

APPARATUS AND SYSTEM FOR REVEALING
GRAPHICAL ITEMS ON A MULTI-TOUCH INTERFACE

Cross-reference to related application:

[001] This patent application relates in subject matter to U.S. Patent Application serial number 12/917,744, filed 02 November 2010, entitled: METHOD AND SYSTEM FOR SECRETELY REVEALING ITEMS ON A MULTI-TOUCH INTERFACE.

Field of the Invention:

[002] The invention pertains to user interaction with a multi-touch interface, and particularly to ways of detecting touch by a human hand.

Background of the Invention:

[003] The Apple iPhone[™] popularized the multi-touch interface to the extent that it has become to be a must-have feature on smart phones. Multi-touch technology is also gaining prominence with computer systems and current operating systems are adapted to handle multi-touch interfaces. Multi-touch interfaces are employed in restaurant order systems, retail systems, handheld tablets, and on laptop computers, for example. This technology is also gaining popularity with video gaming and entertainment systems.

[004] Traditional methods of revealing items on a multi-touch screen include using a finger to press and thereby actuate a virtual button, or to drag a finger along a screen to see a list of items, or to scroll lengthy text across the screen. It is possible, however, that others may see the items revealed while the user is scrolling or actuating a virtual button.

[005] Secrecy is typically sought by those engaged in financial transactions. Card gaming, particularly where are financial rewards are sought, is another field where publicly revealing information can have adverse effects on game play and ultimately any financial rewards gained. Even where financial reward is not at stake, the prospect of winning a card game provides ample incentive for players to maintain secrecy.

[006] There have been various attempts to effectively operate card games on an electronic gaming interface. Such attempts provide varying degrees of secrecy.

[007] US Patent Publication Number US2006/0058091 A1 discloses card gaming machines having interfaces in a networked environment to facilitate tournament card-game play. The machines are particularly adapted for poker gaming, where some cards are revealed to all players, and other cards are not. Hole cards, which normally lie face down, are revealed to a player by touching a virtual button on the touch screen near the hole cards.

[008] European Patent Number EP2218486 A1 Claims a two-handed method of operating a touch screen user interface for card gaming machines. A virtual card, or card stack, is shown on a touch screen. A user places the edge of one hand on the screen to activate the screen. The user slides a finger of the other hand to reveal playing cards. The position of the screen-activating hand promotes secrecy. One limitation of this method is that two hands are required.

[009] A drawback of many interfaces is that card values or other information may be inadvertently revealed to others. What is desired is a method and system employing an interface that will assure that playing cards not intended to be revealed to others remain hidden from public view. What is also desired is a way of assuring that cards are revealed only by a user situated in front of the playing cards, and not another card player.

SUMMARY OF THE INVENTION

[0010] An apparatus for selectively viewing a graphical item includes a computer in operative communication with a multi-touch interface. The computer having memory, a processor, and software. The multi-touch interface includes a display for displaying a graphical item having a value. The graphical item is displayable in a first state where the value is viewable by a user and a second state where the value is hidden from view. The multi-touch interface is adapted to simultaneously detect touch at multiple points of contact. The apparatus includes a means for determining if the touch is caused by a human hand, which is in operative communication with the computer. In one embodiment, the means for determining is allocated memory and processing resources of the computer, which is programmed appropriately. When the interface senses touch, and the means for determining determines when the touch is caused by a human hand, and causes the interface to display the value.

[0011] Optimally the means determining calculates the orientation of the human hand based on multiple points of contact on the interface. Orientation is important because the graphical

item is intended to be revealed solely to the user situated in front of the card hand. Should the hand of another at the table touch the multi-touch interface, any lack of appropriate orientation will prevent the apparatus from shifting the graphical item from the second state where the graphical item value is hidden to the first state where the graphical item value is displayed. Graphical items may include images, or streaming video.

[0012] The sensed touch has curved pattern having an orientation indicative of the lateral edge of a human hand of a user situated directly in front of a card hand. When the human hand contacts the multi-touch interface, the means for determining detects the curved pattern and its orientation to determine that the touch is caused by a human hand. The means for determining also detects movement of the hand. When the orientation matches certain pre-defined, or machine learned criteria, the means for determining enables the graphical item value to be revealed. The computer includes a timer for revealing the item for a particular duration, and may be programmed to delay revealing the item.

[0013] The touch is contemplated to encompass a region, represented by points of contact or lines. Ideally, the touch has a first component indicative of touch from a distal phalanx, a second component indicative of a middle phalanx, and a third component indicative of a proximal phalanx, and a fourth component indicative of the lateral edge of the hypothenar of a human hand. Simply stated, these components are interconnected and the apparatus detects the distance between end points on the first component and the fourth component. When the endpoints are within a pre-determined range, or a range determined by machine learning, the graphical item value is displayed to the user.

[0014] In one embodiment of the invention the multi-touch interface has multiple predetermined user areas where graphical items are displayed and touch is sensed. The first component and the fourth component align at an angle with respect to each other within the predetermined user area, and the means for determining if the touch is caused by a human hand compares the relative angles of each of the first component and the fourth component within the user interface to determine if the touch is caused by a human hand.

[0015] According to another embodiment, the first, second, third and fourth component define a sub-region within the user area, when the sub-region occupies an area “A” within a pre-determined magnitude, the value is displayed. The area “A” and the distance “d” between

endpoints, and the angle at which the first and fourth components are aligned cooperate to help the computer determine whether the touch is from a human hand and whether the touch has been initiated from a player situated in front of the graphical item.

[0016] One use of the apparatus is for card gaming, wherein the graphical item is a playing card having a value, so that the multi-touch interface selectively reveals the value of the card in response to the touch.

[0016a] According to a first aspect of the present invention there is provided an apparatus for selectively viewing a graphical item, comprising:

a multi-touch interface including a display for displaying a graphical item having a value, the graphical item being displayable in a first state where the value is viewable and a second state where the value is hidden from view, the multi-touch interface being adapted to detect touch;

a computer in operative communication with the multi-touch interface, the computer having memory, a processor and means for operating the multi-touch interface, the memory stores data characteristic of at least one human hand; and

a means for determining if the touch is caused by a human hand, said means being in operative communication with the computer for detecting multiple points of contact and comparing the multiple points of contact to the stored data characteristic of at least one human hand;

wherein when the interface senses the touch, and the means for determining determines when the touch is caused by a human hand, the computer causes the multi-touch interface to display the value;

wherein the touch has curved pattern having multiple points of contact with the interface and an orientation indicative of the lateral edge of the human hand contacting the multi-touch interface and the means for determining detects the curved pattern and its orientation to determine when the touch is caused by a human hand.

[0016b] According to a second aspect of the present invention there is provided a card gaming apparatus, comprising:

a multi-touch interface including multiple user areas, each user area includes a display for displaying a graphical item having a value, the graphical item being displayable in a

first state where the value is viewable and a second state where the value is hidden from view, the multi-touch interface being adapted to detect touch;

a computer in operative communication with the multi-touch interface, the computer having memory, a processor and software, for operating the multi-touch interface, the memory stores data characteristic of touch by a human hand;

a means for determining if the touch is caused by a human hand, said means being in operative communication with the computer for detecting multiple points of contact and comparing the multiple points of contact to the stored data characteristic of at least one human hand;

wherein when the interface senses the touch, and the means for determining determines when the touch is caused by a human hand, the computer causes the interface to display the value;

wherein the touch has a curved pattern having multiple points of contact with the interface and an orientation indicative of the lateral edge of a human hand contacting the multi-touch interface and the means for determining detects the curved pattern and its orientation to determine when the touch is caused by a human hand and when the curved pattern faces a particular user.

BRIEF DESCRIPTION OF THE DRAWINGS

- [0017] FIG. 1A is a perspective view of a room having several gaming tables.
- [0018] FIG. 1B is a top perspective view of a single gaming table.
- [0019] FIG. 2 is a top view of a gaming table.
- [0020] FIG. 3 is a top view of an interface displaying a card.
- [0021] FIG. 4 is a top view of an interface displaying a card.
- [0022] FIG. 5 is a top view of a card.

- [0023] FIG. 6 is a top view of an interface displaying an object.
- [0024] FIG. 7 is a top view of an interface displaying a value.
- [0025] FIG. 8 is an interface with a computer.
- [0026] FIG. 9 is a system diagram in accordance with the present invention.
- [0027] FIG. 10 is a top view of a gaming table having a plurality of user areas.
- [0028] FIG. 11 is a top view of a user area of FIG. 10 showing the contact area of a human hand.
- [0029] FIG. 12 is a top view of a user area of FIG. 10 showing the contact area of a human hand.
- [0030] FIG. 13 is a top view of a user area of FIG. 10 showing the contact area of a human hand.
- [0031] FIG. 14 is a perspective view of the lateral edge of a human hand on the user area of FIG. 10.

DETAILED DESCRIPTION

[0031] FIG. 1A shows a room having numerous gaming tables 10. Each table 10 includes a number of interfaces 12 mounted on the table to facilitate game play. Each interface 12 includes a screen capable of tactile input and visual output. It can be appreciated that many rooms may be networked together, and even networked with on-line gaming interfaces. Numerous players in a networked gaming environment enable tournament play, progressive jackpots and other game variants possible with numerous players.

[0032] FIG. 1B shows an embodiment of a gaming system having a single table 10. The single table 10 has a table top 11, which includes a single multi-touch interface 12 to enable multiple players to share the multi-touch interface 12. The interface 12 displays a dealer hand 24 and four player card hands 26. Each dealer hand 24 and card hand 26 consists of a discrete group of cards. Displaying more than one player card hand 26 expedites game play for players grouped at the table 10. It can be appreciated that while each player card hand 26 may be representative of players in close proximity, or at the same table, the player card hands 26 may also be representative of remote players communicating via a network.

[0033] The table 10 has a support structure, housing, or cabinet, which provides physical support for the interface 12 and other features needed for a gaming machine. The system is configured such that a player can operate it while standing or sitting. It should be appreciated that the game table may be configured in other suitable manners.

[0034] Preferably, the table 10 includes any suitable combination of a printer, a chip tray, a bill acceptor, a secure cashbox, and a smartcard reader device. The table 10 also may house speakers for enabling audio output.

[0035] The table 10 may be adapted for displaying game graphics representative of actual objects of various game including cards, dice, and game boards. The table 10 also displays game functions such as bets required, outcomes and awards to one or more players. This enables one or more players and dealers to simultaneously or sequentially interact with the game tables using their hands, or using other physical objects such as playing cards, dice, or wagering chips or other suitable input devices.

[0036] While the table 10 has single interface 12 for all players, advantageous variations include a system having a table 10 with a separate interface for each player, or each team of players.

[0037] FIG. 2 shows an interface 12. The interface 12 displays a card game with cards 14 and playing chips. Each card 14 is a virtual card, being a representation of a physical playing card. Each card 14 has a back side 18 and a face 20. The back side 18 has a pattern, and the face 20 has a value. For example, card 22 has a value displayed as a graphic with the letter “A” and diamond shape, and being displayed in the color red. This graphic is recognizable by astute card players as being an Ace of Diamonds. Cards 14 may also have graphics representative of numerical values, or any value of a card deck.

[0038] In an alternate embodiment, each player has an individual interface, and the individual interfaces are networked together and each interface displays a single player hand.

[0039] FIG. 3 shows a hand 30 of a human player on a portion of the interface 12. It is understood that the hand may be a left hand or right hand. The interface 12 displays a playing card 40. The hand 30 has a medial edge 32 including a thumb 36, and a lateral edge 34 including a pinky finger 38. The hand 30 moves over the card 40 in the direction of the arrow 43. In particular, the lateral edge 34 initially touches the interface 12 along numerous points of contact 42 in proximity of the card 40. The card 40 has a center. The hand 30 slides on the interface 12 towards the center in the direction of the arrow 43 to reveal a portion of the card. According to one aspect of the invention, the hand 30 slides with linear movement.

[0040] The interface 12 detects the initial touch and movement of the multiple points of contact 42, which causes the value of the card 40 to be revealed. Detecting the touch as multiple points of contact 42 and movement thereof, assures that the lateral edge 34 of the hand 30 is positioned optimally with respect to the interface 12 to hide the value of the card 40 from other players.

[0041] A method of the invention includes providing the interface 12 and displaying a card 40 having a value on the interface 12. The method also includes detecting a touch on the interface 12. The touch includes a curved pattern having multiple points of contact 42 with the interface 12 and is indicative of the lateral edge 34 of a human hand. The multiple points of contact 42 are located along a curved line that is defined by the lateral edge 34 of the human hand. In one embodiment, the touch includes a sweeping movement of the multiple points of contact 42 over a portion of the interface 12 and the interface 12 reveals the value of the card 40 in response to the sweeping movement.

[0042] The value of the card 40 is revealed by bending the card 40 to reveal at least one corner of the card 40, wherein the value is represented by a graphic including a letter or number.

[0043] In accordance with one embodiment of the invention, the method completes by un-detecting the touch and hiding the value of the card 40. This is accomplished by displaying the back side of the card previously displayed card. In an alternate embodiment, the method completes by detecting a reverse sweeping movement away from the card 40 to hide the value of the card 40.

[0044] FIG. 4 shows a human hand 30 having a wrist 44 and an axis 46 defined through the wrist 44. The hand 30 is relaxed having a natural curl, resulting in a curve being defined along the lateral edge 34. Extension of the wrist moves the hand about the axis 46 through the angle α . Preferably, the angle α is between 10 and 60 degrees.

[0045] As the wrist the fingers and the lateral edge 34 of the hand sweep in an arcuate movement pattern over the card 40. The axis 46 is the center of rotation for the arcuate movement, which is generally represented by the direction of the arc-arrow 48. It can be appreciated that the fingers also extend slightly, because the wrist and fingers often extend and flex together during normal anatomical movement.

[0046] The card 40 has a corner 50. Preferably the movement of the lateral edge 34 is away from and over the corner 50 of the card. The corner 50 of the card flips, revealing the card value when the hand passes over the card 40, away from the corner 50.

[0047] FIG. 5 shows the card 40. The card 40 has a center 52, a latitudinal line 54 and a longitudinal line 56. The lines 54 and 56 are perpendicular to each other and each are defined along a central axis of the card 40. According to one variation of the invention, the arcuate movement is defined by the arrow 58 and moves between the corner 50 of the card 40 towards the latitudinal line 54. According to another variation of the invention, the arcuate movement extends between the corner 50 towards the longitudinal line 56. In another variation of the invention, the arcuate movement extends generally towards the center 52.

[0048] The angle α shows an arcuate movement from near the latitudinal line 54 towards the longitudinal line 56. The angle β shows a second arcuate movement pattern from near the corner 50 of the card past the latitudinal line 54 and towards the longitudinal line 56.

[0049] It can be appreciated that while the arcuate movement is shown generally as a curve having a center of curvature at the axis 46. It can be appreciated, however, that movement of the hand is typically not a uniform arc but a function of the movement of the wrist, fingers, elbow and shoulder. The wrist and fingers are of primary import and yield the most range of motion for activities such as writing and flipping cards. The invention includes learned pattern recognition algorithms to recognize movements of players. Accordingly the term “arcuate” as used herein includes a variety of curves indicative of the natural movement of the hand.

[0050] FIG. 6 shows a hand 30 concealing an object 60 displayed on an interface 12. The object 60 includes a keypad for entering a personal identification number, or other number. The hand 30 has multiple points of contact 42 with the interface 12 to enable the hand 30, when slightly curled and having the lateral edge in contact with the interface 12, to conceal the keypad from others. Sweeping the lateral edge 34 along the interface 12 enables the multiple points of contact 42 to create a recognizable linear or arcuate pattern, while concealing the keypad 60 from others. In the present embodiment the object 60 is being displayed upon recognition of the touch pattern of the multiple points of contact 42. In a case where the hand is being removed from the interface then the object 60 will be hidden again. The position of the object 60 on the display may be determined by the position information of the multiple points of contact 42, or at least one of those contacts, such that the displayed object 60 will be positioned in the near vicinity of the hand respectively the touch pattern.

[0051] A point of reference of the object 60 as located at (y_2, x_2) and is a particular distance from a point of reference of the points of contact 42 at (x_1, y_1) . When this distance is within a certain range and orientation, the points of contact 42 enable recognition of the touch pattern. Recognition of the touch pattern enables the object 60 to be displayed.

[0052] FIG. 7 shows the hand 30 in contact with the interface 12 along multiple points of contact 42. The hand 30 conceals a secret value 68. The value 68 is preferably a numerical value representative of a financial account balance. Movement of the hand 30 in contact with the interface 12, and in the direction of the arc-arrows 48 reveals the value 68 to the user. The hand 30 is slightly curled, having a curved lateral surface 34 in contact with the interface 12, the curled orientation of the hand conceals the value 68 from others. According to a further aspect, the position of the value 68 on the display may be dependent on the position of the touch pattern

defined by means of the hand 30 respectively by the multiple points of contact 42 and the position of the value 68 on the display may track the movement of the hand 30 for instance if moved in direction of the arc-arrows 48.

[0053] FIG. 8 shows an interface 12 in operable connection with a general purpose computer 84. The interface 12 includes a touch sensor 80 integrated with a video display 82, and in communication with the computer 84. The computer 84 includes a main board 86 having a controller, memory for storing software and software drivers, and a central processor.

[0054] The touch sensor 80 preferably is a type based on Capacitive, Resistive, Surface Acoustic Wave (SAW) / Grounded Acoustic Wave (GAW) or similar technologies. It can be appreciated that numerous ways of sensing motion on or above an interface are available and may be developed. The invention can be adapted to such numerous technologies.

[0055] The controller receives inputs from the touch sensor 80 and performs various functions in response to the central processor. The memory stores a software driver that allows the controller and central processor to communicate with the interface and allows the controller to recognize input detected by the touch sensor.

[0056] The computer 84 may be positioned in close proximity to the interface 12 in accordance with one aspect of the invention. In accordance with another aspect of the invention, the computer is integrated in a remote server and the interface communicates with the server. The computer 84 includes a central processor, memory storage, video display unit with video Input/Outputs (I/O), at least one audio output unit with audio I/O to an audio speaker, a computer operating system, software, software drivers for all I/O peripherals, and serial/parallel and/or USB ports for connection to peripherals such as a printer, smartcard reader devices, and Data I/O interfaces and Data I/O converters/splitters.

[0057] A software program is stored in the memory storage of the computer. The program organizes the display of all game components displayed on the interface. The program filters relevant data for action, interpret the meaning of the touch and movement, with considerations from a previous event, present state or a predicted event, and act on the result of the interpretation.

[0058] The program comprises algorithms including touch recognition algorithms, a random number controlled algorithm and card bending algorithm. The random number controlled algorithm for example may use a Gaming Labs International (GLI) certified random number generator for doing electronic card shuffling. The card bending algorithm is designed to provide realistic card flipping.

[0059] The program manages game play, which includes setting timers for players to respond, issuing, withdrawing, showing 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 the virtual chips based on the credits purchased, won or lost. The program also produces sound effects or music through the speakers and displays objects in the interface.

[0060] FIG. 8 shows an interface 12 along with functional hardware. The interface 12 includes a touch sensor 80 integrated with a video display 82, and in communication with a general purpose computer 84. The computer 84 includes a main board 86 having a controller, memory connected to the main board 86 for storing software, software stored in the memory for operating the interface, software drivers, and a main processor.

[0061] FIG. 9 shows a system diagram of the computer 84. The main board 86 includes memory 88 being a computer readable medium, a main processor 90 and RAM 92 connected in operative communication. The computer 84 has an input output I/O controller 94. The I/O controller 94 communicates with a control panel 96, a touch screen unit 98, a display unit 100, a coin acceptor 102, a bill acceptor 104, a card reader 106, a ticket reader/printer 108, and a sound circuit 110. The sound circuit 110 is in operative communication with speakers 112.

[0062] The memory 88 stores data characteristic of at least one human hand, particularly formatted for ease in pattern recognition based on the multiple points of contact typical of a human hand. Preferably, the memory 88 stores data received by the system during use, and also stores data from a database of samples pre-programmed into the memory. The stored data enables the computer 84 to apply machine learning algorithms adapted for pattern recognition to enable the computer 84 to continually update the memory 88. The stored data and the pattern recognition algorithms enable the computer to rapidly determine when a touch is from a human hand, when the hand is flexed or extended, the size of the hand, and the orientation of the hand to

enable the system to verify that the touch is authorized, i.e. made by a person positions in front of a card hand.

[0063] The touch screen unit 98 preferably includes a touch sensor 80 integrated into the display unit 100. The touch screen unit 98, according to one aspect of the invention, includes a monitor based on Cathode Ray Tube (CRT), Liquid Crystal Display (LCD), plasma, thin film transistor liquid crystal display (TFT-LCD), or similar technologies having a display screen on which the touch sensor 80 can be arranged, fitted or integrated.

[0064] The coin acceptor 102 and the bill acceptor 104 accept currency and communicate the amount accepted to the I/O controller 94. The card reader 106 reads credit cards, debit cards, gift cards or other card having electronic indicia of monetary value.

[0065] The ticket reader 108 prints tickets and receipts revealing the winnings of a player, or other financial outcome. The ticket reader 108 also receives tickets having indicia of monetary value.

[0066] The sound circuit 110 is configured to provide an acoustic-based interface for the user. Each movement or action by a user may result in a particular sound, or instruction being generated by the computer 84. The speakers 112 communicate the sounds to the user.

[0067] FIG. 10 shows a portion of a table 120 having predefined user areas where in the present case a first user area 122a, a second user area 122b, and a third user area 122c is shown. Each user area 122a, 122b, and 122c includes a discrete multi-touch interface to enable user interaction with the table 120. Preferably user area boundaries are displayed on the table 120. A first user hand 124a may be placed on the first user area 122a, a second user hand 124b may be placed on the second user area 122b, and a third user hand 124c may be placed on the third user area 122c. Each user hand 124a, 124b, 124c generates a respective group of numerous points of contact 126a, 126b, 126c representative of each respective hand.

[0068] The table 120 in the present case is rectangular, having one user area on each side of the rectangle. It can be appreciated that the table 120 can be round, oval, or any other shape. Also, additional user areas can be defined where users are positioned in a side-by-side arrangement and distanced appropriately to prevent one user from seeing cards revealed by another user in the side-by-side arrangement. The user areas 122a, 122b, and 122c have a

predetermined shape and size. The shape may be any shape to achieve the functionality of the present invention and the size is large enough to fit a user's hand.

[0069] Each user area 122a, 122b, and 122c, in one embodiment has a trapezoidal shape to conform to the most likely area where a users hand and wrist and hand can lie on the table 120. Operating the interface 12 of the table 120 in the present case is based on a co-ordinate system defined by an x-axis 128 and a y-axis 129 that conforms roughly to the side 130 and the side 132 of the table 120, respectively. The side 130 defines a boundary of the user area 122c and the side 132 defines a boundary of the user area 122b, which is the longest side of a trapezoid in one embodiment.

[0070] FIG. 11 shows a user area 134 on the interface 12 of FIG. 10. The user area 134 detects touch of the hand of a user. The user area 134 particularly detects a first component 164 representing the distal phalanx, a second component 166 representing a middle phalanx, a third component 168 representing a proximal phalanx, and a fourth component 170 representing the lateral edge of a hypothenar of a human hand. Together, the first component 164, the second component 166, the third component 168 and the fourth component 170 represent a lateral edge of a user hand.

[0071] The first component 164 and the fourth component 170 each have a corresponding axial line 150 and 152, respectively. The axial lines 150 and 152 are defined by a series of points of contact 140. The axial lines 150 and 152 approximate the center of each component, 164 and 170, respectively. The axial lines 150 and 152 intersect at point 154 to define an angle 156 between the axial lines 150 and 152, which is representative of the angle between the distal phalanx and the hypothenar of a human hand.

[0072] The point 172 is the distal tip of the distal phalanx 174, and the point 174 is the proximal tip of the hypothenar in contact with the user area 134. The distance "d" 158 is the distance between point 172 and the point 174 in a direction parallel to the edge 130 of the table, which defines a portion of the user area 134.

[0073] Rotation of the user hand will change the distance "d" so that, for example, should a hand of another game player or game observer extending reach from a position other than directly in front of the card hand, the touch to the user area 134, and have detectable mis-orientation. This mis-orientation will prevent the graphical items i.e. playing card values from

being revealed. Further, when mis-orientation is detected the apparatus may provide an audible or visual warning to a user indicating that no further action will result unless the mis-orientation is corrected. Mis-orientation may be indicative of a touch from an unauthorized user.

Accordingly, the system can restrict use by unauthorized users.

[0074] The angle 156 between the lines 150 and 152 is indicative of the flexion or extension of the fingers of the hand. According to a situation the distance “d” may be determined in case the hand is completely elongated, i.e. where the axial lines 150 and 152 substantially coincide respectively the angle 156 between the axial lines 150 and 152 is substantially straight angle of 180 degrees.

[0075] In one embodiment of the invention, indicia of orientation of a user’s hand may be visually captured by a camera situated above the user area 134. Multiple other ways of determining the orientation of a user’s hand are contemplated for use with the present invention, which include various biometric identification methods.

[0076] The present invention is useful in inhibiting unauthorized revelation of graphical items. Machine learning can detect differences between users based on the natural degree that the fingers flex when relaxed. Accordingly, the angle 156 can provide one indicia of unauthorized use when an unauthorized user touches the user area 134.

[0077] Further the shape of the touch area 138 can be learned by the computer to further assist in preventing unauthorized users from selectively revealing the graphical items.

[0078] Additionally the distance “d” can be used to determine whether a user is authorized to reveal the graphical items. The distance “d” is particularly useful in determining orientation of the touch area 138 which can reveal when a user is likely seated in front of the user area 134, or when the user is situated elsewhere.

[0079] FIG. 12 shows the user area 134 and shows the touch area 138. The axial line 150 defines a center of the distal phalanx, the axial line 160 defines a center of the middle phalanx, the axial line 162 defines a center of the proximal phalanx, and the axial line 152 defines a center of the hypothenar of a human hand. The axial lines 150 and 160 provide an approximation of the multiple points of contact.

[0080] Together, the axial lines 150, 152, 162 and 164 define an area “A” between these lines and the edge 130 of the table, which defines one boundary of the user area 134. Changes in the area “A” and the distance “d” cooperate indicate a change in shape of the touch area and thus, movement of the user hand. Changes in the area “A” and the distance “d” also cooperate indicate to identify a user for authorization purposes. Together the variables “A” and “d” can indicate whether the touch area is a user hand or other item. Together the variables “A” and “d” can reflect the orientation of the touch areas to enable the present invention to determine whether the touch is that of a desired user, or another unauthorized user. In this way the reliability and efficacy of the reveal function of the present invention is improved.

[0081] FIG. 13 shows a variation of FIG. 12 with the touch area 138 having an alternate orientation. In this alternate orientation, the area “A”, the angle 156 and the distance “d” have changed. The angle 156 is smaller and the distance “d” being shorter than shown in FIG. 12 due to flexion of the fingers of the human hand. Such flexion results in a changed position, size and orientation of the touch area 138.

[0082] FIG. 14 shows the lateral edge of a human hand on the user area. The fingers of the human hand are lengthened in a neutral position, having neither flexion nor hyper-extension. Multiple points of contact are shown corresponding to the distal phalanx 164, the middle phalanx 166, the proximal phalanx 168 and the hypothenar 170. The points of contact corresponding to the hypothenar 170 are slightly curved in alignment with respect to the x-axis edge 130, which serves as a point of reference. The points of contact corresponding to the distal phalanx 164, the middle phalanx 166, and the proximal phalanx 168 are not perfectly linear, each having a slightly curved configuration. It can be appreciated that the points of contact can be segmented and represented as lines, such as shown in FIGS. 11-13.

[0083] While the present invention is disclosed in terms of various specific embodiments, it can be appreciated that these embodiments are by way of example only. The scope of the invention is defined by the appended claims.

Claims:

1. An apparatus for selectively viewing a graphical item, comprising:

a multi-touch interface including a display for displaying a graphical item having a value, the graphical item being displayable in a first state where the value is viewable and a second state where the value is hidden from view, the multi-touch interface being adapted to detect touch;

a computer in operative communication with the multi-touch interface, the computer having memory, a processor and means for operating the multi-touch interface, the memory stores data characteristic of at least one human hand; and

a means for determining if the touch is caused by a human hand, said means being in operative communication with the computer for detecting multiple points of contact and comparing the multiple points of contact to the stored data characteristic of at least one human hand;

wherein when the interface senses the touch, and the means for determining determines when the touch is caused by a human hand, the computer causes the multi-touch interface to display the value;

wherein the touch has curved pattern having multiple points of contact with the interface and an orientation indicative of the lateral edge of the human hand contacting the multi-touch interface and the means for determining detects the curved pattern and its orientation to determine when the touch is caused by a human hand.

2. An apparatus as set forth in Claim 1, wherein the touch has a first component indicative of touch from a distal phalanx, a second component indicative of a middle phalanx, and a third component indicative of a proximal phalanx, and a fourth component indicative of a hypothenar;

the first component has an end point and the fourth component has an end point; and

the means for determining if the touch is caused by a human hand determines a distance between the first component endpoint and the fourth component end point.

3. An apparatus in accordance with claim 2 wherein the means for determining if the touch is caused by a human hand and the computer compares the distance between the first component endpoint and the fourth component end point to a pre-determined range to

determine if the touch is caused by a human hand, the pre-determined range being learned by the computer through machine learning.

4. An apparatus in accordance with claim 1, wherein the multi-touch interface has at least one predetermined user area, the first component and the fourth component align at an angle with respect to each other within the predetermined user area, and the means for determining if the touch is caused by a human hand compares the relative angles of each of the first component and the fourth component within the user interface to determine if the touch is caused by a human hand.

5. An apparatus as set forth in Claim 2, wherein the first, second, third and fourth component define a sub-region within the user area, when the sub-region occupies an area "A" within a pre-determined magnitude, the value is displayed.

6. An apparatus as set forth in Claim 2, further comprising a timer, the display timer limits the time that or regulates when the value is displayed.

7. An apparatus as set forth in Claim 2, further comprising:

a movement detection means, the movement detection means being adapted for detecting movement of the touch,

whereby the computer causes the graphical item to be displayed in response to the movement.

8. An apparatus as set forth in Claim 2, the apparatus being adapted for card gaming, wherein

the graphical item is a playing card having a value, the multi-touch interface selectively reveals the value of the card in response to the touch.

9. A card gaming apparatus, comprising:

a multi-touch interface including multiple user areas, each user area includes a display for displaying a graphical item having a value, the graphical item being displayable in a first state where the value is viewable and a second state where the value is hidden from view, the multi-touch interface being adapted to detect touch;

a computer in operative communication with the multi-touch interface, the computer having memory, a processor and software for operating the multi-touch interface, the memory stores data characteristic of touch by a human hand;

a means for determining if the touch is caused by a human hand, said means being in operative communication with the computer for detecting multiple points of contact and comparing the multiple points of contact to the stored data characteristic of at least one human hand;

wherein when the interface senses the touch, and the means for determining determines when the touch is caused by a human hand, the computer causes the interface to display the value;

wherein the touch has a curved pattern having multiple points of contact with the interface and an orientation indicative of the lateral edge of a human hand contacting the multi-touch interface and the means for determining detects the curved pattern and its orientation to determine when the touch is caused by a human hand and when the curved pattern faces a particular user.

10. An apparatus as set forth in Claim 9, wherein the touch has a first component indicative of touch from a distal phalanx, a second component indicative of a middle phalanx, and a third component indicative of a proximal phalanx, and a fourth component indicative of a hypothenar;

the first component has an end point and the fourth component has an end point;

the means for determining if the touch is caused by a human hand determines a distance between the first component endpoint and the fourth component end point to determine when the touch is caused by a human hand of the particular user.