DIABETIC RETINAL IMAGE CLASSIFICATION
USING DEEP LEARNING

ABSTRACT

Diabetic retinopathy is a serious complication of diabetes and a leading cause of blindness in adults. Early detection and diagnosis of this condition through retinal image analysis can significantly improve patient outcomes. In this study, we present a deep learning-based approach for the automated classification of retinal images as either "Diseased" or "Normal" based on the presence or absence of diabetic retinopathy.

The core of our approach lies in leveraging a convolutional neural network (CNN) architecture trained on a large dataset of label retinal images. We utilize transfer learning techniques, fine-tuning a pre-trained CNN model to adapt to the specific features relevant to diabetic retinopathy detection. The model is trained using a combination of retinal images annotated by medical professionals.

Once trained, the model is capable of making predictions on unseen retinal images. For each input image, the model outputs a probability score indicating the likelihood of diabetic retinopathy being present. We threshold this probability to classify images as either "Diseased" or "Normal".

To demonstrate the effectiveness of our approach, we implemented the model into a Python script. The script loads a pre-trained model, processes a single retinal image, and makes predictions regarding its status. Visual feedback is provided to the user, including the predicted classification and a confidence score.

The presented approach offers a promising tool for assisting healthcare professionals in the early detection and management of diabetic retinopathy. Future work may involve further refinement of the model architecture, integration into clinical workflows, and large-scale validation studies to assess its performance in real-world settings.