

# CELEBRITY FACE PREDICTION

## Model

Convolutional Neural Network

## Model Architecture

**Input Layer** - (None, 128, 128, 3)

**Convolutional Layer and Maxpool Layer** - 3 pair of Convolutional Layer and Maxpool Layer are constructed with 32, 48, and 64 neurons respectively. Each of the three 2D convolution layers uses Relu as activation function and Kernel size of (2,2). Each and every Maxpool layer consists of pool size of (2,2).

**Dropout and Flatten Layer** - Dropout layer with a drop out rate of 0.5 is followed by Flatten Layer.

**Dense Layer** - Total of 5 Dense layers are used to build the model. The first four layers Relu activation and the last layer uses Softmax as activation. The Dense layers consist of 512, 128, 64, 32, and 5 neurons respectively.

Since it is a classification problem expecting 5 classes as output, we found that sparse categorical cross entropy will be the suitable loss function. Adam is used as the optimizer.

## Training Process

### Data:

The data contains images of 5 celebrities named Lionel Messi, Maria Sharapova, Roger Federer, Serena Williams and Virat Kohli.

### Preprocessing

The images are read using the cv2 imread function and converted to array. Before it the size was changed to 128 \* 128. Then the entire images are uploaded to the list and the corresponding labels to another list named label. Both data and label are again converted to n-dimensional array.

### Data Splitting

70% : 30% split with a randomstate of 115

## Model Training

Model is trained for 20 epochs with a batch size of 64 and validation split of 0.2.

## Prediction and Evaluation

The output is predicted using model.predict function and using argmax the index is retrieved. According to the respective index, images are identified.

Loss and Accuracy plots are used to evaluate performance of the model.

Through model.evaluate, we found that model got 75.5% accuracy and a loss function of 0.88.

## Critical Findings

The accuracy and loss plot visualises the progression of each epoch training and validation set.

On the epoch progression accuracy increases and loss is decreasing. But some variations can be found.

On increasing epoch number can find models with better accuracy.

The dataset has some noises. Some of the images belonging to persons are misclassified under another persons.

Some of the persons are miss classified into other classes. But almost 75 percent of predictions are correct.

## Model Summary

Model: "sequential"		
Layer (type)	Output Shape	Param #
=====		
conv2d (Conv2D)	(None, 126, 126, 32)	896
max_pooling2d (MaxPooling2D)	(None, 63, 63, 32)	0
conv2d_1 (Conv2D)	(None, 61, 61, 48)	13872
max_pooling2d_1 (MaxPooling2D)	(None, 30, 30, 48)	0
conv2d_2 (Conv2D)	(None, 28, 28, 64)	27712
max_pooling2d_2 (MaxPooling2D)	(None, 14, 14, 64)	0
dropout (Dropout)	(None, 14, 14, 64)	0
flatten (Flatten)	(None, 12544)	0
dense (Dense)	(None, 512)	6423040
...		
Total params: 6541685 (24.95 MB)		
Trainable params: 6541685 (24.95 MB)		
Non-trainable params: 0 (0.00 Byte)		

