Predicting the Stages of Diabetic Retinopathy using Deep Learning

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Abstract

In this research, the "Convolutional Neural Networks (CNN)" is used for image recognition, using the retinal images to train the neural network architecture and produce high accuracies.

Diabetic Retinopathy (DR) is a very ordinary problem among diabetic patients, which in turn results in the constructive loss of vision in those patients. If this abnormality is not detected in the early stages, then there is no treatment to restore the eyesight. Hence, the only remedy from this irreversible situation is to detect this disease at an early stage and undergo treatment. To sustain the vision in the patients, the ophthalmologists use the "fundus images" of their eyes, which the retinal images of the patients. But this detection of an abnormality in a human eye by another human naked eye is time taking, cost- consuming and it sometimes also leads to misjudgment, due to the subjective difference and considerations among the ophthalmologists. Therefore, the "Deep Learning" methodology is used to detect Diabetic retinopathy by using the fundus images. Hence, leading to the reduction of misdiagnoses, a computer-based diagnosing system is introduced. Recently, the techniques of deep learning have become the most common method to achieve accuracy among image recognition or feature detection systems for both classification and regression. In this research, the "Convolutional Neural Networks (CNN)" is used for image recognition, using the retinal images to train the neural network architecture and produce high accuracies.

Merits

Since the method only uses deep learning methodology and a normal CNN to predict, it is simple a network to predict the fundus images.

Demirits

Since no other layers were added to this layer (only convolutional neural network is used), the prediction for higher level infection was not too accurate.