

Project Development Phase

Model Performance Test

Date	10 February 2025
Team ID	LTVIP2025TMID34696
Project Name	Enchanted Wings: Marvels Of Butterfly Species
Maximum Marks	10 Marks

Model Performance Testing:

Project team shall fill the following information in model performance testing template.

S.No.	Parameter	Values	Screenshot																																													
1.	Metrics	Classification Model: <ul style="list-style-type: none">• Accuracy: 87.64% (example)• Precision, Recall, F1-score calculated using classification_report• Confusion Matrix: Used to evaluate class-wise performance• Model used: VGG16 with transfer learning and fine-tuning	<pre>2 import numpy as np 3 import seaborn as matplotlib, sns as saborn, pyplot as pl 4 5 # Predict 6 val_data.reset 7 y_pred = model_in.preeect(yport='d1') classif-ton-report() 8 y_true = y_pred_classes 9 10 # Classification Report:prit(classification_report 11 Confusion_Matrix= confusion_matrix 12 13 cm = corjsion_matrix <2 antienart(y_true, y_pred_classes) 14 15 # Confusion Matrix 16 confusion_matrix= cmt?usio_matr: 17 plt.teguer(sceema('a': #blués) 18 plt.show()</pre> <table><tr><th></th><th>transliffiatu</th><th>precision</th><th>f1-score</th><th>support</th></tr><tr><td></td><td>3</td><td>0</td><td>0</td><td>3</td></tr><tr><td></td><td>1</td><td>2</td><td>0</td><td>3</td></tr><tr><td></td><td>0</td><td>1</td><td>0</td><td>3</td></tr><tr><td>accuracy</td><td>0.83</td><td>1.00</td><td>0.83</td><td></td></tr><tr><th></th><th>tréclure: aen eusre</th><th>precision</th><th>f1-score</th><th>support</th></tr><tr><td>precision</td><td>0.75</td><td>1.00</td><td>0.86</td><td>3</td></tr><tr><td>recall</td><td>0.67</td><td>0.67</td><td>0.67</td><td>3</td></tr><tr><td>f1-score</td><td>0.70</td><td>0.67</td><td>0.70</td><td>3</td></tr></table>		transliffiatu	precision	f1-score	support		3	0	0	3		1	2	0	3		0	1	0	3	accuracy	0.83	1.00	0.83			tréclure: aen eusre	precision	f1-score	support	precision	0.75	1.00	0.86	3	recall	0.67	0.67	0.67	3	f1-score	0.70	0.67	0.70	3
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2.	Tune the Model	<p>Hyperparameter Tuning:</p> <ul style="list-style-type: none"> Used ImageDataGenerator with augmentations Batch size, learning rate, and epochs adjusted to reduce overfitting Best results with <code>img_size=128</code>, <code>batch_size=32</code>, and learning rate=<code>1e-4</code> <p>Validation Method:</p> <ul style="list-style-type: none"> 80% training, 20% testing split Used ModelCheckpoint, EarlyStopping during training to optimize performance 	<pre> 1 input - 2 from tensorflow.keras.callbacks import EarlyStopping, ModelCheckpoint 3 # Create an ImageDataGenerator for data augmentation 4 datagen = ImageDataGenerator(rotation_range=20, horizontal_flip=True, rescale=1/255.0 5 early_stopping = EarlyStopping(monitor='val_loss', patience=3) 6 model_checkpoint = ModelCheckpoint('model.h5', monitor='val_acc', save_best_only=True) 7 model.compile(optimizer=Adam(lr=1e-4), loss='categorical_crossentropy', metrics=['accuracy']) 8 model.fit(train_generator, epochs=15, batch_size=32, validation_data=(val_images, val_labels), callbacks=[early_stopping, model_checkpoint]) > III ► holiday mean_flow rain_mean 5 Epoch 1/15 loss=mea bts w -nea(loss_acc, acc a Epoch 1/15 0.62108 - accv 0.8055 val_loss: 0.8377 Epoch 2/15 0.50166 - accv 0.8414 val_loss: 0.4697 </pre>
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