

✓ Data Set Preparing

```

import os
import shutil
import random
import math

# --- Configuration ---

# 1. Define the path to your current folder with all 14 landmark subfolders.
SOURCE_DIR = "/content/drive/MyDrive/LandmarkDataset"

# 2. Define the path for the new, structured dataset. This folder will be created.
DEST_DIR = "/content/drive/MyDrive/Travelgine_Landmarks/Landmark_Dataset_Split"

# 3. Define the split ratios for your dataset.
# 70% for training, 20% for validation, 10% for testing.
TRAIN_RATIO = 0.7
VALIDATION_RATIO = 0.2
TEST_RATIO = 0.1

# --- Script Execution ---

print(f"Starting dataset restructuring...")
print(f"Source: {SOURCE_DIR}")
print(f"Destination: {DEST_DIR}")

# Create the main destination directory if it doesn't exist
if os.path.exists(DEST_DIR):
    print(f"Destination directory '{DEST_DIR}' already exists. Please ensure it's empty or choose a new path.")
else:
    os.makedirs(DEST_DIR)
    print(f"Created destination directory: {DEST_DIR}")

# Create train, validation, and test subdirectories
train_path = os.path.join(DEST_DIR, 'train')
validation_path = os.path.join(DEST_DIR, 'validation')
test_path = os.path.join(DEST_DIR, 'test')

os.makedirs(train_path, exist_ok=True)
os.makedirs(validation_path, exist_ok=True)
os.makedirs(test_path, exist_ok=True)

# Get the list of landmark class folders from the source directory
landmark_folders = [d for d in os.listdir(SOURCE_DIR) if os.path.isdir(os.path.join(SOURCE_DIR, d))]

# Process each landmark folder
for landmark in landmark_folders:
    print(f"\nProcessing landmark: {landmark}")

    # Create corresponding subfolders in train, validation, and test
    os.makedirs(os.path.join(train_path, landmark), exist_ok=True)
    os.makedirs(os.path.join(validation_path, landmark), exist_ok=True)
    os.makedirs(os.path.join(test_path, landmark), exist_ok=True)

    # Get all image files for the current landmark
    source_landmark_path = os.path.join(SOURCE_DIR, landmark)
    images = [f for f in os.listdir(source_landmark_path) if os.path.isfile(os.path.join(source_landmark_path, f))]

    # Shuffle the images to ensure random distribution
    random.shuffle(images)

    # Calculate the split points
    total_images = len(images)
    train_split_index = math.floor(total_images * TRAIN_RATIO)
    validation_split_index = train_split_index + math.floor(total_images * VALIDATION_RATIO)

    # Get the lists of files for each set
    train_images = images[:train_split_index]
    validation_images = images[train_split_index:validation_split_index]
    test_images = images[validation_split_index:]

    # Function to copy files
    def copy_files(file_list, destination_folder):
        for file in file_list:
            file_path = os.path.join(source_landmark_path, file)
            dest_file_path = os.path.join(destination_folder, file)
            shutil.copy(file_path, dest_file_path)

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for file_name in file_list:
    source_file = os.path.join(source_landmark_path, file_name)
    dest_file = os.path.join(destination_folder, landmark, file_name)
    shutil.copy2(source_file, dest_file)

# Copy files to their new directories
copy_files(train_images, train_path)
copy_files(validation_images, validation_path)
copy_files(test_images, test_path)

print(f" - Copied {len(train_images)} images to 'train' set.")
print(f" - Copied {len(validation_images)} images to 'validation' set.")
print(f" - Copied {len(test_images)} images to 'test' set.")

print("\n--- Dataset restructuring complete! ---")

☒ Processing landmark: Galle_Fort
- Copied 487 images to 'train' set.
- Copied 139 images to 'validation' set.
- Copied 71 images to 'test' set.

Processing landmark: Nine_Arches_Bridge
- Copied 149 images to 'train' set.
- Copied 42 images to 'validation' set.
- Copied 22 images to 'test' set.

Processing landmark: Adams_Peak
- Copied 317 images to 'train' set.
- Copied 90 images to 'validation' set.
- Copied 47 images to 'test' set.

Processing landmark: Gal_Viharaya
- Copied 177 images to 'train' set.
- Copied 50 images to 'validation' set.
- Copied 26 images to 'test' set.

Processing landmark: Mihintale
- Copied 198 images to 'train' set.
- Copied 56 images to 'validation' set.
- Copied 29 images to 'test' set.

Processing landmark: Independence_Memorial_Hall
- Copied 105 images to 'train' set.
- Copied 30 images to 'validation' set.
- Copied 16 images to 'test' set.

Processing landmark: Ruwanwelisaya_Stupa
- Copied 222 images to 'train' set.
- Copied 63 images to 'validation' set.
- Copied 33 images to 'test' set.

Processing landmark: Bambarakanda_Falls
- Copied 101 images to 'train' set.
- Copied 29 images to 'validation' set.
- Copied 15 images to 'test' set.

Processing landmark: Jaya_Sri_Maha_Bodhi
- Copied 91 images to 'train' set.
- Copied 26 images to 'validation' set.
- Copied 14 images to 'test' set.

Processing landmark: Nallur_Kandaswamy_Temple
- Copied 106 images to 'train' set.
- Copied 30 images to 'validation' set.
- Copied 16 images to 'test' set.

Processing landmark: Kelaniya_Raja_Maha_Vihara
- Copied 175 images to 'train' set.
- Copied 50 images to 'validation' set.
- Copied 26 images to 'test' set.

Processing landmark: Jami_Ul-Alfar_Mosque
- Copied 170 images to 'train' set.
- Copied 48 images to 'validation' set.

```

↙ Load the Split Datasets and Perform EDA

This step involves loading the images from your new Landmark_Dataset_Split directory and then visualizing a few samples to ensure everything has been loaded correctly.

```
import tensorflow as tf
import matplotlib.pyplot as plt
import os

# --- Part 1.3: Load the Split Dataset ---

# Define paths to your new train, validation, and test directories
BASE_DIR = "/content/drive/MyDrive/Travelgine_Landmarks/Landmark_Dataset_Split"
TRAIN_DIR = os.path.join(BASE_DIR, 'train')
VALIDATION_DIR = os.path.join(BASE_DIR, 'validation')
TEST_DIR = os.path.join(BASE_DIR, 'test')

# Define model parameters
IMG_HEIGHT = 224
IMG_WIDTH = 224
BATCH_SIZE = 32

# Load the training dataset
print("Loading training data...")
train_ds = tf.keras.utils.image_dataset_from_directory(
    TRAIN_DIR,
    label_mode='int',
    seed=123,
    image_size=(IMG_HEIGHT, IMG_WIDTH),
    batch_size=BATCH_SIZE
)

# Load the validation dataset
print("\nLoading validation data...")
val_ds = tf.keras.utils.image_dataset_from_directory(
    VALIDATION_DIR,
    label_mode='int',
    seed=123,
    image_size=(IMG_HEIGHT, IMG_WIDTH),
    batch_size=BATCH_SIZE
)

# Load the test dataset
print("\nLoading test data...")
test_ds = tf.keras.utils.image_dataset_from_directory(
    TEST_DIR,
    label_mode='int',
    seed=123,
    image_size=(IMG_HEIGHT, IMG_WIDTH),
    batch_size=BATCH_SIZE,
    shuffle=False # Keep test data in order for later evaluation
)

# Get the class names from the folder names
class_names = train_ds.class_names
print("\nLandmark classes found:", class_names)
print(f"Number of classes: {len(class_names)}")

# --- Part 2.1: Visualize Sample Images (EDA) ---

print("\nDisplaying sample images from the training set...")
plt.figure(figsize=(10, 10))
for images, labels in train_ds.take(1):
    for i in range(9):
        ax = plt.subplot(3, 3, i + 1)
        plt.imshow(images[i].numpy().astype("uint8"))
        plt.title(class_names[labels[i]])
        plt.axis("off")
plt.show()
```

>Loading training data...

Found 3029 files belonging to 14 classes.

>Loading validation data...

Found 854 files belonging to 14 classes.

>Loading test data...

Found 449 files belonging to 14 classes.

Landmark classes found: ['Adams_Peak', 'Bambarakanda_Falls', 'Gal_Viharaya', 'Galle_Fort', 'Independence_Memorial_Hall', 'Jami_Ul-Alfar_Number of classes: 14

Displaying sample images from the training set...

Galle_Fort



Galle_Fort



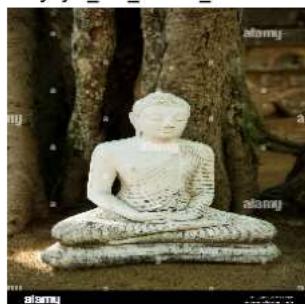
Ruwanwelisaya_Stupa



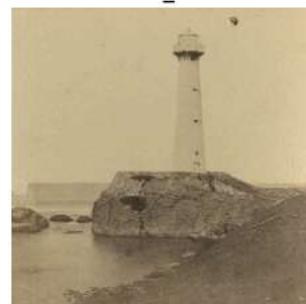
Mihintale



Jaya_Sri_Maha_Bodhi



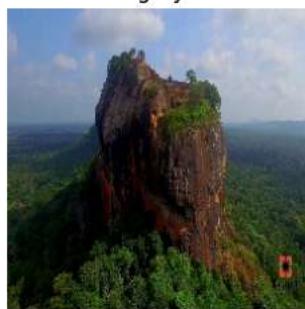
Galle_Fort



Nallur_Kandaswamy_Temple



Sigiriya



Mihintale



✓ Define Data Augmentation and Build the Model

```
import tensorflow as tf
from tensorflow import keras
from tensorflow.keras import layers
from tensorflow.keras.applications import EfficientNetB0

# --- Part 3: Data Augmentation ---

# Create a set of layers to apply random transformations to the images.
# This helps prevent overfitting and improves the model's ability to generalize.
data_augmentation = tf.keras.Sequential(
    [
        layers.RandomFlip("horizontal"),
        layers.RandomRotation(0.1),
        layers.RandomZoom(0.1),
        layers.RandomTranslation(0.1, 0.1),
```

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    ],
    name="data_augmentation"
)

# --- Part 4: Model Building with Transfer Learning ---

# 4.1: Configure the dataset for optimal performance
#.cache() keeps images in memory after the first epoch
#.prefetch() overlaps data preprocessing and model execution while training
AUTOTUNE = tf.data.AUTOTUNE
train_ds = train_ds.cache().prefetch(buffer_size=AUTOTUNE)
val_ds = val_ds.cache().prefetch(buffer_size=AUTOTUNE)
test_ds = test_ds.cache().prefetch(buffer_size=AUTOTUNE)

# 4.2: Build the Transfer Learning Model
# Define the input shape for our model
inputs = tf.keras.Input(shape=(IMG_HEIGHT, IMG_WIDTH, 3))

# Apply data augmentation to the inputs
x = data_augmentation(inputs)

# Use a preprocessing layer specific to EfficientNet
# This scales pixel values to the range expected by the model
x = tf.keras.applications.efficientnet.preprocess_input(x)

# Load the pre-trained EfficientNetB0 model without its final classification layer
# We use weights pre-trained on the large ImageNet dataset
base_model = EfficientNetB0(
    include_top=False,
    weights='imagenet',
    input_tensor=x
)

# Freeze the weights of the base model so they are not updated during training
base_model.trainable = False

# Add our own custom classification layers on top of the base model
x = layers.GlobalAveragePooling2D()(base_model.output)
x = layers.Dropout(0.2)(x) # Dropout layer for regularization to prevent overfitting
outputs = layers.Dense(len(class_names), activation='softmax')(x) # Final layer with 14 outputs

# Create the final model
model = tf.keras.Model(inputs, outputs)

print("Model built successfully.")

→ Model built successfully.

```

✓ ***Compile and Train the Model***

```

# --- Part 5: Model Compilation and Training ---

# 5.1: Compile the Model
# This configures the model for training.
# The 'adam' optimizer is a good default choice for many problems.
# 'SparseCategoricalCrossentropy' is the correct loss function for multi-class classification.
model.compile(
    optimizer=tf.keras.optimizers.Adam(learning_rate=0.001),
    loss=tf.keras.losses.SparseCategoricalCrossentropy(),
    metrics=['accuracy']
)

# Display a summary of the model's architecture, showing all layers and parameters
print("Model Summary:")
model.summary()

# 5.2: Define Callbacks
# This callback saves the best version of the model based on validation accuracy.
model_checkpoint_callback = tf.keras.callbacks.ModelCheckpoint(
    filepath="best_model.keras",
    save_weights_only=False,
    monitor='val_accuracy',
    mode='max',
)

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save_best_only=True)

# This callback stops training early if the validation loss doesn't improve for 5 consecutive epochs.
early_stopping_callback = tf.keras.callbacks.EarlyStopping(
    monitor='val_loss',
    patience=5, # Number of epochs with no improvement after which training will be stopped.
    restore_best_weights=True
)

# 5.3: Train the Model
print("\n--- Starting Model Training ---")
# We'll start with 20 epochs. Early stopping may end the training sooner if the model converges.
epochs = 20
history = model.fit(
    train_ds,
    validation_data=val_ds,
    epochs=epochs,
    callbacks=[model_checkpoint_callback, early_stopping_callback]
)

print("\n--- Model Training Complete ---")
```

Model Summary:
Model: "functional_3"

Layer (type)	Output Shape	Param #	Connected to
input_layer_2 (InputLayer)	(None, 224, 224, 3)	0	-
data_augmentation (Sequential)	(None, 224, 224, 3)	0	input_layer_2[0]...
rescaling_2 (Rescaling)	(None, 224, 224, 3)	0	data_augmentatio...
normalization_1 (Normalization)	(None, 224, 224, 3)	7	rescaling_2[0][0]
rescaling_3 (Rescaling)	(None, 224, 224, 3)	0	normalization_1[...
stem_conv_pad (ZeroPadding2D)	(None, 225, 225, 3)	0	rescaling_3[0][0]
stem_conv (Conv2D)	(None, 112, 112, 32)	864	stem_conv_pad[0]...
stem_bn (BatchNormalizatio...)	(None, 112, 112, 32)	128	stem_conv[0][0]
stem_activation (Activation)	(None, 112, 112, 32)	0	stem_bn[0][0]
block1a_dwconv (DepthwiseConv2D)	(None, 112, 112, 32)	288	stem_activation[...
block1a_bn (BatchNormalizatio...)	(None, 112, 112, 32)	128	block1a_dwconv[0...
block1a_activation (Activation)	(None, 112, 112, 32)	0	block1a_bn[0][0]
block1a_se_squeeze (GlobalAveragePool...)	(None, 32)	0	block1a_activati...
block1a_se_reshape (Reshape)	(None, 1, 1, 32)	0	block1a_se_squee...
block1a_se_reduce (Conv2D)	(None, 1, 1, 8)	264	block1a_se_resha...
block1a_se_expand (Conv2D)	(None, 1, 1, 32)	288	block1a_se_reduc...
block1a_se_excite (Multiply)	(None, 112, 112, 32)	0	block1a_activati... block1a_se_expan...
block1a_project_co... (Conv2D)	(None, 112, 112, 16)	512	block1a_se_excit...
block1a_project_bn (BatchNormalizatio...)	(None, 112, 112, 16)	64	block1a_project_...
block2a_expand_conv (Conv2D)	(None, 112, 112, 96)	1,536	block1a_project_...
block2a_expand_bn (BatchNormalizatio...)	(None, 112, 112, 96)	384	block2a_expand_c...
block2a_expand_act... (Activation)	(None, 112, 112, 96)	0	block2a_expand_b...
block2a_dwconv_pad (ZeroPadding2D)	(None, 113, 113, 96)	0	block2a_expand_a...
block2a_dwconv (DepthwiseConv2D)	(None, 56, 56, 96)	864	block2a_dwconv_p...
block2a_bn (BatchNormalizatio...)	(None, 56, 56, 96)	384	block2a_dwconv[0...
block2a_activation (Activation)	(None, 56, 56, 96)	0	block2a_bn[0][0]
block2a_se_squeeze (GlobalAveragePool...)	(None, 96)	0	block2a_activati...

block2a_se_reshape (Reshape)	(None, 1, 1, 96)	0	block2a_se_squee...
block2a_se_reduce (Conv2D)	(None, 1, 1, 4)	388	block2a_se_resha...
block2a_se_expand (Conv2D)	(None, 1, 1, 96)	480	block2a_se_reduc...
block2a_se_excite (Multiply)	(None, 56, 56, 96)	0	block2a_activation... block2a_se_expan...
block2a_project_co... (Conv2D)	(None, 56, 56, 24)	2,304	block2a_se_excit...
block2a_project_bn (BatchNormalizatio...)	(None, 56, 56, 24)	96	block2a_project_...
block2b_expand_conv (Conv2D)	(None, 56, 56, 144)	3,456	block2a_project_...
block2b_expand_bn (BatchNormalizatio...)	(None, 56, 56, 144)	576	block2b_expand_c...
block2b_expand_act... (Activation)	(None, 56, 56, 144)	0	block2b_expand_b...
block2b_dwconv (DepthwiseConv2D)	(None, 56, 56, 144)	1,296	block2b_expand_a...
block2b_bn (BatchNormalizatio...)	(None, 56, 56, 144)	576	block2b_dwconv[0...]
block2b_activation (Activation)	(None, 56, 56, 144)	0	block2b_bn[0][0]
block2b_se_squeeze (GlobalAveragePool...)	(None, 144)	0	block2b_activati...
block2b_se_reshape (Reshape)	(None, 1, 1, 144)	0	block2b_se_squee...
block2b_se_reduce (Conv2D)	(None, 1, 1, 6)	870	block2b_se_resha...
block2b_se_expand (Conv2D)	(None, 1, 1, 144)	1,008	block2b_se_reduc...
block2b_se_excite (Multiply)	(None, 56, 56, 144)	0	block2b_activation... block2b_se_expan...
block2b_project_co... (Conv2D)	(None, 56, 56, 24)	3,456	block2b_se_excit...
block2b_project_bn (BatchNormalizatio...)	(None, 56, 56, 24)	96	block2b_project_...
block2b_drop (Dropout)	(None, 56, 56, 24)	0	block2b_project_...
block2b_add (Add)	(None, 56, 56, 24)	0	block2b_drop[0][...] block2a_project_...
block3a_expand_conv (Conv2D)	(None, 56, 56, 144)	3,456	block2b_add[0][0]
block3a_expand_bn (BatchNormalizatio...)	(None, 56, 56, 144)	576	block3a_expand_c...
block3a_expand_act... (Activation)	(None, 56, 56, 144)	0	block3a_expand_b...
block3a_dwconv_pad (ZeroPadding2D)	(None, 59, 59, 144)	0	block3a_expand_a...
block3a_dwconv (DepthwiseConv2D)	(None, 28, 28, 144)	3,600	block3a_dwconv_p...
block3a_bn (BatchNormalizatio...)	(None, 28, 28, 144)	576	block3a_dwconv[0...]
block3a_activation (Activation)	(None, 28, 28, 144)	0	block3a_bn[0][0]
block3a_se_squeeze (GlobalAveragePool...)	(None, 144)	0	block3a_activati...

block3a_se_reshape (Reshape)	(None, 1, 1, 144)	0	block3a_se_squee...
block3a_se_reduce (Conv2D)	(None, 1, 1, 6)	870	block3a_se_resha...
block3a_se_expand (Conv2D)	(None, 1, 1, 144)	1,008	block3a_se_reduc...
block3a_se_excite (Multiply)	(None, 28, 28, 144)	0	block3a_activati... block3a_se_expan...
block3a_project_co... (Conv2D)	(None, 28, 28, 40)	5,760	block3a_se_excit...
block3a_project_bn (BatchNormalizatio...)	(None, 28, 28, 40)	160	block3a_project_...
block3b_expand_conv (Conv2D)	(None, 28, 28, 240)	9,600	block3a_project_...
block3b_expand_bn (BatchNormalizatio...)	(None, 28, 28, 240)	960	block3b_expand_c...
block3b_expand_act... (Activation)	(None, 28, 28, 240)	0	block3b_expand_b...
block3b_dwconv (DepthwiseConv2D)	(None, 28, 28, 240)	6,000	block3b_expand_a...
block3b_bn (BatchNormalizatio...)	(None, 28, 28, 240)	960	block3b_dwconv[0...]
block3b_activation (Activation)	(None, 28, 28, 240)	0	block3b_bn[0][0]
block3b_se_squeeze (GlobalAveragePool...)	(None, 240)	0	block3b_activati...
block3b_se_reshape (Reshape)	(None, 1, 1, 240)	0	block3b_se_squee...
block3b_se_reduce (Conv2D)	(None, 1, 1, 10)	2,410	block3b_se_resha...
block3b_se_expand (Conv2D)	(None, 1, 1, 240)	2,640	block3b_se_reduc...
block3b_se_excite (Multiply)	(None, 28, 28, 240)	0	block3b_activati... block3b_se_expan...
block3b_project_co... (Conv2D)	(None, 28, 28, 40)	9,600	block3b_se_excit...
block3b_project_bn (BatchNormalizatio...)	(None, 28, 28, 40)	160	block3b_project_...
block3b_drop (Dropout)	(None, 28, 28, 40)	0	block3b_project_...
block3b_add (Add)	(None, 28, 28, 40)	0	block3b_drop[0][...] block3a_project_...
block4a_expand_conv (Conv2D)	(None, 28, 28, 240)	9,600	block3b_add[0][0]
block4a_expand_bn (BatchNormalizatio...)	(None, 28, 28, 240)	960	block4a_expand_c...
block4a_expand_act... (Activation)	(None, 28, 28, 240)	0	block4a_expand_b...
block4a_dwconv_pad (ZeroPadding2D)	(None, 29, 29, 240)	0	block4a_expand_a...
block4a_dwconv (DepthwiseConv2D)	(None, 14, 14, 240)	2,160	block4a_dwconv_p...
block4a_bn (BatchNormalizatio...)	(None, 14, 14, 240)	960	block4a_dwconv[0...]
block4a_activation (Activation)	(None, 14, 14, 240)	0	block4a_bn[0][0]
block4a_se_squeeze (GlobalAveragePool...)	(None, 240)	0	block4a_activati...

block4a_se_reshape (Reshape)	(None, 1, 1, 240)	0	block4a_se_squee...
block4a_se_reduce (Conv2D)	(None, 1, 1, 10)	2,410	block4a_se_resha...
block4a_se_expand (Conv2D)	(None, 1, 1, 240)	2,640	block4a_se_reduc...
block4a_se_excite (Multiply)	(None, 14, 14, 240)	0	block4a_activati... block4a_se_expan...
block4a_project_co... (Conv2D)	(None, 14, 14, 80)	19,200	block4a_se_excit...
block4a_project_bn (BatchNormalizatio...)	(None, 14, 14, 80)	320	block4a_project_...
block4b_expand_conv (Conv2D)	(None, 14, 14, 480)	38,400	block4a_project_...
block4b_expand_bn (BatchNormalizatio...)	(None, 14, 14, 480)	1,920	block4b_expand_c...
block4b_expand_act... (Activation)	(None, 14, 14, 480)	0	block4b_expand_b...
block4b_dwconv (DepthwiseConv2D)	(None, 14, 14, 480)	4,320	block4b_expand_a...
block4b_bn (BatchNormalizatio...)	(None, 14, 14, 480)	1,920	block4b_dwconv[0...]
block4b_activation (Activation)	(None, 14, 14, 480)	0	block4b_bn[0][0]
block4b_se_squeeze (GlobalAveragePool...)	(None, 480)	0	block4b_activati...
block4b_se_reshape (Reshape)	(None, 1, 1, 480)	0	block4b_se_squee...
block4b_se_reduce (Conv2D)	(None, 1, 1, 20)	9,620	block4b_se_resha...
block4b_se_expand (Conv2D)	(None, 1, 1, 480)	10,080	block4b_se_reduc...
block4b_se_excite (Multiply)	(None, 14, 14, 480)	0	block4b_activati... block4b_se_expan...
block4b_project_co... (Conv2D)	(None, 14, 14, 80)	38,400	block4b_se_excit...
block4b_project_bn (BatchNormalizatio...)	(None, 14, 14, 80)	320	block4b_project_...
block4b_drop (Dropout)	(None, 14, 14, 80)	0	block4b_project_...
block4b_add (Add)	(None, 14, 14, 80)	0	block4b_drop[0][...] block4a_project_...
block4c_expand_conv (Conv2D)	(None, 14, 14, 480)	38,400	block4b_add[0][0]
block4c_expand_bn (BatchNormalizatio...)	(None, 14, 14, 480)	1,920	block4c_expand_c...
block4c_expand_act... (Activation)	(None, 14, 14, 480)	0	block4c_expand_b...
block4c_dwconv (DepthwiseConv2D)	(None, 14, 14, 480)	4,320	block4c_expand_a...
block4c_bn (BatchNormalizatio...)	(None, 14, 14, 480)	1,920	block4c_dwconv[0...]
block4c_activation (Activation)	(None, 14, 14, 480)	0	block4c_bn[0][0]
block4c_se_squeeze (GlobalAveragePool...)	(None, 480)	0	block4c_activati...
block4c_se_reshape (Reshape)	(None, 1, 1, 480)	0	block4c_se_squee...

<code>__name__</code>	<code>(None, 1, 1, 20)</code>	<code>9,620</code>	<code>block4c_se_resha...</code>
<code>block4c_se_reduce (Conv2D)</code>	<code>(None, 1, 1, 20)</code>	<code>9,620</code>	<code>block4c_se_resha...</code>
<code>block4c_se_expand (Conv2D)</code>	<code>(None, 1, 1, 480)</code>	<code>10,080</code>	<code>block4c_se_reduc...</code>
<code>block4c_se_excite (Multiply)</code>	<code>(None, 14, 14, 480)</code>	<code>0</code>	<code>block4c_activati... block4c_se_expan...</code>
<code>block4c_project_co... (Conv2D)</code>	<code>(None, 14, 14, 80)</code>	<code>38,400</code>	<code>block4c_se_excit...</code>
<code>block4c_project_bn (BatchNormalizatio...)</code>	<code>(None, 14, 14, 80)</code>	<code>320</code>	<code>block4c_project_...</code>
<code>block4c_drop (Dropout)</code>	<code>(None, 14, 14, 80)</code>	<code>0</code>	<code>block4c_project_...</code>
<code>block4c_add (Add)</code>	<code>(None, 14, 14, 80)</code>	<code>0</code>	<code>block4c_drop[0][...] block4b_add[0][0]</code>
<code>block5a_expand_conv (Conv2D)</code>	<code>(None, 14, 14, 480)</code>	<code>38,400</code>	<code>block4c_add[0][0]</code>
<code>block5a_expand_bn (BatchNormalizatio...)</code>	<code>(None, 14, 14, 480)</code>	<code>1,920</code>	<code>block5a_expand_c...</code>
<code>block5a_expand_act... (Activation)</code>	<code>(None, 14, 14, 480)</code>	<code>0</code>	<code>block5a_expand_b...</code>
<code>block5a_dwconv (DepthwiseConv2D)</code>	<code>(None, 14, 14, 480)</code>	<code>12,000</code>	<code>block5a_expand_a...</code>
<code>block5a_bn (BatchNormalizatio...)</code>	<code>(None, 14, 14, 480)</code>	<code>1,920</code>	<code>block5a_dwconv[0...]</code>
<code>block5a_activation (Activation)</code>	<code>(None, 14, 14, 480)</code>	<code>0</code>	<code>block5a_bn[0][0]</code>
<code>block5a_se_squeeze (GlobalAveragePool...)</code>	<code>(None, 480)</code>	<code>0</code>	<code>block5a_activati...</code>
<code>block5a_se_reshape (Reshape)</code>	<code>(None, 1, 1, 480)</code>	<code>0</code>	<code>block5a_se_squee...</code>
<code>block5a_se_reduce (Conv2D)</code>	<code>(None, 1, 1, 20)</code>	<code>9,620</code>	<code>block5a_se_resha...</code>
<code>block5a_se_expand (Conv2D)</code>	<code>(None, 1, 1, 480)</code>	<code>10,080</code>	<code>block5a_se_reduc...</code>
<code>block5a_se_excite (Multiply)</code>	<code>(None, 14, 14, 480)</code>	<code>0</code>	<code>block5a_activati... block5a_se_expan...</code>
<code>block5a_project_co... (Conv2D)</code>	<code>(None, 14, 14, 112)</code>	<code>53,760</code>	<code>block5a_se_excit...</code>
<code>block5a_project_bn (BatchNormalizatio...)</code>	<code>(None, 14, 14, 112)</code>	<code>448</code>	<code>block5a_project_...</code>
<code>block5b_expand_conv (Conv2D)</code>	<code>(None, 14, 14, 672)</code>	<code>75,264</code>	<code>block5a_project_...</code>
<code>block5b_expand_bn (BatchNormalizatio...)</code>	<code>(None, 14, 14, 672)</code>	<code>2,688</code>	<code>block5b_expand_c...</code>
<code>block5b_expand_act... (Activation)</code>	<code>(None, 14, 14, 672)</code>	<code>0</code>	<code>block5b_expand_b...</code>
<code>block5b_dwconv (DepthwiseConv2D)</code>	<code>(None, 14, 14, 672)</code>	<code>16,800</code>	<code>block5b_expand_a...</code>
<code>block5b_bn (BatchNormalizatio...)</code>	<code>(None, 14, 14, 672)</code>	<code>2,688</code>	<code>block5b_dwconv[0...]</code>
<code>block5b_activation (Activation)</code>	<code>(None, 14, 14, 672)</code>	<code>0</code>	<code>block5b_bn[0][0]</code>
<code>block5b_se_squeeze (GlobalAveragePool...)</code>	<code>(None, 672)</code>	<code>0</code>	<code>block5b_activati...</code>
<code>block5b_se_reshape (Reshape)</code>	<code>(None, 1, 1, 672)</code>	<code>0</code>	<code>block5b_se_squee...</code>
<code>block5b_se_reduce</code>	<code>(None, 1, 1, 28)</code>	<code>18,844</code>	<code>block5b_se_resha...</code>

(Conv2D)			
block5b_se_expand (Conv2D)	(None, 1, 1, 672)	19,488	block5b_se_reduc...
block5b_se_excite (Multiply)	(None, 14, 14, 672)	0	block5b_activati... block5b_se_expan...
block5b_project_co... (Conv2D)	(None, 14, 14, 112)	75,264	block5b_se_excit...
block5b_project_bn (BatchNormalizatio...)	(None, 14, 14, 112)	448	block5b_project_...
block5b_drop (Dropout)	(None, 14, 14, 112)	0	block5b_project_...
block5b_add (Add)	(None, 14, 14, 112)	0	block5b_drop[0][...] block5a_project_...
block5c_expand_conv (Conv2D)	(None, 14, 14, 672)	75,264	block5b_add[0][0]
block5c_expand_bn (BatchNormalizatio...)	(None, 14, 14, 672)	2,688	block5c_expand_c...
block5c_expand_act... (Activation)	(None, 14, 14, 672)	0	block5c_expand_b...
block5c_dwconv (DepthwiseConv2D)	(None, 14, 14, 672)	16,800	block5c_expand_a...
block5c_bn (BatchNormalizatio...)	(None, 14, 14, 672)	2,688	block5c_dwconv[0...]
block5c_activation (Activation)	(None, 14, 14, 672)	0	block5c_bn[0][0]
block5c_se_squeeze (GlobalAveragePool...)	(None, 672)	0	block5c_activati...
block5c_se_reshape (Reshape)	(None, 1, 1, 672)	0	block5c_se_squee...
block5c_se_reduce (Conv2D)	(None, 1, 1, 28)	18,844	block5c_se_resha...
block5c_se_expand (Conv2D)	(None, 1, 1, 672)	19,488	block5c_se_reduc...
block5c_se_excite (Multiply)	(None, 14, 14, 672)	0	block5c_activati... block5c_se_expan...
block5c_project_co... (Conv2D)	(None, 14, 14, 112)	75,264	block5c_se_excit...
block5c_project_bn (BatchNormalizatio...)	(None, 14, 14, 112)	448	block5c_project_...
block5c_drop (Dropout)	(None, 14, 14, 112)	0	block5c_project_...
block5c_add (Add)	(None, 14, 14, 112)	0	block5c_drop[0][...] block5b_add[0][0]
block6a_expand_conv (Conv2D)	(None, 14, 14, 672)	75,264	block5c_add[0][0]
block6a_expand_bn (BatchNormalizatio...)	(None, 14, 14, 672)	2,688	block6a_expand_c...
block6a_expand_act... (Activation)	(None, 14, 14, 672)	0	block6a_expand_b...
block6a_dwconv_pad (ZeroPadding2D)	(None, 17, 17, 672)	0	block6a_expand_a...
block6a_dwconv (DepthwiseConv2D)	(None, 7, 7, 672)	16,800	block6a_dwconv_p...
block6a_bn (BatchNormalizatio...)	(None, 7, 7, 672)	2,688	block6a_dwconv[0...]
block6a_activation (Activation)	(None, 7, 7, 672)	0	block6a_bn[0][0]
block6a_se_squeeze	(None, 672)	0	block6a_activati...

(GlobalAveragePool... 	 	 	
block6a_se_reshape (Reshape)	(None, 1, 1, 672)	0	block6a_se_squee...
block6a_se_reduce (Conv2D)	(None, 1, 1, 28)	18,844	block6a_se_resha...
block6a_se_expand (Conv2D)	(None, 1, 1, 672)	19,488	block6a_se_reduc...
block6a_se_excite (Multiply)	(None, 7, 7, 672)	0	block6a_activati... block6a_se_expan...
block6a_project_co... (Conv2D)	(None, 7, 7, 192)	129,024	block6a_se_excit...
block6a_project_bn (BatchNormalizatio... 	 	 	
block6b_expand_conv (Conv2D)	(None, 7, 7, 1152)	221,184	block6a_project_...
block6b_expand_bn (BatchNormalizatio... 	 	 	
block6b_expand_act... (Activation)	(None, 7, 7, 1152)	0	block6b_expand_b...
block6b_dwconv (DepthwiseConv2D)	(None, 7, 7, 1152)	28,800	block6b_expand_a...
block6b_bn (BatchNormalizatio... 	 	 	
block6b_activation (Activation)	(None, 7, 7, 1152)	0	block6b_bn[0][0]
block6b_se_squeeze (GlobalAveragePool... 	 	 	
block6b_se_reshape (Reshape)	(None, 1, 1, 1152)	0	block6b_se_squee...
block6b_se_reduce (Conv2D)	(None, 1, 1, 48)	55,344	block6b_se_resha...
block6b_se_expand (Conv2D)	(None, 1, 1, 1152)	56,448	block6b_se_reduc...
block6b_se_excite (Multiply)	(None, 7, 7, 1152)	0	block6b_activati... block6b_se_expan...
block6b_project_co... (Conv2D)	(None, 7, 7, 192)	221,184	block6b_se_excit...
block6b_project_bn (BatchNormalizatio... 	 	 	
block6b_drop (Dropout)	(None, 7, 7, 192)	0	block6b_project_...
block6b_add (Add)	(None, 7, 7, 192)	0	block6b_drop[0][...] block6a_project_...
block6c_expand_conv (Conv2D)	(None, 7, 7, 1152)	221,184	block6b_add[0][0]
block6c_expand_bn (BatchNormalizatio... 	 	 	
block6c_expand_act... (Activation)	(None, 7, 7, 1152)	0	block6c_expand_b...
block6c_dwconv (DepthwiseConv2D)	(None, 7, 7, 1152)	28,800	block6c_expand_a...
block6c_bn (BatchNormalizatio... 	 	 	
block6c_activation (Activation)	(None, 7, 7, 1152)	0	block6c_bn[0][0]
block6c_se_squeeze (GlobalAveragePool... 	 	 	
...

block6c_se_reshape (Reshape)	(None, 1, 1, 1152)	0	block6c_se_squee...
block6c_se_reduce (Conv2D)	(None, 1, 1, 48)	55,344	block6c_se_resha...
block6c_se_expand (Conv2D)	(None, 1, 1, 1152)	56,448	block6c_se_reduc...
block6c_se_excite (Multiply)	(None, 7, 7, 1152)	0	block6c_activati... block6c_se_expan...
block6c_project_co... (Conv2D)	(None, 7, 7, 192)	221,184	block6c_se_excit...
block6c_project_bn (BatchNormalizatio...)	(None, 7, 7, 192)	768	block6c_project_...
block6c_drop (Dropout)	(None, 7, 7, 192)	0	block6c_project_...
block6c_add (Add)	(None, 7, 7, 192)	0	block6c_drop[0][...] block6b_add[0][0]
block6d_expand_conv (Conv2D)	(None, 7, 7, 1152)	221,184	block6c_add[0][0]
block6d_expand_bn (BatchNormalizatio...)	(None, 7, 7, 1152)	4,608	block6d_expand_c...
block6d_expand_act... (Activation)	(None, 7, 7, 1152)	0	block6d_expand_b...
block6d_dwconv (DepthwiseConv2D)	(None, 7, 7, 1152)	28,800	block6d_expand_a...
block6d_bn (BatchNormalizatio...)	(None, 7, 7, 1152)	4,608	block6d_dwconv[0...]
block6d_activation (Activation)	(None, 7, 7, 1152)	0	block6d_bn[0][0]
block6d_se_squeeze (GlobalAveragePool...)	(None, 1152)	0	block6d_activati...
block6d_se_reshape (Reshape)	(None, 1, 1, 1152)	0	block6d_se_squee...
block6d_se_reduce (Conv2D)	(None, 1, 1, 48)	55,344	block6d_se_resha...
block6d_se_expand (Conv2D)	(None, 1, 1, 1152)	56,448	block6d_se_reduc...
block6d_se_excite (Multiply)	(None, 7, 7, 1152)	0	block6d_activati... block6d_se_expan...
block6d_project_co... (Conv2D)	(None, 7, 7, 192)	221,184	block6d_se_excit...
block6d_project_bn (BatchNormalizatio...)	(None, 7, 7, 192)	768	block6d_project_...
block6d_drop (Dropout)	(None, 7, 7, 192)	0	block6d_project_...
block6d_add (Add)	(None, 7, 7, 192)	0	block6d_drop[0][...] block6c_add[0][0]
block7a_expand_conv (Conv2D)	(None, 7, 7, 1152)	221,184	block6d_add[0][0]
block7a_expand_bn (BatchNormalizatio...)	(None, 7, 7, 1152)	4,608	block7a_expand_c...
block7a_expand_act... (Activation)	(None, 7, 7, 1152)	0	block7a_expand_b...
block7a_dwconv (DepthwiseConv2D)	(None, 7, 7, 1152)	10,368	block7a_expand_a...
block7a_bn (BatchNormalizatio...)	(None, 7, 7, 1152)	4,608	block7a_dwconv[0...]
block7a_activation (Activation)	(None, 7, 7, 1152)	0	block7a_bn[0][0]

block7a_se_squeeze (GlobalAveragePool...)	(None, 1152)	0	block7a_activati...
block7a_se_reshape (Reshape)	(None, 1, 1, 1152)	0	block7a_se_squee...
block7a_se_reduce (Conv2D)	(None, 1, 1, 48)	55,344	block7a_se_resha...
block7a_se_expand (Conv2D)	(None, 1, 1, 1152)	56,448	block7a_se_reduc...
block7a_se_excite (Multiply)	(None, 7, 7, 1152)	0	block7a_activati... block7a_se_expan...
block7a_project_co... (Conv2D)	(None, 7, 7, 320)	368,640	block7a_se_excit...
block7a_project_bn (BatchNormalizatio...)	(None, 7, 7, 320)	1,280	block7a_project_...
top_conv (Conv2D)	(None, 7, 7, 1280)	409,600	block7a_project_...
top_bn (BatchNormalizatio...)	(None, 7, 7, 1280)	5,120	top_conv[0][0]
top_activation (Activation)	(None, 7, 7, 1280)	0	top_bn[0][0]
global_average_poo... (GlobalAveragePool...)	(None, 1280)	0	top_activation[0...
dropout_1 (Dropout)	(None, 1280)	0	global_average_p...
dense_1 (Dense)	(None, 14)	17,934	dropout_1[0][0]

Total params: 4,067,505 (15.52 MB)

Trainable params: 17,934 (70.05 KB)

Non-trainable params: 4,049,571 (15.45 MB)

--- Starting Model Training ---

Epoch 1/20

95/95 ━━━━━━━━━━ 554s 6s/step - accuracy: 0.3877 - loss: 1.9558 - val_accuracy: 0.7529 - val_loss: 0.9187

Epoch 2/20

95/95 ━━━━━━━━━━ 426s 4s/step - accuracy: 0.7222 - loss: 0.9728 - val_accuracy: 0.7951 - val_loss: 0.6819

Epoch 3/20

95/95 ━━━━━━━━━━ 442s 4s/step - accuracy: 0.7741 - loss: 0.7498 - val_accuracy: 0.8220 - val_loss: 0.5956

Epoch 4/20

95/95 ━━━━━━━━━━ 399s 4s/step - accuracy: 0.8195 - loss: 0.6441 - val_accuracy: 0.8337 - val_loss: 0.5505

Epoch 5/20

95/95 ━━━━━━━━━━ 446s 4s/step - accuracy: 0.8302 - loss: 0.5925 - val_accuracy: 0.8419 - val_loss: 0.5158

```
import matplotlib.pyplot as plt
import numpy as np
import seaborn as sns
from sklearn.metrics import classification_report, confusion_matrix

# --- Part 6: Model Evaluation and Analysis ---

# 6.1: Plot Training History
# The 'history' object holds the training and validation metrics for each epoch.
print("--- Generating Training History Plots ---")

acc = history.history['accuracy']
val_acc = history.history['val_accuracy']
loss = history.history['loss']
val_loss = history.history['val_loss']

# Get the number of epochs the model actually ran for
epochs_range = range(len(acc))

plt.figure(figsize=(14, 5))
plt.subplot(1, 2, 1)
plt.plot(epochs_range, acc, label='Training Accuracy')
plt.plot(epochs_range, val_acc, label='Validation Accuracy')
plt.legend(loc='lower right')
plt.title('Training and Validation Accuracy')
plt.xlabel('Epoch')
plt.ylabel('Accuracy')

plt.subplot(1, 2, 2)
plt.plot(epochs_range, loss, label='Training Loss')
plt.plot(epochs_range, val_loss, label='Validation Loss')
plt.legend(loc='upper right')
plt.title('Training and Validation Loss')
plt.xlabel('Epoch')
plt.ylabel('Loss')
plt.show()

# 6.2: Evaluate on the Test Set
# Load the best model that was saved by the ModelCheckpoint callback
print("\n--- Loading the best saved model for final evaluation ---")
best_model = tf.keras.models.load_model("best_model.keras")

print("\n--- Evaluating model on the test dataset ---")
loss, accuracy = best_model.evaluate(test_ds)
print(f"Test Accuracy: {accuracy * 100:.2f}%")

# 6.3: Generate Classification Report and Confusion Matrix
print("\n--- Generating Classification Report and Confusion Matrix ---")

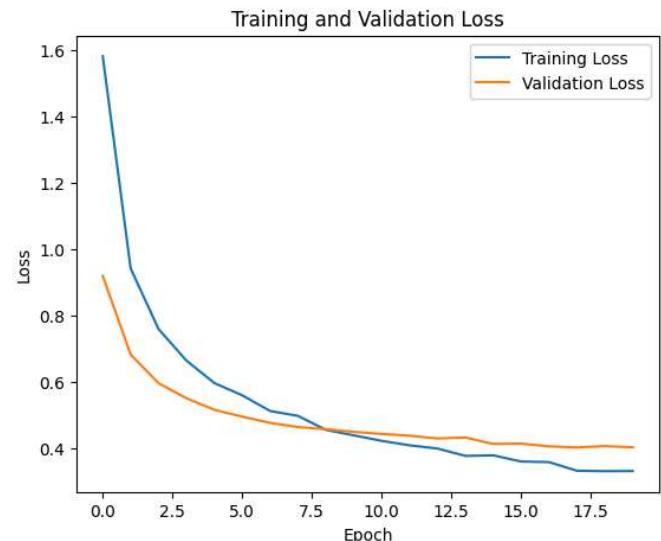
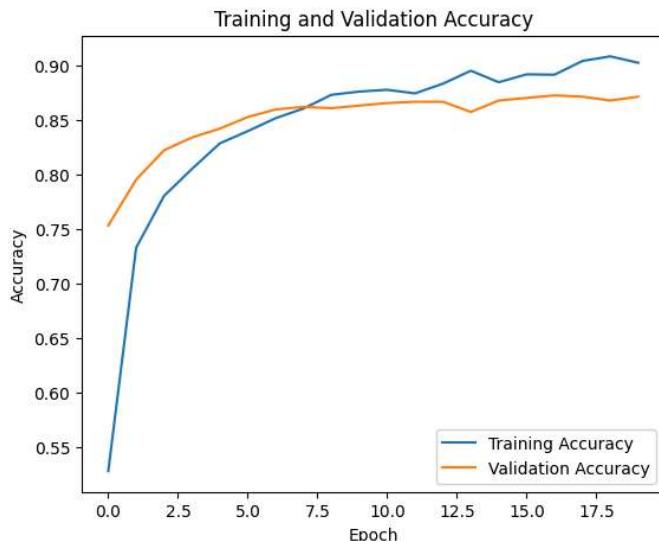
# Get all true labels and predictions from the test set
y_true = []
y_pred_probs = []
for images, labels in test_ds:
    y_true.extend(labels.numpy())
    y_pred_probs.extend(best_model.predict(images, verbose=0))

# Convert prediction probabilities to class indices
y_pred = np.argmax(y_pred_probs, axis=1)

# Print Classification Report
print("\nClassification Report:")
print(classification_report(y_true, y_pred, target_names=class_names))

# Plot Confusion Matrix
cm = confusion_matrix(y_true, y_pred)
plt.figure(figsize=(12, 10))
sns.heatmap(cm, annot=True, fmt='d', cmap='Blues',
            xticklabels=class_names, yticklabels=class_names)
plt.xlabel('Predicted Label', fontsize=12)
plt.ylabel('True Label', fontsize=12)
plt.title('Confusion Matrix', fontsize=14)
plt.xticks(rotation=45, ha='right')
plt.yticks(rotation=0)
plt.show()
```

--- Generating Training History Plots ---



--- Loading the best saved model for final evaluation ---

--- Evaluating model on the test dataset ---

15/15 ————— 43s 3s/step - accuracy: 0.9110 - loss: 0.3542
Test Accuracy: 88.64%

--- Generating Classification Report and Confusion Matrix ---

Classification Report:

	precision	recall	f1-score	support
Adams_Peak	0.88	0.91	0.89	46
Bambarakanda_Falls	1.00	1.00	1.00	15
Gal_Viharaya	0.89	1.00	0.94	25
Galle_Fort	0.91	0.97	0.94	71
Independence_Memorial_Hall	1.00	0.75	0.86	16
Jami_Ul-Alfar_Mosque	0.92	0.92	0.92	25
Jaya_Sri_Maha_Bodhi	0.85	0.79	0.81	14
Kelaniya_Raja_Maha_Vihara	0.75	0.69	0.72	26
Mihintale	0.95	0.69	0.80	29
Nallur_Kandaswamy_Temple	0.91	0.67	0.77	15
Nine_Arches_Bridge	1.00	1.00	1.00	22
Ruwanwelisaya_Stupa	0.70	0.97	0.81	33
Sigiriya	0.92	0.95	0.94	77
Temple_of_the_Tooth	0.90	0.74	0.81	35
accuracy			0.89	449
macro avg	0.90	0.86	0.87	449
weighted avg	0.89	0.89	0.88	449

Confusion Matrix

True Label	Predicted Label													
	Adams_Peak	Bambarakanda_Falls	Gal_Viharaya	Galle_Fort	Independence_Memorial_Hall	Jami_Ul-Alfar_Mosque	Jaya_Sri_Maha_Bodhi	Kelaniya_Raja_Maha_Vihara	Mihintale	Nallur_Kandaswamy_Temple	Nine_Arches_Bridge	Ruwanwelisaya_Stupa	Sigiriya	Temple_of_the_Tooth
Adams_Peak	42	0	0	1	0	0	0	0	0	0	0	0	3	0
Bambarakanda_Falls	0	15	0	0	0	0	0	0	0	0	0	0	0	0
Gal_Viharaya	0	0	25	0	0	0	0	0	0	0	0	0	0	0
Galle_Fort	1	0	0	69	0	0	0	1	0	0	0	0	0	0
Independence_Memorial_Hall	0	0	0	3	12	0	0	0	0	0	0	0	1	0
Jami_Ul-Alfar_Mosque	0	0	0	1	0	23	0	0	0	0	0	0	0	1
Jaya_Sri_Maha_Bodhi	0	0	0	0	0	0	11	1	0	0	0	2	0	0
Kelaniya_Raja_Maha_Vihara	0	0	2	1	0	0	0	18	0	0	0	4	0	1

LandMarkClassification.ipynb - Colab

	Mihintale	2	0	0	0	0	0	0	1	20	0	0	3	3	0
Nallur_Kandaswamy_Temple	-	0	0	0	1	0	2	0	0	0	10	0	1	0	1
Nine_Arches_Bridge	-	0	0	0	0	0	0	0	0	0	22	0	0	0	0
Ruwanwelisaya_Stupa	-	1	0	0	0	0	0	0	0	0	0	0	32	0	0
Sigiriya	-	2	0	0	0	0	0	2	0	0	0	0	0	73	0
Temple_of_the_Tooth	-	0	0	1	0	0	0	0	3	1	1	0	3	0	26
Adams_Peak															
Bambarakanda_Falls															
Gal_Viharaya															
Galle_Fort															
Independence_Memorial_Hall															
Jami_Ul-Alfar_Mosque															
Jaya_Sri_Maha_Bodhi															
Kelaniya_Raja_Maha_Vihara															
Mihintale															
Nallur_Kandaswamy_Temple															
Nine_Arches_Bridge															
Ruwanwelisaya_Stupa															
Sigiriya															
Temple_of_the_Tooth															

Predicted Label

Start coding or generate with AI.

```
# --- Part 7: Save Artifacts and Prepare for Deployment ---\n\n# 7.1: Save the Final Model in Keras Format\n# The 'best_model' variable already holds the best version of your model\n# that was loaded in the previous evaluation step.\n\n# Define the save path in your Google Drive\nsave_path = "/content/drive/MyDrive/Travelgine_Landmarks/sri_lanka_landmark_classifier.keras"\n\n# Save the model\nbest_model.save(save_path)\nprint(f"Model successfully saved to: {save_path}")\n\n# 7.2: (Optional but Recommended) Convert and Save to TensorFlow Lite Format\n# This format is highly optimized for mobile and web applications.\nprint("\n--- Converting model to TensorFlow Lite format ---")\n\n# Convert the Keras model to the TFLite format\nconverter = tf.lite.TFLiteConverter.from_keras_model(best_model)\ntflite_model = converter.convert()\n\n# Define the save path for the TFLite model in your Google Drive\ntflite_save_path = "/content/drive/MyDrive/Travelgine_Landmarks/sri_lanka_landmark_classifier.tflite"\n\n# Save the TFLite model to a file\nwith open(tflite_save_path, 'wb') as f:\n    f.write(tflite_model)\n\nprint(f"TFLite model successfully saved to: {tflite_save_path}")\n\n134087330219984: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330218256: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330218640: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330219792: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330218832: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330220560: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330219600: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330221328: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330221520: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330220944: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330220176: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330221904: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330222480: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330221136: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330220752: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330222288: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330222864: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330223440: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330222672: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330223824: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330221712: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330223248: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330223632: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330222096: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330224400: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330223056: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330225168: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330220368: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330224592: TensorSpec(shape=(), dtype=tf.resource, name=None)\n134087330224976: TensorSpec(shape=(), dtype=tf.resource, name=None)
```