CONVOLUTIONAL NEURAL NETWORKS FOR CLASSIFICATION OF CAR MODELS (TRANSFER LEARNING|DEPLOYMENT)

INTRODUCTION

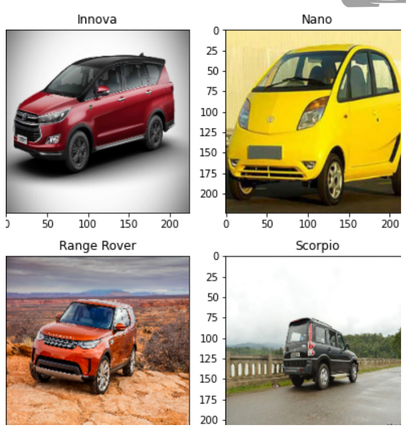
For mobile and embedded vision applications, MobileNets is a class of efficient models. They are built on a simplified architecture that builds lightweight deep neural networks using depthwise separable convolutions.

PROBLEM STATEMENT

- Main goal: classify the car model using Deep Learning techniques
- Applied web scraping to obtain images
- Arriving at the best model using Optimization/Regularisation Techniques
- Evaluation based on Accuracy Score
- For training, use categorical-cross entropy
- Use deep learning techniques(namely CNNs)

DATASET

- Total images: 250
- Train : validation = 80 : 20

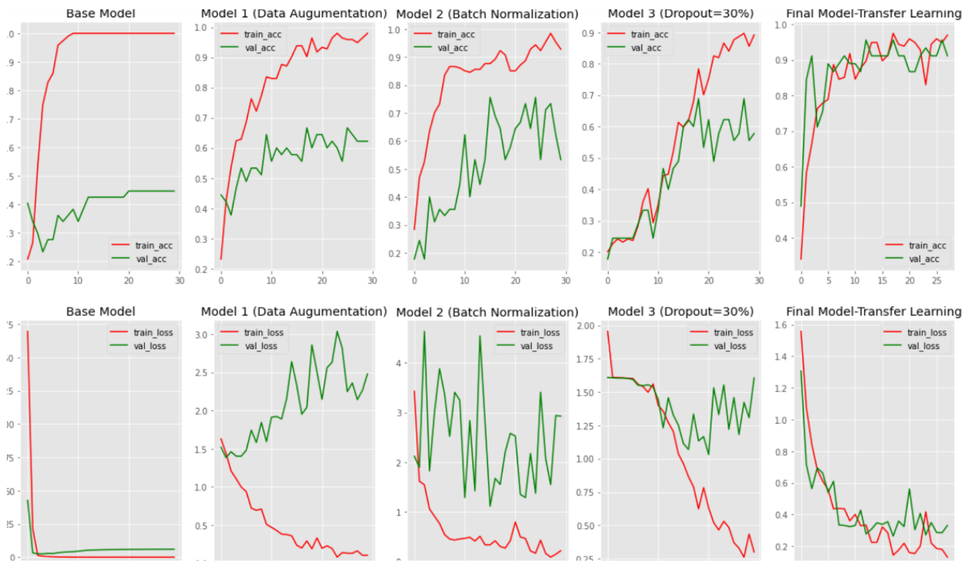


MODELS

- Base Model(CNN Based)
- Model 1(CNN + Image Augmentation)
- Model 2(CNN +Image Augmentation + Batch Normalization)
- Model 3(CNN + Image Augmentation + DropOut)
- Final Model(Transfer Learning + callbacks)
- Deployment

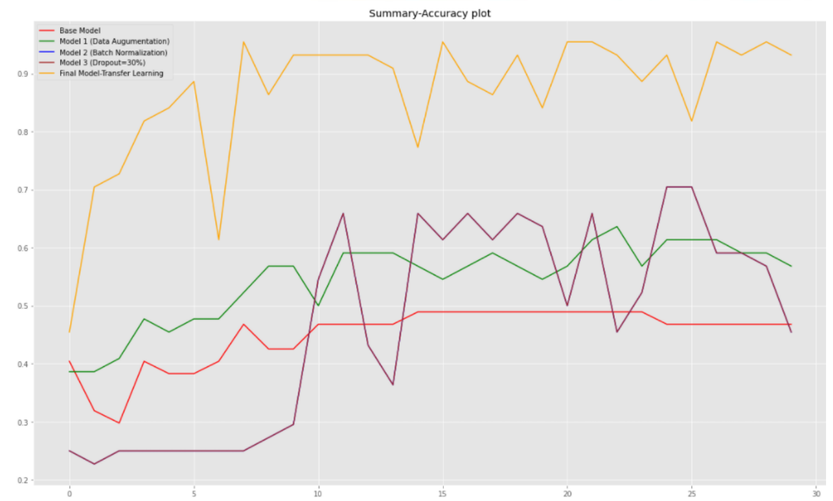
EXPERIMENTAL EVALUATION

- The base model is severely overfitted on the train data and the loss remains constant after a few initial epochs
- Throughout the course of the improvement models 2,3,4, the difference between the train and test accuracy is reduced
- The loss of validation seems to be fluctuating hence its accuracy and the training loss shows a smooth downward trend.
- In the final model, Transfer Learning (MobileNet) there is almost no overfitting due to the corrective steps taken.



FINAL RESULTS

- Steps were taken to arrive at the Final model
- Use of pre-trained weights from MobileNet for the 70 convolutional layers
- Open up convolutional layers from the 71st layer to train with a dense hidden layer of 512 neurons.
- These layers account for the optimization of weights through backpropagation.
- .Use of GlobalAveragePooling2D,"sgd" optimizer.
- Use of callbacks(EarlyStopping, ModelCheckpoint)



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