

brief summary of certain disclosed embodiments. Indeed, the present disclosure may encompass a variety of forms that may be similar to or different from the embodiments set forth below.

[0004] In a first aspect, there is provided a queue wait time estimation and output system for an amusement park, the queue wait time estimation and output system including: a memory storing instructions; a processor; a first queue monitoring device corresponding to a first queue monitoring mode of a plurality of queue monitoring modes, wherein the first queue monitoring device includes at least a wireless personal area network (PAN) sensor, a camera, a device tap sensor, a ticket tap sensor, an interactive tap device, or an infrared sensor; and a second queue monitoring device corresponding to a second queue monitoring mode of the plurality of queue monitoring modes, wherein the processor is configured to execute the instructions to cause the processor to: receive, via a queue monitoring mode input sensor, a queue monitoring mode input indicative of an accuracy or reliability of one or more queue monitoring modes of the plurality of queue monitoring modes; select, based on the queue monitoring mode input, the first queue monitoring mode from the plurality of queue monitoring modes; receive, after selecting the first queue monitoring mode based on the queue monitoring mode input, a first input via the first queue monitoring mode, wherein the first input is indicative of a first queue monitoring characteristic of at least one queue; receive a second input via the second queue monitoring mode of the plurality of queue monitoring modes, wherein the second input is indicative of a second queue monitoring characteristic of the at least one queue, and the second queue monitoring mode is different than the first queue monitoring mode; determine, in response to the first input indicative of the first queue monitoring characteristic and the second input indicative of the second queue monitoring characteristic, at least one estimated queue wait time corresponding to the at least one queue; and output, to a display device, the at least one estimated queue wait time.

[0005] In a second aspect, there is provided a queue wait time estimation and output system for an amusement park, the queue wait time estimation and output system including: a memory storing instructions; and a processor configured to execute the instructions to cause the processor to: receive, from at least one queue monitoring mode input sensor, at least one queue monitoring mode input indicative of an accuracy or reliability of one or more queue monitors, wherein the at least one queue monitoring mode input sensor includes: a power sensor configured to detect an outage of the one or more queue monitors; or a weather sensor configured to detect a weather-related characteristic associated with the at least one queue monitoring mode input indicative of the accuracy or reliability of the one or more queue monitors; select, in response to the at least one queue monitoring mode input, a wireless personal area network (PAN) monitor of the one or

more queue monitors; receive, after selecting the wireless PAN monitor, a plurality of inputs from the wireless PAN monitor, wherein each input of the plurality of inputs is indicative of a wireless PAN connection time of a respective customer interface device (CID) between a beginning and an end of a queue; determine, in response to the plurality of inputs, an estimated queue wait time corresponding to the queue; and output, to a display device, the estimated queue wait time.

[0006] In a third aspect, there is provided a queue wait time estimation and output system for an amusement park, the queue wait time estimation and output system including: a memory storing instructions; and a processor configured to execute the instructions to cause the processor to: receive, via a queue monitoring mode input sensor, a queue monitoring mode input indicative of an accuracy or reliability of one or more queue monitoring modes of a plurality of queue monitoring modes, wherein the queue monitoring mode input sensor includes: a power sensor configured to detect an outage of the one or more queue monitoring modes of the plurality of queue monitoring modes; or a weather sensor configured to detect a weather-related characteristic associated with the queue monitoring mode input indicative of the accuracy or reliability of the one or more queue monitoring modes of a plurality of queue monitoring modes; select, in response to receiving the queue monitoring mode input, a queue monitoring mode from the plurality of queue monitoring modes; receive, from the queue monitoring mode, a plurality of inputs corresponding to a queue monitoring characteristic of a queue; determine a subset of inputs of the plurality of inputs that exceed a threshold value of the queue monitoring characteristic; determine, based on the subset of inputs, an estimated queue wait time corresponding to the queue; and output, to a display device, the estimated queue wait time.

[0006a] In a fourth aspect, there is provided a queue wait time estimation and output system for an amusement park, the queue wait time estimation and output system including: a memory storing instructions; a processor; and at least one Bluetooth sensor corresponding to a first queue monitoring mode of a plurality of queue monitoring modes, wherein the at least one Bluetooth sensor is configured to continuously monitor a Bluetooth connection between the at least one Bluetooth sensor and a customer interface device (CID) of a guest in the at least one queue, and wherein the processor is configured to execute the instructions to cause the processor to: receive, via a queue monitoring mode input sensor, a queue monitoring mode input indicative of an accuracy or reliability of one or more queue monitoring modes of the plurality of queue monitoring modes; select, based on the queue monitoring mode input, the first queue monitoring mode from the plurality of queue monitoring modes; receive, after selecting the first queue monitoring mode based on the queue monitoring mode input, a first input via the first queue monitoring mode, wherein the first input is indicative of a first queue monitoring characteristic of at least one

queue; receive a second input via a second queue monitoring mode of the plurality of queue monitoring modes, wherein the second input is indicative of a second queue monitoring characteristic of the at least one queue, and the second queue monitoring mode is different than the first queue monitoring mode; determine, in response to the first input indicative of the first queue monitoring characteristic and the second input indicative of the second queue monitoring characteristic, at least one estimated queue wait time corresponding to the at least one queue; and output, to a display device, the at least one estimated queue wait time.

[0006b] In a fifth aspect, there is provided a queue wait time estimation and output system for an amusement park, the queue wait time estimation and output system including: a memory storing instructions; and a processor configured to execute the instructions to cause the processor to: receive, via a queue monitoring mode input sensor, a queue monitoring mode input indicative of an accuracy or reliability of one or more queue monitoring modes of a plurality of queue monitoring modes, wherein the queue monitoring mode input sensor includes: a power sensor configured to detect an outage of the one or more queue monitoring modes of the plurality of queue monitoring modes; or a weather sensor configured to detect a weather-related characteristic associated with the queue monitoring mode input indicative of the accuracy or reliability of the one or more queue monitoring modes of the plurality of queue monitoring modes; select, based on the queue monitoring mode input, a first queue monitoring mode from the plurality of queue monitoring modes; receive, after selecting the first queue monitoring mode based on the queue monitoring mode input, a first input via the first queue monitoring mode, wherein the first input is indicative of a first queue monitoring characteristic of at least one queue; receive a second input via a second queue monitoring mode of the plurality of queue monitoring modes, wherein the second input is indicative of a second queue monitoring characteristic of the at least one queue, and the second queue monitoring mode is different than the first queue monitoring mode; determine, in response to the first input indicative of the first queue monitoring characteristic and the second input indicative of the second queue monitoring characteristic, at least one estimated queue wait time corresponding to the at least one queue; and output, to a display device, the at least one estimated queue wait time.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] 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:

[0008] FIG. 1 is an overhead schematic view of an amusement park including amusement park attractions and a queue wait time estimation system, in accordance with an embodiment of the present disclosure;

[0009] FIG. 2 is a schematic illustration of a queue wait time estimation system configured to receive various queue wait time characteristics and to output queue wait time estimates to various displays, in accordance with an embodiment of the present disclosure;

[0010] FIG. 3 is an overhead view of a queue with a wireless personal area network (PAN) queue monitoring mode, in accordance with an embodiment of the present disclosure;

[0011] FIG. 4 is an overhead view of a queue with a camera-based people counting and/or facial recognition monitoring mode, in accordance with an embodiment of the present disclosure;

[0012] FIG. 5 is an overhead view of a queue with a device, ticket, and/or interactive tap point monitoring mode, in accordance with an embodiment of the present disclosure;

CLAIMS:

1. A queue wait time estimation and output system for an amusement park, the queue wait time estimation and output system comprising:
 - a memory storing instructions;
 - a processor;
 - a first queue monitoring device corresponding to a first queue monitoring mode of a plurality of queue monitoring modes, wherein the first queue monitoring device comprises at least a wireless personal area network (PAN) sensor, a camera, a device tap sensor, a ticket tap sensor, an interactive tap device, or an infrared sensor; and
 - a second queue monitoring device corresponding to a second queue monitoring mode of the plurality of queue monitoring modes, wherein the processor is configured to execute the instructions to cause the processor to:
 - receive, via a queue monitoring mode input sensor, a queue monitoring mode input indicative of an accuracy or reliability of one or more queue monitoring modes of the plurality of queue monitoring modes;
 - select, based on the queue monitoring mode input, the first queue monitoring mode from the plurality of queue monitoring modes;
 - receive, after selecting the first queue monitoring mode based on the queue monitoring mode input, a first input via the first queue monitoring mode, wherein the first input is indicative of a first queue monitoring characteristic of at least one queue;
 - receive a second input via the second queue monitoring mode of the plurality of queue monitoring modes, wherein the second input is indicative of a second queue monitoring characteristic of the at least one queue, and the second queue monitoring mode is different than the first queue monitoring mode;
 - determine, in response to the first input indicative of the first queue monitoring characteristic and the second input indicative of the second queue monitoring characteristic, at least one estimated queue wait time corresponding to the at least one queue; and
 - output, to a display device, the at least one estimated queue wait time.
2. The queue wait time estimation and output system of claim 1, wherein the first queue monitoring characteristic and the second queue monitoring characteristic correspond to only one queue.
3. The queue wait time estimation and output system of claim 1, wherein the first queue monitoring characteristic corresponds to a first queue of the at least one queue and the second queue monitoring characteristic corresponds to a second queue of the at least one queue.

4. The queue wait time estimation and output system of claim 1, wherein the processor is configured to execute the instructions to cause the processor to:
 - receive a plurality of data points corresponding to the first input and the second input;
 - compare the plurality of data points to a data threshold;
 - determine a first subset of data points of the plurality of data points that fail to meet the data threshold and a second subset of data points of the plurality of data points that meet the data threshold;
 - filter out the first subset of data points of the plurality of data points that fail to meet the data threshold; and
 - determine the at least one estimated queue wait time corresponding to the at least one queue based on the second subset of data points.
5. The queue wait time estimation and output system of claim 4, wherein the data threshold comprises a percentage of a previously determined queue wait time estimate.
6. The queue wait time estimation and output system of claim 1, wherein the first queue monitoring mode comprises a wireless personal area network (PAN) mode corresponding to the wireless PAN sensor, and the second queue monitoring mode comprises a camera mode.
7. The queue wait time estimation and output system of claim 6, wherein the camera mode comprises at least a people counting camera mode or a facial recognition camera mode.
8. The queue wait time estimation and output system of claim 1, wherein the first queue monitoring mode comprises a device tap mode corresponding to the device tap sensor, a ticket tap mode corresponding to the ticket tap sensor, an interactive tap mode corresponding to the interactive tap device, or any combination thereof.
9. The queue wait time estimation and output system of claim 1, wherein the first queue monitoring mode comprises an infrared sensor mode corresponding to the infrared sensor.
10. The queue wait time estimation and output system of claim 1, comprising at least one Bluetooth sensor corresponding to the first queue monitoring mode, wherein the at least one Bluetooth sensor is configured to continuously monitor a Bluetooth connection between the at least one Bluetooth sensor and a customer interface device (CID) of a guest in the at least one queue.

11. The queue wait time estimation and output system of claim 1, wherein the processor is configured to execute the instructions to cause the processor to select the first queue monitoring mode from the plurality of queue monitoring modes based on:

at least one additional queue monitoring mode input corresponding to at least a queue type or attraction type.

12. A queue wait time estimation and output system for an amusement park, the queue wait time estimation and output system comprising:

a memory storing instructions; and

a processor configured to execute the instructions to cause the processor to:

receive, from at least one queue monitoring mode input sensor, at least one queue monitoring mode input indicative of an accuracy or reliability of one or more queue monitors, wherein the at least one queue monitoring mode input sensor comprises:

a power sensor configured to detect an outage of the one or more queue monitors; or

a weather sensor configured to detect a weather-related characteristic associated with the at least one queue monitoring mode input indicative of the accuracy or reliability of the one or more queue monitors;

select, in response to the at least one queue monitoring mode input, a wireless personal area network (PAN) monitor of the one or more queue monitors;

receive, after selecting the wireless PAN monitor, a plurality of inputs from the wireless PAN monitor, wherein each input of the plurality of inputs is indicative of a wireless PAN connection time of a respective customer interface device (CID) between a beginning and an end of a queue;

determine, in response to the plurality of inputs, an estimated queue wait time corresponding to the queue; and

output, to a display device, the estimated queue wait time.

13. The queue wait time estimation and output system of claim 12, wherein the processor is configured to execute the instructions to cause the processor to:

receive a plurality of additional inputs from a monitor having a mode type different than the wireless PAN monitor, wherein each additional input of the plurality of additional inputs is indicative of a queue monitoring characteristic of the queue; and

determine, in response to the plurality of inputs and the additional plurality of inputs, the estimated queue wait time corresponding to the queue.

14. The queue wait time estimation and output system of claim 12, wherein the processor is configured to execute the instructions to cause the processor to:

determine a need to calculate an additional estimated queue wait time in lieu of the estimated queue wait time;

receive a plurality of additional inputs from a monitor having a mode type different than the wireless PAN monitor, wherein each additional input of the plurality of additional inputs is indicative of a queue monitoring characteristic of the queue;

determine, in response to the additional plurality of inputs, the additional estimated queue wait time corresponding to the queue; and

output, to the display device, the additional estimated queue wait time.

15. A queue wait time estimation and output system for an amusement park, the queue wait time estimation and output system comprising:

a memory storing instructions; and

a processor configured to execute the instructions to cause the processor to:

receive, via a queue monitoring mode input sensor, a queue monitoring mode input indicative of an accuracy or reliability of one or more queue monitoring modes of a plurality of queue monitoring modes, wherein the queue monitoring mode input sensor comprises:

a power sensor configured to detect an outage of the one or more queue monitoring modes of the plurality of queue monitoring modes; or

a weather sensor configured to detect a weather-related characteristic associated with the queue monitoring mode input indicative of the accuracy or reliability of the one or more queue monitoring modes of a plurality of queue monitoring modes;

select, in response to receiving the queue monitoring mode input, a queue monitoring mode from the plurality of queue monitoring modes;

receive, from the queue monitoring mode, a plurality of inputs corresponding to a queue monitoring characteristic of a queue;

determine a subset of inputs of the plurality of inputs that exceed a threshold value of the queue monitoring characteristic;

determine, based on the subset of inputs, an estimated queue wait time corresponding to the queue; and

output, to a display device, the estimated queue wait time.

16. The queue wait time estimation and output system of claim 15, wherein the queue monitoring characteristic corresponds to an actual wait time, each input of the plurality of inputs corresponds to the actual wait time of a guest, and the threshold value comprises a percentage of a previously determined queue wait time estimate.

17. The queue wait time estimation and output system of claim 1, wherein the queue monitoring mode input sensor comprises:

a power sensor configured to detect an outage of the one or more queue monitoring modes of the plurality of queue monitoring modes; or

a weather sensor configured to detect a weather-related characteristic associated with the queue monitoring mode input indicative of the accuracy or reliability of the one or more queue monitoring modes of the plurality of queue monitoring modes.

18. A queue wait time estimation and output system for an amusement park, the queue wait time estimation and output system comprising:

a memory storing instructions;

a processor; and

at least one Bluetooth sensor corresponding to a first queue monitoring mode of a plurality of queue monitoring modes, wherein the at least one Bluetooth sensor is configured to continuously monitor a Bluetooth connection between the at least one Bluetooth sensor and a customer interface device (CID) of a guest in the at least one queue, and wherein the processor is configured to execute the instructions to cause the processor to:

receive, via a queue monitoring mode input sensor, a queue monitoring mode input indicative of an accuracy or reliability of one or more queue monitoring modes of the plurality of queue monitoring modes;

select, based on the queue monitoring mode input, the first queue monitoring mode from the plurality of queue monitoring modes;

receive, after selecting the first queue monitoring mode based on the queue monitoring mode input, a first input via the first queue monitoring mode, wherein the first input is indicative of a first queue monitoring characteristic of at least one queue;

receive a second input via a second queue monitoring mode of the plurality of queue monitoring modes, wherein the second input is indicative of a second queue monitoring characteristic of the at least one queue, and the second queue monitoring mode is different than the first queue monitoring mode;

determine, in response to the first input indicative of the first queue monitoring characteristic and the second input indicative of the second queue monitoring characteristic, at least one estimated queue wait time corresponding to the at least one queue; and

output, to a display device, the at least one estimated queue wait time.

19. A queue wait time estimation and output system for an amusement park, the queue wait time estimation and output system comprising:

a memory storing instructions; and

a processor configured to execute the instructions to cause the processor to:

receive, via a queue monitoring mode input sensor, a queue monitoring mode input indicative of an accuracy or reliability of one or more queue monitoring modes of a plurality of queue monitoring modes, wherein the queue monitoring mode input sensor comprises:

a power sensor configured to detect an outage of the one or more queue monitoring modes of the plurality of queue monitoring modes; or

a weather sensor configured to detect a weather-related characteristic associated with the queue monitoring mode input indicative of the accuracy or reliability of the one or more queue monitoring modes of the plurality of queue monitoring modes;

select, based on the queue monitoring mode input, a first queue monitoring mode from the plurality of queue monitoring modes;

receive, after selecting the first queue monitoring mode based on the queue monitoring mode input, a first input via the first queue monitoring mode, wherein the first input is indicative of a first queue monitoring characteristic of at least one queue;

receive a second input via a second queue monitoring mode of the plurality of queue monitoring modes, wherein the second input is indicative of a second queue monitoring characteristic of the at least one queue, and the second queue monitoring mode is different than the first queue monitoring mode;

determine, in response to the first input indicative of the first queue monitoring characteristic and the second input indicative of the second queue monitoring characteristic, at least one estimated queue wait time corresponding to the at least one queue; and

output, to a display device, the at least one estimated queue wait time.