

INTERACTIVE PROJECTION DISPLAY SHOWCASE

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application claims the benefit and priority of Singapore Provisional Patent Application No. 201303373-3, filed on 2 May 2013 and entitled "Interactive Rear Projection Display Showcase", which is herein incorporated by reference.

FIELD OF THE INVENTION

The present invention relates to projection display showcase, and in particular, a large screen user interactive projection display showcase where a product can be displayed with a computer-based interactive multimedia being shown and/or the product is physically to touch.

BACKGROUND OF THE INVENTION

It is very common in the market to see large screen interactive displays. The conventional system utilizes image projection method, flat panel display or TV monitor integrated with a touch position sensor. Any touch points or gestures detected is digitized by the touch sensor and relayed to the computer over a serial, USB or other wirelss means of connection. This forms the human-computer interface.

There are two primary methods of projecting video images onto a screen, namely, front projection and rear projection. The screen for projection is made to be interactive by integrating a touch frame, sensor or film media to the screen.

In view of the nature of the image projection, front projection screens are opaque in order for the light projected onto the surface to be visible and vibrants. However, any object or person that is in the path of the image projection will cast a shadow on screen, obscuring parts of the projected image. With ultra-short throw projectors, shadows are still present but it is minimal.

Rear projection screens are translucent in order for the projected images to be visible on the front or audience facing side of the screen. As such, any object placed behind the projection screen is obscured and cannot be seen in front of the projection screen. Compared to the front projection method, image is projected from the rear to the

screen, as such any object or person standing in front of the projection screen will not obscure any part of the projected images on screen.

Thus it is not practicable to use the conventional front and rear projection system as an interactive showcase of physical objects behind the screen integrated with custom multimedia content projected from the projector.

US Patent No.8493339 discloses a multimedia jukebox system storing a plurality of multimedia content choices, the system comprising: a touchscreen display displaying a plurality of display regions and a dynamically adjusted belt region, the display configured to provide content in at least a first display region and a second display region, and to provide a plurality of distinct, unrelated, selectable applications in the belt region; a processor configured to select content for display on at least one of the display regions, the selecting based on at least one interaction of a first user with the touchscreen display, wherein the processor is further configured to select the plurality of applications for display in the belt region; and a memory coupled to the processor, the memory storing the plurality of applications and a plurality of multimedia content choices, the memory configured to provide the processor with instructions for executing one or more of the plurality of applications wherein the first display region and second display region are configured so that when the first user interacts with the first display region using the touchscreen display, a second user's view-of the second display region is at least partially visible, and wherein the first user and the second user are distinct users viewing the display.

US Patent No. 8446364 discloses a method of pairing a remote pointing device with a display system for interactively controlling the operation of the display system, comprising the steps of: displaying pairing code information at a graphics display; capturing, at the pointing device, image data representative of at least a portion of the graphics display, the captured image data including the pairing code information; transmitting, from the pointing device, a wireless pairing signal corresponding to the captured pairing code information; receiving the wireless pairing signal at the display system; responsive to the received wireless pairing signal matching the pairing code information displayed at the graphics display, authorizing wireless control signals transmitted by the pointing device to control the operation of the display system; and

then, responsive to wireless control signals from the pointing device, operating the display system to display visual information at the graphics display.

US Patent No. 8217997 discloses a method of interactively and remotely operating a computer system, comprising: generating visual payload image frame data; combining, with the visual payload image frame data, at least one positioning target pattern corresponding to complementary intensity variances at one or more selected pixel locations of the visual payload image frame data, applied in successive frames; displaying the combined visual payload image frame data and positioning target pattern on a display; capturing image data representative of at least a portion of the display including the positioning target, over at least two frames; processing image data to subtract frames of the captured image data from one another to recover the positioning target pattern as viewed remotely from the display; and determining a pointed-to location of the display responsive to the recovered positioning target pattern; wherein the combining step comprises, for each pixel at which the positioning target pattern is to be displayed: determining an intensity component value for at least one color component of the visual payload image frame data at that pixel; calculating at least one variance value responsive to the intensity component value at that pixel, and according to an inverse gamma correction function; in a first frame, adding a calculated variance value to the visual payload image frame data for that pixel; and in a second frame, subtracting a calculated variance value from the visual payload image frame data for that pixel.

U.S. Pat. No. 7,420,540 describes a pointing device useful for a user that is relatively distant from the display, and that does not necessarily rely on the content of the displayed image for positioning. When actuated, this pointing device captures an image from a distance, including one or more corners of the display, and perhaps the center of the display, and forwards that captured image to a controller. The controller then determines the positioning and relative movement of the pointing device from the location and orientation of the display corners in the images captured by the pointing device. However, this approach is limited to those situations in which the user is sufficiently distant from the display that the field of view of the pointing device includes one or more display corners, and would appear not to operate well in smaller environments or in those situations in which the speaker is near a large display.

US Patent No. 8217918 discloses an interactive display system comprising an interactive surface for displaying an image, the interactive surface being adapted for detecting the position of a plurality of pointing devices positioned, in use, on the interactive surface, the system being further adapted to define active regions of the interactive surface, corresponding to different areas of the interactive surface, for each pointing device, wherein in each of the active regions only inputs detected from one of the pointing devices associated with that region are processed.

These conventional method or system of displaying showcase offers limited presentation options and user interactivity is limited to user.

SUMMARY OF THE INVENTION

It is an aspect of the present invention to provide an interactive projection display showcase, wherein an interactive projection screen with custom window openings are made on the projection film media applied on the glass. These openings serve as "see through" windows to showcase physical objects, merchandize or products in conjunction with custom produced interactive multimedia content that would complement the physical object, products or merchandize on display.

An object of the present invention is to provide an interactive projection displayed showcase, wherein the physical objects, merchandize or products may be strategic positions behind the projection screen. Special openings or cut-outs are made specifically to create these the areas for showcasing the physical product, merchandize or object, specifically aligned and in-sync with the custom interactive multimedia content.

Another aspect of the present invention is to provide an interactive display showcase, wherein actual window openings made on the projection screen is provided. Each window opening shall come with a shelf or ledge, so that user not only can see, but also can touch and access physically the displayed object.

In accordance with one aspect of the present invention, there is provided an interactive projection display showcase comprising:

(a) a projection screen configured to display interactive multimedia content being projected by an image projection means, wherein a product display opening or a plurality of display openings, each having an exhibiting platform formed on that screen;

(b) a plurality of touch sensors being formed on the screen wherein the interactive multimedia content is accessible to the user by way of touch or touch gestures on the screen;

(c) an image projection means, using LCD, DLP, LED or other common image projection technology; and

(d) a PC installed with an interactive multimedia presentation software linked between the image projection means and the touch sensors on the projection screen; wherein the content of the interactive multimedia is being designed and mapped in conjunction to the display opening or openings on the projection screen.

A main object of the present invention is to provide an interactive projection display showcase, wherein a user can view a displayed object but cannot physical touch the object on the screen, and the display method can be either a front or a rear projection method.

Another object of the present invention, wherein the projection film on the screen needs to have cutouts to match the display areas.

Yet still a further object of the present invention to provide an interactive projection display showcase, wherein a touch foil media or touch frame sensor is deployed on the screen.

Yet still a further object of the present invention to provide an interactive projection display showcase, wherein the interactive projection display show case further comprises (e) support means for supporting the projection screen in vertical or horizontal and at a distance where the projected images from the projecting means are focus thereon.

Still a further object of the present invention is to provide an interactive projection display showcase, wherein the showcase further comprises (f) support means for supporting the image projection means in landscape or portrait orientation and at the optimal projection throw distance.

Another object of the present invention is to provide an interactive projection display showcase, wherein the projection screen comprises a screen, being made from glass or acrylic, a projection film media with opening or openings to allow the exhibiting of a display object or objects, and the touch sensors are configured on the screen, facilitating users to operate the interactive multimedia content projected on the interactive screen.

A further object of the present invention is to provide an interactive projection display showcase, wherein the touch sensors are of single to multiple touch points for users to operate the interactive multimedia content projected on the display showcase.

Yet still a further object of the present invention to provide an interactive projection display showcase, wherein the projection film media is applied to said screen by an adhesive means, and the exhibiting platform, or plurality of exhibiting platforms, is aligned with the product display opening or openings.

Yet another object of the present invention is to provide an interactive rear projection display showcase, wherein the screen comprises a glass and a rear projection film, and the projection film has an opening to allow the exhibiting platform to stretch out.

Still an object of the present invention is to provide an interactive projection display show case, which allows maximizing the display screen within any allocated space, the projection means may be removably mounted at the rear of the screen without needing to alter the focal length of the projector.

Other features and advantages of the present invention will be apparent in view of the following detailed description and exemplary embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

The advantages and utilities of the apparatus of the present invention will be more fully understood with reference to the following description and drawings wherein:

FIG. 1 is a schematic view of a preferred embodiment of an interactive rear projection display showcase in accordance with the subject invention; wherein a displayed object can be seen.

FIG. 2 show the front view of the screen of the display showcase and show a schematic view the arrangement of the interactive rear projection display showcase in accordance with the present invention; wherein a displayed object can seen and be touched.

FIG. 3 shows a schematic view of another preferred embodiment of an interactive projection display showcase, wherein the displayed objections can be accessible through the windows provided on the screen.

FIG. 4 shows the individual layers making up the screen in accordance with the preferred embodiment of the present invention.

FIG. 5 is a perspective view showing the individual layers making up the screen, wherein an interactive single or multi touch frame is used and the glass panel is being cut to allow physical access of the displayed object.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. 1, there is shown a preferred embodiment of an interactive projection display showcase 100. The showcase 100 comprises (a) a projection screen 120 projection means 400. A product display opening 130 or a plurality of display openings, each having an exhibiting platform 134 are formed on that screen 120 to indicate a product. A plurality of touch sensors 200/220 is formed on the screen 120 wherein the interactive multimedia content is accessible to the user by way of touch or touch gestures on the screen 120. The image projection means 400, using LCD, DLP, LED or other common image projection technology is used to project images onto the screen 120. A PC 300 installed with an interactive multimedia presentation software is linked between the image projection means 400 and the touch sensors 200/220 on the projection screen 120; wherein the content of the interactive multimedia is being

designed and mapped in conjunction to the display opening or openings 130 on the projection screen 120.

The interactive projection display showcase 100 is further provided with a support means (not shown) for supporting the projection screen 120 in vertical or horizontal and at a distance where the projected images from the projecting means 400 are focus thereon. In the present embodiment, the support means for supporting the image projection means 400 is positioned in landscape or portrait orientation and at the optimal projection throw distance.

In the present invention, as shown in FIG. 4, the projection screen 120 comprises a projection glass 110, being made from glass or acrylic, a projection film media 140 with opening or openings 130 to allow the exhibiting of a display object or objects 500 and an interactive touch foil sensor 200. The touch sensors 200/220 also shown in FIG. 2, are configured on the screen 120, facilitating users to operate the interactive multimedia content projected on the display showcase 100. In the present preferred embodiment, the touch sensors 200/220 are of single to multiple touch points for users to operate the interactive multimedia content projected on the display showcase 100. On the surface of the glass 110 there is provided the projection film media 140 which is applied to said screen 110 by an adhesive means. The exhibiting platform 134, or plurality of exhibiting platforms, is aligned with the product display opening 130 or openings. In accordance with the present invention, the interactive touch foil 200 can be replaced with a touch frame 220.

In accordance with another preferred embodiment, there is provide an interactive rear projection display showcase 100 comprising: (a) a projection screen 120 configured to display interactive multimedia content being projected by an image projection means 400, wherein a product display opening or a plurality of display openings 130, each having an exhibiting platform 134 formed on the screen 120; (b) a plurality of touch sensors 200/220 being formed on the screen wherein the interactive multimedia content is accessible to the user by way of touch or touch gestures on the screen 120; (c) the image projection means 400, using LCD, DLP, LED or other common image projection technology; and (d) a PC 300 installed with an interactive multimedia presentation software linked between the image projection means 400 and the touch sensors 200/220 on the projection screen 120; wherein the content of the interactive

multimedia is being designed and mapped in conjunction to the display opening 130 or openings on the projection screen 120. The rear projection display is further provided with a support means (not shown), which is used for supporting the projection screen 120 in vertical and horizontal and at a distance where the projected images from the projecting means 400 are focus thereon. The support means for supporting the image projection means 400 in landscape or portrait orientation and at the optimal projection throw distance.

Identical to the projection display show case, the projection screen 120 comprises a screen 110, being made from glass or acrylic, and an applied projection film media 140, with opening or openings 130 to allow the exhibiting of a display object or objects 500, and the touch sensors 200/220 are configured on the screen, facilitating users to operate the interactive multimedia content projected on the display showcase 110. The touch sensors 200/220 are single to multiple touch points for users to operate the interactive multimedia content projected on the display showcase 100. The projection film media 140 is applied to said screen by adhesive means, and the exhibiting platform 134, or a plurality of exhibiting platforms, is aligned with each product display opening or openings 130.

Referring to FIG. 3, in another preferred embodiment, the interactive projection display showcase 100 has a projection screen 110 which is a glass or acrylic panel, together with an applied projection film media 140, and a touch frame 220 or camera sensor is deployed on the front of the screen, which is provided with a cutout or cutouts or opening 130 to allow physically access of to a displayed object or objects 500 via the cutout or cutouts made on the screen, and the exhibiting platform, or platforms, is allowed to hold a displayed object or objects. In the present interactive projection display showcase, the exhibiting platform, or plurality exhibiting platforms, is aligned with the product display opening or openings.

Preferably, the display showcase 100 is of a size and shape which a user can be comfortably used when the user of the showcase 100 is standing or sitting on a chair in the course of operation.

Referring now to FIG. 2, there is shown the front view of the display showcase 100 together with the connection of the PC 300, and a projecting means, which is the

projector 400. The glass 120 is provided with a plurality of touchscreen sensors 200 and are configured at an appropriate position of the glass 120, facilitating a user to operate the display showcase 100. In the present invention, the touch foil sensors 200 are positioned across the screen and if a touch frame 220 is deployed, it is applied on the perimeter of the screen.

In the preferred embodiment, the interactive rear projection display showcase 100 has a translucent display screen. A rear projection film 124 is positioned at the back of the glass 120 and is mounted by spray adhesive or any other methods where the projection film is removable. Many other common methods of mounting the projection film 124 to the glass 120 can also be used.

An exhibiting platform 134 which is used to hold a product for displaying and it is aligned with the opening on the screen for product displaying, and the exhibiting platform 134 is configured in a position which a product can be securedly held.

In accordance with the present invention, the projector 400 is moveably to move forward to or backward away from the screen 120 so as to produce the best focus of an image. The interactive film 124 is cut with an opening 130 which corresponds to the screen 120 to allow an exhibiting platform or shelf 134 to be stretched out. The exhibiting platform or shelf 134 is positioned or aligned with the screen 120 at the lower edge of the opening 130.

The base (not shown) that supports the screen 120 may generally be of any shape which can securedly support the screen 120, and it is strong enough to support display screen 120 and will withstand the pressure applied to it when a user touches the screen 120 of the showcase 100.

The projection means 400 is a projector and is positioned at the back of the screen 120. The distance between the screen 120 to the projector 400 is determined by the available space. The types of projector 400 may be a LCD, LED or DLP projector, commonly available in the market.

FIG. 3 shows schematically another preferred embodiment of the interactive display showcase. The glass or acrylic screen, for example, is provided with a plurality of

windows or openings 130, and corresponding to each of the window or opening, a display platform 134 is provided. When a projected information, for example, related to a watch, the windows or openings with the display platform 134 are provided with the object 500 and the user can touch physically the displayed item. The touch or the sense of the subject matter will create a better impression of the object and therefore the objective of interactive display showcase is achieved. The arrangement of the window or opening is designed such that the projected information corresponds to the products shown on the screen.

FIG. 4 indicates a perspective view of the screen of the interactive display showcase of the present invention. The display showcase 100 comprises a glass or acrylic panel or the like 110, a film 140 with a plurality of windows or openings 130, and a plurality of platforms 134 aligned with the windows or openings 130. In the preferred embodiment, where the interactive projection display showcase with display openings is disclosed, user can see and touch the physical objects on display and a touch foil 200 cannot be used in this preferred embodiment. The touch frame sensor or camera sensor or equivalent is used but a front or rear projection method can be displayed. In this preferred embodiment, the projection screen has openings or cutouts, and the front or rear projection film is applied. The projection film needs to have cutouts to match display areas.

In operation, the projected images on the showcase 100 provide information of the product displayed at the platform 134, and a user can touch the touchscreen sensors 200/220 to access to the information that the user requires. In other words, the window or openings 130 on the screen 120 not only allow the user to see, but also allow the user to touch the physical objects or merchandize on display within the custom interactive multimedia content. If desired by the merchandizer or exhibitor, the item on display may even be removed for closer inspection. The window openings are designed in close coordination with the custom interactive multimedia content, such that the showcase is position based on the interactive design, composition and programming.

FIG. 5 is a perspective view showing the individual layers making up the screen, wherein an interactive single or multi touch frame 220 is used and the glass panel 110 is being cut to allow physical access of the displayed object (not shown). In this

preferred embodiment of the present invention, the glass panel 110 is, either glass or acrylic with custom openings or cutouts 130, and the front or rear projection film with cutouts to match with the glass 110. A bezel or frame 600 is used to conceal the touch frame 220 and the cable 230 so as to give an aesthetic view to the showcase 100.

It should be appreciated that various changes may be made to the preferred and alternative embodiments described herein, without departing from the subject invention, the scope of which is defined in the appended claims.

Claims

1. An interactive projection display showcase comprising:
 - (a) a projection screen configured to display interactive multimedia content being projected by an image projection means, wherein a product display opening or a plurality of display openings, each having an exhibiting platform formed on that screen;
 - (b) a plurality of touch sensors being formed on the screen wherein the interactive multimedia content is accessible to the user by way of touch or touch gestures on the screen;
 - (c) an image projection means, using LCD, DLP, LED or other common image projection technology; and
 - (d) a PC installed with an interactive multimedia presentation software linked between the image projection means and the touch sensors on the projection screen; wherein the content of the interactive multimedia is being designed and mapped in conjunction to the display opening or openings on the projection screen.
2. The interactive projection display showcase of Claim 1, further comprising
 - (a) support means for supporting the projection screen in vertical or horizontal and at a distance where the projected images from the projecting means are focus thereon.
3. The interactive projection display showcase of Claim 1, further comprising
 - (a) support means for supporting the image projection means in landscape or portrait orientation and at the optimal projection throw distance.
4. The interactive projection display showcase of Claim 1, wherein the projection screen comprises a screen, being made from glass or acrylic, a projection film media with opening or openings to allow the exhibiting of a display object or objects.
5. The interactive projection display showcase of Claim 1, wherein the touch sensors are configured on the screen, facilitating users to operate the interactive multimedia content projected on the display showcase.

6. The interactive projection display showcase of Claim 5, wherein the touch sensors are of single to multiple touch points for users to operate the interactive multimedia content projected on the display showcase.
7. The interactive projection display showcase of Claim 1, wherein the projection film media is applied to said screen by an adhesive means.
8. The interactive projection display showcase of Claim 1, wherein the exhibiting platform, or plurality of exhibiting platforms, is aligned with the product display opening or openings.
9. An interactive rear projection display showcase comprising:
 - (a) a projection screen configured to display interactive multimedia content being projected by an image projection means, wherein a product display opening or a plurality of display openings, each having an exhibiting platform formed on the screen;
 - (b) a plurality of touch sensors being formed on the screen wherein the interactive multimedia content is accessible to the user by way of touch or touch gestures on the screen;
 - (c) an image projection means, using LCD, DLP, LED or other common image projection technology; and
 - (d) a PC installed with an interactive multimedia presentation software linked between the image projection means and the touch sensors on the projection screen; wherein the content of the interactive multimedia is being designed and mapped in conjunction to the display opening or openings on the projectin screen.
10. The interactive rear projection display showcase of Claim 9, further comprising
 - (a) support means for supporting the projection screen in vertical or horizontal and at a distance where the projected images from the projecting means are focus thereon.
11. The interactive rear projection display showcase of Claim 9, further comprising
 - (a) support means for supporting the image projection means in landscape or portrait orientaion and at the optimal projection throw distance.

12. The interactive rear projection display showcase of Claim 9, wherein the projection screen comprises a screen, being made from glass or acrylic, and an applied projection film media, with opening or openings to allow the exhibiting of a display object or objects.
13. The interactive rear projection display showcase of Claim 9, wherein the touch sensors are configured on the screen, facilitating users to operate the interactive multimedia content projected on the display showcase.
14. The interactive rear projection display showcase of Claim 13, wherein the touch sensors are of single to multiple touch points for users to operate the interactive multimedia content projected on the display showcase.
15. The interactive rear projection display showcase of Claim 9, wherein the projection film media is applied to said screen by adhesive means.
16. The interactive rear projection display showcase of Claim 9, wherein the exhibiting platform, or a plurality of exhibiting platforms, is aligned with each product display opening or openings.
17. The interactive projection display showcase of Claim 1 and Claim 9, wherein the projection screen is a glass or acrylic panel, together with an applied projection film media, which is provided with a cutout or cutouts to allow physically access of to a display object or objects via the cutoff or cutouts made on the screen.
19. The interactive projection display showcase of Claim 16, wherein the exhibiting platform, or platforms, is allowed to hold a displayed object or objects.
20. The interactive projection display showcase of Claim 16, wherein an exhibiting platform, or plurality exhibiting platforms, is aligned with the product display opening or openings.