

Batch Number	BG - 8
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Title	A Feature-Optimized Ensemble Model for Diabetic Retinopathy Detection via CNN and APSO Integration
Domain / Technology	Deep Learning
Base Paper Link	https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=10985749
Dataset Link	https://www.kaggle.com/datasets/pkdarabi/diagnosis-of-diabetic-retinopathy
Software Requirements	Browser: Any Latest Browser Like Chrome Operating System: Windows 7 Server Or Later Python Environment: Google Colab / Jupyter Notebook / VS Code Libraries/Packages: Ultralytics, OpenCV, Numpy, Pandas, Matplotlib, Scikit-Learn, Requests.
Hardware Requirements	System Type: Intel Core I5 Or Above RAM: 8 GB Number Of Cores: 4 Number Of Threads: 4 Storage: 100 GB Free Disk Space Internet: Stable High-Speed Connection
Abstract	Diabetic retinopathy (DR) is one of the leading causes of blindness, and early and reliable screening is essential for treatment. This work presents a hybrid detection mechanism utilizing deep learning and swarm-intelligence-based feature optimization. The retinal fundus images are first processed by applying contrast enhancement and segmentation to identify the pathological regions. Then features are jointly extracted via two complementary convolutional net architectures, GoogLeNet and a modified ResNet-16, which are then refined using Adaptive Particle Swarm Optimization (APSO) to remove redundancy. The selected features are classified using popular traditional machine learning models, with Random Forest performing the best overall based on accuracy, precision, recall, F1-score and AUC results on the Kaggle EyePACS dataset. The proposed mechanism was demonstrated to yield state-of-the-art accuracy while generating interpretable outputs via LIME, and so presents strong potential for scalable and trustworthy DR screening.