VisionAI — Research Report

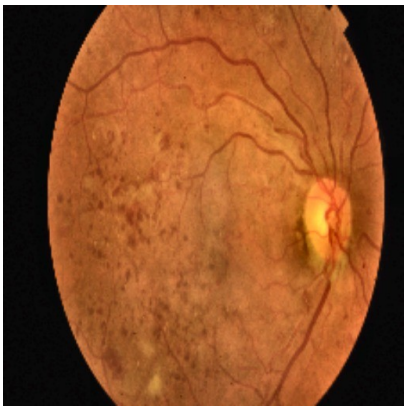
Patient Metadata

Full_Name: Jenifer
Age: 56
Gender: Female
Systolic: 180
Diastolic: 110
Glucose_Level: 343
BMI: 30.8

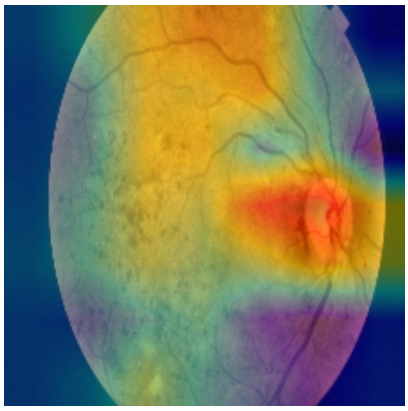
Prediction Summary

Predicted Stage: SEVERE | Confidence: 56.15%
Risk Score: 96.40%

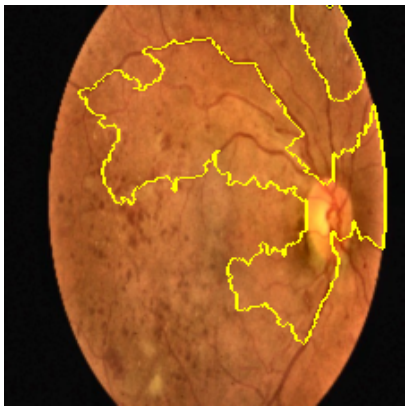
Original



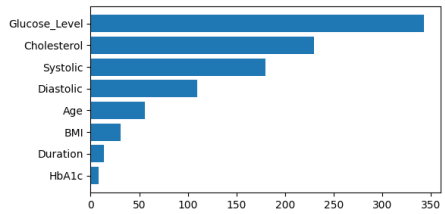
GradCAM



LIME



SHAP (Feature Importance)



Lesion Breakdown & Quantification

Lesion Quantification:
- exudates: 19.102
- hemorrhages: 0.333
- cotton_wool: 0.0
- lesion_percentage: 19.435

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.