Multi-scale Attention for Diabetic Retinopathy Detection in Retinal Fundus Photographs

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Abstract

The diagnosis and/or grading of diabetic retinopathy (DR) in the retina fundus has traditionally been done by physicians using manual procedures. However, there has been a significant demand for automated eye diagnostic and grading systems due to the constant rise in the number of persons with diabetes over the past few decades. An excellent diagnostic and predictive value for treatment planning exists with automatic DR grading based on retinal fundus pictures. With the majority of the current automated DR grading systems, it is exceedingly challenging to capture significant features because of the minor changes between severity levels. This paper presents a deep learning-based method for automatically assessing diabetic retinopathy in retina fundus pictures. This paper presents a deep learning-based method for automatically assessing diabetic retinopathy in retina fundus pictures. In order to increase the discriminative ability of the retrieved features, we implement a multi-scale attention mechanism within a deep convolutional neural network architecture in this research. Additionally, we provide a brand-new loss function termed modified grading loss that enhances the training convergence of the suggested strategy by taking into account the distance between various grades of distinct DR categories. The suggested technique is trained, validated, and tested using a dataset about diabetic retinopathy that is openly available. The experimental findings are presented to illustrate how well the suggested strategy competes.

Keywords: diabetes, deep learning, diabetic retinopathy, microvascular complication, hyperglycemia, attention, CNN