

Sport Celebrity Image Classification

1. MODEL

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

- Input Layer: Convolutional layer with 32 filters of size (3, 3) and ReLU activation.
- MaxPooling Layer: MaxPooling with a pool size of (2, 2) for downsampling.
- Flatten Layer: Flattens the output from the previous layers.
- Dense Layer 1: Fully connected layer with 256 neurons and ReLU activation.
- Dropout Layer: Dropout layer with a dropout rate of 0.5 for regularization.
- Dense Layer 2: Fully connected layer with 512 neurons and ReLU activation.
- Output Layer: Dense output layer with 5 neurons (equal to the number of classes) and softmax activation for multi-class classification.

The model is compiled with the Adam optimizer, sparse categorical crossentropy loss function, and accuracy as the evaluation metric.

2. TRAINING

Data Preprocessing:

- Images are loaded from different celebrity directories.
- Images are resized to (128, 128) pixels.

Train-Test Split:

- The dataset is split into training and testing sets (80% training, 20% testing).

Normalization:

- Pixel values are normalized to the range [0, 1].

Model Training:

- The model is trained for 30 epochs with a batch size of 128.
- Training includes validation split (10% of the training data) for monitoring overfitting.

3. FINDINGS

Training Accuracy and Validation Accuracy:

- The training accuracy reaches around 99%, indicating potential overfitting.

- Validation accuracy fluctuates, suggesting that the model may need regularization or adjustments.

Loss and Accuracy Metrics:

- Training loss decreases over epochs, but validation loss increases after a certain point, indicating overfitting.
- The model achieves an accuracy of approximately 82.35% on the test set.

Class-wise Evaluation:

- Precision, recall, and F1-score vary across different classes.
- Class 1 (Maria Sharapova) has a high precision and recall, while Class 2 (Roger Federer) has a lower precision.

Model Prediction:

- The `make_prediction` function successfully predicts the celebrity label for a given image.