Stage: SEVERE

Metadata Snapshot

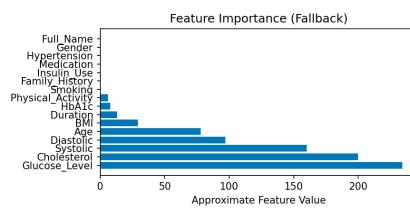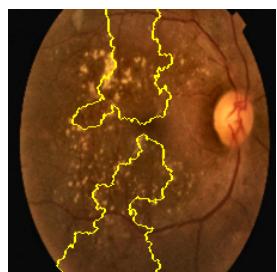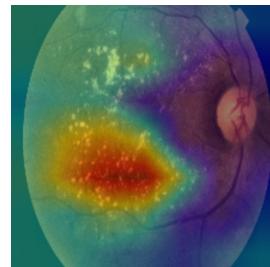| |
|---|
| Name: Sebastian |
| Age: 78 |
| Gender: Male |
| Systolic (mmHg): 160 |
| Diastolic (mmHg): 97 |
| BMI: 29.1 |
| Glucose: 234 |
| HbA1c: 7.8 |
| Cholesterol: 200 |
| Smoking: Yes |
| Hypertension: Yes |
| Diabetes Duration: 13 |

Summary

- Research Notes
- UID: 3f4795dd
- Predicted stage: SEVERE
- Confidence: 83.6%

- Risk score: 95.42%

- 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: 24.07%

- - Exudates: 2.08%

- - Hemorrhages: 2.97%

- - Cotton Wool: 0.00%

- - Neovascularization: 30.00%

- - Total Lesion Load: 29.13%

- SHAP / feature importance: check SHAP plots for systemic features (HbA1c, BMI, BP).

- Probability vectors:

- - CNN: [0.01661859080195427, 0.009372644126415253, 0.012959725223481655, 0.9499325752258301, 0.011116418056190014]

- - ML : [0.21136369507961952, 0.20268235745827803, 0.19376393050773666, 0.19047474400645248, 0.20171527294791336]

- - Fused: [0.04583035825762507, 0.03836910264489016, 0.04008035760254893, 0.8360139336333661, 0.03970624786156982]

- 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.

Lesion Distribution (%)

Model Stage Probabilities

Model Metrics

Model Comparison (Accuracy %)