Optimized Inception-Based Architecture for the Detection of Macular Degeneration

Debolina Das
SCORE, VIT Vellore, Tamil Nadu

Garvita Singhal
SCORE, VIT Vellore, Tamil Nadu

Sakshi Dwivedi
SCORE, VIT Vellore, Tamil Nadu

Dr. Parimala M
SCORE, VIT Vellore, Tamil Nadu

Abstract:

This paper introduces Fusionception, a hybrid deep learning model for the classification of retinal Optical Coherence Tomography (OCT) images [22]. The paper starts with a comparative analysis of three convolutional neural network (CNN) models- InceptionV1, InceptionV3 and InceptionResNetV2 on [42] three publicly available datasets- OCTID, Retinal OCT Images (Kermany et al.), and the Age-related Macular Degeneration OCT dataset. Among these models, InceptionV3 and InceptionResNetV2 resulted in better accuracy and generalization. Based on these, Fusionception combines the strengths of both models by extracting the deep features of each model. These features are then combined using global average pooling and concatenation followed by a custom-designed dense classification layer [23]. We applied fine tuning and data augmentation to ensure its robust performance across different datasets. Fusionception demonstrates potential to be an effective tool in Ophthalmology with a powerful ability to recognize complex patterns and give reliable classifications across different OCT images.

Keywords:

Macular Degeneration, Convolutional Neural Networks, Inception V1, Inception V3, Inception ResNet V2, Retinal Image Classification, Medical Image Analysis.