

Predicting Diabetic Risk Using Retinal Data with Deep Learning

Submitted By :

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Project Report: Predicting Diabetic Risk Using Retinal Data

1. Project Overview

This project involves the development of a deep learning-based Recurrent Neural Network (RNN) model to predict the likelihood of diabetes in patients using retinal image data. By leveraging advanced computer vision and deep learning techniques, this model assists in early detection and diagnosis of diabetic retinopathy from fundus images.

2. Objectives

- To preprocess and analyze retinal images and metadata for diabetic prediction.
- To build and train a deep learning model combining Convolutional Neural Networks (CNNs) and RNNs for improved temporal pattern recognition.
- To evaluate the model's performance in predicting diabetic stages from retinal features.

3. Tools and Technologies Used

Programming Language:

- Python

Libraries and Frameworks:

- TensorFlow & Keras
- Pandas & NumPy
- Matplotlib, Seaborn, Plotly
- Scikit-learn
- PIL
- OS & Glob

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Models:

- ResNet50, InceptionResNetV2
- Custom RNN and Dense layers
- Keras Sequential & Functional API

4. Dataset and Preprocessing

Source: Retinal images and labels from trainLabels.csv

Processing Steps:

- Read image paths and match with labels
- Map to patient ID and eye orientation
- Filter existing images
- Convert labels to categorical format

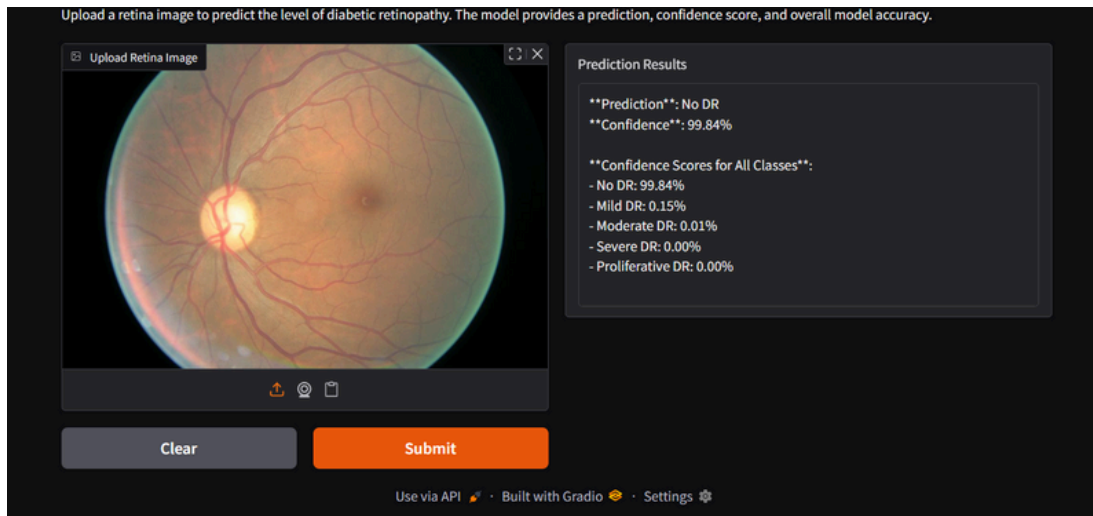
5. Model Pipeline

1. Data Ingestion using pandas and glob
2. Data Augmentation using ImageDataGenerator
3. Model Building with pretrained CNNs and custom layers
4. Compilation using SGD, and training with callbacks
5. Evaluation and visualization of results

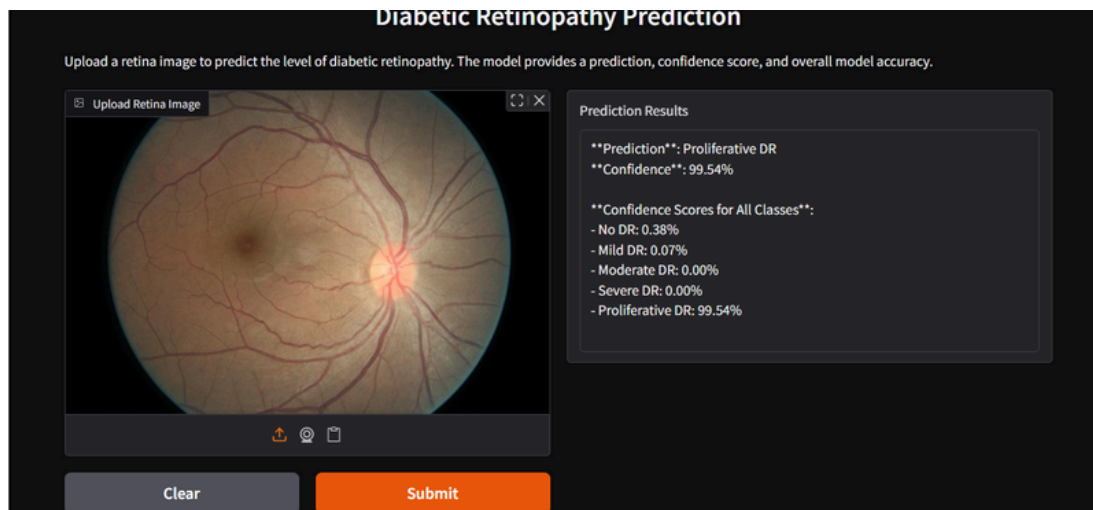
6. Sample Retina Images

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Sample 1: Healthy Retina



Sample 2: Diabetic Retina



7. Sample Prediction Link

You can access a demonstration of the trained model and perform predictions using the following link:

<https://9fd4fd8ed59d4ac823.gradio.live>

(Valid only for 1 week)