tances that are closer. Alternatively, properties of the sensations caused by the stimuli are made to change depending on the distance.

[0103] To summarize, it is possible to ensure the same field of view as for a healthy person by using a wide-angle lens as the lens for the image acquisition unit. Falling of the spatial resolution of the stimuli due to the broader field of view of the camera can be countered by compressing the ends of the image and presenting the vicinity of the center using a high resolution. It is also possible to measure the depth using the focus adjustment of the camera and provide depth-dependent presentations based on this depth measurement.

[0104] It is further possible to simplify the system by taking only objects in the vicinity of the wearer as targets of sensation presentation using a fixed focal point lens suitable for a focal point of a distance up to a few meters from the wearer. It is also possible to perform depth-dependent presentation based on depth measurement integration by a plurality of cameras. Broadening the field of view using a plurality of cameras is also possible. It is further possible to perform depth-dependent presentation based on using the theory of TOF measurement.

INDUSTRIAL APPLICABILITY

[0105] The present invention is applicable to forehead-mounted electro-tactile displays, and more specifically is applicable to a portable visual sense proxy device.

1. An electro-tactile display comprising:
- an electrode substrate provided with a plurality of stimulation electrodes;
- a conductive gel layer positioned between the stimulation electrodes and the skin of a wearer;
- a switching circuit section electrically connected to said stimulation electrodes;
- a stimulation pattern generating section electrically connected to said switching circuit section; and
- means for alleviating a sensation experienced by the wearer as a result of the stimulation electrodes.

2. The electro-tactile display of claim **1**, wherein said electro-tactile display is a forehead-mounted electro-tactile display.

3. The electro-tactile display of claim **1**, wherein said means for alleviating a sensation is configured from said conductive gel layer and wherein said conductive gel layer has a resistance value equivalent to that of the horny layer of the skin.

4. The electro-tactile display of claim **3**, wherein the thickness of said conductive gel layer is 0.3 to 2.0 millimeters.

5. The electro-tactile display of claim **4**, wherein the thickness of said conductive gel layer is 0.5 to 1.0 millimeters.

6. The electro-tactile display of claim **1** further comprising:
- stimulation determination means that determines whether or not to carry out electrical stimulation based on a threshold value of a stimulation determination function; and
- threshold value adjustment means that adjusts said threshold value of said stimulation determination means;
- wherein said means for alleviating a sensation is configured from said stimulation determination means and said threshold value adjustment means, and said threshold value adjustment means changes said threshold value so that the number of times of stimulation occurring in a fixed time period does not exceed a predetermined maximum number of stimuli.

7. The electro-tactile display of claim **6**, wherein said threshold value adjustment means ensures that the stimulation frequency is at least 30 Hz or more by suppressing the total number of stimuli occurring in a fixed time period.

8. The electro-tactile display of claim **6**, wherein an intermediate gradation representation is implemented by increasing the number of times of stimulation at one point in a fixed time period.

9. The electro-tactile display of claim **1**, wherein an electrical stimulation presentation board is comprised of said electrode substrate, said conductive gel layer, and said switching circuit section.

10. The electro-tactile display of claim **9**, wherein said electrode substrate is a flexible substrate.

11. The electro-tactile display of claim **10**, wherein said flexible substrate comprises at lease one cut therein.

12. The electro-tactile display of claim **11**, wherein a plurality of regions are defined by forming a plurality of cuts in transverse and vertical directions so as to leave the edges of said flexible substrate and a predetermined number of electrodes are provided at each region.

13. The electro-tactile display of claim **12**, wherein a set of a switching circuit and a communication circuit is provided for each region, and wherein communication wiring for each communication circuit is provided at the edges.

14. The electro-tactile display of claim **11**, wherein the flexible substrate includes a plurality of strip-shaped regions extending in a longitudinal direction of the electrical stimulation presentation board, with a predetermined number of electrodes being provided at each strip-shaped region.

15. The electro-tactile display of claim **9**, wherein the electrical stimulation presentation board is provided with one or more elastic layers positioned at the surface side and/or the rear surface side of the electrode substrate.

16. The electro-tactile display of claim **15**, wherein said elastic layer is an anisotropically conductive elastic layer provided at the surface side of the electrode substrate.

17. The electro-tactile display of claim **10**, wherein the switching circuit section is provided at the flexible substrate.

18. The electro-tactile display of claim **10**, wherein said electrical stimulation presentation board comprises a circuit substrate independent of the flexible substrate, and the switching circuit is provided at the circuit substrate.

19. The electro-tactile display of claim **1** further comprising:
- means for measuring stimulation voltage; and
- means for adjusting power supply voltage;
- wherein the power supply voltage is set to a voltage a predetermined voltage V higher than the measured stimulation voltage by said means for adjusting power supply voltage.

20. The electro-tactile display of claim **1**, wherein said electro-tactile display is a forehead-mounted electro-tactile display and wherein said display includes means for emphasizing stimulation at time-varying locations and said means for emphasizing stimulation cancels changes to images caused by movement of the wearer and emphasizes an object moving in an external environment.

21. The electro-tactile display of claim **1** further comprising means for detecting depth so as to present sensations depending on distance.

* * * * *