

CLAIMS

What is claimed is:

1. An apparatus comprising:
a memory storing instructions; and
a processor communicatively coupled to the memory and configured to execute the instructions
to:
receive an image of a scene;
determine at least one marker within the scene;
determine a boundary of an object within the scene;
modify the boundary based on the at least one marker; and
track a movement of the object within additional images of the scene based on the
determined boundary.
2. The apparatus of claim 1, wherein the processor is configured to execute the instructions
to determine that the tracked movement satisfies at least one predetermined movement based on
movement data.
3. The apparatus of claim 2, wherein the processor is configured to execute the instructions
to:
provide for displaying a first indication that the object is not cleaned when the at least one
predetermined movement has not been satisfied; and
provide for displaying a second indication that the object is cleaned when the at least one
predetermined movement has been satisfied.
4. The apparatus of claim 1, wherein determining the boundary of the object comprises
applying an image segmentation algorithm to the image.
5. The apparatus of claim 1, wherein the processor is configured to execute the instructions
to detect at least one marker within the image, wherein determining the boundary of the object is based on
the detected at least one marker.
6. The apparatus of claim 1, wherein determining the boundary of the object comprises:
determining an area of the image that comprises the marker; and
combining the area of the image with the boundary of the object to generate an adjusted boundary
for the object.
7. The apparatus of claim 6, wherein determining the area of the image that comprises the
marker comprises:
generating at least one virtual marker for the image based on marker configuration data; and
determining the area of the image based on the at least one virtual marker.

8. The apparatus of claim 1 wherein the processor is configured to execute the instructions to:

determine that the tracked movement fails to satisfy at least one predetermined movement based on movement data; and

provide for display an indication that the object has not been cleaned.

9. The apparatus of claim 1 wherein the processor is configured to execute the instructions to:

detect a surface in the image;

determine at least a portion of the surface that coincides with the object; and

determine that the at least portion of the surface has been cleansed by the object.

10. The apparatus of claim 9, wherein determining the at least portion of the surface that coincides with the object comprises determining that first pixels of the image that correspond to the at least portion of the surface coincides with second pixels of the image that correspond to the object.

11. A method by at least one processor comprising:

receiving an image of a scene;

determining at least one marker within the scene;

determining a boundary of an object within the scene;

modifying the boundary based on the at least one marker; and

tracking a movement of the object within additional images of the scene based on the determined boundary.

12. The method of claim 11 comprising determining that the tracked movement satisfies at least one predetermined movement based on movement data.

13. The method of claim 12 comprising:

providing for display a first indication that the object is not cleaned when the at least one predetermined movement has not been satisfied; and

providing for display a second indication that the object is cleaned when the at least one predetermined movement has been satisfied.

14. The method of claim 11, wherein determining the boundary of the object comprises applying an image segmentation algorithm to the image.

15. The method of claim 11 comprising detecting at least one marker within the image, wherein determining the boundary of the object is based on the detected at least one marker.

16. A non-transitory, computer readable medium comprising instructions stored thereon, wherein the instructions, when executed by at least one processor, cause the at least one process to perform operations comprising:

receiving an image of a scene;
determining at least one marker within the scene;
determining a boundary of an object within the scene;
modifying the boundary based on the at least one marker; and
tracking a movement of the object within additional images of the scene based on the determined boundary.

17. The non-transitory, computer readable medium of claim 16, wherein the performed operations comprise determining that the tracked movement satisfies at least one predetermined movement based on movement data.

18. The non-transitory, computer readable medium of claim 16, wherein the performed operations comprise:

providing for display a first indication that the object is not cleaned when the at least one predetermined movement has not been satisfied; and

providing for display a second indication that the object is cleaned when the at least one predetermined movement has been satisfied.

19. The non-transitory, computer readable medium of claim 16, wherein the performed operations comprise applying an image segmentation algorithm to the image.

20. The non-transitory, computer readable medium of claim 16, wherein the performed operations comprise detecting at least one marker within the image, wherein determining the boundary of the object is based on the detected at least one marker.

21. An apparatus comprising:
a memory storing instructions; and
a processor communicatively coupled to the memory and configured to execute the instructions to:

receive an image from a camera directed to a sink;

determine a location of a hand based on the image;

determine a hand movement is satisfied based on the location of the hand;

determine whether the hand is sanitized based on the hand movement; and

generate and store data based on the determination of whether the hand is sanitized.

22. The apparatus of claim 21, wherein determining the hand movement is satisfied comprises determining an orientation of the hand based on the image, and comparing the orientation of the hand to a second image characterizing the hand movement.

23. An apparatus comprising:
a sensor;

a motor;
a memory storing instructions; and
a processor communicatively coupled to the sensor, to the motor, and to the memory, and
configured to execute the instructions to:
 receive sensor data from the sensor characterizing a movement;
 based on the sensor data, provide a first signal to the motor to cause the dispensing of a
sanitizing solution; and
 provide a second signal to the motor to cause the dispensing of the sanitizing solution to
cease.

24. The apparatus of claim 23, wherein the dispensing of the sanitizing solution is to a back
of a hand.

25. An apparatus comprising:
a memory storing instructions; and
a processor communicatively coupled to the memory and configured to execute the instructions
to:

 receive a first image;
 determine a first object in a room based on the first image;
 receive a second image;
 determine a second object in the room based on the second image;
 determine the first object has contaminated the second object;
 generate contamination graph data characterizing that the first object has contaminated
the second object; and
 store the contamination graph data in a database.

26. The apparatus of claim 25, wherein determining the first object has contaminated the
second object comprises determining the first object has touched the second object.

27. The apparatus of claim 25, wherein determining the first object has contaminated the
second object comprises determining the first object has come within a distance of the second object.

28. The apparatus of claim 27, wherein determining the first object has contaminated the
second object comprises determining the first object is within an airflow distance of the second object.