REPORT

Submitted by,

NIDIN V NANDAN

MSc Computer Science With Data Analytics Reg No: 223039

TASK: CELEBRITY IMAGE CLASSIFICATION

Dataset:
Different folders named on celebrity name containing their photos

CHOSEN MODEL-Convolutional Neural Network(CNN)
"

```
model = tf.keras.models.Sequential([
        tf.keras.layers.Conv2D(32, (3, 3), activation='relu', input_shape=(128, 128, 3)),
        tf.keras.layers.MaxPooling2D((2, 2)),
        tf.keras.layers.Flatten(),
        tf.keras.layers.Dense(256, activation='relu'),
        tf.keras.layers.Dropout(0.5),
        tf.keras.layers.Dense(512, activation='relu'),
        tf.keras.layers.Dense(5, activation='softmax')
])
model.compile(optimizer='adam',loss='sparse_categorical_crossentropy',
metrics=['accuracy'])
```

"

Here
Input Layer: Accepts images of size 128x128 pixels with three color channels (RGB).
Convolutional Layers:
32 filters of size 3x3, using ReLU activation function.
Followed by max-pooling with a 2x2 window to reduce spatial dimensions.
Flattening Layer:
Flattens the output from the convolutional layers into a 1D array to feed into the densely connected layers.

Densely Connected Layers:
First dense layer with 256 neurons and ReLU activation.
Dropout layer with a rate of 0.5 to reduce overfitting.
Second dense layer with 512 neurons and ReLU activation.
Final dense layer with 5 neurons, using the softmax activation function for multi-class classification (outputting probabilities for 5 classes).
Optimizer: Adam optimizer is used
Loss function: Sparse categorical cross-entropy, which is suitable for multi-class classification.
Metrics: Accuracy, to evaluate the model's performance during training.

Model summary:

```
Model: "sequential"
_________________________________________________________________
 Layer (type)                Output Shape              Param #
=================================================================
 conv2d (Conv2D)             (None, 126, 126, 32)      896

 max_pooling2d (MaxPooling2  (None, 63, 63, 32)        0
 D)

 flatten (Flatten)           (None, 127008)            0

 dense (Dense)               (None, 256)               32514304

 dropout (Dropout)           (None, 256)               0

 dense_1 (Dense)             (None, 512)               131584

 dense_2 (Dense)             (None, 5)                 2565

=================================================================
Total params: 32649349 (124.55 MB)
Trainable params: 32649349 (124.55 MB)
Non-trainable params: 0 (0.00 Byte)
_________________________________________________________________
```

Training:
history = model.fit(x_train, y_train, epochs=40, batch_size=128, validation_split=0.1)
Here the model is trained for 40 epochs with batch size of 128

Evaluation:

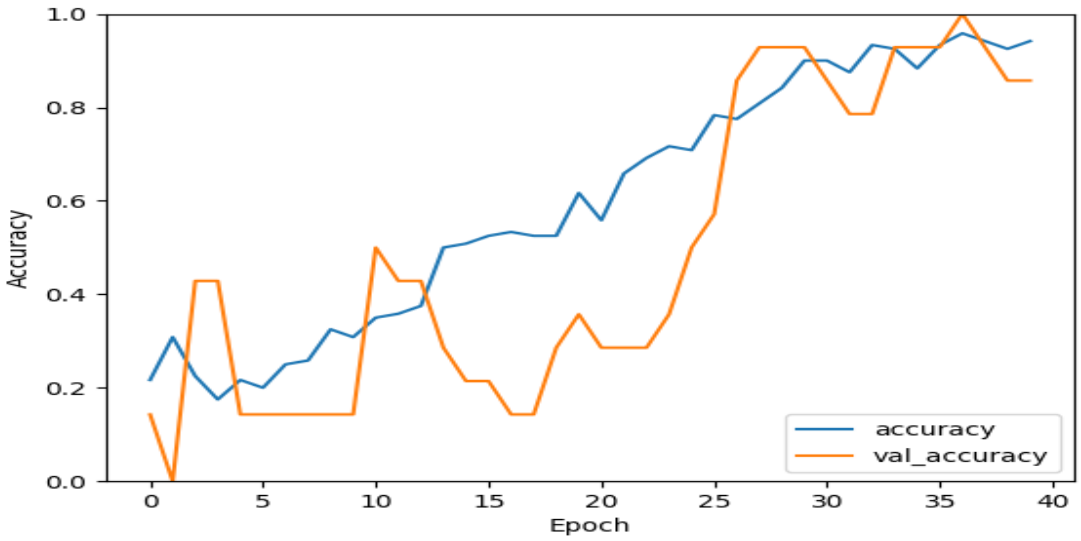
Here we evaluated the model on the test data and a classification report was generated
The accuracy was recorded as 76%

Classification Report:

Classification Report

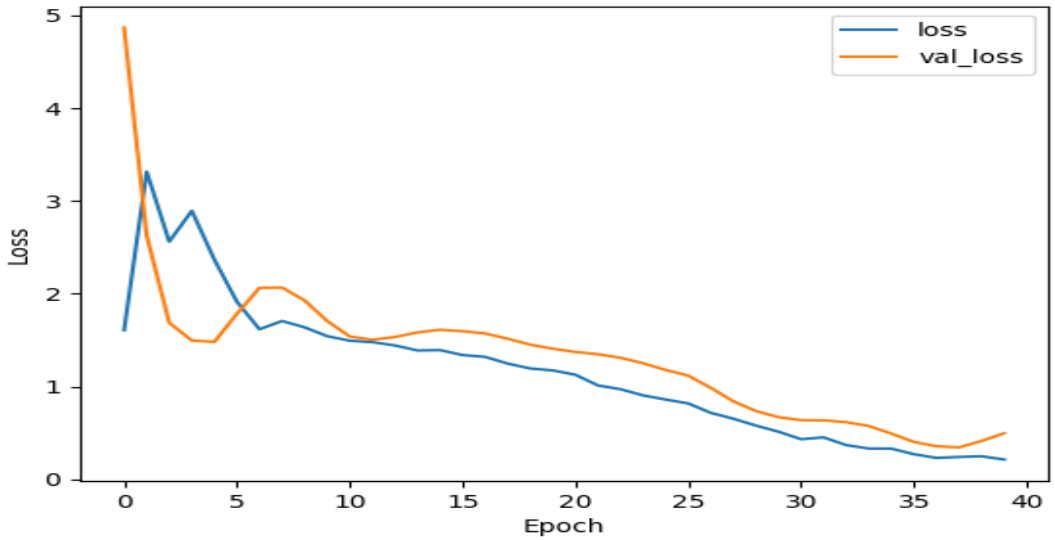
	precision	recall	f1-score	support
0	0.88	0.70	0.78	10
1	0.75	0.86	0.80	7
2	0.75	0.75	0.75	4
3	0.75	0.50	0.60	6
4	0.70	1.00	0.82	7
accuracy			0.76	34
macro avg	0.77	0.76	0.75	34
weighted avg	0.78	0.76	0.76	34

Accuracy plot:



During the training the accuracy and val_accuracy is increasing for each epoch

Loss plot:



During the training period the loss is decreasing with increase in each epoch

Prediction:

A function "predict_celebrity" was created in order to take the user input image a preprocessed for predicting the celebrity

And we can observe that the model is predicting correctly the celebrities among the inputted image