Celebrities Recognition Model Report

Introduction

This report provides an overview of the Celebrities Recognition model implemented using TensorFlow and Keras. The model is trained on a dataset of celebrity images and utilizes a Convolutional Neural Network (CNN) architecture for image classification.

Selected Model: Convolutional Neural Network (CNN)

Architecture:

- Input Layer: Accepts images with dimensions (128, 128, 3).
- Convolutional Layer: Incorporates 32 filters using a (3, 3) kernel with ReLU activation.
- Max Pooling Layer: Decreases spatial dimensions for feature extraction.
- Flatten Layer: Converts the 2D matrix data into a vector for further processing.
- Dense Layers: Two fully connected layers with ReLU activation, one of which includes a dropout of 0.1 for regularization. The final layer uses softmax activation for multi-class classification.

Compilation:

- Optimizer: Utilizes the Adam optimizer to adjust the model's weights during training.
- Loss Function: Employs sparse categorical crossentropy, suitable for integer labels in multi-class classification tasks.

Training Procedure:

Data Loading and Preprocessing:

Images are read and pre processed from a specified directory, generating a dataset along with corresponding labels. The images are resized to dimensions of (128, 128) pixels, and pixel values are normalized.

Data Splitting:

The dataset is partitioned into training and testing sets, with a distribution of 70% for training and 30% for testing.

Model Training:

The model undergoes training for 200 epochs, employing a batch size of 128 for each iteration. A validation split of 10% is utilized to monitor the model's performance during training.

Visualizations:

Accuracy and loss are plotted and saved for both the training and validation sets over the epochs. These visualizations serve as tools for analyzing the model's learning trajectory and identifying potential instances of overfitting.

Critical Findings:

Accuracy and Loss Plots:

The accuracy plot visually represents the model's progressive enhancement over epochs for both the training and validation datasets. The loss plot illustrates the convergence of the model during training, providing valuable insights into its ability to generalize to unseen data.

Model Evaluation:

The trained model undergoes evaluation on a distinct test set. The accuracy of the model on the test data is calculated and printed, offering a quantitative measure of its performance.

Example Predictions:

The model's proficiency in predicting celebrities from specific images is showcased. Sample predictions are made on images of Lionel Messi, Roger Federer, Virat Kohli, Maria Sharapova, and Serena Williams. A qualitative assessment of the model's performance on real-world data is provided.

Note: Some predictions may be incorrect due to the presence of misleading images in certain folders within the training set.

Conclusion

The chosen CNN model displays potential in celebrity identification. Key findings, such as accuracy and loss visualizations, provide valuable insights into the model's learning dynamics. The evaluation on a test set and sample predictions offer crucial perspectives on its real-world performance. In light of these significant revelations, there is room for further optimization and refinement to enhance the accuracy and robustness of the model.