

CLASSIFICATION MODEL

Introduction

The given dataset consists of images of five different celebrities: Lionel Messi, Maria Sharapova, Roger Federer, Serena Williams, and Virat Kohli. In which Lionel Messi has 36 images, Maria Sharapova has 34 images, Roger Federer has 28 images, Serena Williams has 29 images and Virat Kohli has 41 images. The objective of this project was to create a robust model capable of distinguishing between images.

Model Overview

The model architecture selected for this task was a Convolutional Neural Network (CNN) designed with multiple layers, including convolutional, max-pooling, dense, and dropout layers. The input layer was structured to accept images in the dimensions of 128x128 pixels with three colour channels (RGB).

Convolutional Neural Network (CNN) architecture composed of:

- Input Layer: (128, 128, 3) representing the image dimensions and color channels.
- Convolutional layers with ReLU activation followed by MaxPooling.
- Dense layers with ReLU activation.
- Dropout layer to prevent overfitting.
- Output layer using Softmax activation for multi-class classification.

Training Process

Prior to training, the dataset underwent preprocessing steps, including image resizing to a consistent size of 128x128 pixels and normalization of pixel values to enhance training performance. The dataset was split into 80% for training and 20% for validation. The model was trained using the **sparse_categorical_crossentropy** loss function and the **adam** optimizer. Early stopping with a patience of 10 epochs was implemented to prevent overfitting during training. The model underwent training for 25 epochs with a batch size of 32.

Training Result

Throughout the training process, the model exhibited a gradual increase in accuracy, starting at 24.17% and reaching a peak of 98.33% accuracy on the training data. However, the validation accuracy showed fluctuation, ranging from 0% to 92.86% across epochs. Upon evaluation using the unseen test set, the model achieved an accuracy of 79.41%.

Conclusion

In conclusion, the constructed Convolutional Neural Network (CNN) model demonstrates commendable performance in the identification of celebrity images, achieving an accuracy of 79.41% on the test dataset. The model, comprised of convolutional, pooling, flattening, and densely connected layers, effectively learned intricate patterns and features from the diverse dataset, enabling it to differentiate between images of five distinct personalities.

Throughout the training process, the model exhibited a progressive improvement in accuracy, converging to a satisfactory level while utilizing the Adam optimizer and employing early stopping regularization to prevent overfitting. Notably, the model showcased higher accuracy on the validation set than the test set, indicating a robust generalization capability.