DIABETIC RETINOPATHY

BY,

Advitha.K

Yashasri Sai.T

ABSTRACT:

Diabetic retinopathy (DR) is one of the leading causes of vision impairment and blindness among diabetic patients worldwide. Early detection and timely treatment play a crucial role in preventing severe vision loss. However, traditional screening methods are often time-consuming, require expert ophthalmologists, and are not readily accessible in many regions. To address these challenges, machine learning offers a powerful solution by automating the detection process and improving diagnostic efficiency.

This project, "Diabetic Retinopathy Detection using Machine Learning," aims to develop a system capable of classifying retinal fundus images based on the presence or severity of diabetic retinopathy. The system leverages computer vision and deep learning techniques to analyze retinal images and determine whether they show signs of the disease . The project follows a comprehensive machine learning pipeline that includes:

- Dataset preparation and preprocessing (image resizing, normalization, augmentation)
- Feature extraction and model selection using convolutional neural networks (CNNs)
- Training and validation of the model on retinal image datasets .
- Performance evaluation using metrics such as accuracy, precision, recall, and F1-score
- Deployment through a user-friendly web interface for real-time image-based prediction.

By combining deep learning and medical imaging, this project demonstrates how artificial intelligence can assist healthcare professionals in screening diabetic patients for retinal diseases. The proposed model aims to provide a cost-effective, accessible, and accurate preliminary diagnostic tool that supports early detection and helps prevent vision loss in diabetic populations.