Project Name: Fundus image based diagnosis and clinical decision support system for early prediction of glaucoma and grading of diabetic retinopathies

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Project Summary:

As per the World health organization, around 2.2 billion people have problem of near or distance vision impairment. Half of them have moderate to severe distance vision impairment or complete blindness. glaucoma, diabetic retinopathies (DR) are the key eye disorders leading to the blindness. By 2040 around 111.8 million people are expected to be affected by glaucoma and 191.0 million DR patients are estimated by 2030. Glaucoma causes due to intraocular pressure on the optic nerve. Thus, the nerve becomes unable to send information to the brain. Aqueous humor is the fluid present in the human eye and if the fluid produced is not equal to the fluid discharged then the restricted fluid creates pressure on nerve cells and ends up with glaucoma.

In this project image-based diagnosis and clinical decision support system is proposed for two very severe ophthalmic diseases glaucoma and diabetic retinopathies (DR). Both of these diseases do not show any significant symptoms at the early stage but destruct the retina badly and causes complete irreversible vision impairment in the advanced stage. Fundus images have very fine blood cells hence it is a challenge to differentiate between healthy and malignant images. In state-of-the-art methods many machine learning approaches are being applied but they ignored textural statistics of fundus images to extract features. It is a very important characteristic since the image texture varies significantly in the case of glaucoma and DR. Our proposed method will be beneficial in automatic early screening of diseases and prevent blindness. It will not only detect glaucoma and four stages of DR but also reduce examination time and manual errors

Deliverables: A scalable model implemented on the available dataset by identifying optimal algorithm using hand-crafted features.