

AbstractObtaining Data for Automatic Glaucoma Diagnosis, and Screening and Diagnostic Techniques and Systems using the Data

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A non-stereo fundus image is used to obtain a plurality of glaucoma indicators. Additionally, genome data for the subject is used to obtain genetic marker data relating to one or more genes and/or SNPs associated with glaucoma. The glaucoma indicators and genetic marker data are input into an adaptive model operative to generate an output indicative of a risk of glaucoma in the subject. In combination, the genetic indicators and genome data are more informative about the risk of glaucoma than either of the two in isolation. The adaptive model may be a two-stage model, having a first stage in which individual genetic indicators are combined with respective portions of the genome data by first adaptive model modules to form respective first outputs, and a second stage in which the first outputs are combined by a second adaptive mode. Texture analysis is performed on the fundus images to classify them based on their quality, and only images which are determined to meet a quality criterion are subjected to an analysis to determine if they exhibit glaucoma indicators. Also, the images are put into a standard format. The system may include estimating the position of the optic cup by combining results from multiple optic cup segmentation techniques. The system may include estimating the position of the optic disc by applying edge detection to the funds image, excluding edge points that are unlikely to be optic disc boundary points, and estimating the position of an optic disc by fitting an ellipse to the remaining edge points.

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