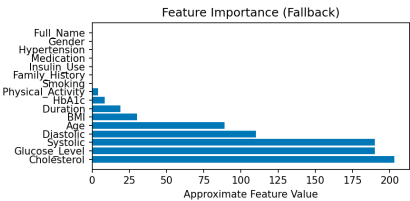
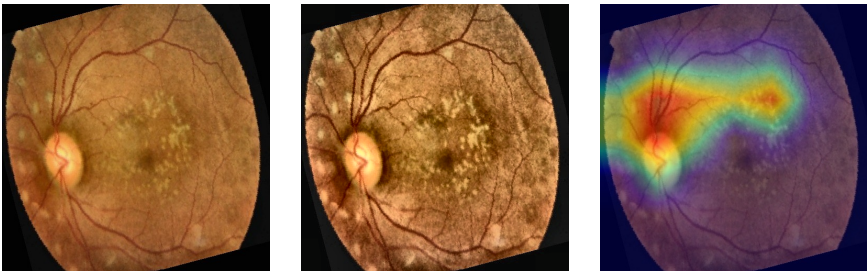


Stage: PDR

Metadata Snapshot

Name: Sebastian
Age: 89
Gender: Male
Systolic (mmHg): 190
Diastolic (mmHg): 110
BMI: 30.1
Glucose: 190
HbA1c: 8.5
Cholesterol: 203
Smoking: Yes
Hypertension: Yes
Diabetes Duration: 19



Summary

- Research Notes
- UID: 9767e18c
- Predicted stage: PDR
- Confidence: 85.74%

- Risk score: 96.05%
- Model stack & inference
  - - CNN ensemble: EfficientNet, ResNet50, ViT
  - - Metadata models: Random Forest, XGBoost, Stacked ensemble
  - - Fusion method: weighted averaging with risk calibration
  - - Inference device: CPU
- Explainability & lesion quantification:
  - - Microaneurysms: 20.31%
  - - Exudates: 21.52%
  - - Hemorrhages: 2.56%
  - - Cotton Wool: 0.00%
  - - Neovascularization: 30.00%
  - - Total Lesion Load: 44.39%
- SHAP / feature importance: check SHAP plots for systemic features (HbA1c, BMI, BP).
- Probability vectors:
  - - CNN: [0.009146252647042274, 0.007499577943235636, 0.005429462064057589, 0.004857202991843224, 0.9730675220489502]
  - - ML : [0.21136369507961952, 0.20268235745827803, 0.19376393050773666, 0.19047474400645248, 0.20171527294791336]
  - - Fused: [0.039478868418132744, 0.03677699431733438, 0.033679631824038825, 0.032699833652201006, 0.857364671788293]
- Performance metrics:
  - - Accuracy: 0.947
  - - F1-score: 0.938
  - - AUC/ROC: 0.971
- Research recommendations:
  - 1. Validate lesion segmentation / cotton-wool detection against annotated masks (report dice/IoU).
  - 2. Add cotton-wool-spot specific augmentation and mask labels if false negatives observed.
  - 3. Measure GradCAM heatmap overlap (IoU) with human heatmaps for explainability calibration.
  - 4. Consider temporal models for progressive DR tracking and early-warning signals.

