Improved automated detection of glaucoma from fundus image using hybrid features

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Abstract

Glaucoma is an ocular disorder, usually caused due to increase in intraocular pressure in the eye, causes damage to the optic nerve responsible for transmitting information between eye and brain. This leads to permanent blindness if left undetected. Glaucoma progression can only be stopped if diagnosed at an early stage. Glaucoma progression is preceded by some structural changes in the retina and optic nerve head. Fundoscopy and ophthalmoscopy are the two major biomedical imaging techniques that are being used by ophthalmologists to analyze the internal structure of eye and report if any abnormality exists. Proposed paper provides a novel, autonomous and more accurate glaucoma detection algorithm that processes a fundus image using some state of art biomedical imaging and machine learning techniques, then correlate their results to categorize an image as glaucoma, non-glaucoma or suspect. If both modules converge on a single decision either glaucoma or non-glaucoma, the image is categorized as glaucoma or healthy respectively. However, in case of conflict in results the image is classified as suspect. Glaucoma and suspects can be further referred to ophthalmologists for expert opinion and detailed diagnosis. Proposed hybrid system has increased the accuracy of referral system for glaucoma patients to 100% with some false referrals of normal cases. *Al-Shifa Journal of Ophthalmology 2015; 11(2): 103-115. © Al-Shifa Trust Eye Hospital, Rawalpindi, Pakistan.*