered domain for the purpose of recreation or instruction. "eSports" refers to a form of sports competition using video games, or a multiplayer video game played competitively for spectators, typically by professional gamers. Digital gaming and "eSports" can be integrated into the embodiments in a variety of manners.

[0027] The term event refers to a form of play, sport, contest, or game, especially one played according to rules and decided by skill, strength, or luck. In some embodiments, an event may be football, hockey, basketball, baseball, golf, tennis, soccer, cricket, rugby, MMA, boxing, swimming, skiing, snowboarding, horse racing, car racing, boat racing, cycling, wrestling, Olympic sport, etc. The event can be integrated into the embodiments in a variety of manners.

[0028] The "total" is the combined number of runs, points, or goals scored by both teams during the game, including overtime. The "over" refers to a sports bet in which the player wagers that the combined point total of two teams will be more than a specified total. The "under" refers to bets that the total points scored by two teams will be less than a certain figure. "Total," "over," and "under" can be integrated into the embodiments in a variety of manners.

[0029] A "parlay" is a single bet that links together two or more wagers; to win the bet, the player must win all the wagers in the "parlay." If the player loses one wager, the player loses the entire bet. However, if he wins all the wagers in the "parlay," the player wins a higher payoff than if they

had placed the bets separately. A "round robin" is a series of parlays. A "teaser" is a type of parlay in which the point spread or total of each individual play is adjusted. The price of moving the point spread (teasing) is lower payoff odds on winning wagers. "Parlay," "round-robin," "teaser" can be integrated into the embodiments in a variety of manners.

[0030] A "prop bet" or "proposition bet" means a bet that focuses on the outcome of events within a given game. Props are often offered on marquee games of great interest. These include Sunday and Monday night pro football games, various high-profile college football games, major college bowl games, and playoff and championship games. An example of a prop bet is "Which team will score the first touchdown?" "Prop bet" or "proposition bet" can be integrated into the embodiments in a variety of manners.

[0031] A "first-half bet" refers to a bet placed on the score in the first half of the event only and only considers the first half of the game or event. The process you go about placing this bet is the same process that you would use to place a full game bet, but as previously mentioned, only the first half is important to a first-half bet type of wager. A "half-time bet" refers to a bet placed on scoring in the second half of a game or event only. "First-half-bet" and "half-time-bet" can be integrated into the embodiments in a variety of manners.

[0032] A "futures bet" or "future" refers to the odds that are posted well in advance on the winner of major events. Typical future bets are the Pro Football Championship, Collegiate Football Championship, the Pro Basketball Championship, the Collegiate Basketball Championship, and the Pro Baseball Championship. "Futures bet" or "future" can be integrated into the embodiments in a variety of manners.

[0033] The "listed pitchers" is specific to a baseball bet placed only if both pitchers are scheduled to start a game start. If they don't, the bet is deemed "no action" and refunded. The "run line" in baseball refers to a spread used instead of the money line. "Listed pitchers" and "no action" and "run line" can be integrated into the embodiments in a variety of manners.

[0034] The term "handle" refers to the total amount of bets taken. The term "hold" refers to the percentage of the house wins. The term "juice" refers to the bookmaker's commission, most commonly the 11 to 10 bettors lay on a straight point spread wagers: also known as "vigorish" or "vig." The "limit" refers to the maximum amount accepted by the house before the odds and/or point spread are changed. "Off the board" refers to a game in which no bets are being accepted. "Handle," "juice," vigorish," "vig," and "off the board" can be integrated into the embodiments in a variety of manners.

[0035] "Casinos" are public rooms or buildings where gambling games are played. "Racino" is a building complex or grounds having a racetrack and gambling facilities for playing slot machines, blackjack, roulette, etc. "Casino" and "Racino" can be integrated into the embodiments in a variety of manners.

[0036] Customers are companies, organizations, or individuals that would deploy, for fees, and may be part of, or perform, various system elements or method steps in the embodiments.

[0037] Managed service user interface service is a service that can help customers (1) manage third parties, (2) develop the web, (3) do data analytics, (4) connect thru application program interfaces and (4) track and report on player behaviors. A managed service user interface can be integrated into the embodiments in a variety of manners.

[0038] Managed service risk management services are a service that assists customers with (1) very important person management, (2) business intelligence, and (3) reporting. These managed service risk management services can be integrated into the embodiments in a variety of manners.

[0039] Managed service compliance service is a service that helps customers manage (1) integrity monitoring, (2) play safety, (3) responsible gambling, and (4) customer service assistance. These managed service compliance services can be integrated into the embodiments in a variety of manners.

[0040] Managed service pricing and trading service is a service that helps customers with (1) official data feeds, (2) data visualization, and (3) land-based, on-property digital signage. These managed service pricing and trading services can be integrated into the embodiments in a variety of manners.

[0041] Managed service and technology platforms are services that help customers with (1) web hosting, (2) IT support, and (3) player account platform support. These managed service and technology platform services can be integrated into the embodiments in a variety of manners.

[0042] Managed service and marketing support services are services that help customers (1) acquire and retain clients and users, (2) provide for bonusing options, and (3) develop press release content generation. These managed service and marketing support services can be integrated into the embodiments in a variety of manners.

[0043] Payment processing services are those services that help customers that allow for (1) account auditing and (2) withdrawal processing to meet standards for speed and accuracy. Further, these services can provide for the integration of global and local payment methods. These payment processing services can be integrated into the embodiments in a variety of manners.

[0044] Engaging promotions allow customers to treat your players to free bets, odds boosts, enhanced access, and flexible cashback to boost lifetime value. Engaging promotions can be integrated into the embodiments in a variety of manners.

[0045] "Cash out" or "pay out" or "payout" allow customers to make available, on singles bets or accumulated bets with a partial cash-out where each operator can control payouts by always managing commission and availability. The "cash-out" or "payout" or "payout" can be integrated into the embodiments in a variety of manners, including both monetary and non-monetary payouts, such as points, prizes, promotional or discount codes, and the like.

[0046] "Customized betting" allows customers to have tailored personalized betting experiences with sophisticated tracking and analysis of players' behavior. "Customized betting" can be integrated into the embodiments in a variety of manners.

[0047] Kiosks are devices that offer interactions with customers, clients, and users with a wide range of modular solutions for both retail and online sports gaming. Kiosks can be integrated into the embodiments in a variety of manners.

[0048] Business Applications are an integrated suite of tools for customers to manage the everyday activities that drive sales, profit, and growth, from creating and delivering actionable insights on performance to help customers to manage sports gaming. Business Applications can be integrated into the embodiments in a variety of manners.

[0049] State-based integration allows for a given sports gambling game to be modified by states in the United States or countries, based upon the state the player is in, based upon mobile phone or other geolocation identification means. State-based integration can be integrated into the embodiments in a variety of manners.

[0050] Game Configurator allows for the configuration of customer operators to have the opportunity to apply various chosen or newly created business rules on the game and to parametrize risk management. The game configurator can be integrated into the embodiments in a variety of manners.

[0051] "Fantasy sports connectors" are software connectors between method steps or system elements in the embodiments that can integrate fantasy sports. Fantasy sports allow a competition in which participants select imaginary teams from among the players in a league and score points according to the actual performance of their players. For example, if a player in fantasy sports is playing at a given real-time sport, odds could be changed in the real-time sports for that player.

[0052] Software as a service (or SaaS) is a software delivery method and licensing in which software is accessed online via a subscription rather than bought and installed on individual computers. Software as a service can be integrated into the embodiments in a variety of manners.

[0053] Synchronization of screens means synchronizing bets and results between devices, such as TV and mobile, PC, and wearables. Synchronization of screens can be integrated into the embodiments in a variety of manners.

[0054] Automatic content recognition (ACR) is an identification technology to recognize content played on a media device or present in a media file. Devices containing ACR support enable users to quickly obtain additional information about the content they see without user-based input or search efforts. A short media clip (audio, video, or both) is selected to start the recognition. This clip could be selected from within a media file or recorded by a device. Through algorithms such as fingerprinting, information from the actual perceptual content is taken and compared to a reference fingerprint database, each reference fingerprint corresponding to a known recorded work.

A database may contain metadata about the work and associated information, including complementary media. If the media clip's fingerprint is matched, the identification software returns the corresponding metadata to the client application. For example, a "fumble" could be recognized during an in-play sports game, and at the time stamp of the event, metadata such as "fumble" could be displayed. Automatic content recognition (ACR) can be integrated into the embodiments in a variety of manners.

[0055] Joining social media means connecting an in-play sports game bet or result to a social media connection, such as FACEBOOK® chat interaction. Joining social media can be integrated into the embodiments in a variety of manners.

[0056] Augmented reality means a technology that superimposes a computer-generated image on a user's view of the real world, thus providing a composite view. In an example of this invention, a real-time view of the game can be seen, and a "bet," a computer-generated data point, is placed above the player bet on. Augmented reality can be integrated into the embodiments in a variety of manners.

[0057] A betting exchange system is a platform that matches up users who wish to take opposite sides in a bet. Users may "back" or "lay" wagers on the outcome of a sporting event or a portion of the event. Each wager on a betting exchange involves two bets, one backing, and one laying. Back betting, or "backing" a selection, is to wager that the outcome will occur. Lay betting, or "laying" a selection, is to wager that the outcome will not occur. Users may then trade those positions up until the point that the wagering market closes and the wagers are paid out. The value of a wager may increase or decrease as a sporting event progresses. Exchanges allow users to cash

out of their position before the market for a wager closes by selling that wager at the current price to another user on the exchange.

[0058] Betting exchange systems allow users to wager on what is not going to happen with "lay" wagers. More often than not, users are more likely to win money by betting on what's not going to happen. Take the correct score markets in soccer, for example. Picking the exact score in a game is impossible to do consistently. One might get it right now and then, but it just comes down to luck. There are so many possible options to choose from. There are nine potential score outcomes even if we could rule out either team scoring more than two goals.

[0059] Betting exchange systems may allow wagers involving more than two users as exchange betting allows for one lay bet to be backed by multiple users, each backing a portion of the lay bet. Those wagers may be at different odds. For example, a first user may want to back Team A to win for $20. There may be a second user, or users, who want to lay $10 on Team A not to win at 2 to 1 odds. There may also be a third user, or users, who want to lay $10 on Team A not to win at 3 to 1 odds. The first user may back team A to win for $10 at the best available odds, in this case, 2 to 1. If the first user wants to back team A to win for $20, they will need to back ten dollars at 2 to 1 against the second user and back the other ten dollars against the third user at 3 to 1. This combination of wagers is the equivalent backing Team A to win for $20 at 2.5 to 1 odds.

[0060] Betting exchange systems do not take on the risk of any given wager as a traditional sportsbook would as the exchange users set the odds. Removing the risk to the wagering platform allows users to get more value out of a wager as they are paying less to the exchange that does not have to take on the risk that a sportsbook must price into each wager. There is no inherent limit to the stakes or odds that a user of a betting exchange can propose. Betting exchange systems derive

revenue from wagers differently than traditional sportsbooks. Revenue is based on the volume of wagers and trades on their platform, removing the results of the wager immaterial to the betting exchange system operation. Betting exchange systems do not lay bets themselves but instead rely on users to offer up their wagers, and the betting exchange system's role is to facilitate the exchange of wager terms, trades of wagers, and settlement of wagers.

[0061] Betting exchange systems do not tend to limit or ban successful users the way traditional sportsbooks do. Betting exchange systems do not limit or ban successful users because there is no impact to the betting exchange system from a user's success. A successful user needs only to find someone to take the other side of their wager. A betting exchange system benefits from the increased liquidity brought to markets by successful gamblers.

[0062] Betting exchange systems are not limited in the wagers they can offer. A traditional sportsbook will only offer wagers on which they have calculated odds to offer. Users of a betting exchange system may create their own markets for any outcome and odds that have at least one user to back and at least one user to lay a given outcome. Users may also be able to wager at a different price than the market price. For example, if a user is confident the price on a team they want to back is going to drift to a higher price due to team news, they can put a request up and set a higher price than is currently available, and another user may think they are wrong about their estimation and be prepared to match their bet at the higher price.

[0063] Betting exchange systems may present information about the exchange and potential wagers to back or lay in several different ways. Some betting exchange systems use a standard or grid interface that puts the back and lay options laid out left to right, with the prices getting higher as you move away from the center. The amount of money or action at a given back or lay price is

often displayed. Some betting exchange systems offer an option to back all or lay all. This option allows a user to back or lay an outcome at multiple different prices. A user may not need to back all or lay all to wager at multiple prices on a given outcome.

[0064] A "ladder" interface is a view in which that the full market depth of a market on a betting exchange system is shown, along with all the values associated with that price (volume already traded, amounts available, etc.). This type of interface enables a user to see where the market has been and helps them evaluate where it might be heading in the short term. Users may define a default "stake" or wager amount that, once defined, will allow the user to place orders immediately with a single click on the back or lay option at the price the user wants to enter the market at. Users may remove their stake in the same fashion if another user has not yet accepted the stake. Ladder interfaces allow users to place a large number of trades in a short time. This trading volume allows users to win, not only if their selection is successful but by hedging their position across all possible outcomes. Each tick (price increment) on the ladder would display to the user their financial position if they closed at this point. Some betting exchange systems show a graphical representation of where the selection has been matched. Some show the user where they are in the queue of contracts to be met. Third-party software providers receive data from the betting exchange system through an API to allow users to customize their interface and functionality. These third-party software programs may also allow users to incorporate additional data feeds, such as a news feed related to the live sporting event, into the user's wagering interface.

[0065] A betting exchange system offers users multiple ways to win. Users may be able to use automated bots to manage their betting activity. Users who lack the expertise to create bots may set up betting triggers that automate certain betting behaviors when specific market prices are met. Users may engage in "position trading" in which bets may be placed with the intent to sell them

off, seeking to find opportunities in market swings. Betting exchanges allow users many "hedging" options that may incorporate one or more of these strategies to mitigate risk. Liquidity in betting exchange systems may be limited by regulations that restrict participants in an exchange bet. Therefore, a betting exchange system should take steps to maximize the amount of liquidity on their platform to ensure the most markets are available.

[0066] A betting exchange system relies on liquidity to ensure market availability. Markets will only be available if there is someone to both back and lay that market. There will be fewer markets available on a betting exchange if fewer people offer odds, and fewer people offer odds if fewer people accept them. If the people are not offering odds and there is no traditional bookmaker to do it, their markets cannot be created, and wagers cannot be placed.

[0067] A machine learning betting system is a system that incorporates machine learning into at least one step in the odds makings, market creation, user interface, or personalization of a sports wagering platform. Machine learning leverages artificial intelligence to allow a computer algorithm to improve itself automatically over time without being explicitly programmed. Machine learning and AI are often discussed together, and the terms are sometimes used interchangeably, but they don't mean the same thing. An important distinction is that although all machine learning is AI, not all AI is machine learning. Machine learning algorithms can develop their framework for analyzing a data set through experience in using that data. Machine learning helps create models that can process and analyze large amounts of complex data to deliver accurate results. Machine learning uses models or mathematical representations of real-world processes. It achieves this through examining features, measurable properties, and parameters of a data set. It may utilize a feature vector, or a set of multiple numeric features, as a training input for prediction purposes. An algorithm takes a set of data known as "training data" as input. The learning algorithm finds

patterns in the input data and trains the model for expected results (target). The output of the training process is the machine learning model. A model may then make a prediction when fed input data. The value that the machine learning model has to predict is called the target or label. When excessively large amounts of data are fed to a machine learning algorithm, it may experience overfitting, a situation in which the algorithm learns from noise and inaccurate data entries. Overfitting may result in data being labeled incorrectly or in predictions being inaccurate. An algorithm may experience underfitting when it fails to decipher the underlying trend in the input data set as it does not fit the data well enough.

[0068] A machine learning betting system will measure error once the model is trained. New data will be fed to the model, and the outcome will be checked and categorized into one of four types of results: true positive, true negative false positive, and false negative. A true positive result is when the model predicts a condition when the condition is present. A true negative result is when the model does not predict a condition when it is absent. A false-positive result is when the model predicts a condition when it is absent. A false negative is when the model does not predict a condition when it is absent. The sum of false positives and false negatives is the total error in the model. While an algorithm or hypothesis can fit well to a training set, it might fail when applied to another data set outside the training set. It must therefore be determined if the algorithm is fit for new data. Testing it with a set of new data is the way to judge this. Generalization refers to how well the model predicts outcomes for a new set of data. Noise must also be managed and data parameters tested. A machine learning betting system may go through several cycles of training, validation, and testing until the error in the model is brought within an acceptable range.

[0069] A machine learning betting system may use one or more types of machine learning. Supervised machine learning algorithms can use data that has already been analyzed, by a person

or another algorithm, to classify new data. Analyzing a known training dataset allows a supervised machine learning algorithm to produce an inferred function to predict output values in the new data. As input data is fed into the model, it changes the weighting of characteristics until the model is fitted appropriately. This supervised learning is part of a process to ensure that the model avoids overfitting or underfitting called cross-validation. Supervised learning helps organizations solve various real-world problems at scale, such as classifying spam in a separate email folder.

[0070] Supervised machine learning algorithms are adept at dividing data into two categories, or binary classification, choosing between more than two types of answers, or multi-class classification, predicting continuous values, or regression modeling, or combining the predictions of multiple machine learning models to produce an accurate prediction, also known as ensembling. Some methods used in supervised learning include neural networks, naïve Bayes, linear regression, logistic regression, random forest, support vector machine (SVM), and more. For example, a supervised machine learning betting system may be provided a dataset of historic sporting events, the odds of various outcomes of those sporting events, and the action waged on those outcomes, and use that data to predict the action on future outcomes by identifying similar historical outcomes. In addition, a machine learning betting system may utilize recommendation algorithms to learn user preferences for teams, players, sports, wagers, etc.

[0071] Unsupervised machine learning analyzes and clusters data that has not been analyzed yet to discover hidden patterns or groupings within the data without the need for a human to define what the patterns or groupings should look like. The ability of unsupervised machine learning algorithms to discover similarities and differences in information makes it the ideal solution for exploratory data analysis, cross-selling strategies, customer segmentation, image, and pattern recognition. Most types of deep learning, including neural networks, are unsupervised algorithms.

[0072] Unsupervised machine learning may be utilized in dimensionality reduction or the process of reducing the number of random variables under consideration by identifying a set of principal variables. Unsupervised machine learning may split datasets into groups based on similarity, also known as clustering. It may also engage in anomaly detection by identifying unusual data points in a data set. It may also identify items in a data set that frequently occur together, also known as association mining. Principal component analysis and singular value decomposition are two methods of dimensionality reduction that may be employed. Other algorithms used in unsupervised learning include neural networks, k-means clustering, probabilistic clustering methods, and more.

[0073] A machine learning betting system may fall between a supervised machine learning algorithm and an unsupervised one. In these systems, an algorithm used training on a smaller labeled dataset to identify features and classify a larger, unlabeled dataset. These types of algorithms perform better when provided with labeled data sets. However, labeling can be time-consuming and expensive, which is where unsupervised learning can provide efficiency benefits. For example, a sportsbook may identify a cohort of users in a dataset who exhibit desirable behavior. A semi-supervised machine learning betting system may use that to identify other users in the cohort who are desirable.

[0074] Reinforcement learning is when data scientists teach a machine-learning algorithm to complete a multi-step process with clearly defined rules. The algorithm is programmed to complete a task and is given positive and negative feedback or cues as it works out how to complete the task it has been given. The prescribed set of rules for accomplishing a distinct goal will allow the algorithm to learn and decide which steps to take along the way. This combination of rules and positive and negative feedback would allow a reinforcement learning machine learning betting system to optimize the task over time. For example, a machine learning betting system may utilize

reinforcement learning to identify potential cheaters by recognizing a series of behaviors associated with undesirable player conduct, cheating, or fraud.

[0075] Some embodiments of this disclosure, illustrating all its features, will now be discussed in detail. It can be understood that the embodiments are intended to be open-ended in that an item or items used in the embodiments is not meant to be an exhaustive listing of such items or items or meant to be limited to only the listed item or items.

[0076] It can be noted that as used herein and in the appended claims, the singular forms "a," "an," and "the" include plural references unless the context clearly dictates otherwise. Although any systems and methods similar or equivalent to those described herein can be used in the practice or testing of embodiments, only some exemplary systems and methods are now described.

[0077] FIG. 1 is a system for a real time action of interest notification system. This system includes of at least two live games, for example a sporting event such as a football game, basketball game, baseball game, hockey game, tennis match, golf tournament, etc., in element 102. A live action input module that receives data about each individual action in the game, for example which players were involved or in action during a sporting event. In some embodiments, an action may be a specific play or specific event in a sporting event. In some embodiments, an action may be a throw, shot, pass, swing, kick, hit, performed by a participant in a sporting event. In some embodiments, an action may be a strategic decision made by a participant in the sporting event such as a player, coach, management, etc. In some embodiments, an action may be a penalty, foul, or type of infraction occurring in a sporting event. In some embodiments, an action may include the participants of the sporting event. In some embodiments, an action may include beginning events of sporting event, for example opening tips, coin flips, opening pitch, national anthem singers, etc.

In some embodiments, a sporting event may be football, hockey, basketball, baseball, golf, tennis, soccer, cricket, rugby, MMA, boxing, swimming, skiing, snowboarding, horse racing, car racing, boat racing, cycling, wrestling, Olympic sport, and the like. Further, a cloud or communication network which may be a wired and/or a wireless network. The communication network, if wireless, may be implemented using communication techniques such as Visible Light Communication (VLC), Worldwide Interoperability for Microwave Access (WiMAX), Long Term Evolution (LTE), Wireless Local Area Network (WLAN), Infrared (IR) communication, Public Switched Telephone Network (PSTN), Radio waves, and other communication techniques known in the art. The communication network may allow ubiquitous access to shared pools of configurable system resources and higher-level services that can be rapidly provisioned with minimal management effort, often over the Internet and utilizing sharing of resources to achieve coherence and economies of scale, like a public utility, while third-party clouds enable organizations to focus on their core businesses instead of expending resources on computer infrastructure and maintenance. An API for delivering data from the live game to the betting network can further be provided in element 108. An API for delivering data between the betting network and the user device can be provided in element 110. A user device for connecting to the cloud or Internet and running the game app can be provided in element 112. A game app that displays the odds for the next action of the live game, allows the user to place a bet, and displays the user's credits, in element 114. A bet GUI that displays the possible betting options and odds for each betting option, the odds determine the ratio of credits bet to credits returned if the bet was correct can be provided in element 116. A bet input module that allows the user to choose to bet credits on one or more options can be provided in element 118. A credits GUI that displays the user's current amount of credits in the credit database, where winning bets will increase the user's amount of credits while losing bets will

decrease the user's amount of credits, credits may be tied to a real money value or to a point system can be provided in element 120. A betting network which provides an artificial intelligence-based software module that monitors the user's history of viewing and making wagers through the game app in order to identify actions that are highly correlated with actions the user has previously played or shown an interest in viewing or wagering on can be provided in element 122. A betting module that allows the user to view available live actions to wager on, select those actions that interest them and wager credits or funds available to them can be provided in element 124. A notification module that monitors live actions available to be wagered on, then compares characteristics of those available live actions to actions the user has shown a tendency to view or wager upon in the past, such as a third down and between 7 and 10 yards to go for a first down involving the New York Giants on the road, and deliver a notification through the game app that such an action is available to be wagered upon. In some embodiments, a user may select potential wager options of interest that they can be notified about when the wager option is available. In some embodiments, the notification may be a push notification, text message, e-mail, banner notification, voice message, or the like, in the event the user in not currently in the game app or is not logged into the game app can be provided in element 126. A user history database that houses the characteristics of all actions the user has either viewed or wagered on can be provided in element 128. A user credit database that houses the credits or funds the user has available to wager in element 130.

[0078] Functioning of the betting module will now be explained with reference to FIG. 2. One of ordinary skill in the art will appreciate that, for this and other processes and methods disclosed herein, the functions performed in the processes and methods may be implemented in differing order. Furthermore, the outlined steps and operations are only provided as examples, and some of the steps and operations may be optional, combined into fewer steps and operations, or expanded

into additional steps and operations without detracting from the essence of the disclosed embodiments.

[0079] This figure displays the betting module . The process begins with user logging into the game app on their device at step 200. Retrieving from the live action data API all available live actions available and the odds available on them, that are calculated in the manner described in US20190197836 (which is incorporated by reference in its entirety) at step 202. Polling the notification module for an available live action that is correlated with the present user's history at step 204. If a notification is received, that action is displayed as a banner notification across the top of the game app's present user interface screen at step 206. Receive the user's selected available live action to potentially wager on at step 208. Record the characteristics of the action being viewed, such as down and distance, teams involved, location, weather, etc., in the user history database at step 210. In this embodiment the system may only measure wagers viewed and wagers made, while treating a wager made as, for example, five times more indicative of future behavior than a wager viewed. However, there are many ways known in the art to measure a user's engagement with content on a device such as a smartphone or tablet. One or more of these methods, such as time on screen, eye gaze tracking, etc., could be used to score wagers viewed on a sliding scale between the one and five used in the present embodiment at step 212. Did the user wager on this live play? at step 214. If the user did select to wager on the live play, query the user credit database for the credits, or funds, available to the user at step 216. Determine if there are sufficient credits or funds available to the user to make the selected wager at step 218. If the user does not have sufficient credits or funds available to them, display an error message that allows the user to change their wager amount or add credits or funds to their account at step 220. If the user has sufficient credits or funds available to them, record the wager in the user history database at step

222. Adjust the user's account balance in the user credit database based on the outcome of the live action and the wager parameters at step 224. Determine if the user is still logged in to the game app at step 226. If the user is still logged in, return to step 202. If the user has logged out, end program at step 228.

[0080] Functioning of the notification module will now be explained with reference to FIG. 3. One skilled in the art will appreciate that, for this and other processes and methods disclosed herein, the functions performed in the processes and methods may be implemented in differing order. Furthermore, the outlined steps and operations are only provided as examples, and some of the steps and operations may be optional, combined into fewer steps and operations, or expanded into additional steps and operations without detracting from the essence of the disclosed embodiments.

[0081] This figure displays the notification module. The process begins with the user logging into the game app on their user device at step 300. The module then polls the live action data API for a new live action available to be wagered on at step 302. It is then determined if the user is viewing the live action received from the live action data API. This is done because the system does not need to send the user a notification to view an action that they are already viewing. In this scenario the module will return to step 302 at step 304. If the live action received is not being viewed by the user, a first filter is applied to the user's historical wagers made and wagers viewed in the user history database. In this embodiment the first filter is the distance from a first down for the offense in an American football game. The live action received from the live action fata API is a 3rd down with 7 yards to go for the New York Giants against the Chicago Bears in the third quarter of their game in Chicago in which the Bears are leading 10-7. The first filter applied in this example, to the user's data in the user history database is for actions with between 7 and 10 yards to go until first down at step 306. Determine if the user has a wagering behavior in their history that is

correlated with the filtered data. For example, the current live action is 7 yards to go for the first down. All actions with between 7 and 10 yards to go that the user either viewed and/or wagered on are retrieved from the User History Database and the correlation between the odds on the current live action and the user's wagering/viewing history is calculated. The threshold for notification may vary from filter to filter and user to user based on the sample size available and how sensitivity of the operators. The operators may set the correlation coefficient threshold for notifying a user when only the distance filter is applied at 0.90. For example, a user's history of wagers made, and wagers viewed shows a high correlation coefficient, 0.92 for actions where there are fifteen to twenty yards to go for a first down. In some embodiments, an unsupervised machine learning betting system may be trained to identify the threshold for user notification based on characteristics of similar users with similar previous wagers and wager characteristics. For example, a machine learning system may identify a cohort of users it expects the present user to behave similarly to based on characteristics of the user, such as their wagering patterns, demographics, team preferences, etc. The wagering history of the cohort of identified similar users may be used to calculate the correlations. The present action has between seven and ten yards to go for a first down, which is not highly correlated enough with the user's wagering history at step 308. If the user's history is highly correlated with the current action and odds a notification is sent to the user at step 310. Determine if there are more filters that can be applied at step 312. In this example, after the distance filter, of 7-10 yards, is applied first, the next filter applied would be the down, 3rd, then one of the teams involved, the New York Giants at step 314. Determine if the user has a wagering behavior in their history that is correlated with the multiply filtered data. For example, the current live action is 7 yards to go for the first down. All 3rd down actions with between 7 and 10 yards to go that the user either viewed and/or wagered on are retrieved from the User History

Database and the correlation between the odds on the current live action and the user's wagering/viewing history is calculated. The user's wagering history shows a correlation coefficient of 0.81, which falls below the notification threshold of 0.85 for two filters. However, when the additional filter that includes games involving the New York Giants, is applied, the correlation coefficient goes to 0.82 which exceeds the notification? threshold of 0.80 at step 316. If the user's history is highly correlated with the current action and odds a notification is sent to the user. The threshold for notification is going to vary from filter to filter and user to user based on the sample size available and how sensitive the operators. The threshold for correlation will have to drop as more filters are applied as the sample size will decrease, so the operators may set the correlation coefficient threshold for two filters at 0.85, and three filters at 0.80 and four or more filters at 0.75. In one embodiment, a machine learning betting system may be trained to identify related filters, as well as what filters to combine and or how much to lower the correlation coefficient thresholds. A supervised machine learning algorithm may be trained on historical notification and wager data to develop a model that identifies a relationship between the score of the game the user is watching, teams involved, and the user's location and the user responding to the notification. For example, a user may be highly likely to respond to a notification when the New York Giants are winning by more than ten points, and he is watching the game at his local sports bar. When the multiply filtered dataset exceeds the correlation coefficient threshold, the user is notified of the pending action at step 318. Determine if the user is still logged into the game app at step 320. If the user is still logged into the game app after at least two filters have been applied to the user history database, the notification module will return to step 312 if there are more filters available, it will return to step 302 if there are no more filters to apply and the program will end if the user has logged out at step 322.

[0082] Functioning of the user history database will now be explained with reference to FIG. 4. One skilled in the art will appreciate that, for this and other processes and methods disclosed herein, the functions performed in the processes and methods may be implemented in differing order. Furthermore, the outlined steps and operations are only provided as examples, and some of the steps and operations may be optional, combined into fewer steps and operations, or expanded into additional steps and operations without detracting from the essence of the disclosed embodiments.

[0083] This figure displays the user history database. The database contains one table for each registered user of the game app. That table collects data about each wager the user views and wagers on. That data includes but is not limited to, the teams involved, where the game is being played, the distance to go for a first down, what down it is, the odds, the weather, etc. This data is used to calculate correlations between the type of bet available and the user's wagering history. In this example a wager is counted as five instances of viewing a wager so as to give weight to both. In this fashion the wagers a user takes the time to view are still counted towards the types of wagers they are interested in, but wagers they actually gamble on are given significantly more weight. The five to one ratio is chosen as an example in this embodiment and the ratio would be determined by the system operators. Optionally the level of engagement of the user with viewed, but not gambled upon wagers can be measured so as to scale the value of wagers the user views based on their level of interest. For example, a wager the user strongly considered, as measured by engagement, could count for three views at element 400.

[0084] The foregoing description and accompanying figures illustrate the principles, preferred embodiments and modes of operation of the invention. However, the invention should not be construed as being limited to the particular embodiments discussed above. Additional variations of the embodiments discussed above will be appreciated by those skilled in the art.

[0085] Therefore, the above-described embodiments should be regarded as illustrative rather than restrictive. Accordingly, it should be appreciated that variations to those embodiments can be made by those skilled in the art without departing from the scope of the invention as defined by the following claims.

CLAIMS

What is claimed is:

1. A method of providing notifications to a user of a wager of interest to them in a wagering game, the method comprising:

retrieving, on a processor, from a live action Application Programming Interface (API), data describing characteristics of each of a plurality of actions which correspond to a live event;

determining, on the processor, whether any of the plurality of actions are correlated with a historical interest of the user by applying at least one filter to the historical interest of the user;

generating, by machine learning, a first filter derived from a first characteristic of each action of the plurality of actions;

applying, on the processor, the first filter to a user history database of the server containing actions wagered on or viewed by the user to create a filtered set;

calculating, on the processor, a correlation between odds of each action of the plurality of actions and odds of the filtered set;

comparing, on the processor, the calculated correlation, for each action, to a threshold level; and

outputting, to a user device, a notification to the user describing each action of the plurality of actions for which the calculated correlation exceeds the threshold level.

2. The method of claim 1, further comprising:

using machine learning to identify a cohort of users having similar behavior to the user.

3. The method of claim 2, wherein calculation of the correlation uses wagering history of the cohort of users.

4. The method of claim 1, further comprising:

training a machine learning system to identify the threshold level.

5. The method of claim 1, wherein one or more of the at least one filter are set by the user.

6. The method of claim 1, wherein one or more of the at least one filter are set automatically.

7. The method of claim 1, wherein one or more of the at least one filter correspond to one or more actions in the historical interest of the user where the user placed a wager.

8. The method of claim 1, wherein one or more of the at least one filter correspond to one or more actions in the historical interest of the user where the user viewed a wager at least a predetermined number of times.

9. The method of claim 1, further comprising:

displaying the notification on the user device that one or more wagers are correlated to the historical interest of the user are available;

displaying information about a play in the real time event on the user device; and displaying results of the one or more wagers from the real time event.

10. The method of claim 1, further comprising:

after the calculated correlation does not exceed the threshold level,

iteratively narrowing the filtered set by an Mth filter derived from an Mth characteristic of each action of the plurality of actions; and

determining whether the calculated correlation between odds of each action of the plurality of action and odds of the filtered set thus narrowed exceeds the threshold level until no suitable Mth characteristic for deriving the Mth filter exists.

11. The method of claim 1, further comprising:

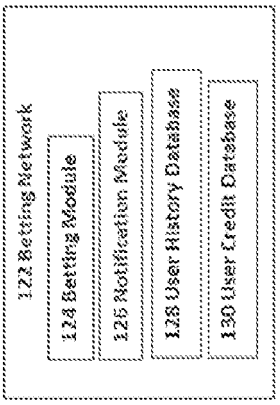
after the calculated correlation does not exceed the threshold level,

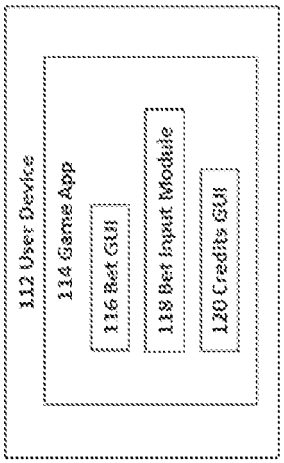
reducing the threshold level; and

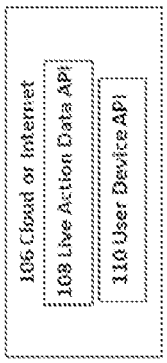
calculating correlations between odds of each action of the plurality of action and odds of the filtered set until the calculated correlation exceeds the reduced threshold level.

12. The method of claim 11, wherein machine learning is used to determine an amount of reduction in the threshold level.

13. The method of claim 1, wherein the machine learning is artificial intelligence.


122 Betting Network
124 Betting Module
126 Notification Module
128 User History Database
130 User Credit Database


112 User Device
114 Game App
116 Bet GUI
118 Bet Input Module
120 Credits GUI


106 Cloud or Internet
108 Live Action Data API
110 User Device API

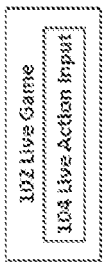

102 Live Game
104 Live Action Input

Fig. 1

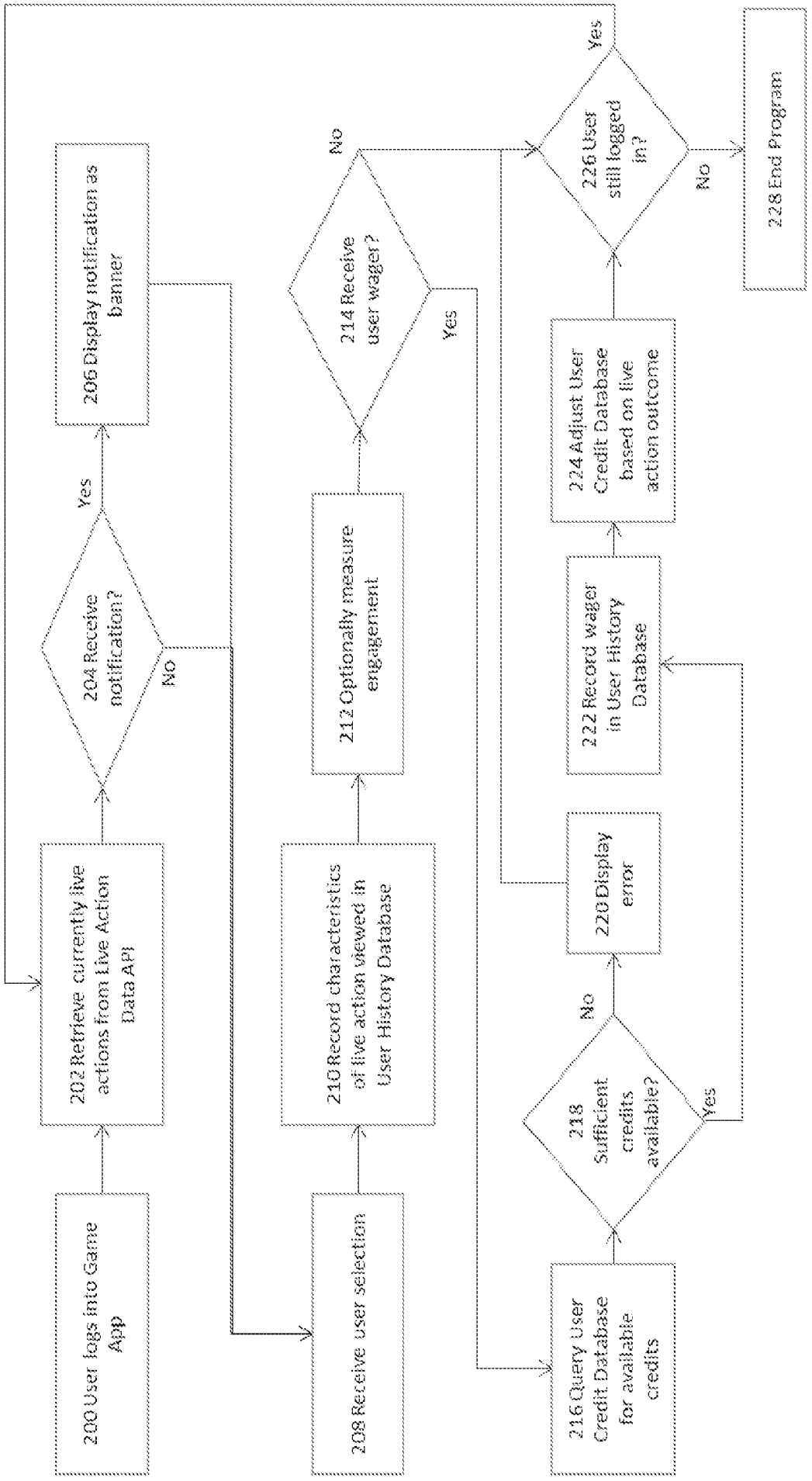

200 User logs into Game App
202 Retrieve currently live actions from Live Action Data API
204 Receive notification?
Yes
No
206 Display notification as banner
208 Receive user selection
210 Record characteristics of live action viewed in User History Database
212 Optionally measure engagement
214 Receive user wager?
No
Yes
216 Query User Credit Database for available credits
218 Sufficient credits available?
No
Yes
220 Display error
222 Record wager in User History Database
224 Adjust User Credit Database based on live action outcome
226 User still logged in?
Yes
No
228 End Program

Fig. 2

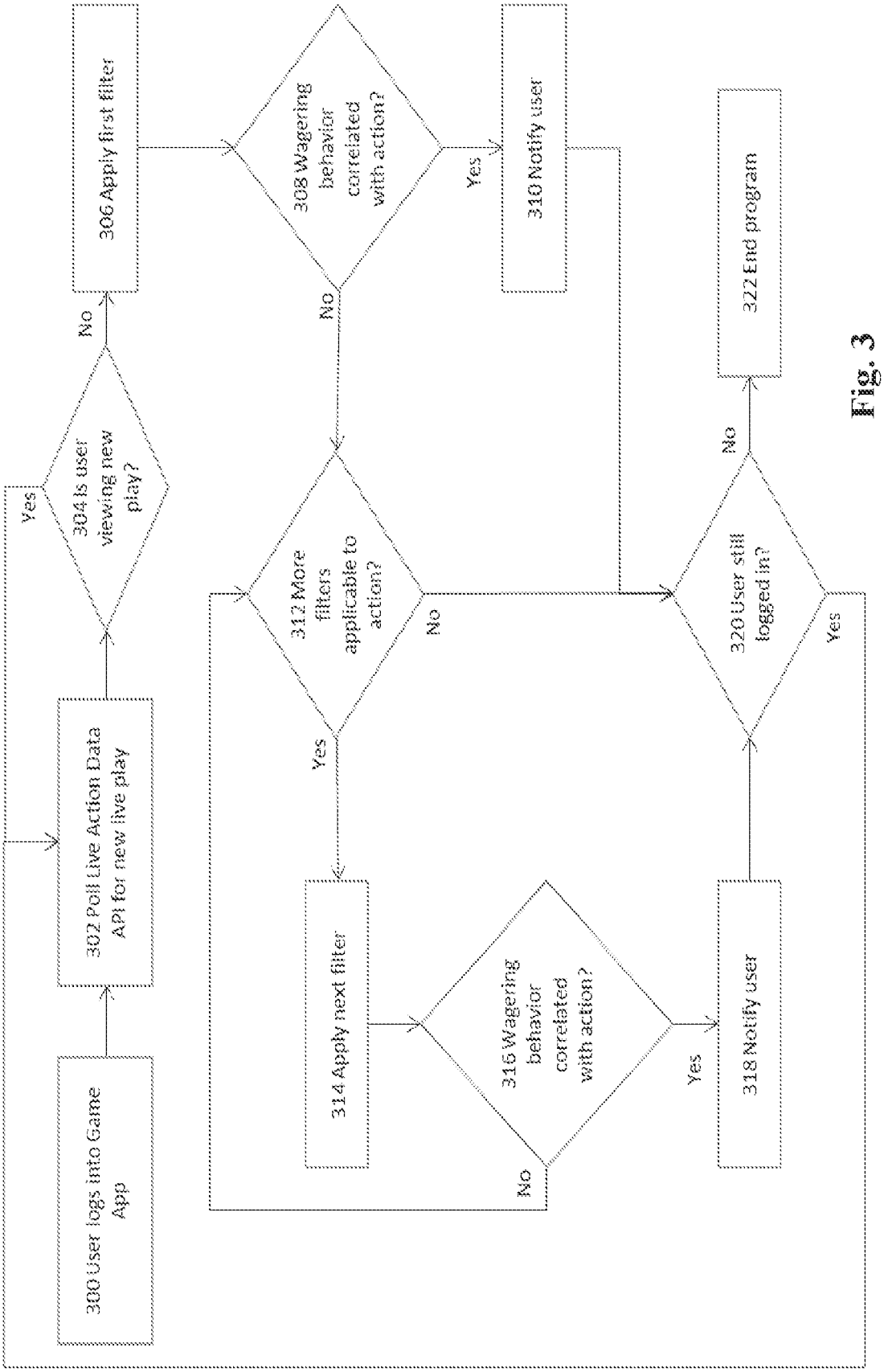

300 User logs into Game App
302 Poll Live Action Data API for new live play
304 Is user viewing new play?
Yes
No
306 Apply first filter
308 Wagering behavior correlated with action?
Yes
310 Notify user
No
312 More filters applicable to action?
Yes
No
314 Apply next filter
316 Wagering behavior correlated with action?
Yes
No
318 Notify user
320 User still logged in?
Yes
No
322 End program

Fig. 3

Action	Wager/View	Odds	Wager Amount	Distance	Offense	Defense	Home Team	Road Team	...	Temperature
1	View	+124		3	NYG	CHI	CHI	NYG		32° F
2	View	+140		5	NYG	CHI	CHI	NYG		32° F
3	Wager	+180	500	7	NYG	CHI	CHI	NYG		31° F
4	Wager	+170	200	6	PIT	CLE	PIT	CLE		72° F
5	Wager	+185	1000	8	NYG	CHI	CHI	NYG		30° F
...										
n	View	+165		1	CLE	PIT	CLE	PIT		52° F

Fig. 4