**A report on Diabetic retinopathy detection using Mobilenet V2 Implemenatation**

**Dataset:** ***The data set is an amalgamation of data from 3 datasets:***

1. ***Eyepacs*** dataset of 35000 images of trainset categorized into 5 classes

2. ***Aptos*** dataset is a subset dataset fromEyepac after some preliminary operationas and different image format – trainset consists of 3000+ images

3. ***Messidor 2*** dataset of 1700+ images

We clubbed these datasets for data normalization. We used partial dataset from Eyepacs and Aptos while using 50% of Messidor2 dataset.

The other 50% of Messidor is kept for testing. Test data set have 961 images belonging to 5 classes same as the train dataset.

**Dataset preprocessing:** Most of the images were taken in right conditions and consists of some visble features. Based on these visible features to human eye, we preprocessed the images that are under exposed and over exposed by creating luminous intensity filter by altering alpha, beta nad gamma channels.

After trail and error method on several dim images , we came to a conclusion of using – *gamma = 1.44*

*alpha = 2.5 and beta = 40* using Opencv’s **ConvertscaleAbs** function and **look up tables.**

Later We applied another Opencv function **Bioinspired\_retina and** augmented some particular filters using retina configuration and creating image using retinaOut\_parvo function

</OPLandIPLparvo>

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These preprocessing steps helped us in bringing up enriched features from images.

We applied data augmentation using Horizontal and vertical flips, Rotation using -20 to +20 degree rotation.

We were able to bring **3400+ images in each class** with a total of **17,121 images in the final dataset.**

**Validation set:** We used 15 % of the data as validation dataset for configuring weights while training.

**Approach:** Transfer learning using Image net weights on MobileNet v2 has be taken into consideration as this network is the state of the art approach in the most mobile compatible networks.

**Hyperparameter tuning:**

*Learning rate:* Lr of 0.00015 has been chosen as this *learning rate* converged?? fast enabling a fast learning on the network.

*Optimiser:* after a series of optimizer changes we decided to go with Adam+Adagrad as our optimiser

*Batch size:* 32 is used for CPU training

*Dropout:* 0.1

*Unfreezing layers:* We freezed first 80 layers and unfreezed the rest layers for better learning. We tested unfreezing different layers and unfreezing from 80th layer learned better features from dataset.//code???

**Accuracy:**

We achieved a **training accuracy of max: 98.45 %** and **validation accuracy up to 91.90%**

**Test accuracy on 50% Messidor testset : 91.6%**