[PLT 3] JP 2014-086311A

Summary of Invention

Technical Problem

[0005] The following problems exist with the abovementioned illumination devices. That is, the fact that the user takes various postures and these postures are ever-changing is not taken into consideration. The user's positional relationship with the desk and the light source also changes when he or she changes posture. Accordingly, there are times when the user's eyes remain close to an object on the desk such as book for an extended period when he or she is reading. This strains the ciliary muscle in the eyeball, and may lead to worsening eyesight. Also, when there are large differences in illuminance on the desktop, this places a load on the eyes, and may similarly lead to worsening eyesight. Furthermore, when the shadow of a writing implement or the user's hand falls on the book, this makes it difficult to read text or the like, and may similarly lead to worsening eyesight. Also, when the illuminance on the desktop is low, the user may move his or her eyes closer in an attempt to read the book or the like, shortening the distance between his or her eyes and the object as aforementioned, and possibly leading to worsening eyesight.

[0006] In view of this, an object of the present invention is to provide an illumination device that is able to appropriately maintain a distance between the user's eyes and an object, and to light up a desktop with appropriate illuminance.

Solution to Problem

[0007] In order to resolve the above problems and achieve the object, an illumination device of the present invention is configured as follows.

[0008] The illumination device includes a light source for lighting up a desktop, an arm mechanism that moves a position of

the light source, an illuminance distribution detection means that detects an illuminance distribution on the desktop, a computation part that calculates a light source position at which illuminance unevenness decreases, based on the illuminance distribution on the desktop detected by the illuminance distribution detection means, and an arm control part that operates the arm mechanism such that the light source moves to the light source position calculated by the computation part.

Advantageous Effects of Invention

[0009] According to the present invention, it becomes possible to appropriately maintain the distance between the user's eyes and an object, and to light up a desktop with appropriate illuminance.

Brief Description of Drawings

[0010] FIG. 1 is a perspective view showing an illumination device according to one embodiment of the present invention and a desk on which the illumination device is set.

FIG. 2 is a perspective view showing the illumination device.

FIG. 3 is a bottom view showing a head part incorporated in the illumination device.

FIG. 4 is a schematic block diagram of the illumination device.

FIG. 5 is an explanatory diagram showing a mechanism model of an arm part incorporated in the illumination device.

FIG. 6 is an explanatory diagram showing the basic operation flow of the illumination device.

member 43, and a head attachment part 45 that is provided so as to pivot freely on this swinging member 44. The head part 60 is attached to the head attachment part 45.

[0016] The arm operation part 50 includes a first motor 51 that is built into the base part 20 and pivots the rotation shaft 23 in the directions of arrow α1 in FIG. 2 and a first angle sensor 51a, a second motor 52 that pivots the first arm 41 in the directions of arrow α2 in FIG. 2 and a second angle sensor 52a, a third motor 53 that pivots the second arm 42 in the directions of arrow α3 in FIG. 2 and a third angle sensor 53a, a fourth motor 54 that pivots the elevation angle adjustment member 43 in the directions of arrow α4 in FIG. 2 and a fourth angle sensor 54a, a fifth motor 55 that pivot the swinging member 44 in the directions of arrow α5 in FIG. 2 and a fifth angle sensor 55a, and a sixth motor 56 that pivot the head attachment part 45 in the directions of arrow α6 in FIG. 2 and a sixth angle sensor 56a.

[0017] The arm mechanism 30 variously controls the position and irradiation direction of the light source 62 which will be discussed later, by operating the arm operation part 50, and can move the light source 62 to an optimal light source position, for example.

[0018] The head part 60 includes a rectangular head base 61, the light source 62 that is provided on the lower surface of this head base 61 and is for lighting up the top of the desk D, desk cameras 63 and 64 that are provided on the light source 62 side and are configured to detect the illuminance distribution on the desktop and output desk images, and an illuminance sensor 65 that is provided on the upper surface of the head base 61 and is for detecting the environmental situation.

[0019] The control device 100 includes a control part 110 that cooperatively controls the various parts and controls the arm part 30, an image processing part 120 that is connected to this control part 110, a computation device (computation part) 130, and a warning part 140 that issues a warning to the user H with sound or light in the case where the distance between the eyes

CLAIMS

1. An illumination device comprising:

a light source for lighting up a desktop;

an arm mechanism that moves a position of the light source;

an illuminance distribution detection means that detects an illuminance distribution on the desktop;

a computation part that calculates a light source position at which illuminance unevenness decreases, based on the illuminance distribution on the desktop detected by the illuminance distribution detection means; and

an arm control part that operates the arm mechanism such that the light source moves to the light source position calculated by the computation part.

2. The illumination device according to claim 1,

wherein the computation part calculates a position at which dispersion of a histogram of the illuminance distribution decreases, as the light source position at which the illuminance unevenness decreases.

3. The illumination device according to claim 1 or 2, comprising:

an illumination situation detection means that detects an illumination situation on the desktop,

wherein the computation part calculates the light source position at which the illuminance unevenness decreases, based on the illumination situation in addition to the illuminance distribution on the desktop.

4. The illumination device according to any of claims 1 to 3, comprising:

a position data detection means that detects position data of a specific region of a user; and

wherein the computation part calculates the light source position at

which the illuminance unevenness decreases, based on the position data in addition to the illuminance distribution on the desktop.

5. The illumination device according to claim 4,

wherein the computation part derives an estimated illuminance distribution that is detected at a viewpoint position of the user, based on the illuminance distribution on the desktop and the position data, and calculates the light source position at which the illuminance unevenness decreases, based on the estimated illuminance distribution.

6. The illumination device according to claims 4 or 5,

wherein the position data is position data of a specific region of an upper body of the user.

7. The illumination device according to claim 6,

wherein the position data of the specific region of the upper body of the user is position data of an eye of the user.