**SUMMARY**

The chosen model is a Convolutional Neural Network (CNN) implemented using TensorFlow's Keras API. The model architecture consists of the following layers:

1. Convolutional layer with 32 filters, a kernel size of (3,3), and ReLU activation function.
2. MaxPooling layer with a pool size of (2,2).
3. Flatten layer to convert the 2D feature maps to a 1D vector.
4. Dense layer with 256 neurons and ReLU activation function.
5. Dropout layer with a dropout rate of 0.5 to prevent overfitting.
6. Dense layer with 512 neurons and ReLU activation function.
7. Output layer with 5 neurons (equal to the number of classes) and softmax activation function.

**Training Process**

1. Data Loading and Preprocessing:

* The dataset consists of images of five celebrities: Lionel Messi, Maria Sharapova, Roger Federer, Serena Williams, and Virat Kohli.
* Images are loaded, resized to (128,128) pixels, and stored in a NumPy array (dataset).
* Labels are assigned to each celebrity class (0 to 4).
* The dataset is split into training and testing sets using an 80-20 split.

1. Model Compilation:

* The CNN model is compiled with the Adam optimizer, Categorical Crossentropy loss function, and accuracy as the evaluation metric.

1. One-Hot Encoding:

* Labels are one-hot encoded to match the categorical nature of the problem.

1. Model Training:

* The model is trained for 50 epochs with a batch size of 32.
* Training progress is monitored, and validation data is used to assess model performance during training.

1. Model Evaluation:

* The trained model is evaluated on the test set, and accuracy is reported.
* Classification report is generated, including precision, recall, and F1-score for each class.

**Findings**

1. Normalization:

* The dataset is normalized by scaling pixel values to the range [0, 1].

2. Model Architecture:

* The CNN architecture is relatively simple, with one convolutional layer followed by max-pooling, flattening, and two dense layers.
* The model uses dropout to reduce overfitting.

3. Training Performance:

* Training and validation accuracy are monitored throughout the training process.
* Model accuracy on the test set is reported after training.

4. Prediction:

* The model is tested on new images using the preprocess\_single\_image function.
* Predictions are made for celebrity classes, and results are printed.