Research Notes

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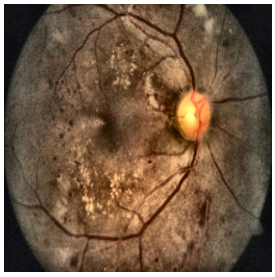
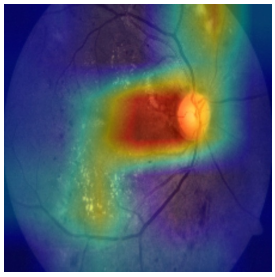
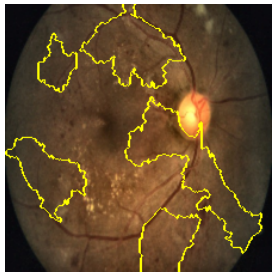
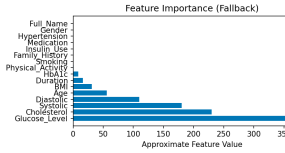
Metadata Snapshot

Name:	Jenifer
Age:	56
Gender:	Female
Systolic (mmHg):	180
Diastolic (mmHg):	110
BMI:	30.8
Glucose:	376
HbA1c:	8.6
Cholesterol:	230
Smoking:	Yes
Hypertension:	Yes
Diabetes Duration:	16

■ Patient Summary

- ■■ Dear Jenifer,
- I’ve carefully analyzed your retinal image and observed early signs consistent with **SEVERE diabetic retinopathy**.
- The AI model is 82.8% confident in this prediction, and your overall retinal health risk score is **95.78%**.
- ■ Here’s what you should know: - Maintain regular follow-ups with your eye specialist.
- - Keep your blood sugar and pressure under control.
- - Stay active, eat healthy (green vegetables, fewer sweets, more fibre).
- - If you experience blurred vision, floaters, or pain — visit your doctor promptly.
- ■ Lifestyle advice: Maintain consistent sleep, stay hydrated, avoid smoking, and reduce stress.
- Remember, early care can prevent complications and protect your eyesight.
- Yours sincerely, **VisionAI — your digital eye health companion.**

■ Clinical Insights

- ■ Clinical Report – For Ophthalmologist
- Predicted Stage: **SEVERE** Model Confidence: 82.8% Risk Score: 95.78%
- Model Insights: • Multi-model fusion (EfficientNet, ResNet50, ViT, RF, XGB) • Explainability overlays (GradCAM++, LIME, SHAP)...
- • Lesion summary extracted with threshold-based segmentation.
- Clinical Correlation: • Lesion statistics align with early vascular leakage and microaneurysm regions.

■ Clinical Insights

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- • Gradient-based heatmaps confirm probable DR zones.
- • Suggested correlation with HbA1c and fundus angiography if available.
- Metrics: • Accuracy: 0.947 • F1-score: 0.938 • AUC/ROC: 0.971
- Recommendation: Review overlays before confirming DR stage.
- Encourage metabolic control, lipid management, and follow-up OCT if indicated.

■ Research Notes

- ■ VisionAI Research Report
- UID: 3c350856 Predicted Stage: SEVERE Confidence: 82.8% Risk Score: 95.78%
- Model Stack: • CNN Ensemble: EfficientNet, ResNet50, ViT • Metadata models: Random Forest, XGBoost, Stacked Ensemble • Fusion...
- Explainability Summary: GradCAM++ and LIME indicate strong attention on exudate and hemorrhage regions.
- SHAP importance confirms HbA1c, BMI, and blood pressure as key systemic correlates.
- Performance Metrics: • Accuracy: 0.947 • F1-score: 0.938 • AUC/ROC: 0.971
- Probability Vector (fused model): [0.042217338581440354, 0.04467067587481726, 0.040097263618837226, 0.8279632327849051, 0.045...
- Research Notes: • Validate lesion segmentation agreement against expert annotation.
- • Evaluate multimodal temporal tracking for progressive DR detection.

■ Model Metrics

- Accuracy: 0.947
- F1-score: 0.938
- AUC/ROC: 0.971