Research Report

Generated: 2025-11-12 13:10:05

Stage: NO_DR

Metadata Snapshot

Name: viji

Age: 45

Gender: Female

Systolic (mmHg): 118

Diastolic (mmHg): 75

BMI: 23.5

Glucose: 95

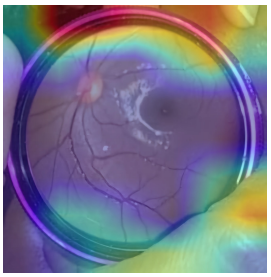
HbA1c: 5.5

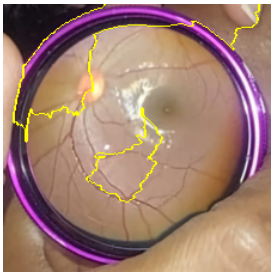
Cholesterol: 165

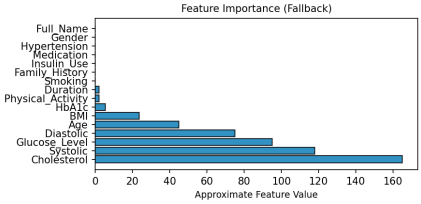
Smoking: No

Hypertension: No

Diabetes Duration: 2







Summary

- Research Notes
- UID: 47caa9b7
- Predicted stage: NO_DR
- Confidence: 59.29%

Summary

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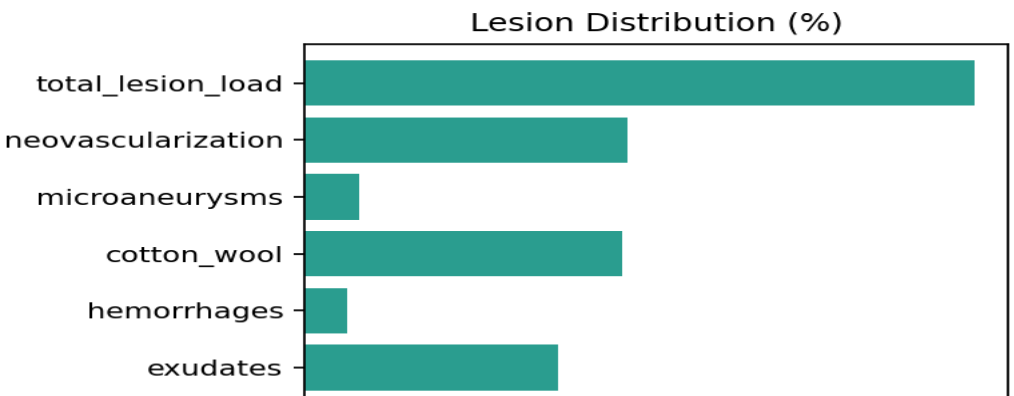
- Risk score: 40.71%
- Model stack & inference
- - CNN ensemble: EfficientNet, ResNet50, ViT
- - Metadata models: Random Forest, XGBoost, Stacked ensemble
- - Fusion method: weighted averaging with risk calibration
- - Inference device: CPU
- Explainability & lesion quantification:
- - Microaneurysms: 4.26%
- - Exudates: 19.68%
- - Hemorrhages: 3.33%
- - Cotton Wool: 24.59%
- - Neovascularization: 25.00%
- - Total Lesion Load: 51.85%
- SHAP / feature importance: check SHAP plots for systemic features (HbA1c, BMI, BP).
- Probability vectors:
- - CNN: [0.6601792573928833, 0.05460159853100777, 0.21186625957489014, 0.06587523221969604, 0.007477611768990755]
- - ML : [0.21136369507961952, 0.20268235745827803, 0.19376393050773666, 0.19047474400645248, 0.20171527294791336]
- - Fused: [0.5928569434613092, 0.07681371501522867, 0.20915091741706537, 0.084565161899766, 0.036613262206630706]
- 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

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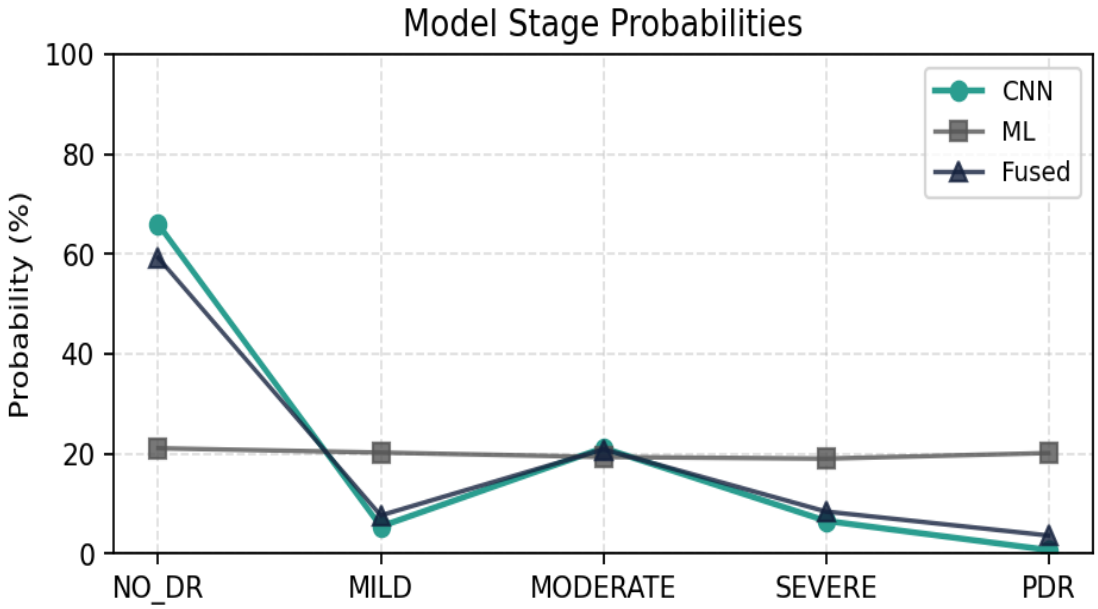

Research Report

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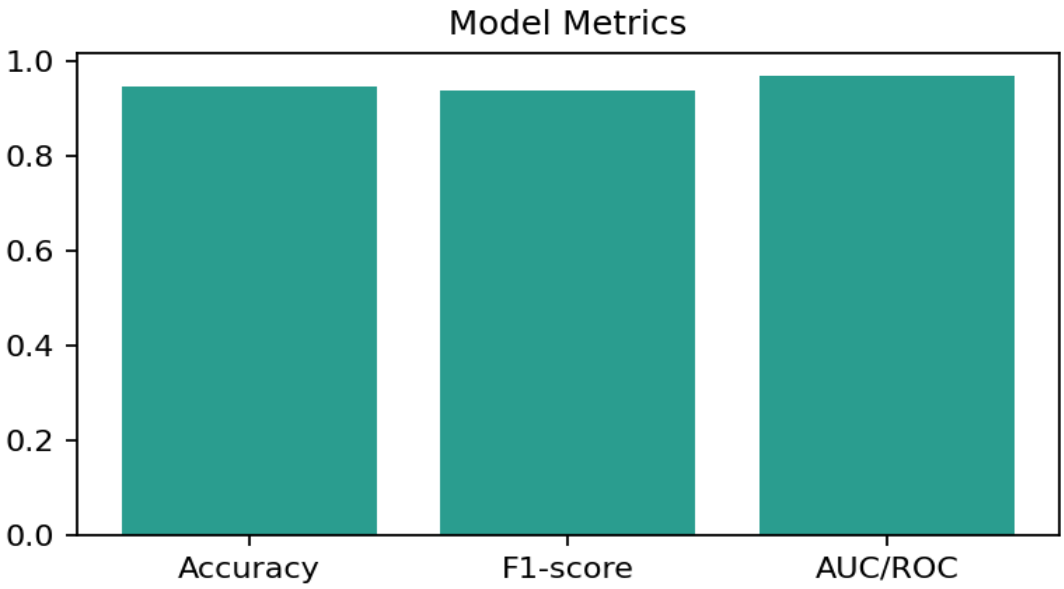

Research Report

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