【CLAIMS】

Claim 1. A diagnosis assistant method for assisting diagnosis of at least one of disease based on a fundus image, comprising:

obtaining a target fundus image of a testee;

obtaining first diagnosis assistant information based on the target fundus image using first neural network model;

obtaining second diagnosis assistant information based on the target fundus image using second neural network model; and

outputting disease diagnosis assistant information based on the first diagnosis assistant information and the second diagnosis assistant information;

wherein the first neural network model and the second neural network model are trained either independently or dependently, considering the relevance between the first diagnosis assistant information and the second diagnosis assistant information,

wherein the first neural network model and the second neural network model are trained based on at least some common a plurality of training data, and

wherein the plurality of training data are selected from diagnostic information label, findings information label and peripheral information label.

Claim 2. The diagnosis assistant method of claim 1,

wherein the first diagnosis assistant information is diagnosis assistant information for first disease,

wherein the second diagnosis assistant information is diagnosis assistant information for second disease, and

wherein the first disease and the second disease are different diseases.

Claim 3. The diagnosis assistant method of claim 2, wherein the first disease is cardiovascular disease.

Claim 4. The diagnosis assistant method of claim 2, wherein the second disease is kidney disease.

Claim 5. The diagnosis assistant method of claim 1,

wherein the diagnostic information label includes a label for presence or absence of a specific disease,

wherein the findings information label includes a label for abnormalities in a specific area, and

wherein the peripheral information label includes at least one of label for at least one of age, gender or left eye - right eye information.

Claim 6. The diagnosis assistant method of claim 3, wherein:

wherein the first diagnosis assistant information includes at least one of grade information indicating the risk for the first disease, score information indicating numerical value used for diagnosis of the first disease or abnormal information indicating belonging to a risk group for the first disease, and

wherein the second diagnosis assistant information includes at least one of grade information indicating the risk for the second disease, score information indicating numerical value used for diagnosis of the second disease or abnormal information indicating belonging to a risk group for the second disease.

Claim 7. The diagnosis assistant method of claim 3,

wherein the grade information indicating the risk for the first disease is based on coronary artery disease risk grade information selected from a plurality of grade information for indicating a risk for the coronary artery disease, and

wherein the score information indicating numerical value used for diagnosis of the first disease is based on coronary artery disease calcium score information used to determine a risk for the coronary artery disease.

Claim 8. The diagnosis assistant method of claim 1, wherein:

the first diagnosis assistant information includes a plurality of information among the grade information indicating the risk for the first disease, the score information indicating numerical value used for diagnosis of the first disease or the abnormal information indicating belonging to a risk group for the first disease,

obtaining first diagnosis assistant information comprises:

determining whether the plurality of information matches; and

obtaining the first diagnosis assistant information based on the matching result of the plurality of information.

Claim 9. A diagnosis assistant device which assists a diagnosis of at least one of disease using a fundus image, comprising:

memory unit; and

at least one processor that controls the memory unit,

wherein the at least one processor configured to:

obtain first diagnosis assistant information based on a target fundus image using first neural network model,

obtain second diagnosis assistant information based on the target fundus image using second neural network model, and

output disease diagnosis assistant information based on the first diagnosis assistant information and the second diagnosis assistant information,

wherein the first neural network model and the second neural network model are trained either independently or dependently, considering the relevance between the first diagnosis assistant information and the second diagnosis assistant information,

wherein the first neural network model and the second neural network model are trained based on at least some common a plurality of training data, and

wherein the plurality of training data are selected from diagnostic information label, findings information label and peripheral information label.

Claim 10. The diagnosis assistant device of claim 9,

wherein the first diagnosis assistant information is diagnosis assistant information for first disease,

wherein the second diagnosis assistant information is diagnosis assistant information for second disease, and

wherein the first disease and the second disease are different diseases.

Claim 11. The diagnosis assistant device of claim 10, wherein the first disease is cardiovascular disease.

Claim 12. The diagnosis assistant device of claim 10, wherein the second disease is kidney disease.

Claim 13. The diagnosis assistant device of claim 9,

wherein the diagnostic information label includes a label for presence or absence of a specific disease,

wherein the findings information label includes a label for abnormalities in a specific area, and

wherein the peripheral information label includes at least one of label for at least one of age, gender or left eye - right eye information.

Claim14. The diagnosis assistant device of claim 11,

wherein the first diagnosis assistant information includes at least one of grade information indicating the risk for the first disease, score information indicating numerical value used for diagnosis of the first disease or abnormal information indicating belonging to a risk group for the first disease, and

wherein the second diagnosis assistant information includes at least one of grade information indicating the risk for the second disease, score information indicating numerical value used for diagnosis of the second disease or abnormal information indicating belonging to a risk group for the second disease.

Claim 15. The diagnosis assistant device of claim 11,

wherein the grade information indicating the risk for the first disease is based on coronary artery disease risk grade information selected from a plurality of grade information for indicating a risk for the coronary artery disease, and

wherein the score information indicating numerical value used for diagnosis of the first disease is based on coronary artery disease calcium score information used to determine a risk for the coronary artery disease.

Claim 16. A diagnosis assistant method for assisting diagnosis of cardiovascular disease based on a fundus image performed by a cardiovascular disease diagnosis assistant device, comprising:

wherein the cardiovascular disease diagnosis assistant device includes first model and second model,

obtaining feature values based on a target fundus image of a testee using the first model; and

obtaining cardiovascular disease diagnosis assistant information by using the feature values and other factor as input to the second model,

wherein the other factor includes at least one of information for an age of the testee, information for a gender of the testee, information for smoking status of the testee, information for hyperlipidemia condition of the testee, information for blood pressure condition of the testee or information for diabetic condition of the testee.

Claim 17. A cardiovascular disease diagnosis assistant device which assists a diagnosis of cardiovascular disease using a fundus image, comprising:

memory unit; and

at least one processor that controls the memory unit,

wherein the cardiovascular disease diagnosis assistant device includes first model and second model, and

wherein the at least one processor configured to:

obtain feature values based on a target fundus image of a testee using the first model; and

obtain cardiovascular disease diagnosis assistant information by using the feature values and other factor as input to the second model,

wherein the other factor includes at least one of information for an age of the testee, information for a gender of the testee, information for smoking status of the testee, information for hyperlipidemia condition of the testee, information for blood pressure condition of the testee or information for diabetic condition of the testee.

Claim 18. A computer-readable recording medium, characterized in storing a program according to claims 1 to 8 and 16.