CLAIMS

1. A method of modifying a retina fundus image for a deep learning model, the method comprising:

(i) converting a retina fundus image to a binary image, pixels of the retina fundus image being converted to low intensity modified pixels and high intensity modified pixels of the binary image;

(ii) determining a first boundary between the low intensity modified pixels and the high intensity modified pixels;

(iii) removing outlier boundary values from the first boundary and constructing a second boundary from remaining boundary values, the second boundary corresponding to estimated parameters of a retinal disc;

(iv) identifying the pixels of the retina fundus image that are within the second boundary; and

(v) constructing a modified retina fundus image for the deep learning model, the modified retina fundus image comprising the identified pixels.

2. A method according to claim 1, wherein the retina fundus image is a grayscale image.

3. A method according to claim 2, further comprising converting a coloured retina fundus image to the grayscale retina fundus image using green channel values prior to converting the retina fundus image in (i).

4. A method according to any preceding claim, wherein converting the retina fundus image in (i) comprises classifying the pixels of the retina fundus image with corresponding intensity values below a predefined intensity threshold as the low intensity modified pixels and the pixels of the retina fundus image with corresponding intensity values above the predefined intensity threshold as the high intensity modified pixels.

5. A method according to claim 4, wherein each of the low intensity modified pixels has an intensity value of 0 and each of the high intensity modified pixels has an intensity value of 255.

6. A method according to any preceding claim, wherein converting the retina fundus image in (i) is performed using two-class Otsu algorithm.

7. A method according to any preceding claim, further comprising capping pixel intensity of the retina fundus image at a pre-set maximum intensity, prior to converting the retina fundus image in (i).

8. A method according to claim 7, wherein the maximum intensity is pre-set to 50.

9. A method according to any preceding claim, further comprising defining the binary image in terms of polar coordinates, prior to determining the first boundary in (ii).

10. A method according to any preceding claim, wherein the high intensity modified pixels are located within the first boundary and the low intensity modified pixels are located outside the first boundary.

11. A method according to any preceding claim, wherein determining the first boundary comprises defining the first boundary in terms of boundary values in polar coordinates.

12. A method according to claim 11, wherein removing outlier boundary values comprises

computing a mean radial value from the boundary values; and

removing the boundary values with radial values that are undefined or deviate from the mean radial value.

13. A method according to claim 12, wherein the boundary values which deviate from the mean radial value by more than 10 units are removed.

14. A method according to any preceding claim, further comprising applying quadratic regression to the remaining boundary values to construct the second boundary.

15. A method according to any preceding claim, further comprising defining the second boundary in Cartesian coordinates, prior to identifying the pixels in (iv).

16. A method according to any preceding claim, wherein constructing the modified retina fundus image comprises

copying the identified pixels into the second boundary; and

filling unoccupied pixels within the second boundary with a background of the modified retina fundus image.

17. A method according to any preceding claim, further comprising rescaling the modified retina fundus image to 512 x 512 pixels.

18. A non-transient computer readable medium storing executable instructions when executed by a processor causes the processor to perform the method according to any preceding claim.

19. A deep learning system for screening eye diseases, the deep learning system including a dataset trained by the retina fundus image of any one of claims 1 to 17.