

Project Development Phase Model Performance Test

| | |
|---------------|---|
| Date | 28 June 2025 |
| Team ID | LTVIP2025TMID45505 |
| Project Name | CleanTech: Transforming Waste Management with Transfer Learning |
| Maximum Marks | |

Model Performance Testing:

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

| S.N o. | Parameter | Values | Screenshot |
|--------|-------------------------------|---|------------|
| 1. | Model Summary | VGG16 pre-trained model with custom top layers GlobalAveragePooling <ul style="list-style-type: none">Dense(128, relu)Dense(3, softmax) | |
| 2. | Accuracy | Training Accuracy - 0.96 Validation Accuracy -0.99 | |
| 3. | Fine Tunning Result(if Done) | Validation Accuracy -0.99 | |

1.

```
# Step 4: Load Pre-trained VGG16
vgg = VGG16(weights='imagenet', include_top=False, input_shape=(224, 224, 3))
vgg.trainable = False

inputs = Input(shape=(224, 224, 3))
x = vgg(inputs, training=False)
x = Flatten()(x)
x = Dropout(0.5)(x)
outputs = Dense(3, activation='softmax')(x)

model = Model(inputs, outputs)
model.compile(optimizer='adam', loss='sparse_categorical_crossentropy', metrics=['accuracy'])
```

2.

```
13/13 ----- 396s 31s/step - accuracy: 0.4689 - loss: 1.2729 - val_accuracy: 0.7615 - val_loss: 0.5417
Epoch 2/7
13/13 ----- 440s 31s/step - accuracy: 0.8086 - loss: 0.4829 - val_accuracy: 0.8846 - val_loss: 0.2561
Epoch 3/7
13/13 ----- 380s 30s/step - accuracy: 0.8652 - loss: 0.2720 - val_accuracy: 0.9359 - val_loss: 0.1662
Epoch 4/7
13/13 ----- 381s 30s/step - accuracy: 0.9133 - loss: 0.1952 - val_accuracy: 0.9769 - val_loss: 0.1065
Epoch 5/7
13/13 ----- 383s 30s/step - accuracy: 0.9461 - loss: 0.1645 - val_accuracy: 0.9923 - val_loss: 0.0814
Epoch 6/7
13/13 ----- 382s 30s/step - accuracy: 0.9667 - loss: 0.0946 - val_accuracy: 0.9974 - val_loss: 0.0655
Epoch 7/7
13/13 ----- 406s 32s/step - accuracy: 0.9668 - loss: 0.0971 - val_accuracy: 0.9949 - val_loss: 0.0638
Model saved as vgg15.keras
```