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(54) Titre : SYSTEME ET PROCEDE D'ECLAIRAGE VIRTUEL INTERACTIF D'UN ECHANTILLON VIRTUEL REPRESENTATIF D'UN OBJET REEL FABRIQUE
(54) Title: SYSTEM AND METHOD FOR INTERACTIVE VIRTUAL LIGHTING OF A VIRTUAL SAMPLE REPRESENTATIVE OF A REAL-LIFE MANUFACTURED OBJECT

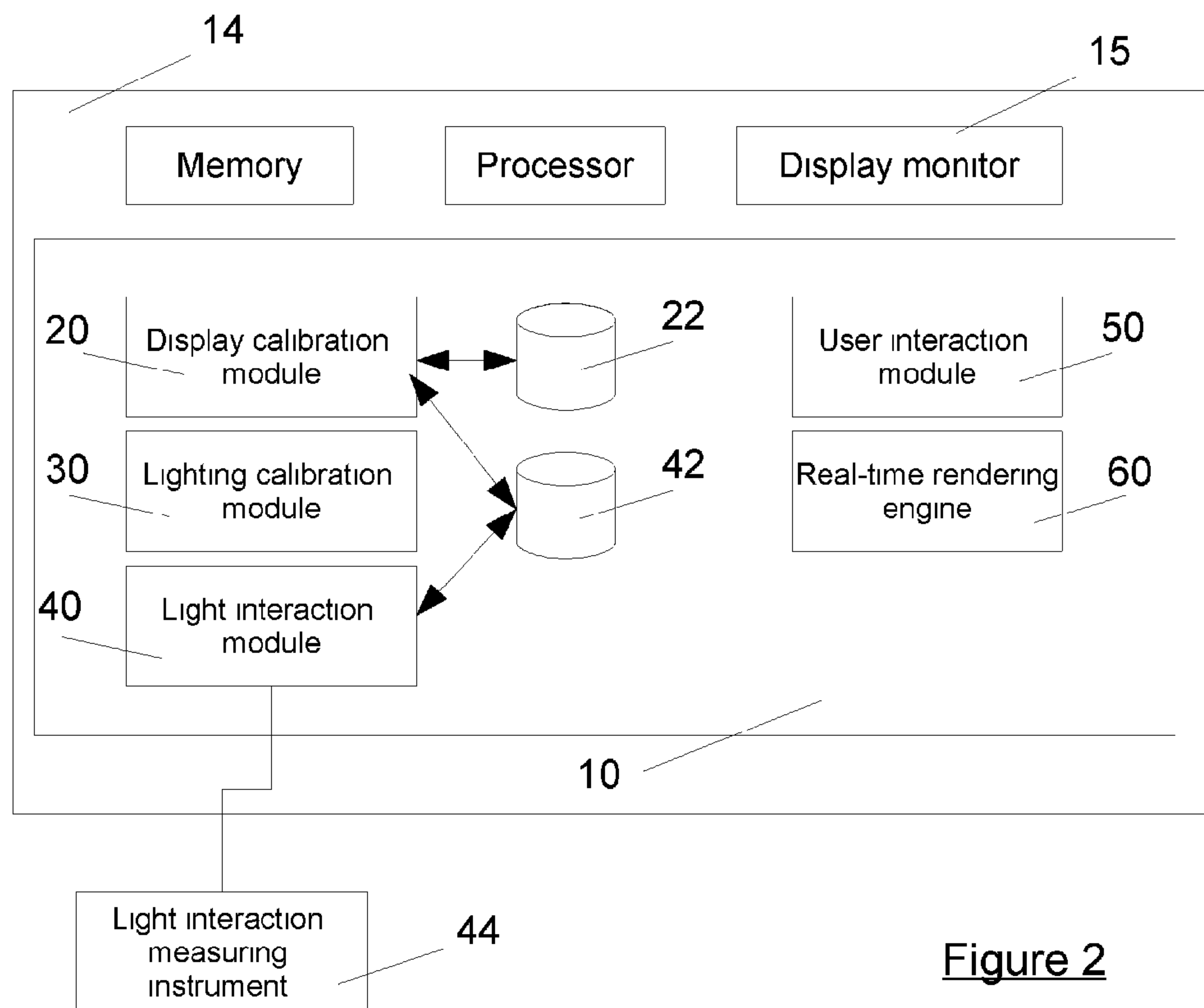


Figure 2

(57) **Abrégé/Abstract:**

A system for interactive virtual lighting of a virtual sample representative of a real-life manufactured object, based on data relative to the real-life manufactured object. A lighting calibration module generates user lighting condition data representative of current

(57) **Abrégé(suite)/Abstract(continued):**

lighting conditions and adjusts parameters of a virtual light source according thereto. A user interaction module captures displacement inputs from the electronic graphical communication device and generates user interaction data therefrom used by a real time rendering engine to move the virtual sample. The real time rendering engine simulates light interaction from the virtual light source with the virtual sample and processes the light interaction data to simulate light interaction from the virtual light with the virtual sample. A computer implemented method for interactive virtual lighting of a virtual sample representative of a real-life manufactured object is also provided.

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(54) Title: SYSTEM AND METHOD FOR INTERACTIVE VIRTUAL LIGHTING OF A VIRTUAL SAMPLE REPRESENTATIVE OF A REAL-LIFE MANUFACTURED OBJECT

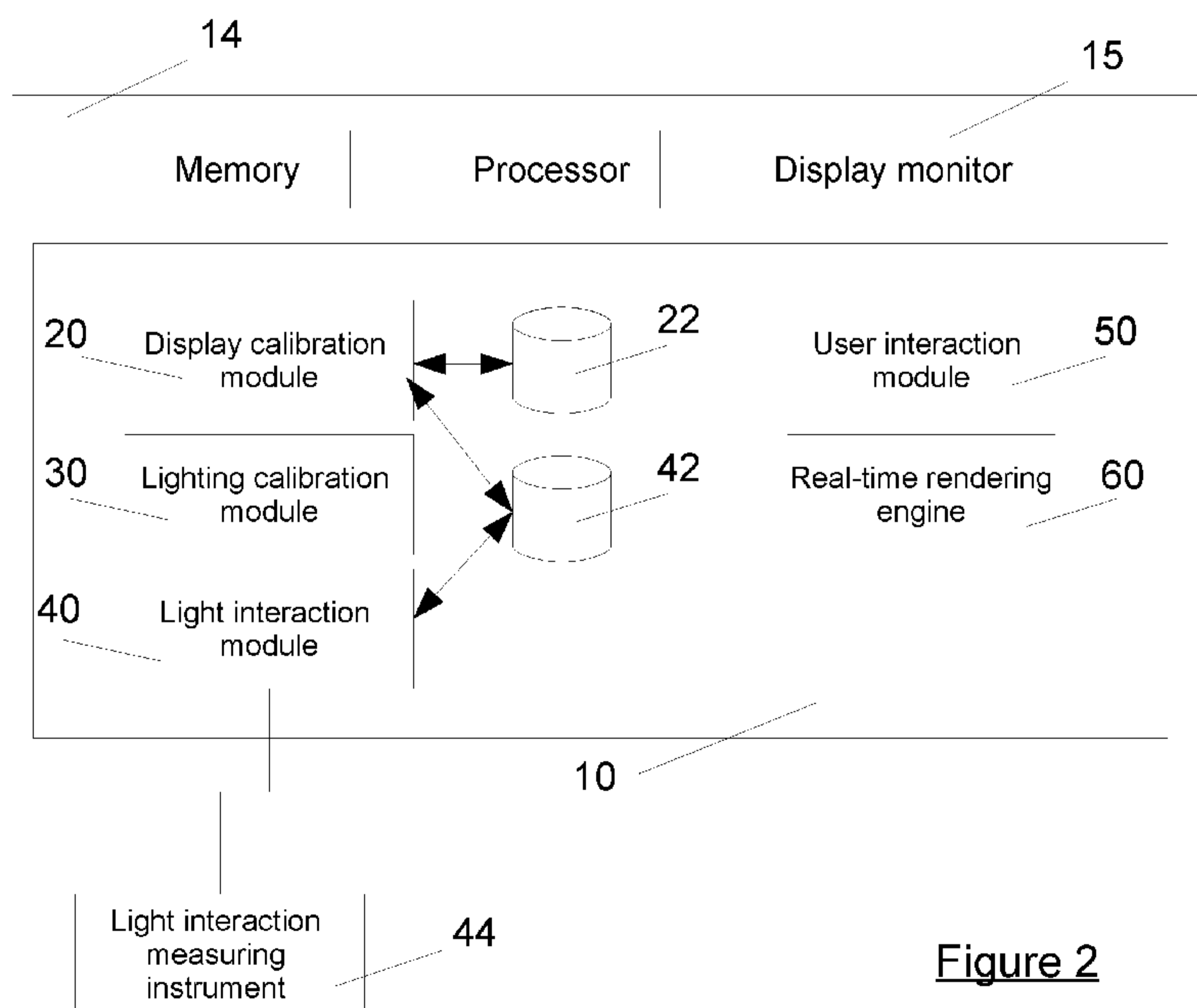


Figure 2

(57) Abstract: A system for interactive virtual lighting of a virtual sample representative of a real-life manufactured object, based on data relative to the real-life manufactured object. A lighting calibration module generates user lighting condition data representative of current lighting conditions and adjusts parameters of a virtual light source according thereto. A user interaction module captures displacement inputs from the electronic graphical communication device and generates user interaction data therefrom used by a real time rendering engine to move the virtual sample. The real time rendering engine simulates light interaction from the virtual light source with the virtual sample and processes the light interaction data to simulate light interaction from the virtual light with the virtual sample. A computer implemented method for interactive virtual lighting of a virtual sample representative of a real-life manufactured object is also provided.

SYSTEM AND METHOD FOR INTERACTIVE VIRTUAL LIGHTING OF A VIRTUAL SAMPLE REPRESENTATIVE OF A REAL-LIFE MANUFACTURED OBJECT

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit under 35 U.S.C. § 119(e) of United States provisional patent application no. 62/279.989 which was filed on January 18, 2016. The entirety of the aforementioned application is herein incorporated by reference.

TECHNICAL FIELD OF THE INVENTION

[0002] The present invention relates to the field of interactive virtual representation of real-life objects. More particularly, it relates to a system for providing virtual representation and lighting of a virtual sample representative of a real-life manufactured object and to a method for providing the same.

BACKGROUND

[0003] In the field of manufactured objects such as, without being limitative, flooring, countertop surfaces, composite panels, decorative surfaces, textiles and the like, physical samples of the products have historically been used to present a plurality of different products available for purchase to potential buyers and help them choose between the possible available options. Such physical samples allow comparison of products based on several criteria including color, surface texture, surface light reflection properties, surface feel, etc.

[0004] Currently, more and more, manufacturers and distributors however wish to move away from physical samples and rather wish to display virtual representations of the plurality of different products available for purchase to potential buyers. For example, the virtual representations of the manufactured products can be displayed using printed sources such as flyers, and digital sources such as pictures, videos, virtual samples and the likes, which can be seen using

CLAIMS:

1. A system for interactive virtual lighting of a virtual sample representative of a real-life manufactured object, on an electronic graphical communication device operatively connected to a display monitor, based on light interaction data and material color data relative to the real-life manufactured object, the system comprising:

a lighting calibration module generating user lighting condition data representative of the current lighting conditions of an immediate environment of a user, the lighting calibration module being configured to adjust at least one parameter of a virtual light source lighting the virtual sample according to the lighting condition data;

a user interaction module capturing real-time virtual object displacement inputs from the electronic graphical communication device and generating real-time user interaction data therefrom; and

a real time rendering engine simulating light interaction from the virtual light source with the virtual sample, the real time rendering engine repeatedly moving the virtual sample according to the real-time user interaction data and concurrently repeatedly processing the light interaction data to simulate light interaction from the virtual light with the virtual sample.

2. The system of claim 1, wherein the at least one parameter of the virtual light source lighting the virtual sample comprises at least one of a light color and a light intensity.

3. The system of claim 2, wherein the lighting calibration module is further configured to receive lighting condition inputs from an input device of the electronic graphical communication device and generate the user lighting condition data representative of the current lighting conditions of the immediate environment of the user based on the received lighting condition inputs.

4. The system of claim 3, wherein the lighting calibration module is configured to receive the lighting condition inputs from user controlled lighting adjustment controls, the lighting calibration module comprising a lighting calibration interface in which a virtual image representative of a physical object in possession of the user and the lighting adjustment controls are displayed on the display monitor, the lighting calibration module repeatedly adjusting at least one parameter of a virtual light lighting the virtual image representative of the physical object in possession of the user on the display monitor according to user inputs from the lighting adjustment controls.

5. The system of claim 3, wherein the lighting calibration module is configured to receive the lighting condition inputs from at least one light capture component operatively connected to the electronic graphical communication device.

6. The system of any one of claims 1 to 5, further comprising a display calibration module, the display calibration module being configured to perform color calibration based on a device color profile specific to one of the display monitor or the electronic graphical communication device.

7. The system of claim 6, wherein the display calibration module is configured to calibrate the colors of the display monitor based on the device color profile specific to the one of the display monitor or the electronic graphical communication device display monitor.

8. The system of claim 6 or 7, wherein the display calibration module is configured to adjust the material color data relative to the real-life manufactured object based on the device color profile specific to the one of the display monitor or the electronic graphical communication device.

9. The system of any one of claims 1 to 8, further comprising a light interaction module configured to measure light interaction parameters relative to the real-life

manufactured object and generate the light interaction data and material color data therefrom.

10. The system of claim 9, wherein the light interaction module comprises a light interaction measuring instrument operative to measure the light interaction parameters relative to the real-life manufactured object.

11. The system of claim 10, wherein the light interaction measuring instrument comprises at least one of a flat scanner and a 3D scanner.

12. The system of any one of claims 9 to 11, wherein the light interaction module further comprises:

a camera having color sensitivity parameters substantially similar to the color sensitivity of the human eye, the camera being operatively connected to the electronic graphical communication device and being operative to record images of the real-life object and a preliminary virtual sample displayed on a color calibrated display monitor based on the generated light interaction data and material color data; and

a light interaction tuning unit receiving the images recorded by the camera and iteratively comparing image data of the real-life object and the preliminary virtual sample from the images and adjusting the parameters of the light interaction data and material color data until a matching threshold is met.

13. A computer implemented method for performing interactive virtual lighting of a virtual sample representative of a real-life manufactured object, on an electronic graphical communication device having a display monitor and based on light interaction data and material color data relative to the real-life manufactured object, the method comprising the steps of:

generating lighting condition data representative of the current lighting conditions of an immediate environment of a user and adjusting at least

one parameter of a virtual light source lighting the virtual sample based on the lighting condition data;

capturing real-time virtual object displacement inputs from the electronic graphical communication device and generating real-time user interaction data therefrom;

repeatedly moving the virtual sample on the display monitor according to the real-time user interaction data; and

repeatedly processing the light interaction data to simulate light interaction with the virtual sample displayed on the display monitor.

14. The computer implemented method of claim 13, wherein generating lighting condition data representative of the current lighting conditions comprises:

displaying a virtual image representative of a physical object in possession of the user and at least one lighting adjustment control on the display monitor;

adjusting at least one parameter of the virtual light source lighting the virtual image, using the at least one lighting adjustment control, to adjust the lighting of the displayed virtual image representative of the physical object, until the color and lighting of the physical object in the current lighting conditions and the color and lighting of the displayed virtual image visually match;

generating the lighting condition data based on the adjustment of the at least one parameter of the virtual light source lighting the virtual image.

15. The computer implemented method of claim 13, wherein generating lighting condition data representative of the current lighting conditions comprises acquiring lighting condition input from at least one light capture component and generating the lighting condition data based on the received lighting condition input.

16. The computer implemented method of any one of claims 13 to 15, further comprising the step of performing color calibration based on a device color profile specific to one of the display monitor or the electronic graphical communication device.

17. The computer implemented method of claim 16, wherein performing color calibration comprises calibrating the colors of the display monitor based on the device color profile specific to the one of the display monitor or the electronic graphical communication device display monitor.

18. The computer implemented method of claim 16 or 17, wherein performing color calibration comprises adjusting the material color data relative to the real-life manufactured object based on the device color profile specific to the one of the display monitor or the electronic graphical communication device.

19. The computer implemented method of any one of claims 13 to 18, further comprising:

measuring light interaction parameters relative to the real-life manufactured object;

generating the light interaction data and material color data therefrom; and

storing the light interaction data and the material color data.

20. The computer implemented method of claim 19, further comprising validating at least one of the light interaction data or material color data and updating the at least one of the light interaction data or material color data.

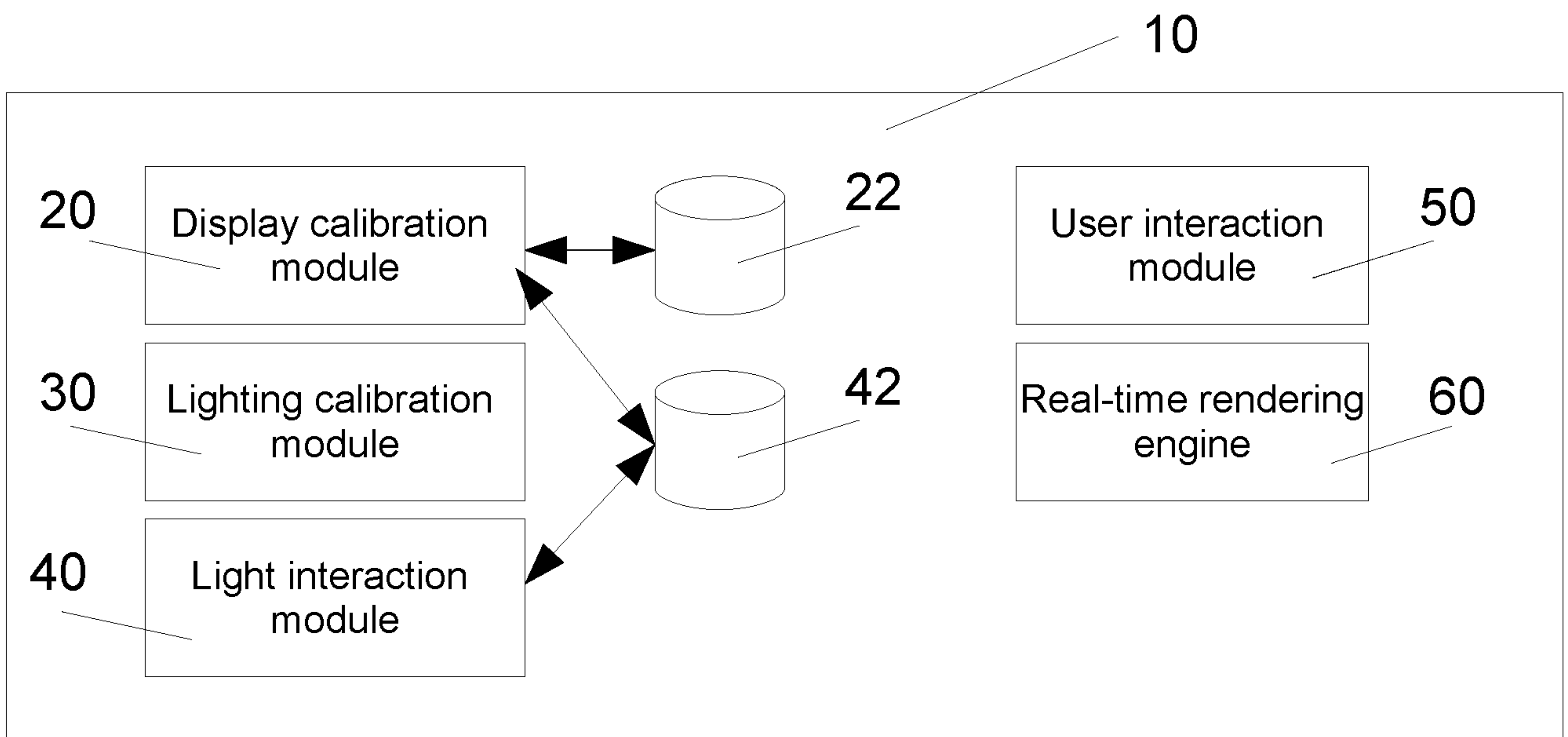


Figure 1

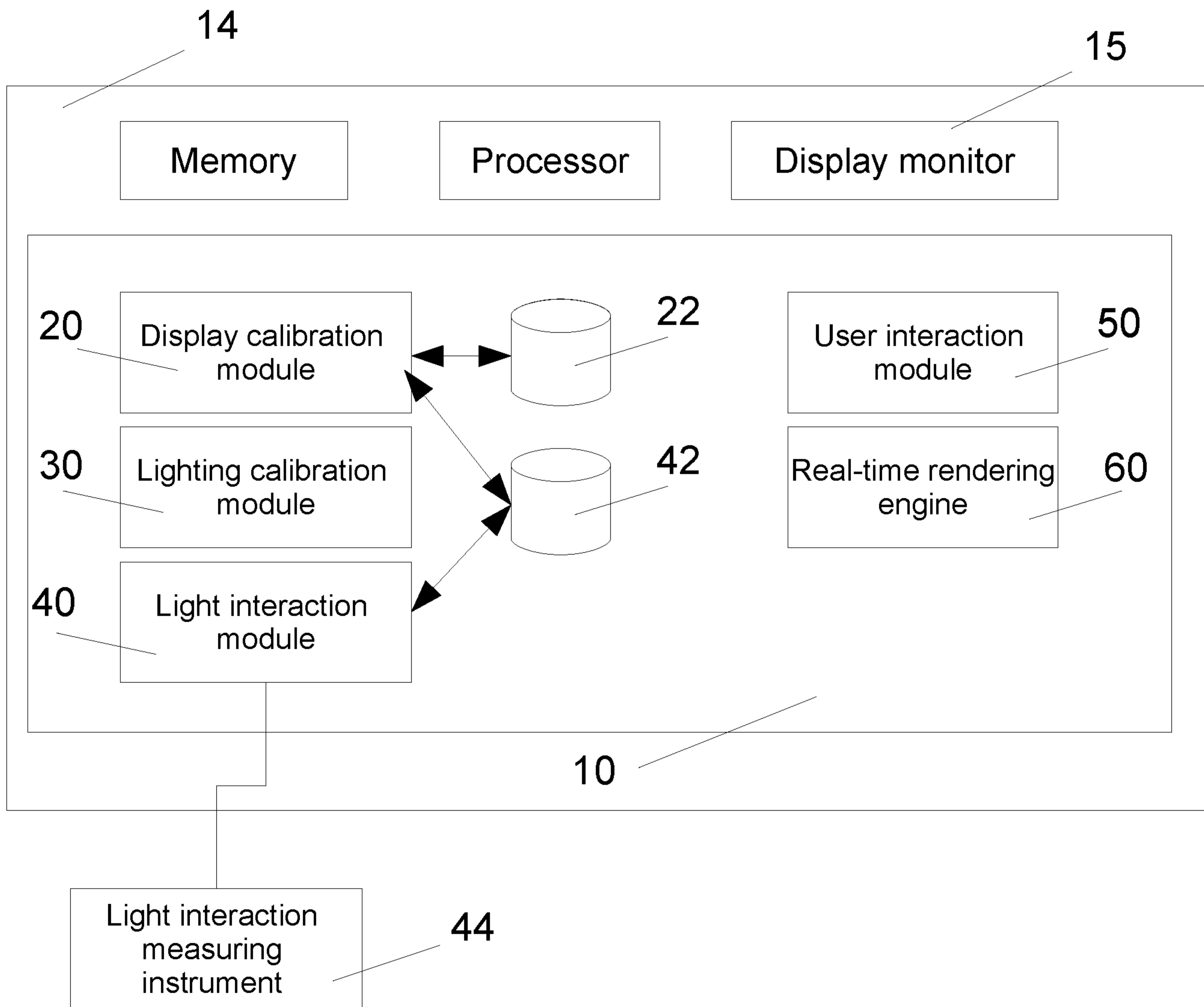


Figure 2

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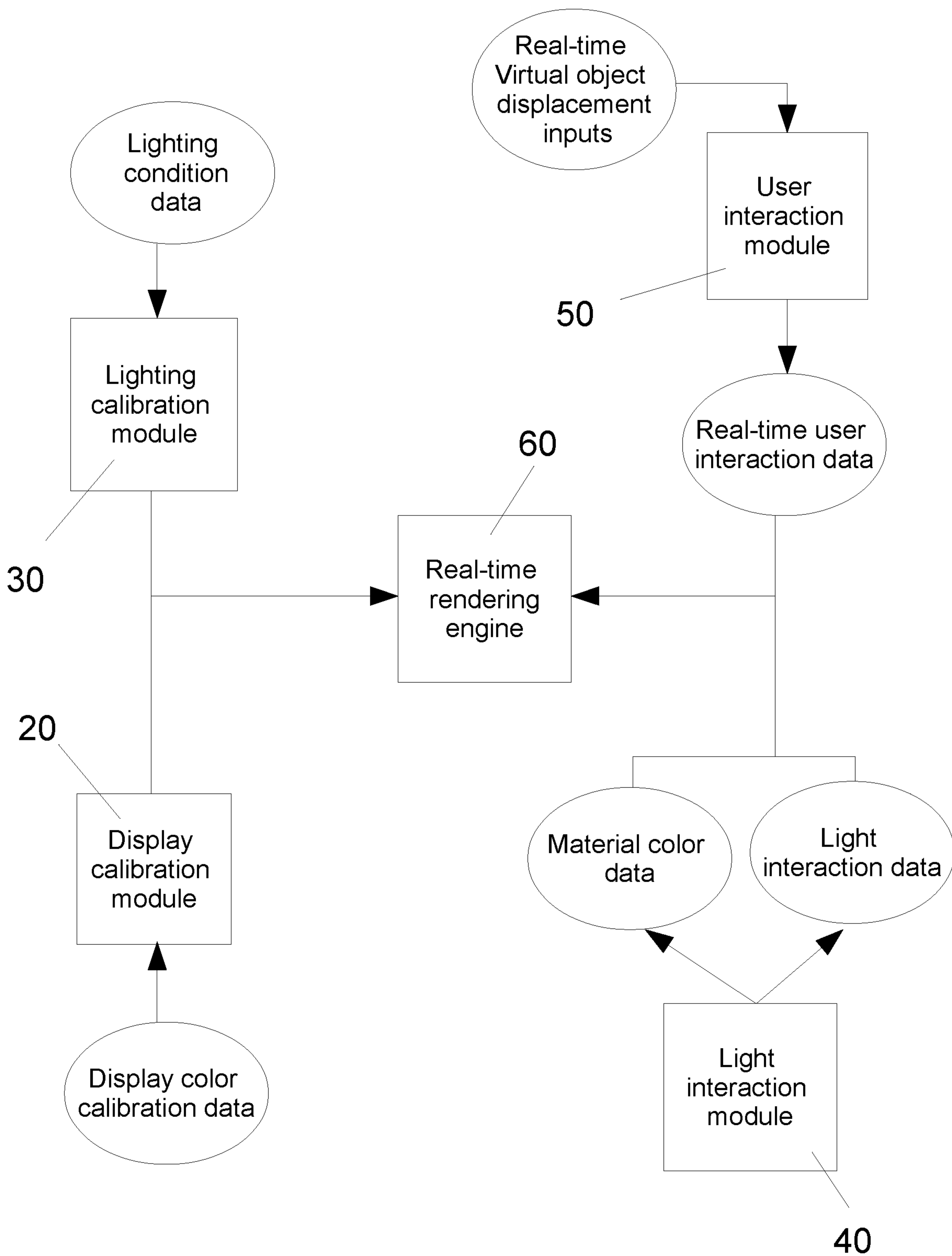


Figure 3

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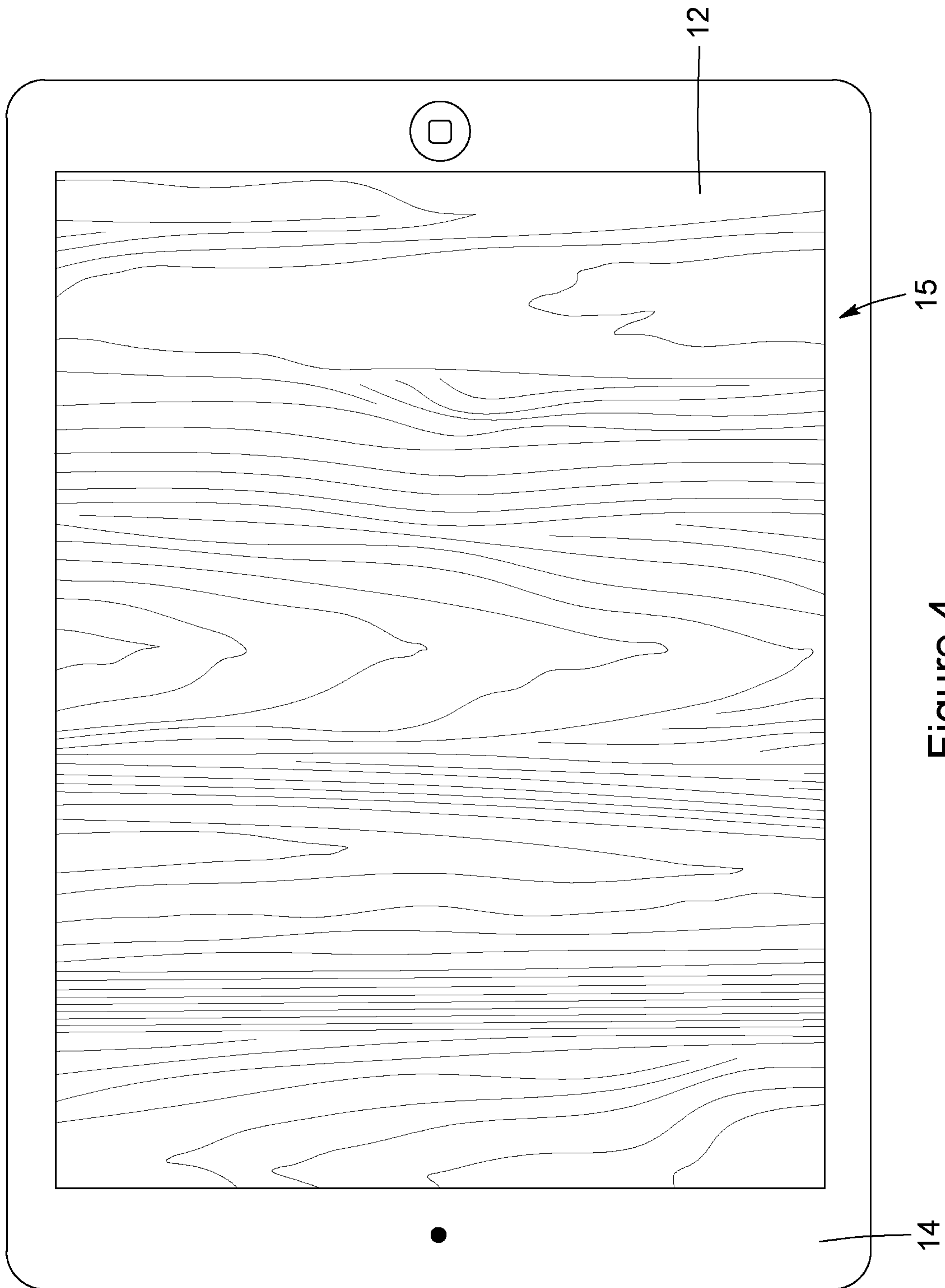


Figure 4

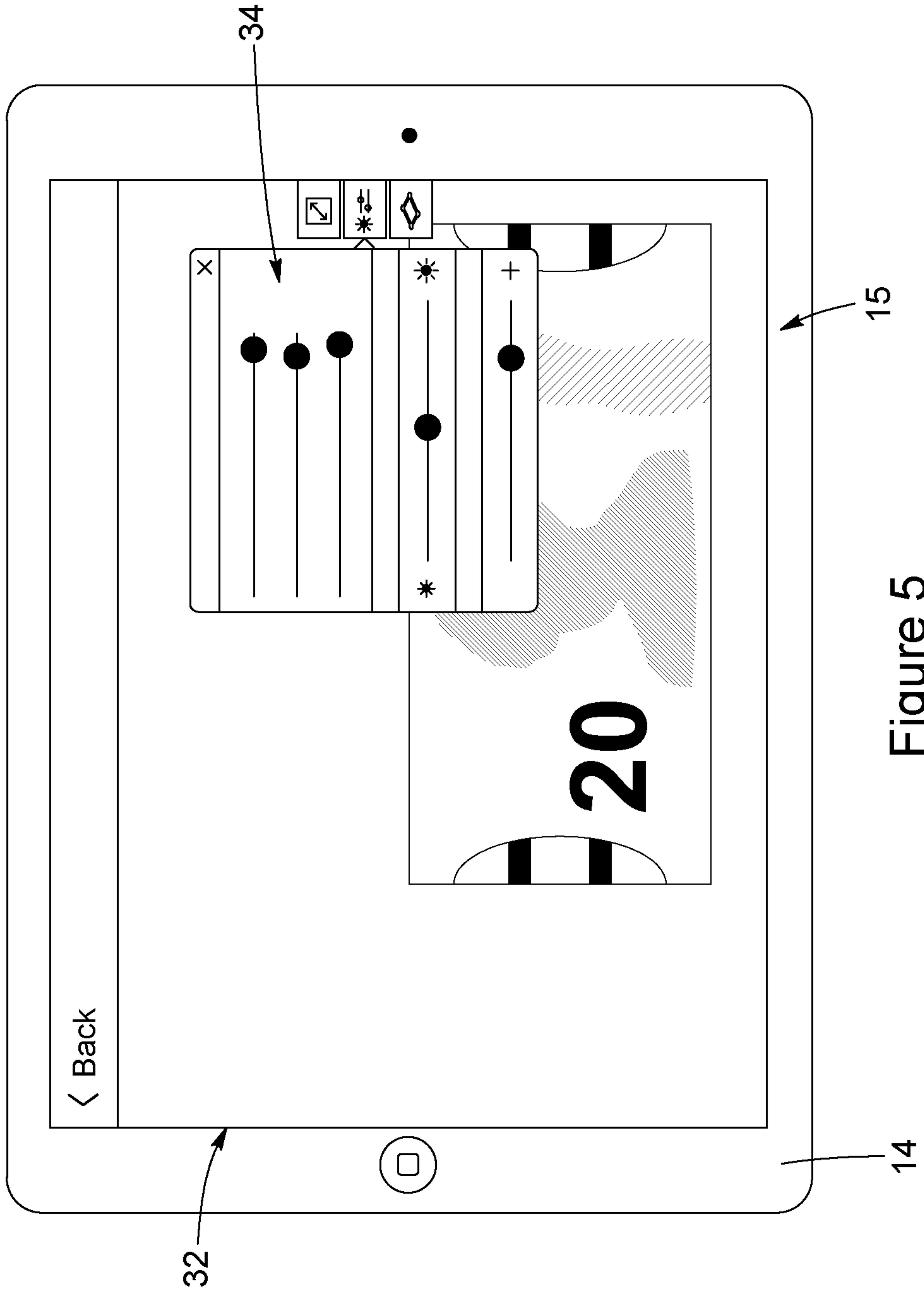


Figure 5

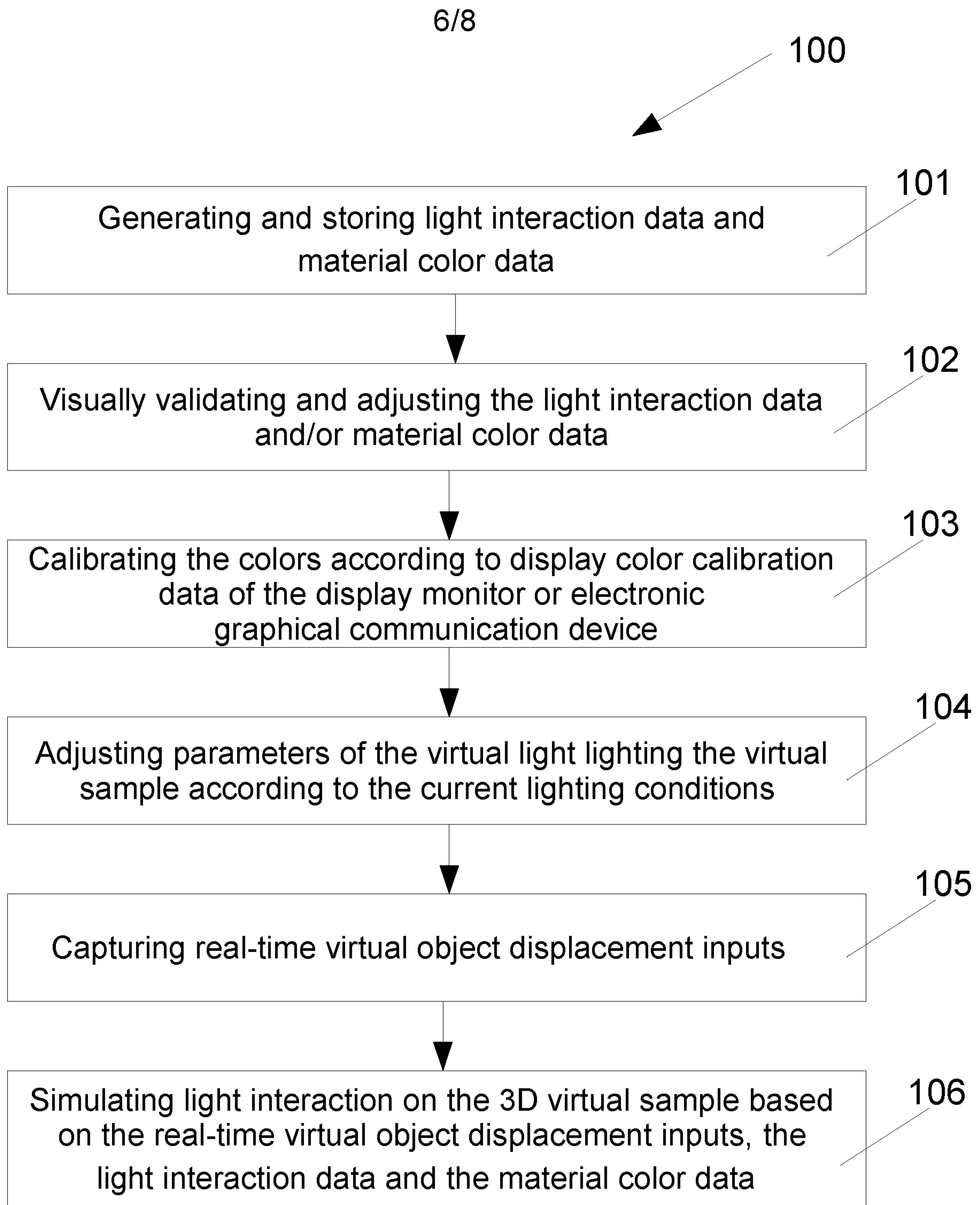
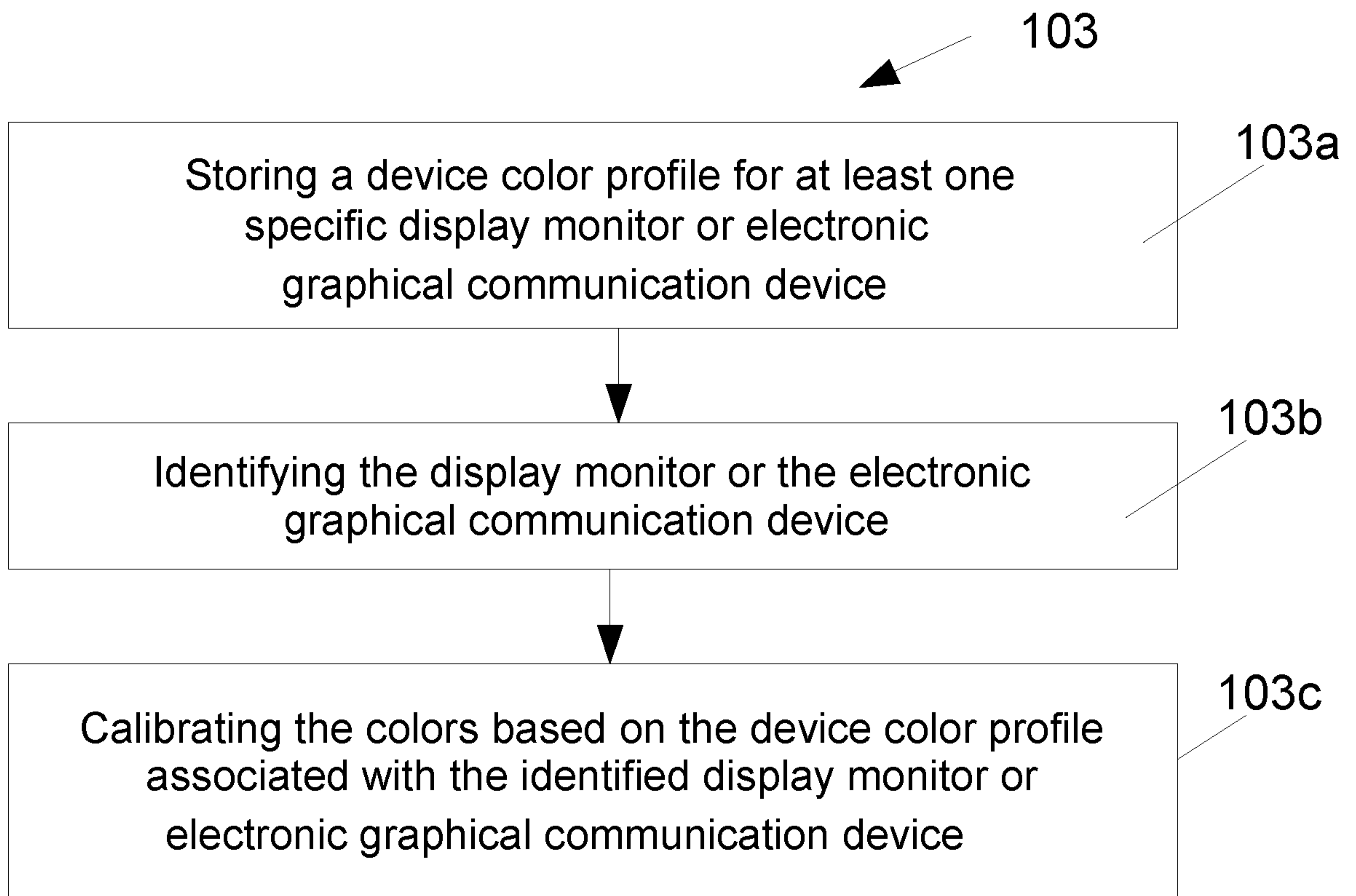
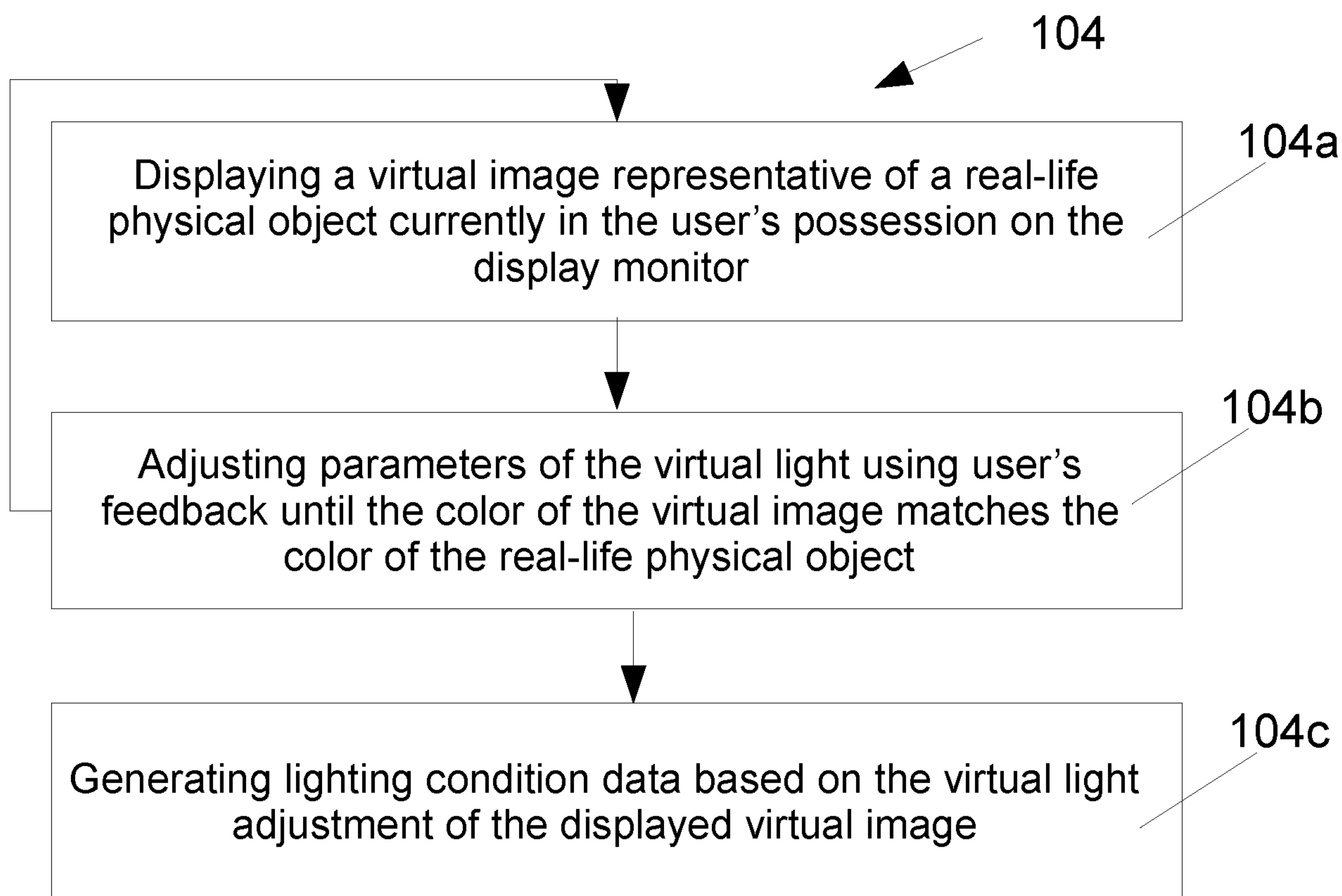


Figure 6

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Figure 7

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Figure 8

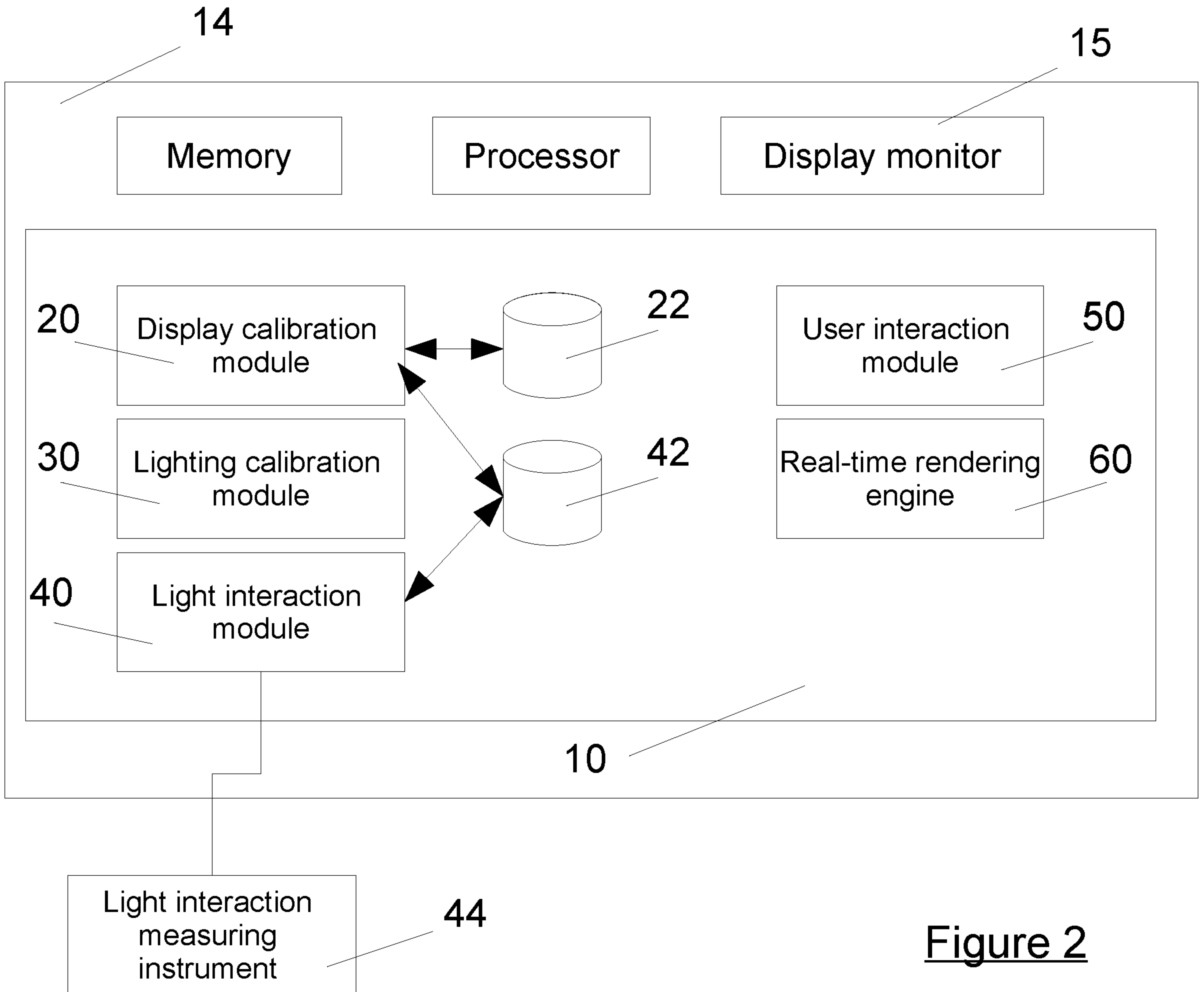


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