CAPSTONE PROJECT PHASE 3

README File

Project Title: CVD Risk Assessment Using Diabetic Retinopathy Fundus Image Analysis

Project ID: PW25_MHR_05

Contents of the ZIP File and File Description

1. Vessel segmentation code

This notebook contains the complete implementation for retinal blood vessel segmentation from fundus images.

Includes:

1.1 Image preprocessing steps (resizing, normalization, contrast enhancement).

1.2 Deep learning model architecture used for vessel segmentation (VGG16 based Unet model).

1.3 Training and validation pipeline.

1.4 Prediction/inference code for segmenting vessels from unseen fundus images.

1.5 The trained vessel segmentation model is saved as:
vgg16_unet400_DREnhanced_model.keras

2. Optic segmentation code

This notebook contains code for optic disc segmentation, which is required to exclude the optic disc region during vessel analysis.

Includes:

2.1 Preprocessing of fundus images.

2.2 Model architecture and training code for optic disc segmentation.

2.3 Inference code to generate optic disc masks.

2.4 The trained optic disc segmentation model is saved as: **efficientnetb3_unet_idrid.h5**.

3. Complete code (Including AVR calculation)

This file integrates all individual modules into a single end-to-end pipeline.

Includes:

3.1 Loading of trained vessel and optic disc segmentation models.

3.2 Vessel segmentation and optic disc removal.

3.3 Extraction of arterioles and venules.

3.4 Calculation of: AVR (Arteriolar-to-Venular Ratio)

3.5 Batch processing of the entire dataset.

4. ReadME file