Research Report

Generated: 2025-11-12 14:19:48

Stage: NO_DR

Metadata Snapshot

Name: viji

Age: 45

Gender: Female

Systolic (mmHg): 110

Diastolic (mmHg): 75

BMI: 24.6

Glucose: 95

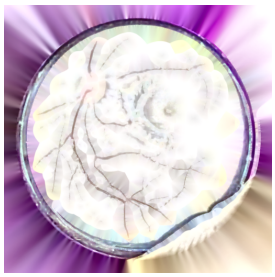
HbA1c: 5.5

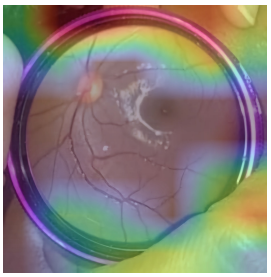
Cholesterol: 165

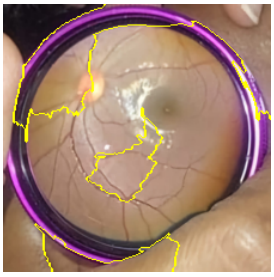
Smoking: No

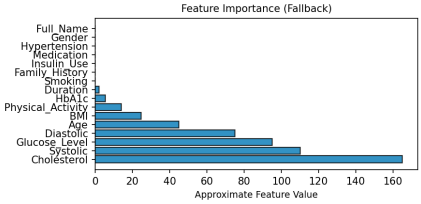
Hypertension: No

Diabetes Duration: 2









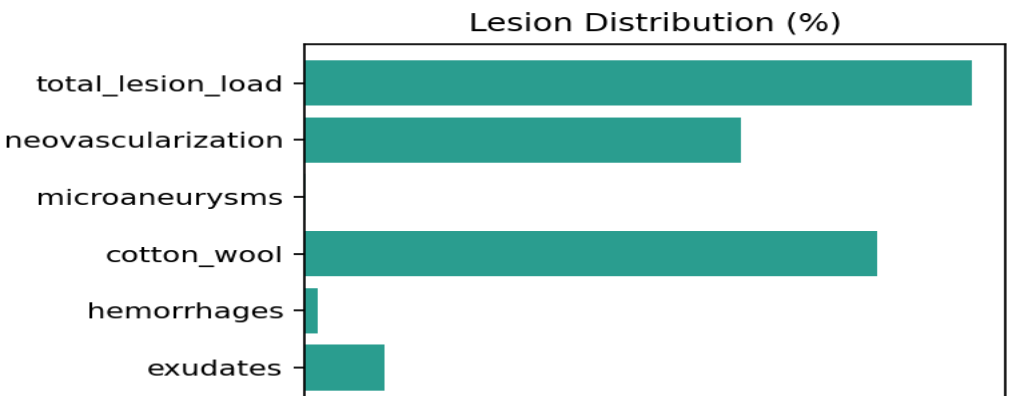
Summary

- Research Notes
- UID: 61466a6e
- Predicted stage: NO_DR
- Confidence: 77.14%

Summary

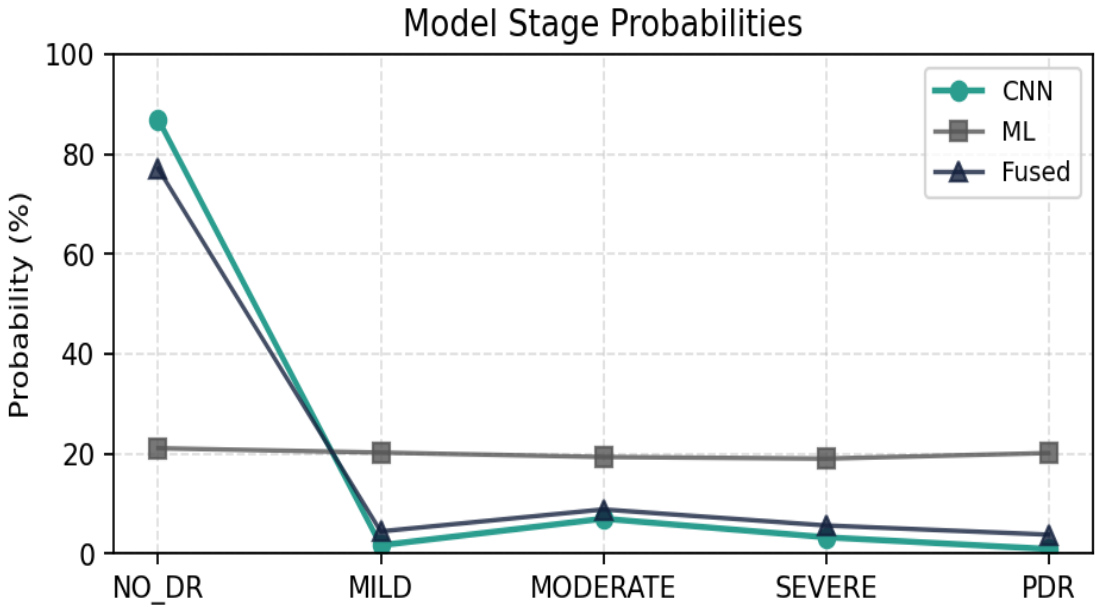
Generated: 2025-11-12 14:19:49

- Risk score: 22.86%
- 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: 8.40%
- - Exudates: 3.47%
- - Hemorrhages: 57.20%
- - Cotton Wool: 25.00%
- - Neovascularization: 19.03%
- - Total Lesion Load: 29.13%
- SHAP / feature importance: check SHAP plots for systemic features (HbA1c, BMI, BP).
- Probability vectors:
- - CNN: [0.8702205419540405, 0.016968317329883575, 0.07027282565832138, 0.03304244577884674, 0.009495915845036507]
- - ML : [0.21136369507961952, 0.20268235745827803, 0.19376393050773666, 0.19047474400645248, 0.20171527294791336]
- - Fused: [0.7713919843902497, 0.04482542157489835, 0.08879648787106129, 0.0566572882704236, 0.03832881789336707]
- 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.



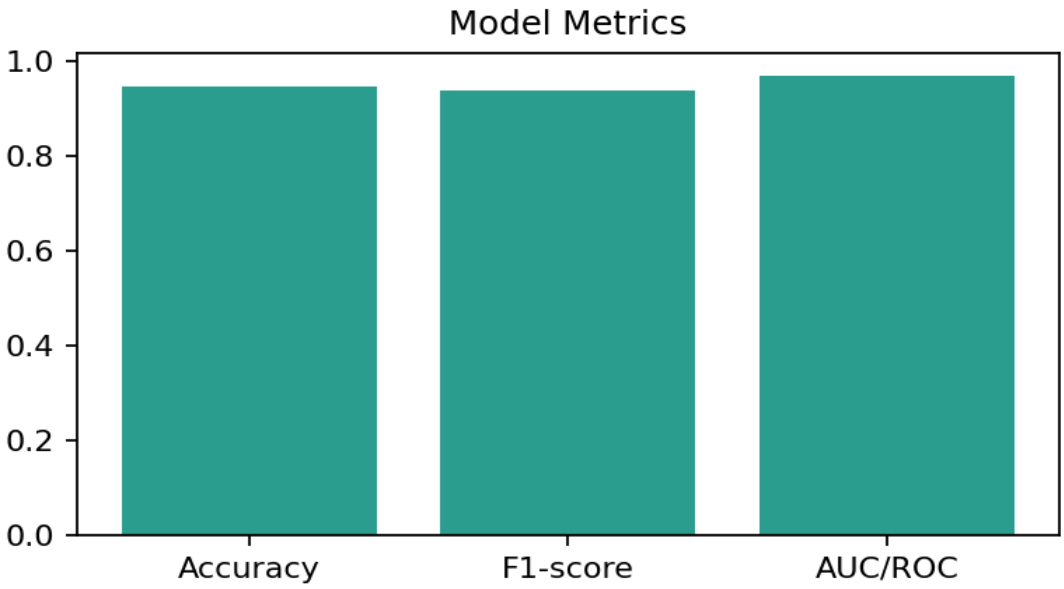
Research Report

Generated: 2025-11-12 14:19:50



Research Report

Generated: 2025-11-12 14:19:51



Research Report

Generated: 2025-11-12 14:19:51