Celebrity Classification Model

1. Model Summary:

Chosen Model:

- The code implements a Convolutional Neural Network (CNN) using TensorFlow's Keras API.

Model Architecture:

- Input Layer: Conv2D layer with 32 filters, a 3x3 kernel, and ReLU activation.
- MaxPooling2D layer with a 2x2 pool size.
- Flatten layer to flatten the input for dense layers.
- Two Dense layers with 256 and 512 units, respectively, using ReLU activation.
- Dropout layer with a dropout rate of 0.5 to prevent overfitting.
- Output Dense layer with 5 units and softmax activation for multi-class classification.

Random Seed:

- A random seed of 7 is set to ensure reproducibility.

2. Data Preprocessing:

Dataset:

- The code loads images of five celebrities (Lionel Messi, Maria Sharapova, Roger Federer, Serena Williams, Virat Kohli) from specified directories and resizes them to (128, 128) pixels.

Data Distribution:

- The code prints the number of images for each celebrity to provide an overview of the dataset.

Train-Test Split:

- The dataset is split into training and testing sets with an 80-20 ratio, ensuring a random state for reproducibility.

Normalization:

- The pixel values of the images are normalized to the range [0, 1] using TensorFlow's normalize function.

3. Model Training:

Compilation:

- The model is compiled using the Adam optimizer and sparse categorical crossentropy loss. Accuracy is chosen as the evaluation metric.

Training:

- The model is trained for 40 epochs with a batch size of 128, and 10% of the training data is used for validation.

4. Model Evaluation:

Evaluation Metrics:

- The code evaluates the model on the test set and prints the accuracy.

Classification Report:

- A classification report is generated using the classification_report function from scikit-learn, providing precision, recall, and F1-score for each class.

5. Model Prediction:

Prediction Function:

- A function is defined to make predictions on new images. It loads an image, preprocesses it, and uses the trained model for prediction.

Prediction Example:

- An example prediction is demonstrated on an image of Virat Kohli.