Research Report

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Stage: NO_DR

Metadata Snapshot

Name: solomon

Age: 67

Gender: Male

Systolic (mmHg): 189

Diastolic (mmHg): 110

BMI: 30.8

Glucose: 398

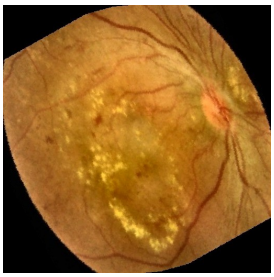
HbA1c: 8.9

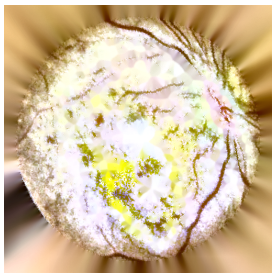
Cholesterol: 276

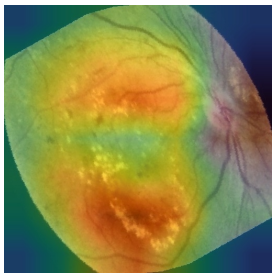
Smoking: Yes

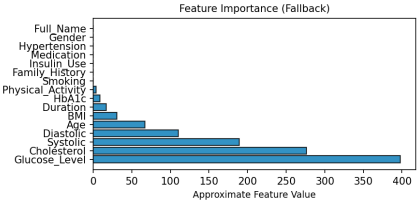
Hypertension: Yes

Diabetes Duration: 17









Summary

- Research Notes
- UID: 229c4e5b
- Predicted stage: NO_DR
- Confidence: 44.93%

Summary

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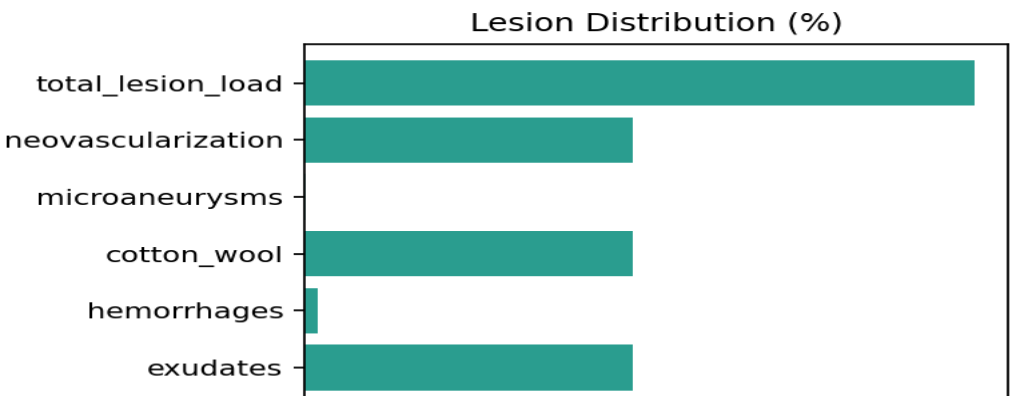
- Risk score: 55.07%
- Model stack & inference
- - CNN ensemble: EfficientNet, ResNet50, ViT
- - Metadata models: Random Forest, XGBoost, Stacked ensemble
- - Fusion method: weighted averaging with risk calibration
- - Inference device: CPU
- Explainability & lesion quantification:
- - Microaneurysms: 10.30%
- - Exudates: 25.00%
- - Hemorrhages: 98.80%
- - Cotton Wool: 25.00%
- - Neovascularization: 25.00%
- - Total Lesion Load: 51.09%
- SHAP / feature importance: check SHAP plots for systemic features (HbA1c, BMI, BP).
- Probability vectors:
- - CNN: [0.4912932813167572, 0.02744530886411667, 0.23995311558246613, 0.22480683028697968, 0.01650153286755085]
- - ML : [0.21136369507961952, 0.20268235745827803, 0.19376393050773666, 0.19047474400645248, 0.20171527294791336]
- - Fused: [0.4493038170608836, 0.05373086300567671, 0.23302472417062414, 0.21965700447735156, 0.044283591285464045]
- 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.



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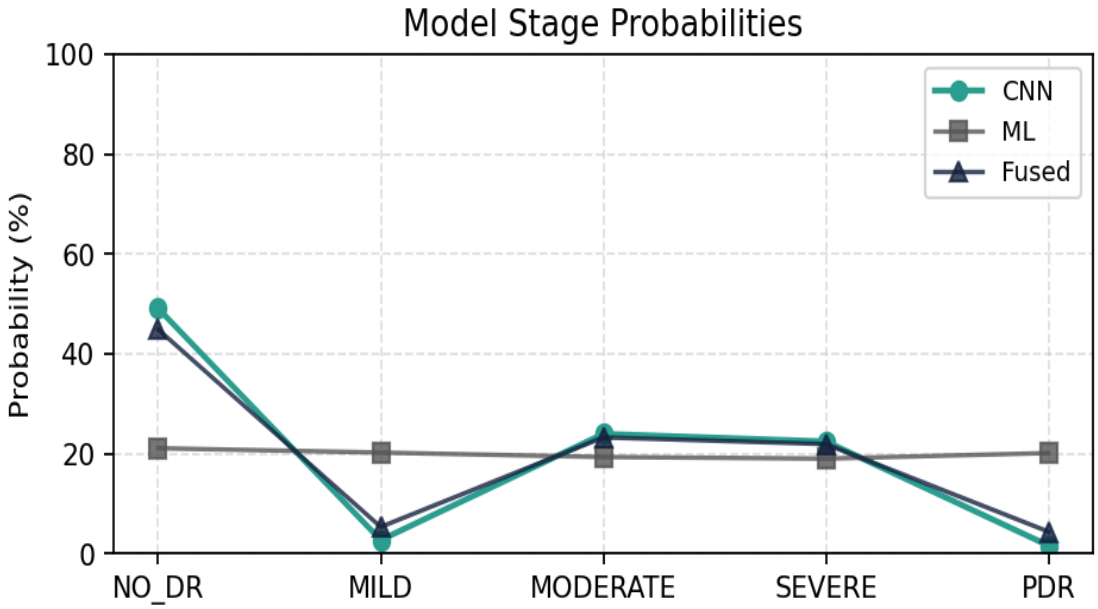

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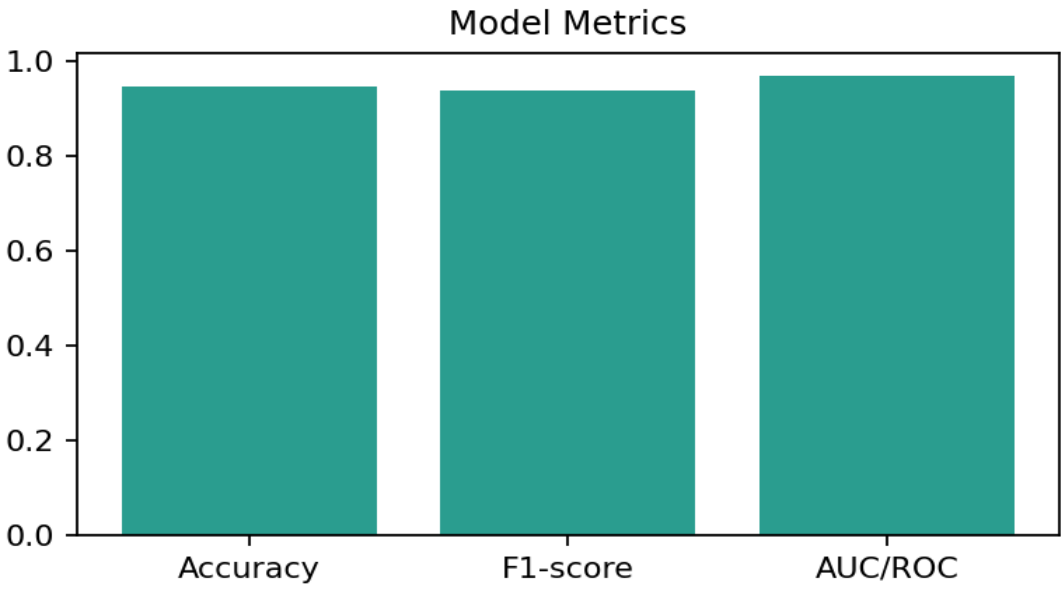

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