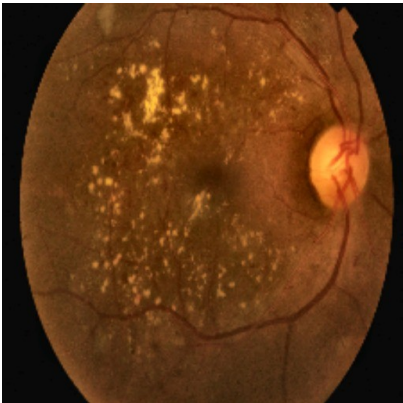# VisionAI — Research Report

Patient Metadata

Full_Name: Jenifer
Age: 56
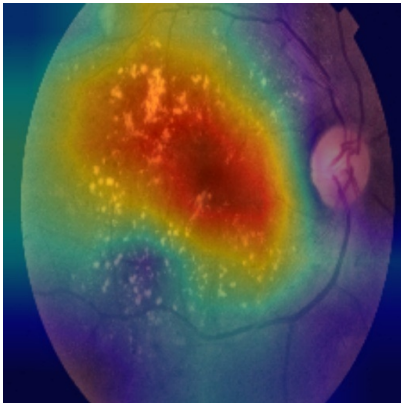Gender: Female
Systolic: 180

Diastolic: 110
Glucose_Level: 343
BMI: 30.8

Prediction Summary

Predicted Stage: SEVERE | Confidence: 71.15%
Risk Score: 50.00%
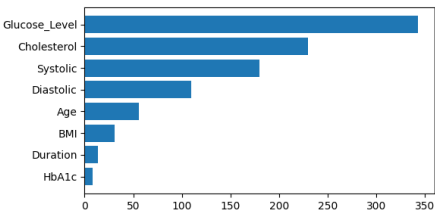
Original

GradCAM

LIME

SHAP (Feature Importance)

Lesion Breakdown & Quantification

Lesion Quantification:
    exudates: 1.035
    hemorrhages: 7.948
    cotton_wool: 0.0
    lesion_percentage: 8.983

Explainable AI & Validation

Grad-CAM++: coarse spatial attention maps; LIME: local perturbation influence; SHAP:
tabular feature attributions. Use these in combination to validate model reasoning and
highlight key image regions and systemic features.

Discussion & Limitations

Model performance can vary across imaging devices and lighting conditions. Lesion
quantification accuracy depends on the quality of Grad-CAM overlays and segmentation
heuristics. Prospective clinical validation is recommended.

Future Work

Integrate pixel-wise segmentation (U-Net) for precise lesion masks; apply domain
adaptation for smartphone images; calibrate predictive uncertainty and provide confidence
intervals per case.