CODING & SOLUTION

Convolutional Neural Network

The Machine Learning model used here is a Convolutional Neural Network. This model runs in a way that different layers are stacked onto each other to form a fully connected neural network. This is a feature that is trained from pictures of big cats, after which the trained model then takes the input image from the user and predicts which big cat it is.

Flask

The web app integration with feature 1 or the CNN Machine Learning model is done using a Python web app framework called Flask. The Flask file runs on a Python base which runs webpages of HTML and CSS while linking the trained model making a complete web application.

PERFORMANCE TESTING

Performance Metrics

```
Accuracy: 0.86

Confusion Matrix:
[[4 0 0 0 1 0 0 0 0 0]
 [0 5 0 0 0 0 0 0 0 0]
 [0 0 4 0 1 0 0 0 0 0]
 [0 0 0 5 0 0 0 0 0 0]
 [1 0 0 0 4 0 0 0 0 0]
 [0 0 0 0 0 5 0 0 0 0]
 [1 0 0 1 0 0 2 0 0 1]
 [0 0 0 0 0 0 0 5 0 0]
 [0 0 0 1 0 0 0 0 4 0]
 [0 0 0 0 0 0 0 0 0 5]]

Classification Report:
                 precision    recall  f1-score   support

African Leopard       0.67      0.40      0.50         5
        Caracal       1.00      1.00      1.00         5
        Cheetah       0.83      1.00      0.91         5
Clouded Leopard       0.83      1.00      0.91         5
         Jaguar       0.67      0.80      0.73         5
          Lions       1.00      1.00      1.00         5
         Ocelot       1.00      0.40      0.57         5
           Puma       1.00      1.00      1.00         5
   Snow Leopard       0.83      1.00      0.91         5
          Tiger       0.83      1.00      0.91         5

       accuracy                           0.86        50
      macro avg       0.87      0.86      0.84        50
   weighted avg       0.87      0.86      0.84        50
```

Validation Method & Hyperparameter Training

```
vpath=r"C:\Users\nihar\Downloads\new animals\valid"
validation_data= keras.preprocessing.image_dataset_from_directory(
    vpath,
    batch_size = 10,
    image_size =(351,351),

    shuffle = True,
    seed =123,
    validation_split =0.2,
    subset ='validation'
)
```

```
Found 50 files belonging to 10 classes.
Using 10 files for validation.
```