

## Automatic Detection Of Diabetic Retinopathy

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**Abstract :** Diabetic Retinopathy (DR) is a leading cause of vision impairment and blindness among individuals with diabetes. Early diagnosis is crucial for effective treatment, yet current diagnostic methods rely heavily on manual analysis of retinal images, which can be time-consuming and prone to subjectivity. This research proposes an automated system for the detection of DR using Jacobi wavelet-based feature extraction combined with Support Vector Machines (SVM) for classification. The integration of wavelet analysis with machine learning techniques aims to improve the accuracy, efficiency, and reliability of DR diagnosis. In this study, retinal images are preprocessed through normalization, resizing, and noise reduction to enhance the quality of the images. The Jacobi wavelet transform is then applied to extract both global and local features, effectively capturing subtle variations in retinal images that are indicative of DR. These extracted features are fed into an SVM classifier, known for its robustness in handling high-dimensional data and its ability to achieve high classification accuracy. The SVM classifier is optimized using parameter tuning to improve performance. The proposed methodology is evaluated using a comprehensive dataset of retinal images, encompassing a range of DR severity levels. The results show that the proposed system outperforms traditional wavelet-based methods, demonstrating significantly higher accuracy, sensitivity, and specificity in detecting DR. By leveraging the discriminative power of Jacobi wavelet features and the robustness of SVM, the system provides a promising solution for the automatic detection of DR, which could assist ophthalmologists in early diagnosis and intervention, ultimately improving patient outcomes. This research highlights the potential of combining wavelet-based image processing with machine learning for advancing automated medical diagnostics.

**Keywords :** iabetic retinopathy (DR), Jacobi wavelets, machine learning, feature extraction, classification

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