Title: VIRTUAL GAMING SYSTEM AND METHOD

Abstract: An system and method is described which allows a player to graphically manipulate at least one of the entities or configuration of a virtual three dimensional object, in particular a playing card or gaming tile, in a three dimensional environment in response to continuous touch movements detected on the monitor screen.
Declarations under Rule 4.17:
— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(H))
— of inventorship (Rule 4.17(iv))
VIRTUAL GAMING SYSTEM AND METHOD

FIELD OF THE INVENTION

The present invention relates to a virtual gaming system and method for manipulating a virtual object, in particular, a playing card or gaming tile.

BACKGROUND OF THE INVENTION

Popular casino style games, such as blackjack, poker, baccarat and Caribbean Stud, amongst others, have traditionally been played in casinos and other gaming venues by means of live tables, where the players are physically present at the table, and deal in physical cards, tiles and chips. Live table games provide for an exciting yet often nervous state of play, with players able to view each other's expressions and see the back of each other's cards, during play.

The operational and physical requirements for operating such table games are time- and labour-consuming, requiring not only the physical apparatus including the gaming table, cards or tiles, betting chips, shuffling machines etc, but also trained dealers to operate and control the game.

With the advent of the computer industry, there are now electronic versions of such table games, having electronic dealers, virtual cards, and buttons to execute functions associated with the game being played. Electronic versions of casino style games invoke many advantages over traditional table games, such as increased security for players, increased privacy and lower labour costs. As a result, these games are attractive to casinos, other gaming venues, as well as players, the world over. Electronic gaming can be played in casinos on traditional poker machines or on specialised computer networks, or over the Internet where players can operate the games from external and independent locations.

Many such electronic games are limited to a simplified graphic display, with minimal, if any, option for players to more personally interact with the cards or objects on screen. At present, manipulating virtual cards for example occurs by an animation scheme that involves pre-rendered images of the cards stored in a computer program, with the pre-rendered images being shown at different instances of time upon a trigger criteria being reached or activated by the
player. The pre-rendered image may be generated by a direct drawing of a series of images which then shows the animated movement one step per image, or alternatively using a three dimensional modelling software, such as Cinema 4D® for example.

Casino operators are constantly seeking new ways to increase the options available to players of casino style games to maintain the interest of new and existing players.

SUMMARY OF THE INVENTION

In a broad form, the present invention provides a system and method allowing the orientation or configuration of virtual three dimensional objects, in particular playing cards and gaming tiles, to be graphically manipulated in real time upon continuous touch movements of a player in a three dimensional environment.

In one aspect of the present invention, a method of graphically manipulating a virtual three dimensional object displayed on a monitor screen is provided, the method including the steps of: detecting a trigger touch on said monitor screen; manipulating at least one of orientation or configuration of said object in a three dimensional environment in response to continuous touch movements detected on said monitor screen.

In a second aspect of the present invention, a method for operating a gaming machine is provided, the method including the steps of: displaying at least one game on at least one monitor screen, the game including at least one virtual three dimensional object displayed on said monitor screen; and allowing said player to graphically manipulate at least one of orientation or configuration of said object in a three dimensional environment in response to continuous touch movements detected on said monitor screen.

A software product operatively adapted to carry out the methods above is also provided.

In a further aspect of the present invention, a virtual gaming system is provided, the system including: a processing unit; at least one monitor screen connected to said processing unit; and a touch detection unit associated with each monitor screen, wherein virtual three dimensional objects displayed on said monitor screens are adapted for graphical manipulation in response to
continuous touch movements detected through said touch detection unit, said
manipulation including manipulating at least one of orientation or configuration
of said object in a three dimensional environment.

The present invention provides a method and system that allows the
manipulation of a number of aspects of an object displayed on a monitor in real
time, and in a three dimensional environment.

Throughout this specification, the term "object" is defined by a playing
card or gaming tile.

In one form, the manipulating of at least one of said orientation or
configuration of said object includes applying at least one of translation, scaling,
rotation or complete revealing to said object. These manipulations allows a user
to move the location or position of an object on the monitor screen, increase or
decrease its size, rotate the object to a position within a 360 degree range in
any of its axes, or reveal the object from a face down position to a face up
position, for example, which are advantageous manipulations used in particular
in the gaming environment. In another form, said manipulating of said object
includes subsequently applying a further translation, scaling, rotation, or
complete revealing of said object. This allows a second and subsequent
manipulation to be performed, for example, decreasing the size of the object,
and subsequently rotating the object about 90 degrees, which is again an
advantageous manipulation used in particular in the gaming environment.

In a further form, the method and system further includes manipulating in
a three dimensional environment said object by partially revealing one feature of
said object from an initial orientation in which said one feature is concealed.
This allows a portion of the object to be revealed in response to, or in
anticipation of, the orientation or configuration manipulations. Such a partial
revealing, again performed in real time in the three dimensional environment, is
advantageous to be performed to view one feature of the object, for example
one portion of a face of a playing card that is initially face down, after which the
player can determine whether to reduce or increase the playing card size for
example.

In one form, the monitor is a touch sensitive monitor screen, wherein the
detection of continuous touch movements and/or detection of the trigger touch
is detected by sensing a player's touch on the touch sensitive monitor screen. Having a touch sensitive screen allows the player to touch the screen to implement commands, which removes the need for a mouse or joystick for example, although these may be alternative embodiments.

The present invention, is particularly suited to the electronic gaming industry, where virtual playing cards are displayed on a monitor screen during a game such as poker for example being played. During play of electronic games, players may wish to rearrange and manipulate their cards for ease of play, and also to ensure players cannot view or guess another player's cards. The present invention provides a method and system that allows such manipulations to be performed in a three dimensional environment, and in real time, which, in the gaming industry, will enhance a player's enjoyment of the game and maintain and attract new interest in such electronic games.

**BRIEF DESCRIPTION OF THE DRAWINGS**

An illustrative embodiment of the present invention will be described with reference to the accompanying figures, wherein:

Figure 1 is a top view of a system setup which may be used with one embodiment of the present invention;

Figure 2 is a flowchart of the steps in a virtual gaming system according to the setup in figure 1;

Figure 3 is a flowchart of the steps of an object manipulation algorithm in one embodiment of the present invention;

Figure 4 is a schematic diagram of a translation manipulation according to one embodiment of the present invention;

Figure 5 is a schematic diagram of a scaling manipulation according to another embodiment of the present invention;

Figure 6 is a schematic diagram of a rearrangement manipulation according to another embodiment of the present invention;

Figure 7 is a schematic diagram of a complete revealing manipulation according to another embodiment of the present invention;

Figure 8 is a schematic diagram of a rotation manipulation according to another embodiment of the present invention.
DESCRIPTION OF PREFERRED EMBODIMENT

In an exemplary embodiment, a virtual gaming system provides a playing card or tile game which is presented in a three dimensional representation on monitor screens for human players to play the game. The monitor screens may be touch sensitive screens, which allows a player to issue commands directly upon touching the screen with their finger for example, or alternatively could be a non-touch screen where the commands are issued via a hand control such as a mouse or joystick. The game displayed on the monitor screens is adapted for graphical manipulation in response to commands from a human player in real time.

Figure 1 is a top view of a system setup which may be used with one embodiment of the present invention. The system setup 23 is suitable for use with the game Texas Hold'em. The system setup 23, with which the present invention may be implemented, includes a table 20, ten monitors 1a to 1j, a pool screen monitor 24, a central processor 19, a printer 17, ten bill acceptors 14a to 14j, and ten smartcard reader devices 22a to 22j.

The system setup 23 is one which may be used in a casino where all players are physically present to play the game. In this case, the system setup may not require a human dealer, instead all the dealer's functions are performed by the central processor 19 and/or via the monitor screen 6. In an alternative embodiment, the entire system may be electronic, with the games being conducted via the Internet, where the players may be in different locations throughout the world. Alternatively again, instead of a table 20, the system may be implemented through monitors in different locations of the one casino, where the players may not be able to view the opposing players. A gaming machine may include a computer or network of computers, for example the Internet, a slot machine, or other machine on which games may be played.

With reference again to figure 1, the table 20 may be shaped in an oval design with ten rectangular hollow spaces cut out for mounting the ten monitors 1a to 1j. Preferably, the monitors 1a to 1j are touch screen monitors to eliminate the need for additional hardware components such as a mouse or joystick. One of these monitors 6 may be used for a dealer monitor rather than a player monitor. The table 20 may provide compartments or spaces to place the central
processor 19, the bill acceptors 14a to 14j, smartcard reader devices 22a to 22j and one or more audio speakers. The table 20 may be set up to look and feel like a traditional casino table, with the difference being that all calculations and presentations of the game play are done electronically by the central processor 19 and the monitors 1a to 1j. The pool screen monitor 24 is used to display the community cards according to the Texas Hold'em game rules. In the present embodiment it is not necessary for the pool screen monitor 24 to have any touch screen facility and interface, however this may be an alternative embodiment. In general, the pool screen monitor 24 may be used to show the community cards that are common to each player, or alternatively the pool screen monitor 24 could be used to display the game play of other tables for example.

The monitors 1a to 1j may each include five basic components:

(i) a touch sensor, for instance based on Capacitive, Resistive, Surface Acoustic Wave (SAW) / Grounded Acoustic Wave (GAW) or similar technologies;

(ii) a monitor, for instance based on Cathode Ray Tube (CRT), Liquid Crystal Display (LCD), plasma or similar technologies having a display screen on which the sensor can be fitted;

(iii) a controller for receiving inputs from the touch sensor and perform functions in response to the central processor 19;

(iv) a software driver that allows the controller and central processor 19 to communicate and allows the controller to recognise input detected by the touch sensor.

The central processor 19 may, for example, be a computer having a processing unit (PU), memory storage, video display unit with video Input/Outputs (I/O) to the video interface of the monitors 1a to 1j, at least one audio output unit with audio I/O to an audio speaker, a computer operating system, software drivers for the peripherals, and ports for connection to peripherals such as a printer 17, smartcard reader devices 22a to 22j, and data I/O interfaces and data I/O converters/splitters, where necessary.

A computer software program may be stored in the memory storage of the central processor 19. The program may organise display of all game
components in a Graphical User Interface (GUI) on the touch screen monitors 1a to 1j. The program may filter out relevant data for action, interpret the meaning of data and act on the result of the interpretation. The data may come from I/O interfaces of all the devices/equipment connected to the program. For example, determining the position of a player's touch on a spot in the space of a graphic component on one of the touch screen monitors 1a to 1j may involve converting a co-ordinate corresponding to each of the touch spots into a string of binary data by the controller of the touch screen. The data may then be transferred through serial connections from the controller to the central processor 19. The central processor 19 may extract the data, read the co-ordinates and act out the action associated with the touch spot.

The program may contain algorithms such as a random number controller algorithm and a card manipulation algorithm. The random number controlled algorithm for example may use a Gambling Labs International (GLI) certified random number generator for doing electronic card shuffling. The card manipulation algorithm may be that described in figure 3 and referred to in detail below.

The program may also manage the game play, which may include setting timers for players to respond, issuing, withdrawing, showing and/or shuffling electronic cards at the appropriate time, responding to a player's or dealer's request, ensuring the correct order of taking turns if the game requires players to take turns, calculating winnings and losses and distributing and withdrawing virtual chips based on the credits purchased, won or lost. The program may also produce sound effects or music through the speakers in the correct order (synchronised with the display) and display the objects in the GUI in the correct order (synchronised with the sound) with the correct graphic animation at every instance just before, during or just after a game.

Another feature of the program may enable real-time transfer and processing of data between the monitors 1a to 1j and the central processor 19. For example, in a Windows™ Operating System platform, Windows™ Message Handling and recursive functions may be used for executing real-time operations. Moreover, the program may contain features to track transactions, do accounting, auditing and print reports for all the games held at the table 20.
The printer 17 may be an electronic device for printing receipts issued for every transaction. The printer 17 may comprise printing capabilities for instance based on inkjet/bubblejet, laser, dot matrix or similar technologies, memory storage, serial/parallel ports for connection to a computer such as the central processor 19, a software driver that allows the controller and connected computer operating system to communicate and help the controller to manage printing functions, and a controller for operating printing functions. The printer 17 may also be used for printing reports of selected or all of the records of transactions that take place at the table 20. An example of a transaction is the completion of a player's exchange of cash for chips, wherein a receipt indicating the cash exchanged for chips is printed for the player. In another example, a printer may be made available at each player monitor 1a to 1j e.g. for printing of transaction receipts, winning reports, etc. where the player desires.

The bill acceptors 14a to 14j may be an electronic device that verifies the authenticity of paper currency given by players in exchange of play credits, real chips or virtual chips. The bill acceptors 14a to 14j may include different types of sensors or verifying means such as light reflectors, magnetic imaging scanner and the like to verify the validity of the authenticity and scans the denomination of paper currency.

The smartcard reader devices 22a to 22j may be an electronic device that allows the use of smartcards with data storage capabilities. The smartcard reader device 22a to 22j reads/writes the credit value from/into the smartcard slotted therein. Other electronic monetary systems, such as credit cards, debit cards, or the like, may also be provided for money or credit transaction for game play.

For other electronic monetary systems, an input panel to each player may be required for inputting player's account password or other authentication signature may require for crediting money in exchanged of virtual chips, or real chips for the game play. These other electronic monetary systems may further connect to the central processor 19 to aid in accounting/printing purposes and/or directly connected to printer 17 to print receipts for transactions. They may also be embedded with their own printer to directly print receipts for transactions.
One of the monitors 6 may be situated in the dealer's dealing area and displays the Graphical User Interface (GUI) for a human dealer to operate. Alternatively, the dealer monitor 6 displays the graphic interface of an automated electronic dealer. In this case, no human is required to operate from the monitor. If a human dealer is desired, the dealer controls and manages the game from the GUI. There is no need for the human dealer to be skilled in card handling as electronic cards are used. There is also no need for the dealer to distribute chips, unless otherwise preferred by players or the casino management staff, and calculate the winnings of the card games. All the chips are electronic and the central processor 19 does the calculations of winnings.

Where a human dealer is referred to, it does not necessarily mean he needs to have any card dealing skills or even is involved in dealing, electronically or otherwise. His role is generally that of a game controller, which may include card game promoter, table cashier, table master and/or the like, the system is designed to have a fully automatic mode, semi-automatic mode or a manual mode.

The GUI displayed for a human player may include a credits area 8 showing the player's existing credits, using virtual chips featuring graphics of actual chips used by a casino or standard pre-programmed chips graphics. As the touch screen monitors 1a to 1j are flat, if all the virtual chips are stacked together, from the top view a player may not be able to count the number of existing chips. Hence, the actual credit value of the existing chips on hand appears in a numbers area 18. Also, as mentioned earlier, there may be an allocated card area 9 where dealt cards may be positioned and be capable of manipulation by a human player through touch on the touch screen monitors. There may also be a bet area 10 where virtual chips placed as a bet may be positioned and a win area 11 where virtual chips won in a game may be shown before the chips are collected and stacked back to the credits area 8. Moreover, there may be a menu bar 16 that may be activated to appear on the display when needed. The menu bar 16 may contain hotkeys to the game play where players may access operations such as cancel bet, repeat bet and etc.

Before joining a game, a human player requires either real chips, a smartcard, cash or other electronic monetary means accepted for the game
which the player may pass to a game dealer. The game dealer operates the
GUI on the dealer’s touch screen monitor 6 to send the corresponding credits to
the player’s screen. Authentication using an iButton authentication device or
other security authentication devices such as magnetic access cards, key
switches or the like may be required to prevent unauthorised transactions. A
printed receipt printed from printer 17 may be issued for every transaction and
internal software may track all transactions for accounting and auditing
purposes. If the player uses smartcards, credits may automatically be converted
into virtual chips and shown on the players screen when the card is inserted into
one of the smartcard reader devices 22a to 22j. The iButton authentication
device may be a small, wearable computer, which may take the form of a key
chain designed for secure corporate logins and personal uses.

During play, the human player may place bets by first touching a virtual
chip of a certain value which the player desires to bet in the credits area 8 and
then may touch the bet area 10. In this manner, one virtual chip may be
deposited in the bet area 10. Subsequently, every touch in the bet area 10 may
deposit another virtual chip of the same value into the bet area 10 unless the
player selects another virtual chip of different value by touching on such a
different virtual chip in his credits area 8. All betting may done during a
prescribed betting time window provided by the control processor.

The game system may further provide other time windows to ensure
orderly and smooth game play. When the betting time window is over, a dealing
time window starts. During this time window, according to the game played, the
virtual cards may be dealt like casino live table card games until all the cards
are dealt. After the dealing time window ends, a view cards time window starts,
during the view cards time window, the players can manipulate the card, the
manipulation of which is described in further detail below.

After a won, lost or drawn game is completed, the winnings and losses
may be calculated and collected by and awarded to the players through
animations on the touch screen monitors 1a to 1j. These animations imitate how
real winnings and losses would be collected and awarded in a live table
environment. A player may quit the table at anytime. If he or she is not in the
game, his or her credits may be refunded using real chips, credit tickets or credit back to a smartcard inserted in the smartcard reader devices 22a to 22j.

Figure 2 is a flow chart showing the steps of playing a game on the game setup described above and shown in figure 1.

In step 202 at the start, the human player may touch the touch screen monitor. The touch sensor of the monitor may detect the touch and trigger a response in the controller of the touch screen monitor to activate the software touch screen driver at step 204.

In step 206, the driver may then generate two dimensional (2D) information of the touch. This information may refer to the co-ordinates of the contacted location on the touch screen monitor. The reference values of the co-ordinates may be extracted based on the horizontal and vertical axes.

The 2D information may then be transferred to the central processor 19 via the data I/O serial/parallel connections from the controller of the touch screen monitor 1b to the central processor 19. At step 208, the central processor 19 may convert the 2D touch information into 3D information. A known technique called Ray Picking, for instance, may be adopted for the conversion from 2D touch information to 3D touch information. During conversion, Ray Picking puts the 2D co-ordinates received from the touch screen monitor through a view port transformation, followed by projection transformation, then through world transformation to get the resultant 3D co-ordinates.

After conversion, the central processor 19 may identify the object being touched at the location on the touch screen based on the 2D and/or 3D information (whichever is appropriate for the object) at step 210.

If the touched region is identified as the menu bar 16 in step 212, the central processor 19 may move on to identify the menu button within the menu bar 16 selected by the human player at step 214. Consequently, in step 216, the central processor 19 may invoke software functions to handle the one or more actions associated with the button clicked by the human player. For example, if a 'cancel bet' button is selected during the betting time window, all the bets placed from the time the betting time window is started to the time the 'cancel bet' button is clicked may be withdrawn.
If the touched region is identified as the credits area 8 in step 218, the
touched virtual chip of a specific value within the credits area 8 may be
highlighted at step 220.

Assuming a virtual chip had been highlighted following the steps of 202
to 210 and to 218 and 220. Now, if the touched region is identified as the bet
area 10 in step 222, the highlighted virtual chip may be placed into the bet area
10 at step 224. Subsequently, each further touch on the bet area 10 may place
one of the highlighted virtual chips into the bet area 10.

If the touched region is identified as the card area 9 in step 226, in the
next step 228, the central processor 19 may extract the 2D co-ordinates that
were previously determined in step 206 and later transfer the co-ordinates into
the memory storage of the central processor 19. The central processor 19 may
check if the touch is within a prescribed margin of a virtual card. The
manipulation algorithm may be activated if the touch is within the margin at step
300. Otherwise the process ends until another touch is sensed by the system.

Figure 3 is a flow chart outlining the steps of the manipulation algorithm
300 in accordance with an embodiment of the present invention.

A player touches the monitor wherein he or she is playing at step 301 in
the card area 8 of figure 1. Alternatively the player could use a mouse for the
trigger touch rather than a touch screen monitor. The technique used to convert
the two dimensional touch information into three dimensional information may
be Ray Picking as referred to above.

In this technique, upon detecting the trigger touch, a virtual ray is
produced extending from the touch detection point, eg the finger touch spot, to
an infinite distance "into" the monitor 1a at step 303, wherein the virtual ray
extends at an angle of 90 degrees from the monitor surface. If a playing card or
tile intersects the ray at step 305, the object is inserted into a list of objects at
step 307 according to their depth information. If there are further objects
intersecting with the ray at step 309, the further objects are added to the list at
step 307. Once all intersecting objects have been added to the list, the topmost
object is selected from the list at step 311, the topmost object being the object
of which the player has chosen and hence wishes to manipulate. The
manipulation algorithm is then applied to the selected object at step 313 to manipulate at least one of the orientation or configuration of the object.

The orientation or configuration manipulations that form part of the present embodiment, and that may be applied at step 313, are schematically shown in figures 4 to 8. The orientation or configuration manipulations are not however limited to those described below. In each manipulation, when a human player touches a virtual card within the card area 9, a reference point may be set on a co-ordinate corresponding to the location on the touch screen where the human player touches. The reference point may be a co-ordinate within a margin of the virtual card. For example, the margin may be formed by two offset parameters of the virtual card, corresponding to a specific area of the virtual card such as the lower right hand corner. When the human player touches on the touch screen monitor 1a associated with the margin, a reference point is set.

Once a reference point is set, the touch sensor senses co-ordinates of any continuous touch within the surface area of the virtual card. For every co-ordinate of the continuous touch that the touch sensor sensed, a corresponding angle and distance of the current co-ordinate relative to the previous sensed co-ordinate may be calculated. The corresponding angle and distance may be found by vector dot product.

The angle of a continuous touch's co-ordinate may be used to determine whether the advancement of the continuous touch is within a valid boundary. The valid boundary may be defined when a reference point is set, and may determine which manipulation type should be processed. The reference points for various types of manipulations are described further below with reference to figures 4 to 7. The relevant orientation or configuration manipulation is then performed on the card using the relevant manipulation algorithm.

During the course of the manipulation algorithm, if the touch sensor does not sense any touch on the monitor's screen, ie the human player's finger leaves the monitor's screen, the reference point may be erased and the virtual card may be restored to the original presentation of the card before the touch. Alternatively, upon removal of the player's touch the card may remain the position it was situated immediately prior to the removal of the player's touch.
Figure 4 shows an implementation of the translation manipulation. The translation manipulation allows cards in a three dimensional environment to be translated to different positions on the monitor screen. This manipulation in particular assists right handed or left handed players to better position their cards for viewing, for peeping, or for subsequent manipulations.

The translation manipulation arises from a pre-determined touch on the centre of a card, following which the program will track the movement of the touch in real-time if the touch, such as the player's finger for example, does not leave the screen and continues to move around the screen. The program will move the card in real-time following the movement of the finger, for example, if the finger moves upwards on the screen, the card will be moved upwards.

Figure 5 shows an implementation of the scaling manipulation. The scaling manipulation allows cards to be resized in real-time within a preset minimum and maximum size. This manipulation in particular assists a player to scale their cards to a smaller size sufficient for peeping and other manipulations to ensure other players are unable to see their cards, while also allowing the cards to be scaled to a larger size for viewing ease.

The scaling manipulation arises from a pre-determined touch on the bottom right hand corner of the card, with continuous diagonal movement by the player's finger causing the card to enlarge or shrink in size. The program will track the movement of the touch in real-time if the finger does not leave the screen, and enlarge the card in real-time following outward diagonal movement of the finger. If the finger moves diagonally inwards, the card will be shrunk following the movement of the finger.

Figure 6 shows an implementation of the rearrangement manipulation. The rearrangement manipulation allows a player to rearrange their cards according to their preferred viewing order to minimise the opportunity for other players to guess the cards held. The cards may be overlapped with other cards, or alternatively could be rearranged to not be touching the other cards.

The rearranging manipulation arises from an extension of the translation manipulation outlined above, and results from a selection of the top left hand corner of the card, with continuous touch movements on the screen allowing translation of the card to another position. An auto drop or auto overlap feature
may drop the selected card back to the nearest predetermined position so that
the cards are lined up in order, for example horizontal or overlapping, once the
player's finger leaves the screen.

Figure 7 shows an implementation of the complete revealing
manipulation. The complete revealing manipulation allows a player to
manipulate all their cards in an aligned form to flip up or flip down at the same
time. This allows the player to quickly and simply view the face values of their
cards in a controlled manner.

The complete revealing manipulation arises from a touch on the left or
right hand sides of the card and moving inwards to the card, which will cause
the card to flip and the manipulation is now a touch on the right side of the card,
requesting the program to track the movement of touch in real-time. If the finger
does not leave the screen and continues to move inwards to the card or cards,
the program will flip the card from a card face to a card back or vice versa,
depending upon the origin in real time following the movement of the finger. The
card will flip to the nearest card face or card back position once the finger
leaves the screen.

Figure 8 shows an implementation of the rotation manipulation. The
rotation manipulation allows a player to rotate their cards to any degree. This
allows the player to peep their cards at any angle they prefer, increasing their
game excitement.

The rotation manipulation arises from a touch detected on the top right
hand corner of the card, and a continuous movement downwards will cause the
card to rotate clockwise, requesting the program to track the movement of the
touch in real-time. If the finger does not leave the screen and continues to move
downwards, the program will rotate the card clockwise in real-time following the
downwards movement of the finger, and if the finger moves upwards, the card
will be rotated anti-clockwise following the movement of the finger. The card will
rotate to the nearest 90 degree point vertical or sideways once the finger leaves
the screen.

As described above, determining which manipulation function to apply to
the cards is determined by the area on the card that the player touches.
However, in other embodiments, other determining methods may be used, for example, a menu box appearing.

After one of the above manipulations has occurred, the player may wish to further manipulate their cards by partially revealing a feature, for example a portion of the face of a card, which is initially in an orientation where the face is concealed, for example where the face is in a face down position, also known as "peeping". Peeping allows a player to view a portion of their cards in real-time through detection by continuous touch movements. The peeping manipulation is described in detail in the present Applicant's co-pending PCT application, PCT/SG2004/000186, which is incorporated herein by cross-reference.

The present invention may be implemented in a variety of electronic casino style games, for example, blackjack, poker, baccarat, Caribbean Stud, Pok-Pek-Kow, Texas Hold'ems, Omaha 8, among others. It is especially useful for player against player games, where players must take due care not to disclose their cards or tiles to other players during the course of play. It may be implemented on a gaming machine such as a computer network, or a traditional modified slot machine, on which a game is displayed and a player is allowed to make wagers on the game. The graphics of the game includes virtual three dimensional playing cards or tiles, of which the card or tile's orientation or configuration can be graphically manipulated.

Any discussion of documents, acts or knowledge in this specification is included to explain the context of the invention. It should not be taken as an admission that any of the material forms part of the prior art base or the common general knowledge in the relevant art.

The present invention has been described with reference to particular implementations. However, it will be appreciated that persons skilled in the art could implement the present invention in many different ways to satisfy the demands of their particular game and systems without departing from the spirit and scope of the invention.
CLAIMS:

1. A method of graphically manipulating a virtual three dimensional object displayed on a monitor screen, the method including the steps of:
   5   detecting a trigger touch on said monitor screen; and
   10  manipulating at least one of orientation or configuration of said object in a three dimensional environment in response to continuous touch movements detected on said monitor screen.

2. A method according to claim 1, wherein manipulating at least one of said orientation or configuration of said object includes applying at least one of translation, scaling, rotation or complete revealing to said object.

3. A method according to any one of the preceding claims, further including the step of manipulating said object by partially revealing one feature of said object from an initial orientation in which said one feature is concealed.

4. A method according to any one of claims 2 or 3, wherein said manipulating of said object includes subsequently applying a further translation, scaling, rotation, or complete revealing of said object.

5. A method according to any one of the preceding claims, wherein said monitor screen is a touch sensitive monitor screen.

6. A method according to any one of the preceding claims, wherein said detection of said trigger touch is detected by sensing a player's touch on a touch sensitive monitor screen.

7. A method according to any one of the preceding claims, wherein said detection of said continuous touch movements is detected by sensing a player's touch on a touch sensitive monitor screen.
8. A method for operating a gaming machine, the method including the steps of:

- displaying at least one game on at least one monitor screen, the game including at least one virtual three dimensional object displayed on said monitor screen; and
- allowing said player to graphically manipulate at least one of orientation or configuration of said object in a three dimensional environment in response to continuous touch movements detected on said monitor screen.

9. A method according to claim 8, wherein manipulating at least one of said orientation or configuration of said object includes applying at least one of translation, scaling, rotation or complete revealing to said object.

10. A method according to any one of claims 8 or 9, further including the step of manipulating said object by partially revealing one feature of said object from an initial orientation in which said one feature is concealed.

11. A method according to any one of claims 9 to 10, wherein said manipulating of said object includes subsequently applying a further translation, scaling, rotation, or complete revealing of said object.

12. A method according to any one of claims 8 to 11, wherein said monitor screen is a touch sensitive monitor screen.

13. A method according to any one of claims 8 to 12, wherein said detection of said trigger touch is detected by sensing a player's touch on a touch sensitive monitor screen.

14. A method according to any one of claims 8 to 13, wherein said detection of said continuous touch movements is detected by sensing a player's touch on a touch sensitive monitor screen.

15. A software product operatively adapted to carry out the method of any one of the preceding claims.
16. A virtual gaming system including:
   a processing unit;
   at least one monitor screen connected to said processing unit; and
   a touch detection unit associated with said monitor screen, wherein
   virtual three dimensional objects displayed on said monitor screen are adapted
   for graphical manipulation in response to continuous touch movements detected
   through said touch detection unit, said manipulation including manipulating at
   least one of orientation or configuration of said object in a three dimensional
   environment.

17. A virtual gaming system according to claim 16 wherein said monitor
   screen is a touch sensitive monitor screen.

18. A virtual gaming system according to claim 17 wherein said touch
detection unit is a touch sensing unit associated with said touch sensitive
monitor screen, and wherein said continuous touch movements are detected by
sensing a player’s touch on said touch sensitive monitor screen.

19. A virtual gaming system according to any one of claims 16 to 18 wherein
   said manipulating of said object includes applying at least one of translation,
   scaling, rotation or complete revealing to said object.

20. A virtual gaming system according to any one of claims 16 to 19 wherein
   said object is further adapted to manipulate said object by partially revealing
   one feature of said object from an initial orientation in which said one feature is
   concealed.

21. A virtual gaming system according to any one of claims 19 to 20 wherein
   said manipulating of said object includes subsequently applying a further
   translation, scaling, rotation, or complete revealing of said object.

22. A virtual gaming system according to any one of claims 16 to 21 wherein
   said monitor screen is divided into a set of functional areas, and the processor
processes touch detected through the touch detection units based on said functional area in which the touch was detected.

23. A virtual gaming system according to claim 22, wherein said set of functional areas includes a playing cards area.

24. A virtual gaming system according to any one of claims 22 or 23, wherein said set of functional areas includes a chip holding area and a betting area.

25. A virtual gaming system according to claim 24, wherein said processor instructs the removal of a chip from display in said chip holding area and display of the chip in said betting area as a result of a single touch detected in said chip holding area through said touch sensor unit, followed by a touch detected in said betting area.

26. A virtual gaming system according to claim 24, wherein said processor instructs the removal of another chip of the same value from display in said chip holding area and display of said chip in said betting area as a result of a subsequent single touch detected in said betting area.

27. A virtual gaming system according to any one of claims 16 to 26 further including a dealer monitor screen connected to said processor unit for displaying shuffling of a stack of cards and dealing of cards to said at least one monitor screen.

28. A virtual gaming system according to claim 27, wherein a touch sensor unit associated with said dealer monitor screen facilitates said dealer monitor screen to function as a user interface to said processor unit.

29. A virtual gaming system according to any one of claims 16 to 28, further including a sound unit for providing an audio signal under the control of said processor unit, and said processor unit is capable of manipulating said audio signal based on signals from said touch sensor unit.
30. A virtual gaming system according to any one of claims 16 to 29, further including a payment unit, and said processor unit accounts transactions of each player.

31. A virtual gaming system according to claim 30, wherein said payment unit includes one or more of a group including an electronic funds transfer machine and a notes reader.

32. A virtual gaming system according to any one of claims 16 to 31, wherein the system is operable under an automatic mode without a human controller.

33. A virtual gaming system according to any one of claims 16 to 31, wherein the system is operable under a semi-automatic mode with a human controller.

34. A virtual gaming system according to any one of claims 16 to 31, wherein the system is manually controllable by a human controller.
Figure 1
Figure 2
Start

Player touches screen

An imaginary ray is produced from the tip of finger to an infinite distance along the direction pointed

Is an object intersecting ray

Insert object into list according to depth information

Are there any more objects intersecting ray

Select the topmost object from list

Apply manipulation (scaling, translation, rotation)

End

Figure 3
### A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl.

G06F 3/033 (2006.01) 
G06T 17/40 (2006.01)

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

### B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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

Electronic database consulted during the international search (name of database and, where practicable, search terms used)

DWPI, USPTO, Google (Keywords: 3D, three, dimen, touch)

### C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of Box C

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Date of the actual completion of the international search: 09 November 2006

Date of mailing of the international search report: 16 Nov 2006

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Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX