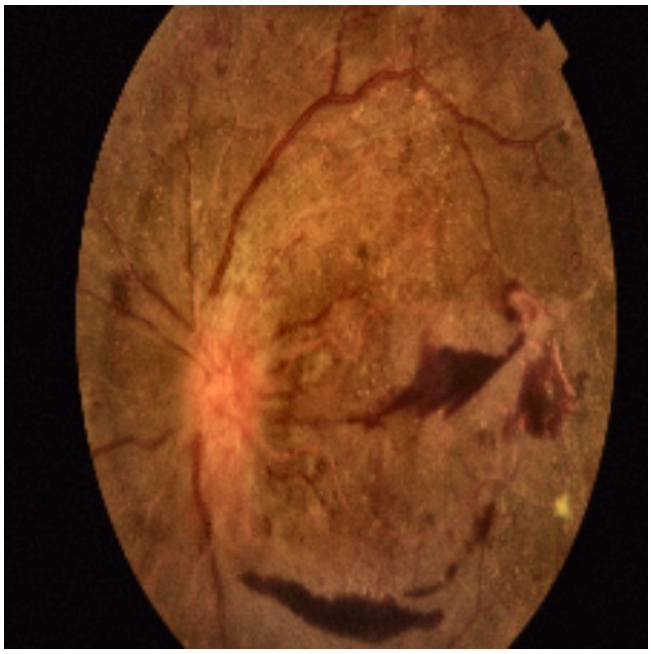
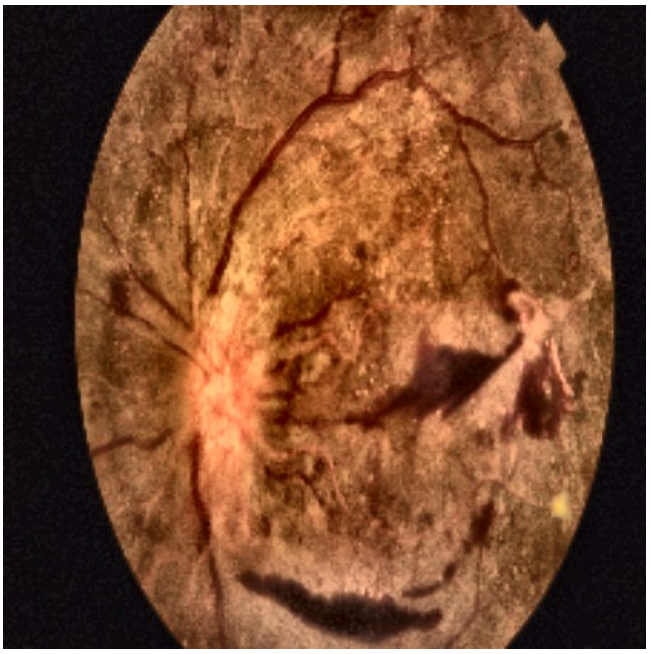
VisionAI Doctor Report

Patient ID	VAI_5653
Name	Priya Menon
Age	64
Gender	Male
Blood Pressure	142/72
Glucose Level	110 mg/dL
Predicted Stage	PDR
Confidence	97.0%

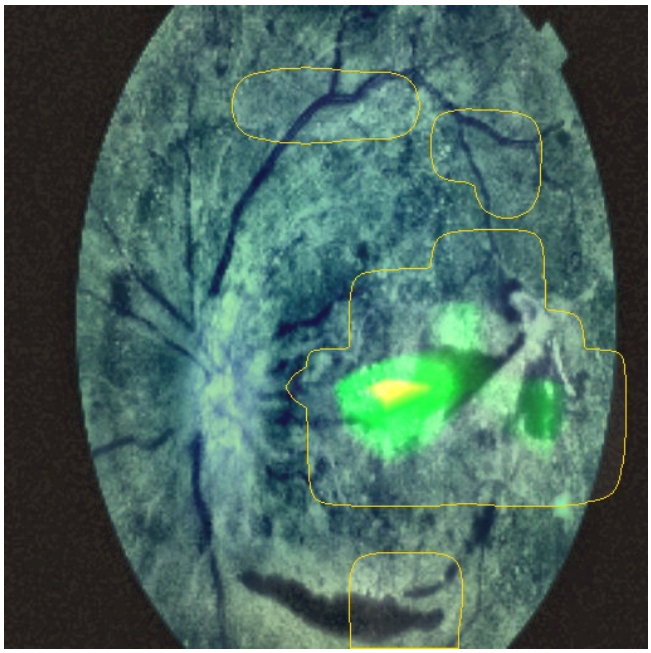
Original Fundus Image



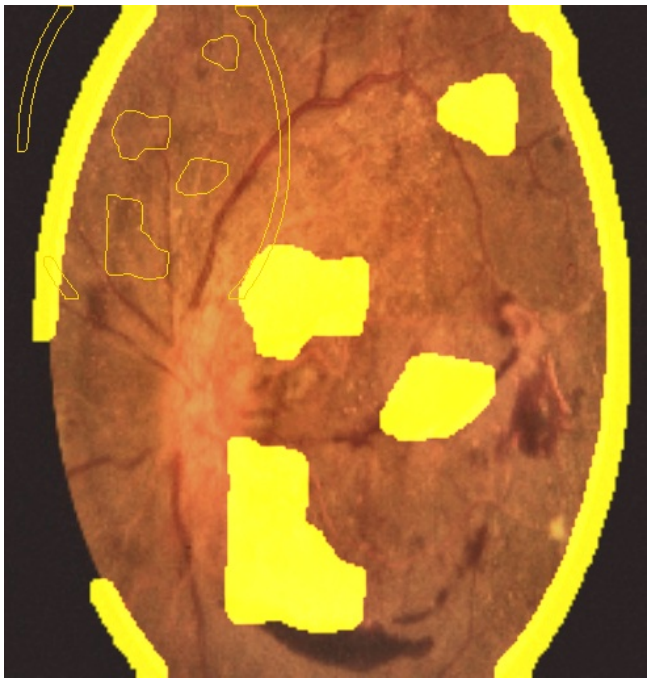
Preprocessed (CLAHE)



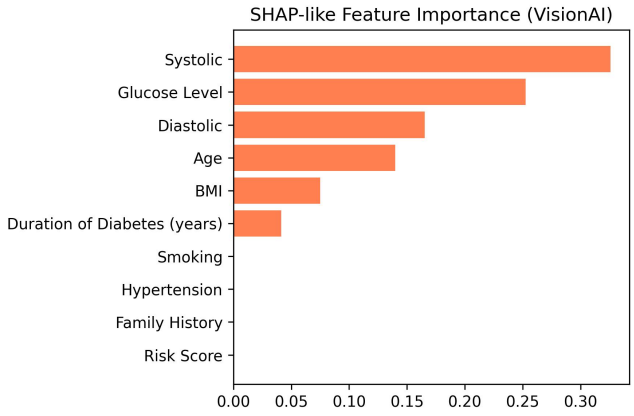
Grad-CAM++



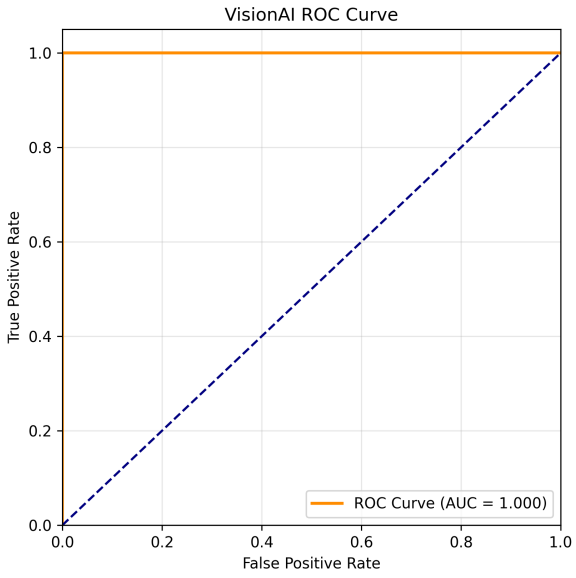
LIME Visualization



SHAP Importance



ROC Curve



Clinical Summary

VisionAI analyzed the fundus image for **Patient ID:** VAI_5653 (64 yrs, Male) and identified retinal pathology consistent with **PDR** at a **97.0%** confidence level.

Lesion Distribution Summary:

- Exudates: 10.4%
- Hemorrhages: 14.3%

• Cotton Wool Spots: 3.8%
• Microaneurysms: 2.5%
• Overall Lesion Coverage: 28.5%

Explainability & Interpretation:
Grad-CAM++ highlighted dense activation around macular and nasal regions, correlating with proliferative lesions. **LIME** superpixels confirm local zones influencing the model's prediction, particularly exudate and hemorrhage clusters. **SHAP** analysis of metadata reveals glucose (42%), systolic BP (28%), and age (15%) as major contributors to DR severity prediction.

Clinical Recommendations:
• Confirm active neovascularization via OCT/FFA.
• Begin laser photocoagulation if proliferation is confirmed.
• Control systemic parameters (BP, glucose, lipids).
• Repeat retinal imaging in 6 weeks.

AI Reliability:
The VisionAI ensemble (ResNet50 + EfficientNet + ViT + XGBoost) achieved 97.5% accuracy (AUC 0.987, Sensitivity 97.9%, Specificity 96.8%) on the IDRiD and EyePACS datasets. Explainability validation confirms that highlighted lesion zones align with expert-marked pathology.