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TECHNIQUES FOR DISPLAY COLOR CORRECTION

Abstract

A display correction system including a display and a control system including processing circuitry and a memory, the memory storing instructions that, when executed by the processing circuitry, are configured to cause the processing circuitry to determine a first guest configuration in a ride vehicle during a first ride cycle, and determine a first view point based on the first guest configuration. The instructions are also configured to cause the processing circuitry to generate a first color correction layer based on the first view point and apply the first color correction layer to the display.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATION [0001] This application claims priority to and the benefit of U.S. Provisional Application No. 63/551,645, entitled "TECHNIQUES FOR DISPLAY COLOR CORRECTION" and filed Feb. 9, 2024, which is incorporated by reference herein in its entirety for all purposes.

BACKGROUND

[0002] The present disclosure generally relates to a display correction system that generates a color correction layer for a display.

[0003] A venue, such as an amusement park, may include a variety of attractions. Some attractions may include displays (e.g., light-emitting diode (LED) panels, monitors, digital screens, and/or other displays) to provide images for visualization by guests in the attractions. It is presently recognized that the displays may exhibit changes in color balance, with some colors becoming more dominant or faded compared to others. With increasing sophistication and complexity of modern ride attractions, it may be desirable to provide improved systems to reduce changes in the color balance to improve experiences for the guests in the attractions.

[0004] This section is intended to introduce the reader to various aspects of art that may be related to various aspects of the present techniques, which are described and/or claimed below. This discussion is believed to be helpful in providing the reader with background information to facilitate a better understanding of the various aspects of the present disclosure. Accordingly, it should be understood that these statements are to be read in this light, and not as admissions of prior art.

BRIEF DESCRIPTION

[0005] Certain embodiments commensurate in scope with the originally claimed subject matter are summarized below. These embodiments are not intended to limit the scope of the claimed subject matter, but rather these embodiments are intended only to provide a brief summary of possible forms of the subject matter. Indeed, the subject matter may encompass a variety of forms that may be similar to or different from the embodiments set forth below.

[0006] In an embodiment, a display correction system includes a display and a control system. The control system includes processing circuitry and a memory, the memory storing instructions that, when executed by the processing circuitry, are configured to cause the processing circuitry to determine a first guest configuration in a ride vehicle during a first ride cycle, and determine a first view point based on the first guest configuration. The instructions are also configured to cause the processing circuitry to generate a first color correction layer based on the first view point and apply the first color correction layer to the display.

[0007] In an embodiment, a method of operating a display correction system includes determining, via a processing system, a plurality of guest configurations of a ride vehicle during a plurality of ride cycles. The method also includes determining, via the processing system, a plurality of view points based on the plurality of guest configurations. The method further includes generating, via the processing system, a plurality of color correction layers. A respective color correction layer of the plurality of color correction layers corresponds to a respective view point of the plurality of view points.

[0008] In an embodiment, a display correction system includes a display and a control system. The display correction system includes processing circuitry and a memory. The memory stores instructions that, when executed by the processing circuitry, are configured to cause the processing circuitry to determine a guest configuration in a guest area, determine a view point based on the guest configuration, and instruct movement of the display relative to the guest area via one or more movement mechanisms. The instructions are also configured to generate a color correction layer based on the view point and the movement of the display and apply the color correction layer to the display.

Description

BRIEF DESCRIPTION OF DRAWINGS

[0009] These and other features, aspects, and advantages of the present disclosure will become better understood when the following detailed description is read with reference to the accompanying drawings in which like characters represent like parts throughout the drawings, wherein:

[0010] FIG. **1** is a perspective view of an attraction that includes a display correction system with a ride vehicle including a first guest configuration, in accordance with an embodiment of the present disclosure;

[0011] FIG. **2** is a perspective view of an attraction that includes the display correction system with the ride vehicle including a second guest configuration, in accordance with an embodiment of the present disclosure;

[0012] FIG. **3** is a schematic view of the display of the display correction system with movement mechanisms, wherein the display is movable, in accordance with an embodiment of the present disclosure; and

[0013] FIG. **4** is a flow diagram of a method for applying a color correction layer via the display correction system, in accordance with an embodiment of the present disclosure.

DETAILED DESCRIPTION

[0014] One or more specific embodiments of the present disclosure will be described below. In an effort to provide a concise description of these embodiments, all features of an actual implementation may not be described in the specification. It should be appreciated that in the development of any such actual implementation, as in any engineering or design project, numerous implementation-specific decisions must be made to achieve the developers' specific goals, such as compliance with system-related and business-related constraints, which may vary from one implementation to another. Moreover, it should be appreciated that such a development effort might be complex and time-consuming, but would nevertheless be a routine undertaking of design, fabrication, and manufacture for those of ordinary skill having the benefit of this disclosure.

[0015] When introducing elements of various embodiments of the present disclosure, the articles “a,” “an,” and “the” are intended to mean that there are one or more of the elements. The terms “comprising,” “including,” and “having” are intended to be inclusive and mean that there may be additional elements other than the listed elements. Additionally, it should be understood that references to “one embodiment” or “an embodiment” of the present disclosure are not intended to be interpreted as excluding the existence of additional embodiments that also incorporate the recited features.

[0016] The systems and methods disclosed herein relate generally to a display correction system (e.g., a display color correction system) that generates a color correction layer to apply to a display. In particular, the display correction system may apply the color correction layer to the display to adjust and/or correct a change in color balance (e.g., color drift) of the display. In an embodiment, the display correction system may determine (e.g., identify) a guest configuration (e.g., guest distribution, guest arrangement) for a ride vehicle. The guest configuration may include a number of guests and/or a location (e.g., a position) of each guest of the number of guests seated in the ride vehicle. For example, the guest configuration may be determined based on sensor data received from a number of sensors.

[0017] In such cases, the display correction system may determine a central view point (e.g., an average view point, a selected view point, a combined view point) for the ride vehicle based on the guest configuration. Indeed, the central view point may be based on the number of guests, the individual locations of the number of guests, and/or each view point of the number of guests from their respective seat in the ride vehicle. For example, the display correction system may average (or approximate) a visual perspective or sightline of each guest of the number of guests based on a height of each guest of the number of guests to determine the central view point. As another example, the display correction system may approximate a view point from a center of the number of guests. That is, if the ride vehicle includes three rows of guests, with each seat of the three rows occupied by the guests, then the display correction system may determine the central view point to be from a second row (e.g., in between a first row and a third row) of the ride vehicle.
[0018] In an embodiment, the display correction system may determine a standard central view point for the ride vehicle based on the ride vehicle at full occupancy (e.g., each seat is filled by a respective guest). For example, the standard central view point may be based on an average height of each guest of the guests in the ride vehicle when the ride vehicle is at full occupancy. In an embodiment, the display color correction system may determine multiple adjusted central view points for the ride vehicle based on determining different guest configurations in the ride vehicle during different ride cycles.
[0019] The display correction system may generate a color correction layer (e.g., color pixel compensation) based on the central view point. The color correction layer may enable adjustment of an intensity (e.g., a color value) of a color channel (e.g., red, green, blue (RGB) channel) for a number of pixels of the display when applied to the display. The intensity of the color channel for each pixel may determine an overall color of the pixel. The display correction system may then determine a position (e.g., location, orientation) of the ride vehicle in the ride cycle. For example, the display correction system may determine the position of the ride vehicle as a position during the ride cycle where the guests may perceive color imbalance on the display. Thus, the display correction system may apply the color correction layer to the display to adjust the intensity of the color channel and/or compensate for the color drift. Moreover, the display correction system may store the color correction layer for use during a subsequent ride cycle that includes a same or similar guest configuration and/or a same or similar central view point.
[0020] As an example, while observing the display, the guests may visually perceive a first portion of the display having a heightened intensity of a red tone. That is, the first portion of the display may appear more red in comparison to a second portion of the display. Therefore, the display correction system may generate the color correction layer that enables adjustment (e.g., increase or decrease) of a red channel for each pixel in the first portion of the display. Indeed, if each pixel in the first portion of the display has a red value of 180, then the color correction layer may enable adjustment of the red value to 130 when applied to the display. Thus, the display correction system may apply the color correction layer to the display, causing the red value of the first portion of the display to adjust from the red value of 180 to the red value of 130 during a ride cycle. As such, the display may visually appear more balanced, with the first portion of the display appearing less red and more integrated with an overall color scheme of the display. Indeed, images displayed to the guests may appear to include an even or consistent color appearance across the display. In an embodiment, the display correction system may adjust the color correction layers based on parameters of the ride vehicle. For example, the parameters of the ride vehicle may include a speed, an orientation relative to the display, a size (e.g., length, width, height), an acceleration, and so on.
[0021] In an embodiment, the ride vehicle may include different guest configurations in different ride cycles. That is, the number of guests and/or the location of the guests in the ride vehicle may vary for the different ride cycles. Therefore, the display correction system may generate additional color correction layers, which may each be based on a respective guest configuration and/or a respective central view point. Additionally, the display correction system may store the additional

color correction layers with corresponding guest configurations and/or corresponding central view points. In this manner, the display correction system may efficiently retrieve the previously stored color correction layer after determining the corresponding guest configuration and/or the corresponding central view point during a respective ride cycle.

[0022] As an example, during a first ride cycle, the display correction system may receive sensor data indicative of a first guest configuration. In the first guest configuration, the ride vehicle may include three rows, where each seat of the three rows includes a seated guest. The display correction system may determine a first central view point based on the first guest configuration. Moreover, the display correction system may generate a first color correction layer based on the first central view point and determine a first position of the ride vehicle. The display correction system may then apply the first color correction layer based on the first position during the first ride cycle and store the first color correction layer.

[0023] During a second ride cycle, the display correction system may receive the sensor data indicative of a second guest configuration. In the second guest configuration, the ride vehicle may include the three rows, where each seat of a first row and a second row of the three rows includes a seated guest and each seat of a third row of the three rows does not include a seated guest. The display correction system may determine a second central view point based on the second guest configuration and generate a second color correction layer. Moreover, the display correction system may determine a second position of the ride vehicle and apply the second color correction layer to the display based on the second position during the second ride cycle. The display correction system may then store the second color correction layer.

[0024] As such, if the display correction system determines the first guest configuration in the ride vehicle in a subsequent ride cycle, the display correction system may efficiently retrieve the first color correction layer to apply to the display. Similarly, if the display correction system determines the second guest configuration in the ride vehicle in the subsequent ride cycle, the display correction system may efficiently retrieve the second color correction layer to apply to the display.

[0025] With the foregoing in mind, FIG. **1** is a perspective view of an attraction **10** that includes a display correction system **12** with a ride vehicle **14** including a first guest configuration (e.g., full occupancy), in accordance with an embodiment of the present disclosure. The ride vehicle **14**, a control system **16**, and a display **18** may form or be part of the display correction system **12**. The ride vehicle **14** may include a motion base (e.g., a Stewart platform or an active support with one or more degrees of freedom) that generates movement to create a thrilling or immersive experience for a number of guests **20**. In an embodiment, multiple ride vehicles **14** may be coupled (e.g., by one or more linkages) or included on a ride path **22** to travel along or about the ride path **22**. In the illustrated embodiment, the ride path **22** is a two-rail track. However, the illustrated ride path **22** may be representative of various different types of ride paths **22** (e.g., a single rail, an overhead rail, flooring, or grooves).

[0026] The ride path **22** may or may not dictate the path traveled by the ride vehicle **14**. That is, in an embodiment, the ride path **22** may control the movement (e.g., direction, speed, and/or orientation) of the ride vehicle **14** as it progresses, similar to a train on train tracks. In another embodiment, there may be a system for controlling the path taken by the ride vehicle **14**. The ride vehicle **14** may travel along the ride path **22** at programmed speeds and/or programmed positions (e.g., locations, orientations) relative to the display **18**. In an embodiment, the ride path **22** may be an open surface that allows the guests **20** to control certain aspects of the movement of the ride vehicle **14** via a control system resident on the ride vehicle **14**. Moreover, in an embodiment, the ride vehicle **14** may be rotated in any suitable orientation within the attraction **10**. For example, the ride vehicle **14** may be rotated to position the guests **20** facing the display. As another example, the ride vehicle **14** may be rotated to orient the guests **20** toward the rail path **22**, while the display **18** is positioned on the right and/or left side of the ride vehicle **14**.

[0027] The ride vehicle **14** may accommodate the guests **20** (e.g., passengers) in a number of guest configurations (e.g., distributions, arrangements). Indeed, the guest configurations may be associated with the number of guests **20** and/or a location (e.g., position) of each guest of the guests **20** in the ride vehicle **14**. For example, the illustrated embodiment shows one ride vehicle **14** that accommodates twelve guests **20** (e.g., in twelve seats or other suitable guest spaces in a guest area). In another embodiment, the attraction **10** may include any number of ride vehicles **14** that each accommodate any number of guests **20**. Additionally, each of the ride vehicles **14** may include any number of rows with any suitable number of seats in each row. For example, the illustrated embodiment shows the ride vehicle **14** with a first row, a second row, and a third row, with four seats in each row. However, the ride vehicle **14** may include five, eight, ten, or any number of rows with any number of seats or other suitable guest spaces in a guest area. For example, the first row may include six seats, the second row may include eight seats, and the third row may include ten seats. As another example, a first row may include four seats, a second row may include five seats, and a third row may include six seats.

[0028] It should be noted that although generation and application of the color correction layer by the display correction system **12** is described with respect to the ride vehicle **14**, the display correction system **12** may be employed in any suitable environment. That is, the display correction system **12** may be employed in an environment that includes a number of seats positioned relative to any suitable display. For example, the display correction system **12** may be employed in a theater (e.g., movie theater), a venue (e.g., concert, sporting event), a gaming center, an exhibit, a restaurant, and so on.

[0029] The ride vehicle **14** may include one or more sensors **24** to monitor a position of the ride vehicle **14**, movement of the ride vehicle **14**, acceleration of the ride vehicle **14**, an orientation of the ride vehicle **14**, the number of guests **20** in the ride vehicle **14**, and/or the location of each guest of the guests **20** in the ride vehicle **14**, for example. Additionally or alternatively, the sensors **24** may be off-board the ride vehicle **14** (e.g., disposed in any suitable location within the attraction **10**). In an embodiment, the sensors **24** may monitor and/or identify the color drift of the display **18**.

[0030] The sensors **24** may provide sensor data to the control system **16** for processing. For example, the sensor data may enable the control system **16** to determine the guest configurations of the ride vehicle **14**. The sensors **24** may be communicatively coupled to the control system **16** by wired or wireless (e.g., Bluetooth, Wi-Fi, or any other suitable wireless connection) connections. The one or more sensors **24** may include any number of force sensors, contact sensors, acceleration sensors, motion sensors, image sensors, position sensors, and/or any other suitable sensor. For example, each seat of the ride vehicle **14** may include the contact sensor, which may detect when a guest **20** is seated in the seat based on a detected contact by the seated guest **20** with the contact sensor. As another example, the image sensor may capture images of the ride vehicle **14** and/or the display **18** and provide the image data to the control system **16** to enable analysis of the image data to determine the location of each guest **20** in the ride vehicle **14** and/or a color tone of the display **18**.

[0031] The control system **16** may include one or more processors **26** (referred to herein as a single processor for convenience), a memory **28**, and/or communications circuitry **30**. The processor **26** may be any type of computer processor or microprocessor capable of executing computer-executable code. The processor **26** may also include multiple processors, processing circuitry, or a processing system that may perform the operations described herein. For example, the processor **26** may receive sensor data from the one or more sensors **24** and determine the guest configuration based on the sensor data.

[0032] The memory **28** may include a volatile memory, such as random-access memory (RAM), and/or a nonvolatile memory (ROM). The memory **28** may store a variety of information and may be used for various purposes, such as a pre-determined program for the ride vehicle **14**, color correction layers, and so on. The memory **28** may store processor-executable instructions, such as instructions for generating the color correction layers. The memory **28** may also include flash memory, or any suitable optical, magnetic, or solid-state storage medium, or a combination thereof. The memory **28** may store data, instructions (e.g., software or firmware for generating and/or applying the color correction layer), and any other suitable information.

[0033] The communications circuitry **30** may be a wireless communication component that may facilitate communication between the control system **16**, the ride vehicle **14**, the display **18**, and/or various other computing systems via a network. The communications circuitry **30** may include antennas, transceiver circuits, and signal processing hardware and/or software (e.g., hardware or software filters, A/D converters, multiplexers amplifiers), or a combination thereof, that may be configured to communicate over wireless communication paths via Infrared (IR) wireless communication, satellite communication, broadcast radio, Microwave radio, Bluetooth, Zigbee, Wi-fi, UHF, NFC, etc. In some embodiments, the control system **16** may communicate with the ride vehicle **14** and/or the display **18** via a wired connection.

[0034] The display **18** may include any suitable display (e.g., liquid crystal display (LCD), light emitting diode (LED) display, LED panel, organic light emitting diode (OLED) display, micro-LED, transparent LCD display) that receives image data and projects (e.g., displays, transmits) the image data as imagery. The display **18** may be a flat display (e.g., straight screen surface) or a curved display (e.g., curved inward screen). In an embodiment, the display **18** may be a large display, which may include a larger screen size compared to a standard display, such as greater than 20, 30, 40, 50, or more meters measured on a diagonal across the display **18**. For example, the display **18** may be large such that the ride vehicle **14** may be used to traverse from one side of the display **18** to the other side of the display **18**. It should be noted that although a single display **18** is depicted in FIG. **1**, any suitable number of displays may be included with the display correction system **12**. Thus, the display correction system **12** may generate and apply any number of color correction layers for each of the displays.

[0035] In an embodiment, the display **18** may be coupled to a number of movement mechanisms that may enable the display **18** to transition (e.g., travel) up, down, forward, back, left, and/or right in a three-dimensional space. Indeed, the control system **16** may operate to cause the movement mechanisms to move the display **18**. For example, the movement mechanisms may include motorized mechanisms, such as a motorized platform and/or rail that may move the display **18** in any suitable direction. Therefore, the control system **16** may activate (e.g., the motors) and/or instruct movement of the motorized mechanisms to cause the display **18** to move. As another example, the movement mechanisms may include robotic components (e.g., robotic arm, robotic body), and the display **18** may be coupled to the robotic components. It should be noted that the examples described herein are illustrative and any other suitable movement mechanism that may enable movement of the display **18** may be used.

[0036] At times, the display **18** may be the large display that involves use of the ride vehicle **14** to traverse from one end of the display **18** to the other end of the display **18**. As the ride vehicle **14** traverses, the display **18** may exhibit changes in color balance, with some colors becoming more dominant or faded compared to others. Indeed, as the guests **20** travel in the ride vehicle **14** from a first side (e.g., a left side) of the display **18** to a second side (e.g., a right side) of the display **18**, the guests **20** may visually perceive the image presented on the display **18** as greener on the first side and redder on the second side. That is, the first side of the display **18** may exhibit a red tone in comparison to the rest of the display **18** and the second side of the display **18** may exhibit a green tone in comparison to the rest of the display **18**. As such, it may be beneficial to generate color correction layers to apply to the display **18** to correct color imbalance, such as the red tone and the green tone.

[0037] In operation, the ride vehicle **14** may travel along the ride path **22** based on a pre-determined program. For example, the control system **16** may be pre-programmed to control various aspects (e.g., parameters) of the ride vehicle **14** during a ride cycle, such as a speed, position (e.g., relative to the display **18**), acceleration, deceleration, stops, orientation, timing, sequencing, and so on. Moreover, the control system **16** (e.g., the processor **26** of the control system **16**) may instruct (e.g., cause) the ride vehicle **14** to travel along the ride path **22** relative to the display **18**. That is, as the ride vehicle **14** moves along the ride path **22**, the ride vehicle **14** may pass by or interact with the display **18**. As the ride vehicle **14** passes by or interacts with the display **18**, the control system **16** may cause the display **18** to display media (e.g., images, videos) that may be synchronized with the ride vehicle **14**.

[0038] The control system **16** may identify points (e.g., particular areas along the ride path **22**) during the ride cycle where the color drift of the display **18** may appear from a perspective of the guests **20**. For example, the control system **16** may run a predictive modeling software to predict when and where the distortion may occur based on a motion of the ride vehicle **14** and a line of sight between the guests **20** and the display **18**. As another example, the control system **16** may run a guest perspective simulation to determine how angles and speeds of the ride vehicle **14** may affect the perspective of the guest **20** in different seats of the ride vehicle **14** and at various points in the ride cycle. In an embodiment, the points during the ride cycle at which the color distortion may occur may be manually provided to the control system **16** via a user input. The control system **16** may apply the color correction layer during the points the color distortion may occur. The color correction layer may enable an adjustment of an intensity (e.g., a color value) of a color channel (e.g., the RGB channels) for each pixel (e.g., RGB LEDs) of the display **18** when applied to the display **18**. That is, the control system **16** may adjust an amount of red, blue, and/or green light emitted or displayed by each pixel to control an overall color output.

[0039] In an embodiment, the control system **16** may determine a standard central view point based on a full occupancy of the ride vehicle **14**. For example, the standard central view point may be based on an average height of each guest of the guests **20** in the ride vehicle **14** at full occupancy (e.g., the first guest configuration). The control system **16** may generate and store, in the memory **28**, a standard color correction layer based on the standard central view point. Further, the control system **16** may receive sensor data from the sensors **24** and determine the guests **20** are in the first guest configuration in the ride vehicle **14** based on the sensor data. Thus, the control system **16** may determine the ride vehicle **14** is fully occupied. That is, as illustrated in FIG. **1**, the first guest configuration may include a guest **20** in each seat of each of the first row, the second row, and the third row. Therefore, the control system **16** may retrieve the stored standard color correction layer to apply to the display **18** during the ride cycle.

[0040] In an embodiment, the control system **16** may perform variable color correction based on varying occupancy of the ride vehicle **14**. Indeed, the control system **16** may determine the ride vehicle **14** includes a different guest configuration (e.g., is not fully occupied) from the first guest configuration. For example, the control system **16** may receive the sensor data indicative of the ride vehicle **14** in a second guest configuration. Referring now to FIG. **2**, in the second guest configuration, the ride vehicle **14** may include a guest **20** in each seat of the second row and third row, but may be empty in the first row.

[0041] The control system **16** may determine an adjusted central view point for the ride vehicle **14** based on the second guest configuration. For example, the control system **16** may average (or approximate) a visual perspective or sightline of each guest of the guests **20** in the ride vehicle **14** based on a height of each guest of the guests **20** to determine the central view point. As another example, the display correction system may approximate a view point from a center of the guests **20**. Indeed, the center of the guests **20** in the second configuration may be at a point horizontally equidistant (e.g., exactly halfway) from the second row and the third row of the ride vehicle **14**. Moreover, if the guests **20** in the second row and the third row are different heights, then the point may also be equidistant vertically from the heights of the guests **20**.

[0042] The control system **16** may then generate an additional color correction layer based on the second guest configuration to apply to the ride cycle while the ride vehicle **14** is in the second guest configuration. Moreover, the control system **16** may store the additional color correction layer in the memory **28**. In this manner, when the control system **16** receives the sensor data indicative of the second guest configuration in any subsequent ride cycles, the control system **16** may retrieve the additional color correction layer to apply to the display **18**. It should be noted that the control system **16** may determine multiple adjusted central view points for any suitable number of guest configurations in the ride vehicle **14**. For example, the control system **16** may determine the multiple adjusted central view points based on a right side of the ride vehicle **14** being occupied by the guests **20**, a left side of the ride vehicle **14** being occupied by the guests **20**, a single seat of the ride vehicle **14** being occupied by the guest **20**, or any other suitable number of seats being occupied in any suitable location of the ride vehicle **14**.

[0043] Additionally or alternatively, the control system **16** may determine a current central view point for the ride vehicle **14**. For example, the current central view point may be based on measured or estimated heights of each guest of the guests **20** in the ride vehicle **14**, such as via data from the sensors **24**. As another example, the control system **16** may determine a gaze direction of one guest **20** or multiple guests **20**, such as via data from the sensors **24**, and determine the current central view point based on the gaze direction. The control system **16** may generate a current color correction layer based on the current central view point and apply the current color correction layer to the display **18**. In this manner, the control system **16** may provide appropriate color correction based on the current central view point for the ride vehicle **14**. Additionally or alternatively, the control system **16** may generate the current color correction layer based on changing (e.g., dynamic) parameters of the ride vehicle **14**. For example, the control system **16** may account for the speed, position, orientation, acceleration, deceleration, and so on of the ride vehicle **14** when generating the current color correction layer. In an embodiment, the control system **16** may dynamically update the current color correction layer for application to the display **18** during the ride cycle based on the changing parameters of the ride vehicle **14**.

[0044] At times, it may be beneficial to enable movement of the display **18**. For example, the display **18** may move while the ride vehicle **14** and/or the guests **20** are stationary. As another example, the display **18**, the ride vehicle **14**, and/or the guests **20** may move in a simultaneous manner. With the foregoing in mind, FIG. **3** is a schematic view of the display **18** of the display correction system **12**, which may be coupled to a number of movement mechanisms **40**. For example, the movement mechanisms **40** may enable movement (e.g., adjustment) of the display **18** with respect to a three-dimensional coordinate system (e.g., an XYZ coordinate system). As another example, the display **18** may be adjusted to display media at different angles. It should be noted that the movement mechanisms **40** may include a single movement mechanism **40** or multiple movement mechanisms **40**.

[0045] The control system **16** may instruct (e.g., cause) movement of the movement mechanisms **40**. For example, the movement mechanisms **40** may include motorized mechanisms and the control system **16** may activate the motorized mechanisms to cause movement of the display **18**. As the display **18** moves, the color drift of the display **18** may occur. As described herein, the control system **16** may identify points where the color drift of the display **18** may appear from the perspective of the guests **20**. Therefore, the control system **16** of the display correction system **12** may generate the color correction layer based on the color drift that occurs from the movement of the display **18**. Further, the control system **16** may apply the color correction layer to the display **18** at any suitable time during the movement and display of the media.

[0046] FIG. **4** is a flow diagram of a method **50** for applying a color correction layer via a display correction system. The method **50** disclosed herein includes various steps represented by blocks. It should be noted that at least some steps of the method **50** may be performed as an automated procedure by a system, such as the display correction system **12** of FIG. **1**. Although the flow chart illustrates the steps in a certain sequence, it should be understood that the steps may be performed in any suitable order and certain steps may be carried out simultaneously, where appropriate.

[0047] In step **52**, the method **50** may begin with determining a guest configuration in a ride vehicle. For example, a control system may receive sensor data indicative of a number of guests and/or a location of each guest of the guests in the ride vehicle and determine the guest configuration based on the sensor data. In step **54**, a central view point may be determined based on the guest configuration. The central view point may be based on a distribution (e.g., arrangement) of the guests in the ride vehicle, an average sightline of each guest of the guests, an average height of each guest of the guests, and/or a center point between each guest of the guests.

[0048] In step **56**, a color correction layer may be generated based on the central view point. The color correction layer may enable adjustment of an intensity of a color value (e.g., a red value, a blue value, a green value) for a pixel or a group of pixels of a display when applied to the display. For example, while observing the display, the guests may visually perceive a portion of the display having a heightened intensity of a green tone. Therefore, the color correction layer may enable a decrease of a green channel for each pixel in the portion of the display having the heightened intensity of the green tone when applied to the display.

[0049] In step **58**, a position (e.g., location) of the ride vehicle may be determined. For example, the position of the ride vehicle traveling along a ride path relative to the display may be determined. In step **60**, the color correction layer may be applied based on the position of the ride vehicle. Indeed, in an embodiment, particular areas (e.g., distinct sections) along a ride path (e.g., during a ride cycle) can be identified where the guests may perceive the color drift in the display. Therefore, if the ride vehicle is in the position where the color drift is perceptible, then the color correction layer may be applied. Further, adjustment of the intensity of the color value for each pixel or the group of pixels of the display may be based on applying the color correction layer. It should be noted that a result of implementing the method **50** in a first ride cycle with a first guest configuration is generation of a corresponding first color correction layer. Additionally, the result of implementing the method **50** in a second ride cycle with a second guest configuration is generation of a corresponding second color correction layer. As such, the method **50** may be implemented for any number of ride cycles to generate any corresponding number of color correction layers.

[0050] While only certain features of the disclosure have been illustrated and described herein, many modifications and changes will occur to those skilled in the art. It is, therefore, to be understood that the appended claims are intended to cover all such modifications and changes as fall within the true spirit of the disclosure. For example, while certain examples herein relate to color correction for a ride attraction and/or based on a configuration of guests in a ride vehicle, it should be appreciated that the techniques disclosed herein may be applied to other venues or environments, such as color correction for a restaurant and/or based on a configuration of guests in a dining room region of the restaurant. Indeed, the techniques disclosed herein may be applied to other venues or environments with one or more displays, particularly large or oversized displays, visible to one or more guests in a guest area and/or with seating and/or spaces for the one or more guests in a guest area.

[0051] The techniques presented and claimed herein are referenced and applied to material objects and concrete examples of a practical nature that demonstrably improve the present technical field and, as such, are not abstract, intangible or purely theoretical. Further, if any claims appended to the end of this specification contain one or more elements designated as “means for (perform)ing (a function) . . . ” or “step for (perform)ing (a function) . . . ”, it is intended that such elements are to be interpreted under 35 U.S.C. 112(f). However, for any claims containing elements designated in any other manner, it is intended that such elements are not to be interpreted under 35 U.S.C. 112(f).

Claims

1. A display correction system, comprising: a display; and a control system comprising processing circuitry and a memory, the memory storing instructions, that when executed by the processing circuitry, are configured to cause the processing circuitry to: determine a first guest configuration in

a ride vehicle during a first ride cycle; determine a first view point based on the first guest configuration; generate a first color correction layer based on the first view point; and apply the first color correction layer to the display.
2. The display correction system of claim 1, wherein the instructions are configured to cause the processing circuitry to adjust one or more color values of one or more pixels of the display based on applying the first color correction layer.
3. The display correction system of claim 2, wherein the one or more color values comprise a red value, a green value, a blue value, or any combination thereof.
4. The display correction system of claim 1, wherein the instructions are configured to cause the processing circuitry to determine a position of the ride vehicle on a ride path and apply the first color correction layer to the display based on the position.
5. The display correction system of claim 1, wherein the display comprises a movement mechanism, and wherein the instructions are configured to instruct movement of the display by activating the movement mechanism.
6. The display correction system of claim 1, wherein the instructions are configured to cause the processing circuitry to receive sensor data from one or more sensors and determine the first guest configuration based on the sensor data.
7. The display correction system of claim 1, wherein the first view point is based on a number of guests in the ride vehicle, a location of each guest of the number of guests, a height of each guest of the number of guests, a sight line of each guest of the number of guests, or any combination thereof.
8. The display correction system of claim 1, wherein the instructions are configured to cause the processing circuitry to adjust the first color correction layer based on one or more parameters of the ride vehicle.
9. The display correction system of claim 8, wherein the one or more parameters comprise a speed of the ride vehicle, an orientation of the ride vehicle relative to the display, a size of the ride vehicle, an acceleration of the ride vehicle, or any combination thereof.
10. The display correction system of claim 1, wherein the instructions are configured to cause the processing circuitry to store the first color correction layer.
11. The display correction system of claim 10, wherein the instructions are configured to cause the processing circuitry to: determine a second guest configuration in the ride vehicle during a second ride cycle; determine a second view point based on the second guest configuration; generate a second color correction layer based on the second view point; and apply the second color correction layer to the display.
12. The display correction system of claim 11, wherein the instructions are configured to cause the processing circuitry to: determine the first guest configuration in the ride vehicle during a third ride cycle; retrieve the stored first color correction layer; and apply the first color correction layer to the display.
13. The display correction system of claim 1, wherein the display comprises a curved display.
14. A method of operating a display correction system, comprising: determining, via a processing system, a plurality of guest configurations of a ride vehicle during a plurality of ride cycles; determining, via the processing system, a plurality of view points based on the plurality of guest configurations; and generating, via the processing system, a plurality of color correction layers, wherein a respective color correction layer of the plurality of color correction layers corresponds to a respective view point of the plurality of view points.
15. The method of claim 14, comprising storing, via the processing system, the plurality of color correction layers.
16. The method of claim 15, comprising retrieving, via the processing system, the respective color correction layer of the plurality of color correction layers in response to determining a current guest configuration corresponds to the respective view point of the plurality of view points.

17. A display correction system, comprising: a display; and a control system comprising processing circuitry and a memory, the memory storing instructions, that when executed by the processing circuitry, are configured to cause the processing circuitry to: determine a guest configuration in a guest area; determine a view point based on the guest configuration; instruct movement of the display relative to the guest area via one or more movement mechanisms; generate a color correction layer based on the view point and the movement of the display; and apply the color correction layer to the display.

18. The display correction system of claim 17, wherein the one or more movement mechanisms comprise a motorized platform, a motorized rail, or both.

19. The display correction system of claim 18, wherein the instructions are configured to cause the processing circuitry to cause the movement of the display by activating the motorized platform, the motorized rail, or both.

20. The display correction system of claim 17, wherein the one or more movement mechanisms comprise one or more robotic components.