A picture containing purple, pink, table

Description automatically generated

**Car Plate Recognition**

**Problem**

The given dataset contains 433 images with bounding box annotations of the car license plates within the image to be trained using neural networks and one car image for number plate detection

**Approach Taken**

The project was developed in Google Colab and the following steps followed in development pipeline:

1. Reading data for car images and annotation

2. Feature extraction: X containing all the images of cars by resizing them and variable y containing all the bounding box annotations.

3. In data sampling the 7 images with annotation boxes are displayed.

4. In data pre processing the x and y values are converted in array and then we divide them by 255.

5. Data Splitting: The data in X is splitted train and validation dataset as x\_train ,y\_train,x\_val and y\_yal in the ratio of 80:20 respectively

6. The first model I tried is VGG19 with weights=imagenet and image size is 200\*200\*3 . The model is compiled with 7 epochs the score for model is 81% with 7% loss value.

7. The second model I tried is CNN with the following layer architecture.

cnnmodel.add(Conv2D(filters=128,kernel\_size=3,activation='relu',input\_shape=(IMAGE\_SIZE, IMAGE\_SIZE, 3)))

cnnmodel.add(Conv2D(filters=64,kernel\_size=3,activation='relu'))

cnnmodel.add(Dropout(0.15))

cnnmodel.add(Conv2D(filters=32,kernel\_size=3,activation='relu'))

cnnmodel.add(Conv2D(filters=16,kernel\_size=3,activation='relu'))

cnnmodel.add(MaxPool2D(pool\_size=(2,2)))

cnnmodel.add(Flatten())

cnnmodel.add(Dense(128, activation="relu"))

cnnmodel.add(Dense(128, activation="relu"))

cnnmodel.add(Dense(64, activation="relu"))

cnnmodel.add(Dense(4, activation="sigmoid"))

If I skip Dropout layer the accuracy of this model is at par VGG19 but after including dropout the accuracy reduced to 70% with 12 % loss value and compiled for 10 epochs.

8. The third model I tried is RESNET50 where the accuracy is very low 50%

**Interpretation of Results**

* As per the analysis the VGG19 performance is best but in VGG19 no dropout layer is included the model I created with CNN performance better if I leave dropout layer (included to avoid over fitting).
* No drought Vgg19 is performing well but the architecture includes 19 layers where as the CNN model has 10 layers . the depth of CNN is less as compared to VGG19 and RESNEt50
* Both CNN and VGG19 are performing well on test Image provided with project.