

Heart Attack Risk Prediction Using Retinal Image: A ResNet18 and Streamlit Deployment Study

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Abstract: Heart Attack remain the leading cause of mortality worldwide, underscoring the urgent need for early, accessible, and accurate diagnostic solutions. Traditional diagnostic methods, such as echocardiography and angiography, though effective, are costly, invasive, and limited in scalability, particularly in resource-constrained settings. Recent studies have identified the retina as a non-invasive “window” to vascular health, with retinal imaging offering critical insights into systemic diseases.

This research introduces a deep learning-based approach for classifying heart disease severity using retinal fundus images. A Convolutional Neural Network (CNN) built on the ResNet18 architecture was trained on a labeled dataset categorized into five severity classes: No Heart Disease, Mild, Moderate, Severe, and Very Severe. Preprocessing steps, including resizing, normalization, and augmentation, enhanced image quality and generalization. The model was trained using the Adam optimizer with cross-entropy loss and validated across multiple performance metrics, including accuracy, precision, recall, F1-score, and confusion matrix analysis. Experimental results demonstrated an accuracy exceeding 89%, with robust generalization across unseen data.

In conclusion, the proposed system highlights the feasibility of leveraging retinal imaging combined with advanced deep learning techniques for non-invasive cardiovascular screening. By bridging the gap between research and practical usability, this study establishes a foundation for scalable, cost-effective, and patient-friendly diagnostic tools..

Keywords: Heart Attack

