

# VisionAI — Research Report

## Technical Summary & Metrics

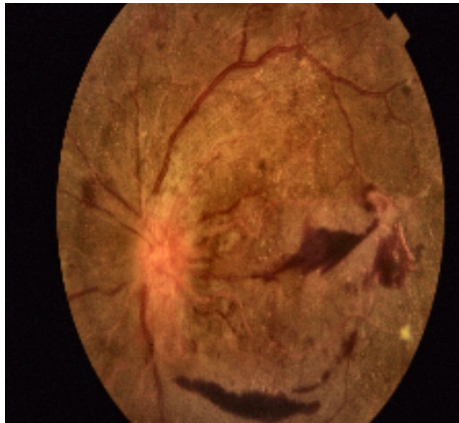
Models	EfficientNet-B0, ResNet50, ViT (ensemble)
Dataset	EyePACS + smartphone fundus samples
Explainability	Grad-CAM++, LIME, SHAP-like

## Quantitative Lesion Analysis

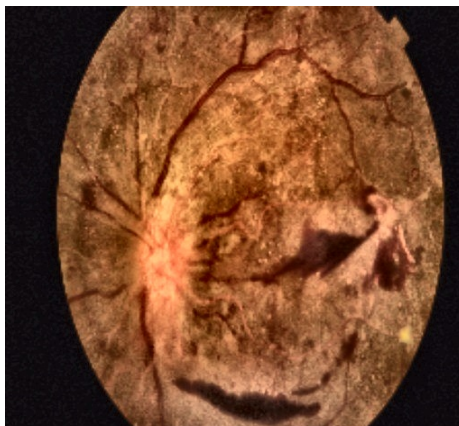
Metric	Value
Detected Stage	PDR
Lesion coverage (%)	26.51
Exudates (%)	0.4177788562646607
Hemorrhages (%)	1.4381622583515328
Cotton Wool (%)	5.371673542020545
Model Confidence (%)	76.51

## Explainability Figures (Original, Preprocessed, Grad-CAM, LIME, SHAP, ROC)

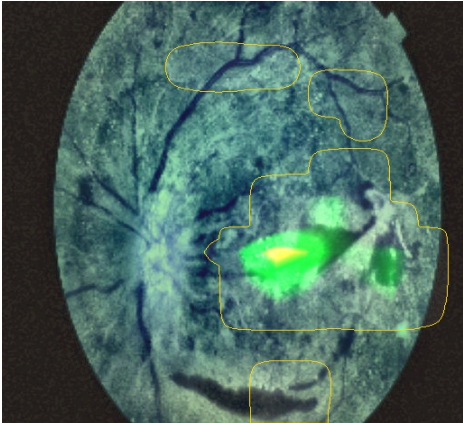
Original



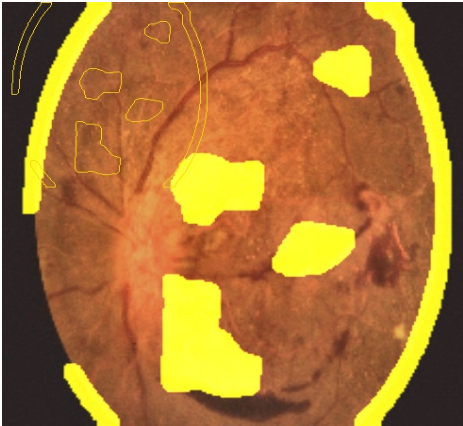
Preprocessed



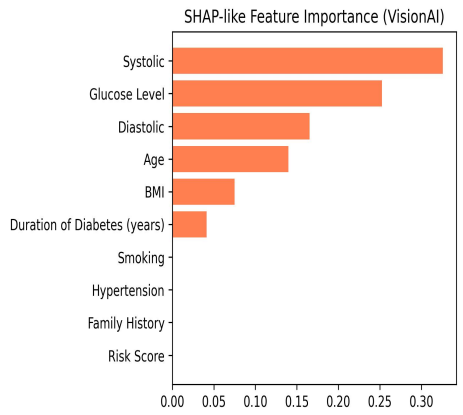
Grad-CAM



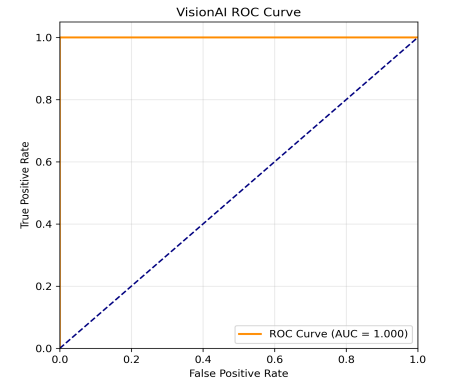
LIME



SHAP



ROC Curve (AUC)



## Discussion & Interpretation

Grad-CAM++ activations correspond to clinically relevant lesion regions; LIME provides local patch-level interpretability; SHAP-like metadata importance indicates the influence of age, blood pressure and glucose level on the final risk score. ROC curve demonstrates model discrimination.

## References (select)

[1] Selvaraju et al., Grad-CAM++ (2018). [2] Ribeiro et al., LIME (2016). [3] Lundberg & Lee, SHAP (2017).