

## CLAIMS:

## 1. An amusement park attraction mapping system, comprising:

a sensing system configured to be disposed within an environment of an amusement park attraction, the sensing system configured to capture scanning data of the environment, wherein the scanning data comprises virtual points representative of objects in the environment;

a positioning system coupled to the sensing system, wherein the positioning system is configured to move the sensing system within the environment; and

a controller communicatively coupled to the sensing system and the positioning system, wherein the controller is configured to:

determine target scanning data to be captured by the sensing system;

instruct the positioning system to move the sensing system to target positions based on the target scanning data;

instruct the sensing system to capture the scanning data at the target positions;

combine the scanning data to create a data point cloud of the environment;

compare the data point cloud with a baseline layout of the environment;  
and

output a signal, based on the comparison of the data point cloud with the baseline layout, to indicate an adjustment of a feature of the environment.

2. The amusement park attraction mapping system of claim 1, wherein the controller is configured to determine additional target scanning data to be captured by the sensing system based on a determination that the scanning data is insufficient to create the data point cloud of the environment, instruct the positioning system to move the sensing system to an additional target position based on the additional

target scanning data; and instruct the sensing system to capture additional scanning data at the additional target position.

3. The amusement park attraction mapping system of claim 1, wherein the controller is configured to determine whether sufficient scanning data has been captured based on an amount of the scanning data, a resolution of the scanning data, a number of sets of the scanning data, or any combination thereof.

4. The amusement park attraction mapping system of claim 1, wherein the scanning data is associated with a first area of the environment, and the additional scanning data is associated with a second area of the environment separate from the first area.

5. The amusement park attraction mapping system of claim 1, wherein the scanning data and the additional scanning data each comprise a set of shared virtual points, and the controller is configured to combine the scanning data and the additional scanning data together based on the set of shared virtual points.

6. The amusement park attraction mapping system of claim 1, wherein the positioning system comprises at least two positioning arms coupled together via at least one joint, wherein the controller is configured to actuate each positioning arm to move the sensing system.

7. The amusement park attraction mapping system of claim 1, wherein the positioning system is coupled to a ride vehicle of the amusement park attraction, the controller is configured to instruct the positioning system to move the sensing system to the target positions relative to the ride vehicle, the controller is configured to instruct the ride vehicle to move to a target location within the environment such that the sensing system is moved to the target location, and the controller is

configured to instruct the sensing system to capture the scanning data at a target position of the target positions corresponding to the target location.

8. The amusement park attraction mapping system of claim 1, wherein the sensing system comprises a light detection and ranging device, an infrared three-dimensional (3D) scanner, a structured light scanner, a digital photogrammetry scanner, or any combination thereof.

9. The amusement park attraction mapping system of claim 1, wherein the controller is configured to output an additional signal, based on the comparison of the scanning data with the baseline layout, to verify placement or appearance of the feature of the environment.

10. A controller for a scanning and mapping system of an amusement park, the controller comprising a tangible, non-transitory, computer-readable medium having computer-executable instructions stored thereon that, when executed, are configured to cause one or more processors to:

determine target scanning data of an environment of the amusement park to be captured, wherein the target scanning data comprises a target collection of virtual points;

instruct a ride vehicle of the amusement park to move a sensing system, coupled to a positioning system, to target locations within the amusement park based on the target scanning data;

instruct the positioning system coupled to the ride vehicle to move the sensing system to target positions relative to the ride vehicle based on the target scanning data; and

instruct the sensing system to capture scanning data at the target locations and the target positions;

combine the scanning data to create a data point cloud of the environment;  
and

compare the data point cloud of the environment with a baseline layout of the environment to determine a discrepancy,

wherein the discrepancy is indicative of an unexpected placement of a feature of the environment.

11. The controller of claim 10, wherein the instructions, when executed, are configured to cause the one or more processors to instruct the ride vehicle to move along a path of an attraction of the amusement park within the environment.

12. The controller of claim 10, wherein the instructions, when executed, are configured to cause the one or more processors to instruct the positioning system to rotate the sensing system relative to the ride vehicle, translate the sensing system relative to the ride vehicle, or both.

13. The controller of claim 10, wherein the instructions, when executed, are configured to cause the one or more processors to receive a user input and to determine the target scanning data based on the user input.

14. The controller of claim 10, wherein the instructions, when executed, are configured to cause the one or more processors to receive previously-captured scanning data of the environment and to determine the target scanning data based on the previously-captured scanning data.

15. A theme park attraction system, comprising:

a ride vehicle;

a sensing system configured to capture scanning data of an environment of a theme park attraction, wherein the scanning data comprises data points representative of physical objects in the environment;

a positioning system coupling the sensing system to the ride vehicle, wherein the positioning system is configured to move the sensing system relative to the ride vehicle; and

a controller communicatively coupled to the ride vehicle, the sensing system, and the positioning system, wherein the controller is configured to:

determine sets of target scanning data to be captured by the sensing system;

instruct the ride vehicle and the positioning system to move the sensing system to a plurality of placements within the environment, wherein each placement is associated with a set of target scanning data of the sets of target scanning data;

instruct the sensing system to capture sets of scanning data, wherein each set of scanning data of the sets of scanning data is associated with a respective placement of the plurality of placements;

combine the sets of scanning data with one another to create a data point cloud of the environment; and

determine whether a discrepancy exists between the data point cloud of the environment and a baseline layout of the environment based on a comparison of the data point cloud of the environment and the baseline layout of the environment,

wherein the discrepancy is indicative of an unexpected placement of a feature of the environment.

16. The theme park attraction system of claim 15, wherein the controller is configured to instruct the ride vehicle to move to a location within the environment and instruct the positioning system to move the sensing system to a position relative to the ride vehicle based on the location.

17. The theme park attraction system of claim 15, wherein the sensing system comprises a location sensor, and the controller is configured to:

receive respective sensor feedback from the location sensor to determine a respective location of the sensing system within the environment for each set of scanning data of the sets of scanning data;

associate each set of scanning data of the sets of scanning data with the respective location of the sensing system within the environment; and

combine the sets of scanning data together based on the respective locations associated with each set of scanning data of the sets of scanning data.

18. The theme park attraction system of claim 15, wherein the controller is configured to output a signal related to an adjustment of the feature of the environment in response to identification of the discrepancy.

19. The theme park attraction system of claim 18, wherein the controller is configured to output the signal to send a notification to a user indicative of the adjustment of the feature, to adjust the feature automatically, or both.

20. The theme park attraction system of claim 15, wherein the baseline layout comprises a pre-existing map of the environment, a model of the environment, or both.

21. The theme park attraction system of claim 15, wherein the controller is configured to output a signal to verify placement or appearance of the feature of the environment in response to a determination that the discrepancy does not exist.