CLAIMS

1. A device for exercising muscles in eyes, comprising:

a housing having an ocular hole corresponding to a user's eye, a line of sight being defined to intersect with the ocular hole;

a target image disposed on the line of sight;

a lens disposed on the line of sight and between the ocular hole and the target image;

a lens driver configured to drive the lens to move forward and backward along the line of sight; and

a controller configured to determine an emmetropia region, set an exercise region that includes a region beyond at least one of a close limit and a remote limit of the emmetropia region, and control the lens driver to drive the lens to reciprocate in the region of the exercise region beyond at least one of the close limit and the remote limit of the emmetropia region.

2. The device according to claim 1, wherein the controller is configured to set the exercise region within a full movable range of the lens, and control the lens driver to drive the lens to reciprocate within the exercise region.

3. The device according to claim 2, wherein the controller is configured to set

the emmetropia region as a predetermined emmetropia region within the movable range, and the exercise region includes the predetermined emmetropia region and the region beyond at least one of the close limit and the remote limit of the emmetropia region.

4. The device according to claim 3, further comprising a user input device configured to receive a user's input, wherein the controller is configured to set at least one of the emmetropia region and the exercise region based on the user's input.

5. The device according to claim 4, wherein the controller is configured to control the lens driver to drive the lens proximal a limit of the full moveable range of the lens, control the lens driver to drive the lens towards an opposite limit of the full moveable range of the lens, receive a first user input from the user input device indicating that the target image is recognized, continue to control the lens driver to drive the lens towards the opposite limit, receive a second user input from the user input device indicating that the target image is blurry, and determine the emmetropia region based on the first user input and the second user input.

6. The device according to claim 4, wherein the controller is configured to control the lens driver to drive the lens to a position outside of the emmetropia region,

wait for a standby time period, receive a user input from the user input device indicating that the target image did not become clear, and set the region beyond at least one of the close limit and the remote limit of the emmetropia region based on a location of the lens outside of the emmetropia region.

7. The device according to claim 1, further comprising a display configured to display the target image.

8. The device according to claim 1, wherein the controller is configured to set the exercise region to include a region beyond the close limit and a region beyond the remote limit of the emmetropia region.

9. The device according to claim 1, wherein the controller is configured to set the region beyond at least one of the close limit and the remote limit of the emmetropia region based on an age of the user.

10. The device according to claim 1, wherein the lens includes at least one of a convex lens, a concave lens, a polarization lens, an omni-focal lens, and a color lens.

11. The device according to claim 8, the lens includes a convex lens.

12. The device according to claim 1, wherein the lens driver includes a lead screw, the lens is coupled to a moving body, the moving body is coupled to the lead screw, and the lens driver is configured to rotate the lead screw thereby causing the moving body to translate along the lead screw and cause the lens to move forward or backward.

13. The device according to claim 1, further comprising a wireless interface, wherein the controller is configured to transmit data to or receive data from an external device using the wireless interface.

14. The device according to claim 13, wherein the controller is configured to receive and store user information and exercise data using the wireless interface.

15. The device according to claim 14, wherein the controller is configured to determine the emmetropia region based on the user information.